MAJOR AMENDMENT
2011 REGION M WATER PLAN

DELTA WATERSHED PROJECT, HIDALGO COUNTY DRIANAGE DISTRICT #1

DECEMBER, 2015

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12. 2011 RWP WMS Prioritization

The following amendment is requested to the 2011 Rio Grande Regional Water Plan in order to include the Delta Watershed Project as a Water Management Strategy, sponsored by the Hidalgo County Drainage District No. 1. Insertions are shown in italics, deletions in strikethrough.

A. Executive Summary Amendments (English)

A.1 Page ES-9, Paragraph 1

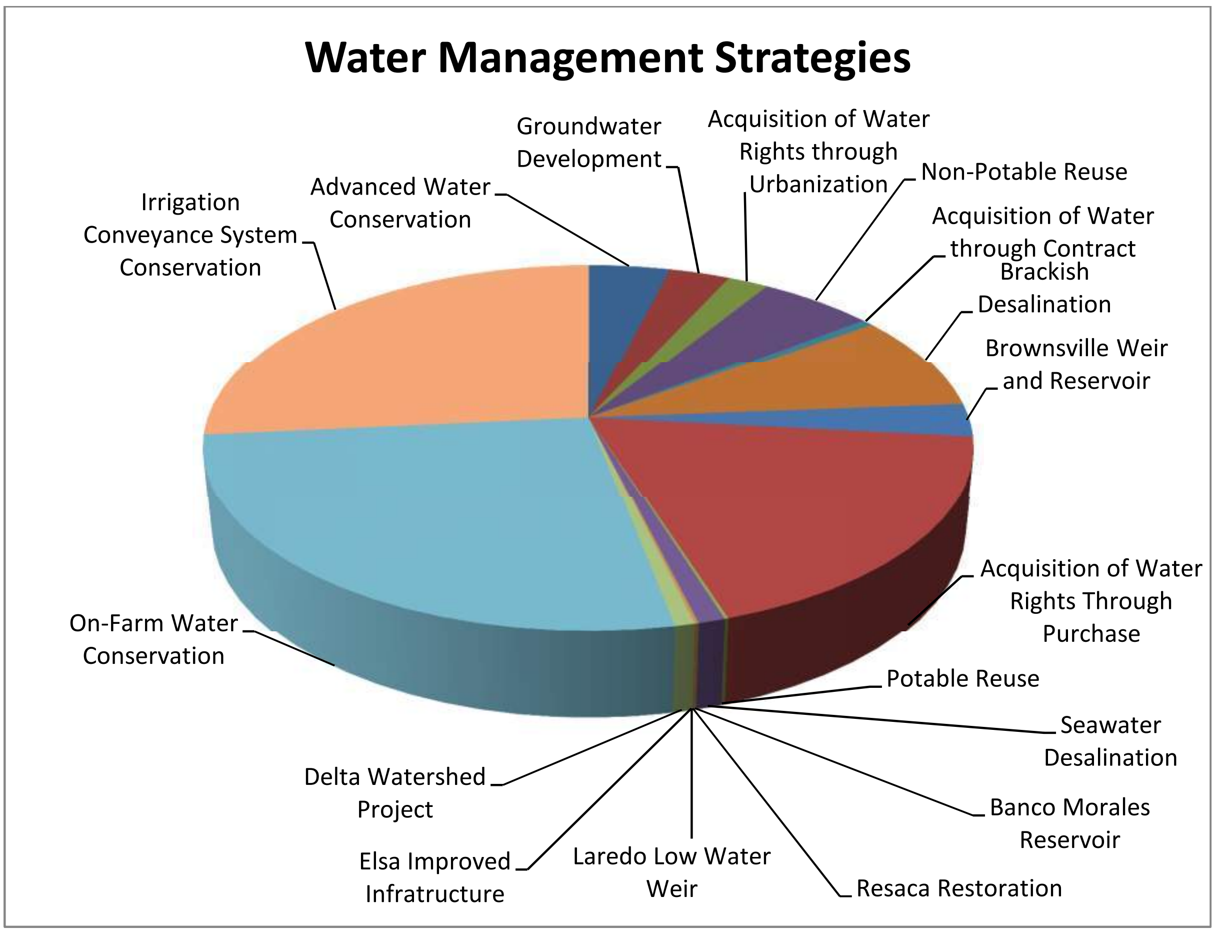
Opportunities for developing additional water supplies for municipal use are limited in the Rio Grande Region because of hydrologic characteristics, economics, and legal constraints associated with the 1944 Mexico/U.S. Water Treaty. Few opportunities exist to increase the water supply yield of the Rio Grande. However, a number of strategies for augmenting municipal water supplies have been examined as part of this planning effort. These include advanced municipal water conservation, the Brownsville weir and reservoir, reuse of reclaimed water strategies for optimizing surface water supply from the Rio Grande, *capture of stormwater and irrigation tailwaters for beneficial use,* groundwater development, brackish and seawater desalination, and acquisition of additional Rio Grande supplies for domestic-municipal-industrial (DMI) uses.

A.2 Page ES-11, Exhibit 10

Strategy	**Water Supplies Per Decade**						**Total Capital Cost**
	2010	**2020**	**2030**	**2040**	**2050**	**2060**	
Advanced Water Conservation	2,917	6,339	11,986	16,512	24,867	32,793	$22,583,710
Groundwater Development	3,772	8,572	17,139	20,492	22,284	24,520	$27,474,302
Acquisition of Water Rights through Urbanization	299	3,433	6,467	9,496	12,868	16,406	$56,167,089
Non-Potable Reuse	2,417	9,444	12,378	20,137	29,810	46,382	$173,803,091
Acquisition of Water through Contract	312	738	1,665	2,352	3,198	4,671	$16,263,877
Brackish Desalination	38,364	44,627	48,309	54,472	66,696	71,700	$263,599,392
Brownsville Weir and Reservoir	20,643	20,643	20,643	20,643	20,643	23,643	$98,411,077
Acquisition of Water Rights Through Purchase	9,611	19,461	41,602	70,944	110,913	151,237	$631,081,709
Potable Reuse	1,120	1,120	1,120	1,120	1,120	1,120	$7,519,850
Seawater Desalination	125	125	143	6,049	6,421	7,902	$185,940,937
Banco Morales Reservoir	238	238	238	238	238	238	$25,790,900

Strategy	Water Supplies Per Decade						Total Capital Cost
	2010	**2020**	**2030**	**2040**	**2050**	**2060**	
Resaca Restoration	877	877	877	877	877	877	$52,000,000
Laredo Low Water Weir	0	0	0	0	0	0	$294,400,000
Elsa Improved Infrastructure	105	105	105	105	105	105	$8,325,386
Delta Watershed Project	*6,017*	*6,017*	*6,017*	*6,017*	*6,017*	*6,017*	*$53,788,355*
On-Farm Water Conservation	36,528	73,085	109,614	146,144	182,698	219,228	$194,417,692
Irrigation Conveyance System Conservation	91,160	182,313	191,435	200,551	209,667	218,783	$130,757,978
TOTAL	214,505	377,137	469,738	576,149	698,422	825,622	$2,242,325,346

A.3 Page ES-12, Exhibit 11



A.4 Page ES-13, Exhibit 12

Exhibit 12: Water Quality Impacts by Water Management Strategy

Water Management Strategy	Positive Impacts	Negative Impacts
Dams, Weirs, and Storage • Brownsville Weir • Laredo Low Water Weir • Banco Morales Reservoir • Resaca Restoration • *Delta Watershed Project*	• Decreased sediment and/or agricultural chemical runoff due to storm events or excessive irrigation • Limits rapid influxes of freshwater to the Laguna Madre, which may benefit seagrass	• Increased urban runoff during storm event • Increased wastewater flows resulting in higher organic levels in receiving stream

A.5 Page ES-16, Paragraph 1

Approximately *325,500 AF/yr* in new municipal water supplies are proposed in the 2010 Region M water plan. All of this except approximately 2,900 AF/yr of advanced water conservation can affect either freshwater inflows to the Lower Laguna Madre or streamflows in the Rio Grande. Alterations in flows on the Rio Grande are beyond the scope of the present evaluation. For Nueces-Rio Grande coastal basin streams draining to the Lower Laguna Madre there are no major dams, diversions, or other water management strategies proposed that can cause changes in streamflows. However, many of the proposed water management strategies can influence freshwater inflow through alteration of wastewater discharges based upon supplies imported from the Rio Grande basin or groundwater. Many of region's growing municipalities lie in the Nueces-Rio Grande coastal basin and will have greatly altered wastewater discharge into the streams that drain to the Laguna Madre.

A.1 Page ES-17, Paragraph 2

Reservoir Sites

TWDB rules also provide that RWPGs "may recommend sites of unique value for construction of reservoirs by including descriptions of the sites, reasons for the unique designation and the expected beneficiaries of the water supply to be developed at the site."

Five reservoir sites have been considered by the Rio Grande RWPG: the proposed Brownsville Weir and Reservoir; the proposed Banco Morales Reservoir, *Delta Watershed Project's Edinburg Lake and new reservoir site,* and the proposed Laredo Low Water Weir. None are recommended for designation as a unique reservoir site at this time.

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B. Executive Summary Amendments (Spanish)

B.1 Page ES-9, Paragraph 1

Oportunidades para el desarrollo de los suministros de agua adicionales para uso municipal están limitadas en la región del Río Grande, debido a las características hidrológicas, economícas y restricciones legales asociadas con el Tratado de agua de México/U.S. de 1944. Existen pocas oportunidades para aumentar el rendimiento de abastecimiento de agua del río grande. Sin embargo, una serie de estrategias para aumentar el abastecimiento municipal de agua ha sido examinada como parte de este esfuerzo de planificación. Estos incluyen la conservación de agua municipal avanzada, la presa de Brownsville, *captura de aguas pluviales y de riego vertedor para uso beneficioso,* reutilización de agua reciclada estrategias para optimizar el abastecimiento de agua superficial desde el Rio Grande, desarrollo de aguas subterráneas, salobre y desalinización de agua salobre y agua del mar y adquisición adicional de abastecimientos del Rio Grande para usos domésticos-municipal-industrial (DMI).

B.2 Page ES-11, Exhibit 10

Strategy	Water Supplies Per Decade						Total Capital Cost
	2010	2020	2030	2040	2050	2060	
Advanced Water Conservation	2,917	6,339	11,986	16,512	24,867	32,793	$22,583,710
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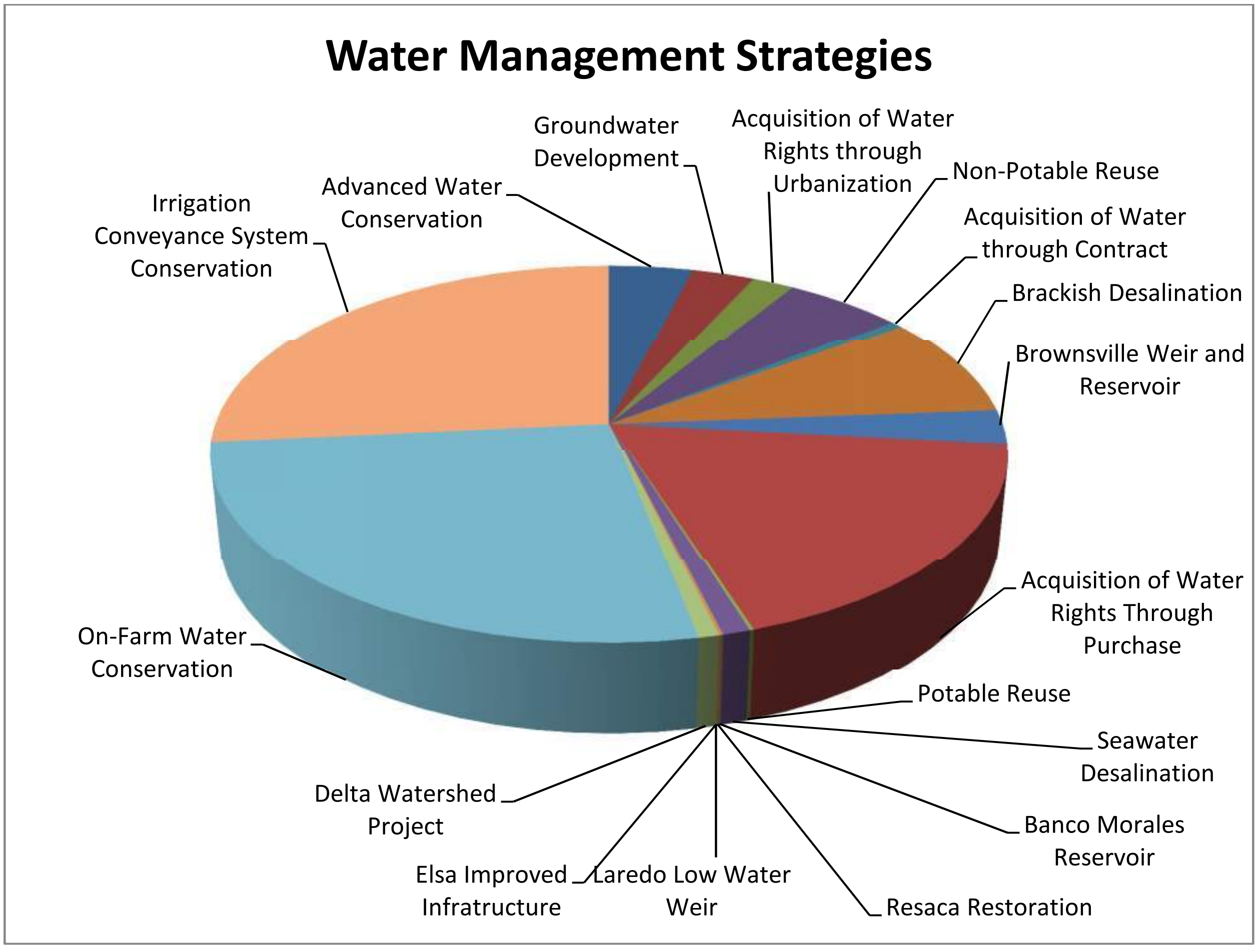
Banco Morales Reservoir	238	238	238	238	238	238	$25,790,900
Resaca Restoration	877	877	877	877	877	877	$52,000,000
Laredo Low Water Weir	0	0	0	0	0	0	$294,400,000

Strategy	Water Supplies Per Decade						Total Capital Cost
	2010	2020	2030	2040	2050	2060	
Elsa Improved Infrastructure	105	105	105	105	105	105	$8,325,386
Delta Watershed Project	*6,017*	*6,017*	*6,017*	*6,017*	*6,017*	*6,017*	*$53,788,355*
On-Farm Water Conservation	36,528	73,085	109,614	146,144	182,698	219,228	$194,417,692
Irrigation Conveyance System Conservation	91,160	182,313	191,435	200,551	209,667	218,783	$130,757,978
TOTAL	214,505	377,137	469,738	576,149	698,422	825,622	$2,242,325,346

B.3 Page ES-12, Exhibit 11



B.4 Page ES-13, Exhibit 12

Exhibit 12: Water Quality Impacts by Water Management Strategy

Estrategia de administración de agua	Impactos positivos	Impactos negativos
Presas, presas y almacenamiento de información • Brownsville Weir • Laredo Bajo agua Weir • Embalse de morales de Banco • Restauración de resaca • Proyecto de Cuencas Delta	• Disminución de sedimentos o escorrentía química agrícola debido a la tormenta de eventos o el riego excesivo • Limita flujos rápidos de agua dulce a la Laguna Madre , que podrán ser objeto de pastos marinos	• Mayor escurrimiento urbano durante el evento de tormenta • Flujos de aumento de las aguas residuales resultantes en los niveles más altos de orgánicos en la recepción de secuencia

B.5 Page ES-16, Paragraph 7

Aproximadamente *325,500 AF*/año en nuevos suministros de agua municipales son propuestas en el plan de agua de la región M de 2010. Todo esto excepto aproximadamente 2.900 AF/año de conservación del agua avanzados pueden afectar tanto a las corrientes de agua dulce de la región baja de la Laguna Madre o las corrientes de agua en el río grande. Alteraciones en las corrientes en el río grande están fuera del alcance de la presente evaluación. Para la cuenca costera de Nueces-Rio Grande desagua en la región baja de la Laguna Madre no ay presas, sistemas de desvíos, u otras propuestas de estrategia de manejo de agua que pueden causar cambios en la corriente del agua. Sin embargo, muchas de las propuestas de las estrategias de agua pueden influir en la afluencia de agua dulce a través de la alteración de los vertidos de aguas residuales basadas en suministros importados procedentes de la cuenca del río grande o las aguas subterráneas. Mucho del crecimiento de los municipios de la región se encuentran en la cuenca costera de Nueces-Rio Grande y enormemente alterara el vertido de aguas residuales en los arroyos que desembocan en la Laguna Madre.

B.6 Page ES-18, Paragraph 2

Embalse de sitios

Las reglas de TWDB proporcionan también que la RWPGs "podrá recomendar sitios de valor único para la construcción de embalses, incluyendo las descripciones de los sitios, razones para la designación única y los beneficiarios previstos del abastecimiento de agua para ser desarrollado en el sitio."

Cinco sitios de embalse han sido consideradas por la RWPG de Rio Grande: la propuesta de Brownsville Weir y embalse; la propuesta de el embalse de morales de Banco, la prepuesta proyecto de cuencas delta, y la propuesta Laredo bajo agua Weir. Ninguno se recomienda para su designación como un sitio único de lagos para almacenar agua en este momento.

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C. Chapter 1 Amendments

C.1 Section 1.7, pg. 1-49 and 1-50

Table 1.6: Water User Groups[1] and Wholesale Water Providers

Water User Group
Irrigation
Water User Group Subdivision
Irrigation District
Cameron County Irrigation
Adams Garden Irrigation District No. 19
Bayview Irrigation District No. 11
Brownsville Irrigation District
Cameron County Irrigation District No. 3
Cameron County Irrigation District No. 4
Cameron County Irrigation District No. 16
Cameron County Irrigation District No. 2
Cameron County Irrigation District No. 6
Harlingen Irrigation District No. 1
Hidalgo and Cameron Counties Irrigation District No. 9
Valley Acres Irrigation District
Hidalgo County Irrigation
Hidalgo and Cameron Counties Irrigation District No. 9
Valley Acres Irrigation District
Donna Irrigation District No. 2
Engleman Irrigation District
Hidalgo County Improvement District No. 19
Hidalgo County Irrigation District No. 1
Hidalgo County Irrigation District No. 13
Hidalgo County Irrigation District No. 16
Hidalgo County Irrigation District No. 2
Hidalgo County Irrigation District No. 5
Hidalgo County Irrigation District No. 6
Hidalgo County Water Control and Improvement District No. 18
Hidalgo County Water Irrigation District No. 3
Santa Cruz Irrigation District
United Irrigation District
Hidalgo County Drainage District No. 1
Willacy County Irrigation
Delta Lake Irrigation District

[1] Individual irrigation districts are not classified as water user groups but rather are addressed as subset of the associated county irrigation water user group (per Amendment no. 1 to Final Study No. 2 as approved by TWDB on April 5, 2010).

Wholesale Water Providers		
WWPs	County Name	River Basin
Brownsville Irrigation and Drainage District	Cameron County	Nueces-Rio Grande, Rio Grande
Cameron County WCID #2	Cameron County	Nueces-Rio Grande
Delta Lake Municipal Authority	Willacy, Hidalgo County	Nueces-Rio Grande
Donna Irrigation District Hidalgo County #1	Hidalgo County	Nueces-Rio Grande
City of Eagle Pass	Maverick County	Rio Grande
Harlingen Irrigation District	Cameron County	Nueces-Rio Grande
Harlingen Waterworks System	Cameron County	Nueces-Rio Grande, Rio Grande
Hidalgo County Drainage District #1	*Hidalgo County*	*Nueces-Rio Grande*
Hidalgo County Irrigation District #6	Hidalgo County	Nueces-Rio Grande, Rio Grande
Hidalgo County WCID #1	Hidalgo County	Nueces-Rio Grande
Hidalgo County WCID #16	Hidalgo County	Nueces-Rio Grande, Rio Grande
Hidalgo County WCID #2	Hidalgo County	Nueces-Rio Grande, Rio Grande
Hidalgo County WCID #3	Hidalgo County	Nueces-Rio Grande, Rio Grande
Hidalgo-Cameron County WCID #9	Hidalgo County	Nueces-Rio Grande
La Feria WCID #3	Cameron, Hidalgo County	Nueces-Rio Grande
La Joya WSC	Hidalgo County	Nueces-Rio Grande, Rio Grande
Laguna Madre WD	Cameron County	Nueces-Rio Grande
City of McAllen	Hidalgo County	Nueces-Rio Grande, Rio Grande
Military Highway WSC	Cameron & Hidalgo County	Nueces-Rio Grande, Rio Grande
North Alamo Water Supply Corporation	Willacy, & Hidalgo County	Nueces-Rio Grande, Rio Grande
Sharyland WSC	Hidalgo County	Nueces-Rio Grande
Southmost Regional Water Authority	Cameron County	Nueces-Rio Grande, Rio Grande
United ID	Hidalgo County	Nueces-Rio Grande, Rio Grande
Valley MUD #2	Cameron County	Nueces-Rio Grande
Webb County Water Utility	Webb County	Rio Grande

D. Chapter 2 Amendments

D.1 Section 2.3.7, pg. 2-24, Table 2.21

Insert into table between Harlingen Water Works System and Hidalgo County Irrigation District No. 6.

Table 2.21: Projected Wholesale Water Provider Demand (in acre-feet per year)

Water Demand Projections for Wholesale Water Providers						
WHOLESALE WATER PROVIDERS	DEMAND					
	2010	2020	2030	2040	2050	2060
BROWNSVILLE IRRIGATION & DRAINAGE DISTRICT	6,105	6,071	6,071	6,071	6,071	6,071
CAMERON COUNTY WCID #2	15,198	15,198	15,198	15,198	15,198	15,198
DELTA LAKE MUNICIPAL AUTHORITY	8,200	8,200	8,200	8,200	8,200	8,200
DONNA IRRIGATION DISTRICT HIDALGO COUNTY #1	6,880	6,880	6,880	6,880	6,880	6,880
EAGLE PASS CITY OF	7,707	7,707	7,707	7,707	7,707	7,707
HARLINGEN IRRIGATION DISTRICT	5,104	5,117	5,127	5,135	5,142	5,148
HARLINGEN WATER WORKS SYSTEM	19,238	19,238	19,238	19,238	19,238	19,238
HIDALGO COUNTY DRAINAGE DISTRICT #1	6,017	6,017	6,017	6,017	6,017	6,017
HIDALGO COUNTY IRRIGATION DISTRICT #6	8,291	8,291	8,291	8,291	8,291	8,291
HIDALGO COUNTY WCID #1	1,437	1,437	1,437	1,437	1,437	1,437
HIDALGO COUNTY WCID #16	1,047	1,047	1,047	1,047	1,047	1,047
HIDALGO COUNTY WCID #2	24,667	24,667	24,667	24,667	24,667	24,667
HIDALGO COUNTY WCID #3	13,980	13,980	13,980	13,980	13,980	13,980
HIDALGO-CAMERON WCID #9	11,500	11,500	11,500	11,500	11,500	11,500
LA FERIA WCID #3	4,852	4,852	4,852	4,852	4,852	4,852
LA JOYA WSC	1,554	2,057	2,599	2,996	2,996	2,996
LAGUNA MADRE WD	7,480	7,480	7,480	7,480	7,480	7,480
MCALLEN CITY OF	33,548	33,548	33,548	33,548	33,548	33,548
NORTH ALAMO WSC	22,338	22,338	22,338	22,338	22,338	22,344
MILITARY HIGHWAY WSC	3,620	4,020	4,130	4,254	4,369	4,502
SHARYLAND WSC	12,140	12,139	12,139	12,140	12,139	12,140
SOUTHMOST REGIONAL WATER AUTHORITY	11,844	11,844	11,844	11,844	11,844	11,844
UNITED IRRIGATION DISTRICT	24,009	24,009	24,009	24,009	24,009	24,009
VALLEY MUD #2	1,382	1,382	1,382	1,382	1,382	1,382
WEBB COUNTY WATER UTILITY	2,311	2,311	2,311	2,311	2,311	2,312
REGION M TOTAL	260,449	261,330	261,992	262,522	262,643	262,790

D.2 Section 2.3.8, pg. 2-27.

Delete the section discussing the Project from the “Other Potential Water Demands” section.

~~Hidalgo County Drainage District No. 1~~

~~Another potential project is being conducted by Hidalgo County Irrigation District which is studying the possibility of developing municipal water within the drainage network of the county. The potential of this project could approximate 10% more water for the total needs of the county.~~

D.3 Attachment 2.1, pg. 2-34, Water Demand Projections for Wholesale Water Providers (Table)

Insert into table between Harlingen Water Works System and Hidalgo County Irrigation District No. 6.

WHOLESALE WATER PROVIDERS	COUNTY	RIVER BASIN	DEMAND					
Hidalgo County Drainage District #1			**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
North Alamo WSC	HIDALGO	NUECES-RIO GRANDE	2,000	2,000	2,000	2,000	2,000	2,000
La Villa	HIDALGO	NUECES-RIO GRANDE	400	400	400	400	400	400
IRRIGATION	HIDALGO	NUECES-RIO GRANDE	3,617	3,617	3,617	3,617	3,617	3,617
TOTAL			6,017	6,017	6,017	6,017	6,017	6,017

E. Chapter 4 Amendments

E.1 Section 4.2, pg. 4-6, Table 4.3

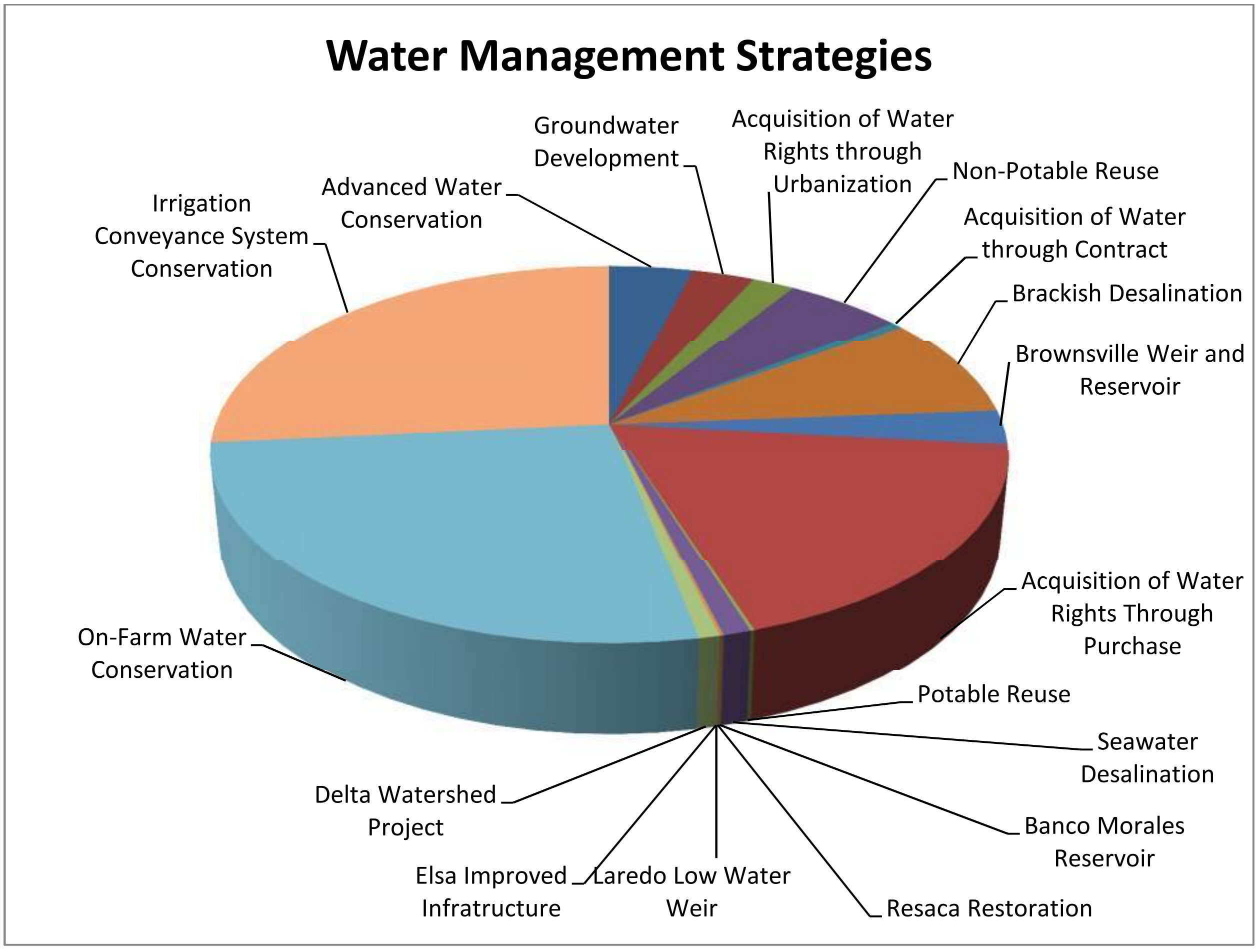
Table 4.3: Wholesale Water Providers Surplus/Deficit Analysis

	2010	2020	2030	2040	2050	2060
Delta Lake Municipal Authority	0	0	0	0	0	0
City of Eagle Pass	0	0	0	0	0	0
Harlingen Waterworks System	0	0	1	0	0	0
Laguna Madre WD	0	0	0	0	0	0
City of McAllen	0	0	0	0	0	0

	2010	2020	2030	2040	2050	2060
Sharyland WSC	0	0	0	0	0	0
Southmost Regional Water Authority	-6,888	-6,888	-6,888	-6,888	-6,888	-6,888
Valley MUD#2	0	0	0	1	0	1
North Alamo WSC	0	0	0	0	0	0
Brownsville Irrigation and Drainage District Needs	-34	-34	-34	-34	-34	-34
Hidalgo County Drainage District #1	*0*	*0*	*0*	*0*	*0*	*0*

E.2 Section 4.3, pg. 4-21. Figure 4.8

Figure 4.8: Water Management Strategies



E.3 Section 4.3, pg. 4-22, Table 4.18

Add in the HCDD1 project and adjust costs accordingly.

Replace with:

Table 4.18: Recommended Water Management Strategies Capital Cost and Water Supply

			Water Supplies Per Decade			
Strategy	Total Capital Cost	First Decade of Water Supply	First Decade Water Supply Volume (ac-ft/yr)	First Decade Estimated Annual Average Unit Cost ($/ac-ft/yr)	Year 2060 Water Supply Volume (ac-ft/yr)	Year 2060 Estimated Annual Average Unit Cost ($/ac-ft/yr)
Acquisition of Water through Contract	$16,263,877	2010	312	$430	4,671	$430
Acquisition of Water Rights Through Purchase	$631,081,709	2010	9,611	$294	151,237	$424
Acquisition of Water Rights through Urbanization	$56,167,089	2010	299	$430	16,406	$430
Advanced Water Conservation	$22,583,710	2010	2,917	$248	32,793	$599
Banco Morales Reservoir	$25,790,900	2020	238	$2,542	238	$2,542
Brackish Desalination	$267,290,631	2010	56,553	$465	92,212	$468
Brownsville Weir and Reservoir	$98,411,077	2020	20,643	$183	23,643	$183
Delta Watershed Project	*$53,788,355*	2010	*6,017*	$1,403	*6,017*	$685
Expansion of Existing Groundwater Wells	*$27,474,302*	2010	3,772	$215	24,520	$254
Irrigation Conveyance System Conservation	$131,899,803	2010	11,204	$3	139,217	$15
Laredo Low Water Weir	$294,400,000	2010	0	$0	0	$0
Non-Potable Reuse	$174,944,916	2010	2,417	$101	64,116	$130
On-Farm Water Conservation	$194,569,720	2010	1,622	$128	114,619	$29
Potable Reuse	$7,519,850	2010	1,120	$150	1,290	$180
Proposed Elevated Storage Tank and Elsa Infrastructure Improvements	$8,325,386	2010	105	$102	105	$102
Resaca Restoration	$52,000,000	2010	877	$2,542	877	$2,542

			Water Supplies Per Decade			
Strategy	Total Capital Cost	First Decade of Water Supply	First Decade Water Supply Volume (ac-ft/yr)	First Decade Estimated Annual Average Unit Cost ($/ac-ft/yr)	Year 2060 Water Supply Volume (ac-ft/yr)	Year 2060 Estimated Annual Average Unit Cost ($/ac-ft/yr)
Seawater Desalination	$185,940,937	2010	125	$1,051	7,902	$1,051
TOTAL	*$2,248,452,262*		*117,832*		*679,863*	

It should be noted, however, that irrigation yields less than municipal rights by a factor of two to one when comparing irrigation Class A rights to the of municipal rights. With the acquisition of water rights accounting for over 40% of the municipal strategies *by 2060*, the Rio Grande will remain the dominant source of water for the Region.

Alternate sources of water will also play an important part in providing the needs for the area. Brackish Groundwater Desalination will provide an alternate source of water not previously used and planned in the previous Rio Grande Regional Plan. Over 22% of the *municipal* supplies will be from brackish desalination. The remaining strategies are shown below.

For DMI users, the strategies that were further evaluated according to TWDB standards for this plan are:

- Municipal Water Conservation
- Non-Potable Reuse of Reclaimed Water
- Acquisition of Additional Rio Grande Water Through Water Rights Purchase, Urbanization & Contract
- Desalination of Brackish Groundwater
- Desalination of Seawater
- Groundwater Development
- Dams, Weir and Storage
    - Brownsville Weir and Reservoir
    - Banco Morales Reservoir
    - Resaca Restoration
    - Laredo Low Water Weir
    - *Delta Watershed Project*
- Water Infrastructure and Distribution
    - Proposed Elsa Tank

E.4 Section 4.3.6, pg. 4-32 and Table 4.24

4.3.6 Recommended Strategies for Reducing Projected Irrigation Needs[2]

[2] A table listing all irrigation supply/demand deficits and recommended water management strategies by county is attached at the end of this chapter.

The economics of the agriculture industry are such that water management strategies considered feasible for the Rio Grande Region are not sufficient to satisfy the projected deficits in their entirety. ~~Consequently, development of new water supply sources for irrigated agriculture – whether surface or groundwater – is not seen as a viable strategy.~~ There nevertheless are strategies that could significantly reduce irrigation demand or increase the available supply of water for irrigation.

For irrigation users, the water management strategies considered for this plan are:

- Agricultural Water Conservation (conveyance systems)
- On-Farm Water Use Efficiency
- *Capture and reuse of runoff and tailwaters*

In addition, because of assumptions made in estimated irrigation water availability during drought-of-record hydrologic conditions, additional irrigation supplies are projected to be available as a consequence of recommended strategies for DMI users that will lessen the need for DMI users to acquire additional Rio Grande supplies than would otherwise be the case. In essence, strategies such as municipal water conservation, desalination, and reuse of reclaimed water for DMI purposes are strategies for reducing the magnitude of projected irrigation shortages.

At the regional level, irrigation shortages of 407,522 acre-feet per year in 2010 and 258,375 acre-feet per year in 2060 are projected under normal conditions. The irrigation water supply/demand analysis for each county can be viewed in the appendix. Additionally, a table analyzing the resulting irrigation supply/demand, once ~~after~~ the irrigation water management strategies are implemented, is displayed below.

Table 4.24: Unmet Irrigation Needs after WMS Implementation

UNMET IRRIGATION NEEDS						
DESCRIPTION	2010	2020	2030	2040	2050	2060
REGULAR NEEDS BEFORE WMS	-407,522	-333,246	-239,408	-245,896	-252,386	-258,375
WMS						
ON-FARM	1,522	10,319	26,199	48,973	78,450	114,519
CONVEYANCE	11,104	37,611	63,662	89,247	114,365	139,117
DELTA WATERSHED PROJECT, CAPTURE AND REUSE	*3,617*	*3,617*	*3,617*	*3,617*	*3,617*	*3,617*
TOTAL WMS SUPPLIES	*16,243*	*51,547*	*93,478*	*141,837*	*196,432*	*257,253*
UNMET NEEDS	*-391,279*	*-281,699*	*-145,930*	*-104,059*	*-55,954*	*-1,122*

The Rio Grande RWPG believes that investment in agricultural water efficiency is one of the cornerstones of the region's near-term water management plan. Accordingly, the Rio Grande RWPG recommends that there be a comprehensive effort by local, state, and federal agencies to "capture" the maximum amount of water savings from irrigated agriculture over the 50-year planning period. The Rio Grande RWPG recommended the following water management strategies for reducing irrigation shortages:

- Conveyance System Improvements

- On-Farm Water Use Efficiency
- *Capture and reuse of runoff and tailwaters through the Delta Watershed Project*

E.5 Section 4.5, pg. 4-34

Opportunities for the development of additional water supplies for municipal use are limited in the Rio Grande Region, both because of the hydrologic characteristics of the region and by economics. As previously noted, there are few opportunities to increase the water supply yield of the Rio Grande. However, a number of strategies for augmenting municipal water supplies have been examined as part of this planning effort. These include: Advanced Municipal Water Conservation; Banco Morales Reservoir; Laredo Low Water Weir; Resaca Restoration; Infrastructure Improvements for City of Elsa; Brownsville Weir and Reservoir; *Delta Watershed Project,* Reuse of Reclaimed Water; Optimizing Surface Water Supply from the Rio Grande; Groundwater Development; Brackish and Seawater Desalination; and Acquisition of Additional Rio Grande Supplies for domestic-municipal-industrial (DMI) uses. The evaluations of these strategies are presented in the sections that follow. More detailed back-up information is provided in the appendix and in technical appendices to this plan.

E.6 Section 4.5.8, pg. 4-66

4.5.8 Dams, Weirs, and Storage

This Water Management Strategy is actually a combination of four individual strategies: Brownsville Weir and Reservoir, Resaca Restoration, Laredo Low Water Weir, and Banco Morales Reservoir, *and the Delta Watershed Project*. Due to the uniqueness of each individual project, the analysis of each in terms of strategy description, water supply yield, cost, environmental impact, implementation issues, and recommendations were evaluated separately. However, there are common themes that each strategy shares. The main intent of each project is to increase the volume of available raw water storage for the end user. This could be the result of constructing an on-channel weir and reservoir, removing sediment from existing storage, or constructing an off-channel reservoir. Each individual strategy is analyzed in more detail below.

E.7 Section 4.5.8.5, pg. 4-79

4.5.8.5 Delta Watershed Project

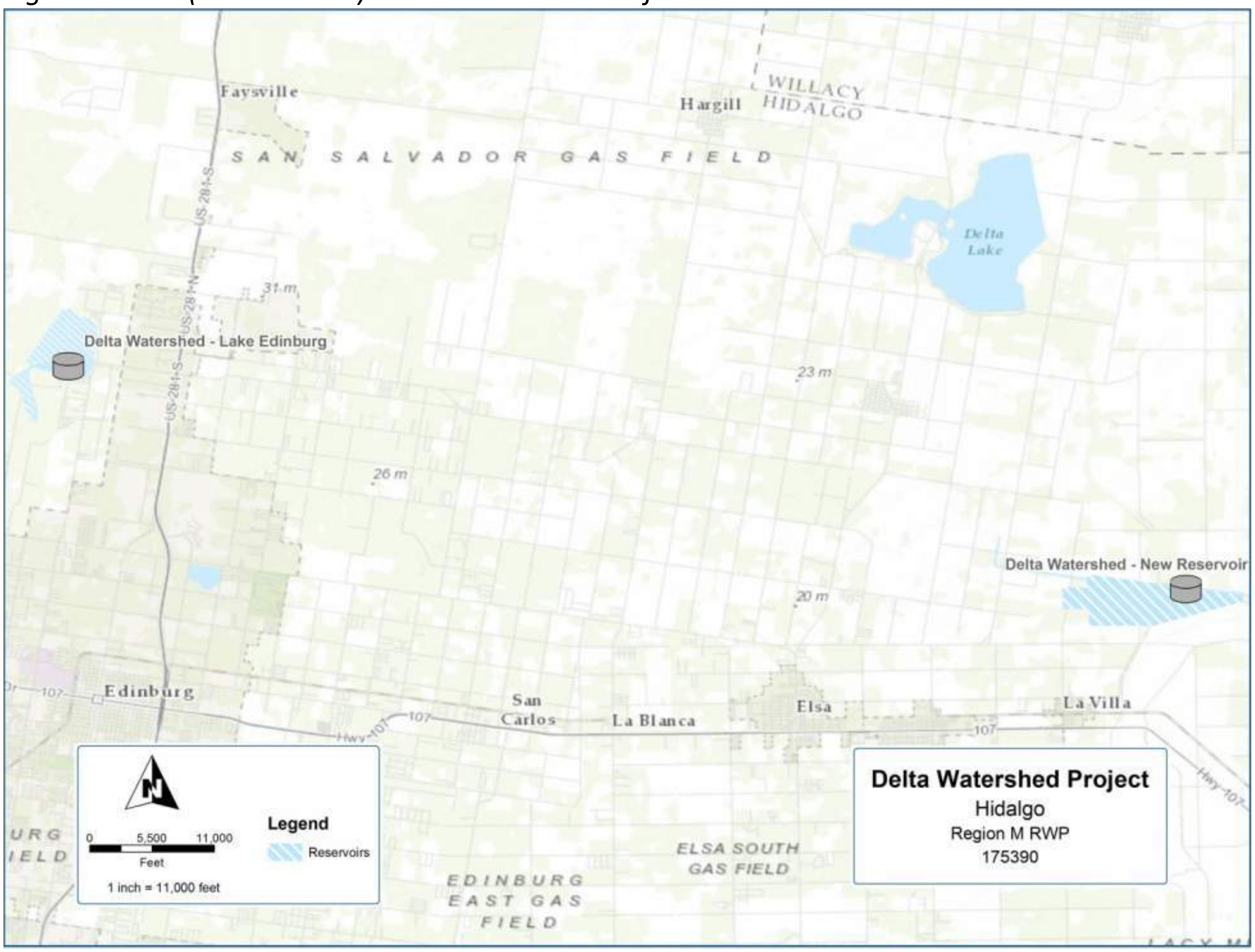
4.5.8.5.1 Strategy Description

Hidalgo County Drainage District manages the drainage canals serving parts of Hidalgo County, and does not currently divert water from the Rio Grande. However, the District intends to develop two storage reservoirs to capture irrigation tailwaters and precipitation run-off for beneficial use which would otherwise flow to the Laguna Madre. Strategies submitted by Hidalgo County Drainage District No. 1 to the RWPG.

This strategy is to reclaim storm water and irrigation runoff into the Hidalgo County Drainage District (HCDD) No. 1 master drainage system and retain this water in two reservoirs adjacent to the main floodwater channel in Northeast Hidalgo County. The reclaimed water will be sold to municipalities and water supply corporations for potable water treatment, and to irrigation districts for agricultural uses. The reservoirs can provide storm water control and management by reducing water volume during major rainfall events for detention reasons. This strategy will also provide education to the general public under the MS4 program.

A map of the Delta Watershed Project Reservoirs is shown in Figure 4.5.8.1-Amendment.

Figure 4.5.8.1 (Amendment) Delta Watershed Project Locations



4.5.8.5.2 Water Supply Yield

The Hidalgo County Drainage District 1 worked with the TCEQ on an approved Hydrologic Variance to the Nueces Rio Grande WAM which establishes the firm yield of the Delta

Watershed.[3] The resulting Firm Yield is 7,522 acre-feet/year. Because this water will be treated to reduce TDS prior to distribution to any end users, an estimated 80% membrane recovery rate was applied for a total supply of 6,017 acre-ft./year.

The WMS seeks to provide 3739 acre-ft./year (2000 acre-ft./year to NAWSC, and 1739 acre-ft./year to Hidalgo County Irrigators in the Nueces Rio Grande basin) from the Edinburg Reservoir, and 2278 acre-ft./year (400 acre-ft./year to La Villa, and 1878 to Hidalgo County Irrigators in the Nueces Rio Grande basin) from the proposed new reservoir. The 2011 Regional Water Supply Facilities Plan indicated that about 15 MGD could be developed for beneficial use, which may be available in years with regular precipitation.

4.5.8.5.3 Cost

Two feasibility studies have been conducted for this strategy. In 2006, a study titled Hidalgo County Water Development Project investigated water availability within the Hidalgo County Master Drainage Systems. Background water quality conditions were also studied by collecting fifteen water samples across the study area. The study concluded that water could be developed for beneficial use. In 2011, the Regional Water Supply Facilities Plan studied the feasibility of the proposed strategy. Potential project sites were evaluated with consideration of the availability of water floodplain and environmental concerns. Alternative water treatment processes were also evaluated with consideration of the water quality conditions with the drainage system. Costs for this strategy from the UCM include a pump station, pipeline, pipeline right-of-way, water treatment, reservoir, and land acquisition. It is assumed that the construction period for this strategy is one year. All costs indexed to September 2008 dollars.

Table 4.52.1A: Cost of Delta Watershed Project Water to WUG's

WUG Name	WUG County Name	WUG Basin Name	DWP Annual Supply	AC2010	AC2020	AC2030	AC2040	AC2050	AC2060
North Alamo WSC	Hidalgo	Nueces-Rio Grande	2,000	$2,348,726	$2,348,726	$1,571,090	$1,571,090	$1,304,134	$1,304,134
La Villa	Hidalgo	Nueces-Rio Grande	400	$661,637	$661,637	$460,403	$460,403	$296,008	$296,008
Irrigation	Hidalgo	Nueces-Rio Grande	3,617	$5,148,602	$5,148,602	$3,527,656	$3,527,656	$2,523,703	$2,523,703

[3] *Rio Grande Regional Water Planning Group (Region M) Hydrologic Variance Request #2,* Jeff Walker, TWDB, March 10, 2015.

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Table 4.52.2A: Delta Watershed Project – Lake Edinburg Cost Details

Cost Estimate Summary ***Water Supply Project Option*** ***Hidalgo County Drainage District #1 - Delta Watershed Project, Lake Edinburg***	
Item	***Estimated Costs for Facilities***
CAPITAL COST	
Dam and Reservoir (Conservation Pool 4250 acft, 425 acres)	$4,207,024
Water Treatment Plant (5 MGD)	$12,425,139
TOTAL COST OF FACILITIES	**$16,632,163**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$5,821,627
Environmental & Archaeology Studies and Mitigation	$873,383
Land Acquisition and Surveying (428 acres)	$1,202,403
Interest During Construction (6% for 1 years with a 1% ROI)	$1,350,277.26
TOTAL COST OF PROJECT	**$25,879,852**
ANNUAL COST	
Debt Service (6 percent, 20 years)	$1,544,362
Reservoir Debt Service (6 percent, 40 years)	$542,514
Operation and Maintenance	
Dam and Reservoir (1.5% of Cost of Facilities)	$62,847
Water Treatment Plant (2.5% of Cost of Facilities)	$2,375,231
TOTAL ANNUAL COST	**$4,524,954**
Available Project Yield (acft/yr), based on a Peaking Factor of 1	3,739
Annual Cost of Water ($ per acft)	$1,210
Annual Cost of Water ($ per 1,000 gallons)	$3.71

Table 4.52.3A: Delta Watershed Project – New Reservoir Cost Details

Cost Estimate Summary ***Water Supply Project Option*** ***Hidalgo County Drainage District #1 - Delta Watershed Project, New Reservoir***	
Item	***Estimated Costs for Facilities***
CAPITAL COST	
Off-Channel Storage/Ring Dike (Conservation Pool 3500 acft, 350 acres)	$9,495,379
Intake Pump Stations (2.7 MGD)	$785,582
Transmission Pipeline (16 in dia., 3 miles)	$698,706
Water Treatment Plant (3 MGD)	$7,975,970
TOTAL COST OF FACILITIES	**$18,955,638**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$6,599,815
Environmental & Archaeology Studies and Mitigation	$789,279
Land Acquisition and Surveying (387 acres)	$1,093,346
Interest During Construction (6% for 1 years with a 1% ROI)	$1,510,166.36
TOTAL COST OF PROJECT	**$28,948,244**
ANNUAL COST	
Debt Service (6 percent, 20 years)	$1,188,540
Reservoir Debt Service (6 percent, 40 years)	$1,017,560
Operation and Maintenance	
Intake, Pipeline, Pump Station (1% of Cost of Facilities)	$26,802
Dam and Reservoir (1.5% of Cost of Facilities)	$142,329
Water Treatment Plant (2.5% of Cost of Facilities)	$1,530,499
Pumping Energy Costs (153544 kW-hr @ 0.09 $/kW-hr)	$12,939
TOTAL ANNUAL COST	**$3,918,669**
Available Project Yield (acft/yr), based on a Peaking Factor of 1	2,278
Annual Cost of Water ($ per acft)	$1,720
Annual Cost of Water ($ per 1,000 gallons)	$5.28

4.5.8.5.4 Environmental Impact

The potential impacts associated with the Hidalgo County Water Supply development include construction and operation of transmission pipelines and a conventional water treatment plant and or reverse osmosis plant which could impact sensitive environmental resources (e.g., native *brush clearing) and such streams and resacas. There are no environmental flow standards adopted for Nueces-Rio Grande Coastal Basin or for the Hidalgo County Drainage District's flood ways. The Delta Watershed Project, however, is consistent with the environmental flow standards adopted for Nueces-Rio Grande Coastal Basin. In the Rio Grande, Rio Grande Estuary, and Lower Laguna Madre Basin and Bay Expert Science Team's study, "Environmental Flows Recommendations Report," the Rio Grande, Rio Grande Estuary, and Lower Laguna Madre Basin and Bay Expert Science Team indicated a reduction in freshwater entering the Laguna Madre would benefit the natural aquatic plant life by maintaining the salinity.*

A total of 775 acres will be inundated with the construction of these reservoirs.

At this time there are no known impacts to Navigation, Natural Resources, or Third Party Social and Economic Impacts. The Delta Watershed Project will result in additional water supplies for municipal and agricultural use.

4.5.8.5.5 Implementation Issues

The main implementation issue for Hidalgo County collection system and future water treatment plant would be funding for the project.

State and federal permits must be obtained before construction can begin, potentially including a Section 404, Clean Water Act Permit. Additionally, the project may need to comply with the National Environmental Policy Act if federal funding is involved and with the Endangered Species Act if any threatened and endangered species are impacted. However, the project has received a non-jurisdictional determination from the U.S. Army Corps of Engineers. <u>In addition, a study, "Environmental Flows Recommendations Report"</u> was prepared by Rio Grande, Rio Grande Estuary, and Lower Laguna Madre Basin and Bay Expert Science Team indicating a reduction in freshwater entering the Laguna Madre would benefit the natural aquatic plant life by maintaining the salinity.

The Delta Watershed Project currently has Memorandums of Understanding with two Irrigation Districts, Engleman and Delta Lake. HCDD#1 is submitting a water rights application to TCEQ. This application is pending approval from the HCDD#1 board for submittal.

The largest potential impact on cultural resources associated with this option comes from pipeline construction and operation. Therefore, pipelines should follow existing and shared rights-of-way whenever possible to minimize the area of disturbance.

The Drainage District will seek a new water right from the TCEQ that authorizes the appropriation and diversion of water directly from the South, North, and Main Flood Way, diversion of water to and storage of water in existing and proposed off-channel reservoirs along the flood ways, and diversion of water from the perimeter of those existing and proposed off-channel reservoirs.

The Delta Watershed WMS will rely on an existing off-channel reservoir and a proposed off-channel reservoir. The proposed new reservoir at the Panchita control structure will be located adjacent to the Main Flood Way east of Mile 17 with a center at 26°19'28"N and 97°54'8" W, which is located two (2) miles north from the City of La Villa, Texas. The existing Edinburg off-channel Reservoir is located six (6) miles northwest of the City of Edinburg, within the Santa Cruz Irrigation District. The center of the reservoir is at 26°23'17.98" N and 98°10'10.86" W. There are no negative impacts on existing water rights, water contracts, and option agreements. The South, North, and Main Flood Ways that are part of the Delta Watershed WMS make up an independent drainage system owned by the Drainage District. There are a few existing water rights with diversions from the drainage system (see for example Certificate of Adjudication No. 22-4524). Any water right issued to the Drainage District will be junior to those water rights, and thus those senior water rights will be protected.

Both phases of the Delta Watershed WMS will take place in the 2010 decade.

4.5.8.5.6 Recommendations

The District is finalizing the water rights application with TCEQ based on the revised WAM Run 3 model within the Nueces Rio Grande Watershed. The Delta Watershed WMS is a recommended WMS.

E.8 Section 4.6, pg. 4-83

4.6 WATER MANAGEMENT STRATEGIES FOR WHOLESALE WATER PROVIDERS

Texas Water Development Board guidelines in Exhibit B state that a Wholesale Water Provider (WWP) is any person or entity, including river authorities, that has contracts to sell more than 1,000 acre-ft of water wholesale in any one year during the five years immediately preceding the adoption of the last regional water plan. Table 4.3 indicates the water providers that follow the TWDB guidelines to designate them as Wholesale Water Providers for this region. This table also shows the projected water surplus/deficit for each WWP.

Out of the ~~nine~~ *eleven* Wholesale Water Providers there are two that have a deficit in this region.

E.9 Section 4.9, pg. 4-104

4.9 STRATEGIES CONSIDERED BUT NOT FULLY EVALUATED

Section 4.9 discusses various projects that are in the process of being fully analyzed by the Region. In order to be recommended as a Water Management Strategy to meet future demands, each WMS must be evaluated in terms of water supply yield, cost, environmental impact, and implementation issues. Due to significant components of each of the following projects still pending and lack of information, they cannot be fully recommended as Water Management Strategies. The projects are listed below:

- ~~Hidalgo County Drainage District No. 1 Project~~

- Proposed Pipeline in Dimmit County, Texas into Region
- Ethanol Production Plants

~~4.9.1 Hidalgo County Drainage District No. 1 Project~~

~~4.9.1.1 Strategy Description~~

~~The Hidalgo County Water Supply Project is being proposed by the Hidalgo County Drainage District as a new source of water for the region in the Lower Rio Grande in Hidalgo County. The proposed project is intended to provide additional dependable water supplies to water users by using the extensive drainage network in Hidalgo County and the existing drainage/flood control systems to collect rainfall runoff and shallow groundwater and use and treat the water and eventually serve to water users. The proposed project is to help meet the demands of water for the future. It is to comprise 10% of the water in Hidalgo County in the year 2050.~~

~~4.9.1.2 Water Supply Yield~~

~~No firm information on water supply yield is available at this time.~~

~~4.9.1.3 Cost~~

~~No firm information on cost is available at this time.~~

~~4.9.1.4 Environmental Impact~~

~~The potential impacts associated with the Hidalgo County Water Supply development include construction and operation of transmission pipelines and a conventional water treatment plant and or reverse osmosis plant which could impact sensitive environmental resources (e.g., native brush clearing) and such streams and resacas.~~

~~4.9.1.5 Implementation Issues~~

~~The main implementation issue for Hidalgo County collection system and future water treatment plant would be funding for the project. Another issue as with any project, necessary state and federal permits must be obtained before construction can begin, potentially including a Section 404, Clean Water Act Permit. Additionally, the project may need to comply with the National Environmental Policy Act if federal funding is involved and with the Endangered Species Act if any threatened and endangered species are impacted.~~

~~The largest potential impact on cultural resources associated with this option comes from pipeline construction and operation. Therefore, pipelines should follow existing and shared rights-of-way whenever possible to minimize the area of disturbance.~~

~~4.9.1.6 Recommendations~~

~~Due to a lack of information detailing cost and water availability, the Rio Grande RWPG cannot recommend the Hidalgo County Water Supply project as a water management strategy for Hidalgo County users. Should final determinations be made in regards to water supply, cost, and potential end users, future water planning efforts could potentially include the project as a recommended water management strategy.~~

E.10 New Section 4.11.3 , pg. 4-124

The Delta Watershed Project, sponsored by Hidalgo County Drainage District #1, is designed to serve both municipal and irrigation customers. The strategy description is in Section 4.5.8.5.

E.11 Attachment 4-1, pg. 4-131 and Errata #2, pg. 23

WATER USER GROUPS AND THEIR WATER MANAGEMENT STRATEGIES

						WMS Supply (ac-ft/yr)					
Region	**WMS Project ID**	**WMS Project Name**	**WUG Basin Name**	**WUG County**	**WUG Name**	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
M		*Delta Watershed Project*	*Nueces-Rio Grande*	*Hidalgo*	*North Alamo WSC*	*2,000*	*2,000*	*2,000*	*2,000*	*2,000*	*2,000*
M		*Delta Watershed Project*	*Nueces-Rio Grande*	*Hidalgo*	*La Villa*	*400*	*400*	*400*	*400*	*400*	*400*
M		*Delta Watershed Project*	*Nueces-Rio Grande*	*Hidalgo*	*Irrigatio n*	*3,617*	*3,617*	*3,617*	*3,617*	*3,617*	*3,617*

	WMS Supply (ac-ft/yr)					
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
WMS WUG Supply Total:	*78,471*	*169,569*	*258,432*	*367,250*	*498,106*	*640,553*

E.12 Attachment 4-1, pg. 4-138 and Errata #2, pg. 33

Note that this table is labeled as unit costs but appears to show annual costs. The costs shown here are unit costs, in keeping with the title and headers of the Table.

					WMS Average Unit Cost ($/ac-ft)					
Region	**WMS Project ID**	**WMS Project Name**	**WUG Name**	**Capital Cost**	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
M		*Delta Watershed Project*	*North Alamo WSC*	*$53,788,355*	$1,210	$1,210	$797	$797	$652	$652
M		*Delta Watershed Project*	*La Villa*	*$53,788,355*	$1,720	$1,720	$1,187	$1,187	$740	$740
M		*Delta Watershed Project*	*Irrigation*	*$53,788,355*	$1,475	$1,475	$999	$999	$698	$698

E.13 Attachment 4-1, pg. 4-142 and Errata #2, pg. 42

Region M WUGs With Unmet Needs With the Implementation of WMS								
WUG	**County**	**Basin**	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**

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Region M WUGs With Unmet Needs With the Implementation of WMS								
WUG	**County**	**Basin**	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Irrigation	Cameron	Nueces-Rio Grande	-127,191	-99,625	-67,053	-54,284	-39,661	-23,026
Irrigation	Cameron	Rio Grande	-4,056	-2,859	-1,445	-847	-159	0
Irrigation	Hidalgo	Nueces-Rio Grande	-172,238	-102,108	-13,722	0	0	0
Irrigation	Hidalgo	Rio Grande	-14,456	-12,065	-9,044	-8,804	-8,530	-8,219
Irrigation	Maverick	Rio Grande	-35,435	-29,844	-23,216	-19,741	-15,760	-11,236
Irrigation	Starr	Rio Grande	-8,777	-7,584	-6,208	-5,658	-4,901	-3,927
Irrigation	Webb	Rio Grande	-6,831	-5,977	-5,180	-5,277	-5,375	-5,464
Irrigation	Willacy	Nueces-Rio Grande	-23,418	-23,053	-21,858	-19,740	-17,429	-14,799
Irrigation	Zapata	Rio Grande	-2,494	-2,201	-1,921	-1,958	-1,995	-2,029
		Total Unmet Needs	-394,896	-285,316	-149,647	-116,309	-93,810	-68,700

F. Chapter 9 Amendments

F.1 9.2.1.1 Summary of Municipal Water Management Strategies

For Municipal users, the strategies recommended for this regional planning area are:

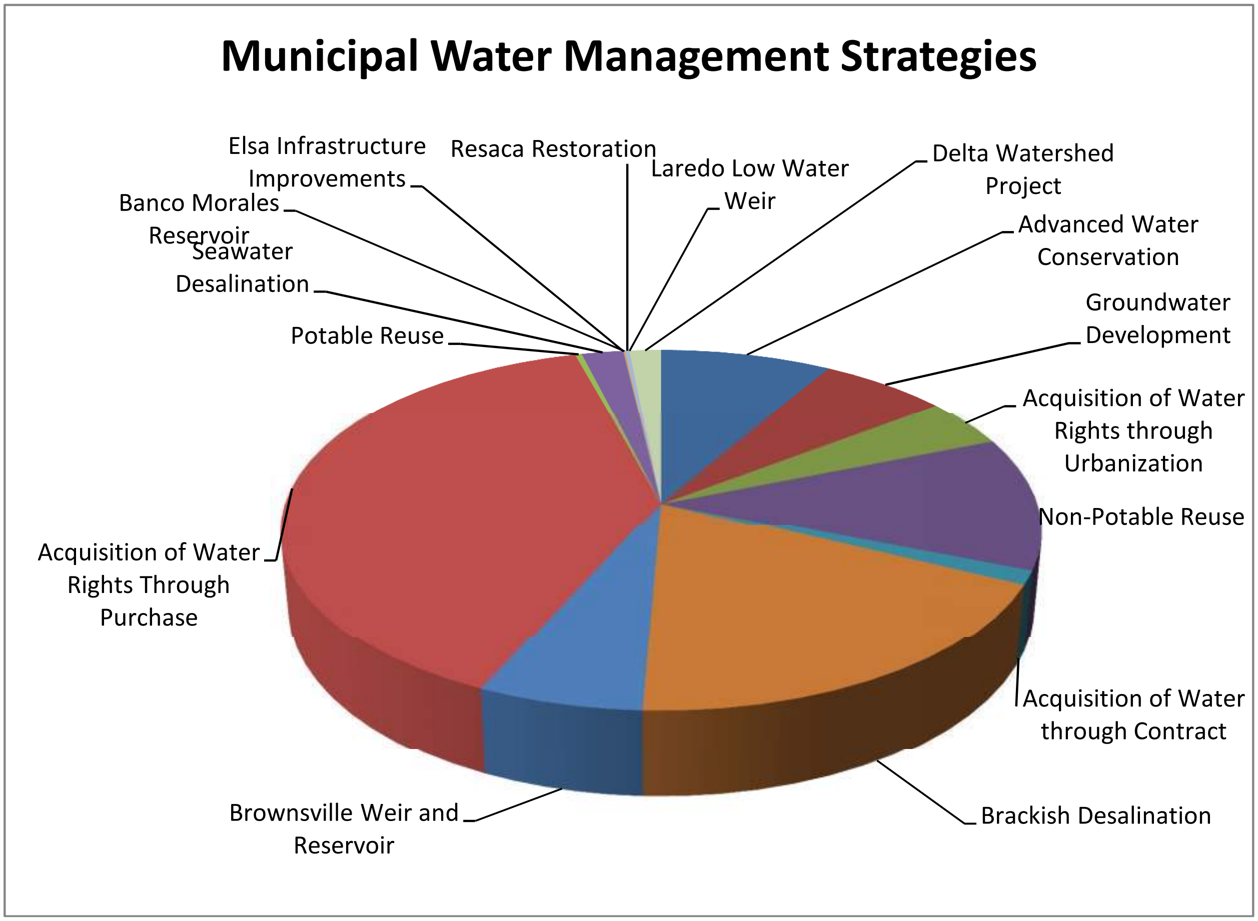
- Advanced Water Conservation;
- Potable Reuse of Reclaimed Water;
- Non-Potable Reuse of Reclaimed Water;
- Acquisition of Additional Rio Grande Water through Water Rights Purchase;
- Acquisition of Additional Rio Grande Water through Urbanization;
- Acquisition of Additional Rio Grande Water through Contract;
- Desalination of Brackish Groundwater;
- Desalination of Seawater;
- Groundwater Development;
- Brownsville Weir and Reservoir;
- Resaca Restoration;
- Laredo Low Water Weir;
- *Delta Watershed Project;*
- Banco Morales Reservoir; and
- Elsa Improved Infrastructure.

F.2 Table 9.1. pg. 9-3

Table 9.1: Summary of WMS Yields & Annual Costs

Strategy	Water Supply Yield	Total Capital Cost	Total Annual Cost
Advanced Water Conservation	32,793	$22,583,710	$0
Groundwater Development	24,520	$27,474,302	$6,218,609
Acquisition of Water Rights through Urbanization	16,406	$56,167,089	$7,056,713
Non-Potable Reuse	46,382	$173,803,091	$6,839,307
Acquisition of Water through Contract	4,671	$16,263,877	$2,009,137
Brackish Desalination	71,700	$263,599,392	$33,347,670
Brownsville Weir and Reservoir	23,643	$98,411,077	$4,324,305
Acquisition of Water Rights Through Purchase	151,237	$631,081,709	$64,078,617
Potable Reuse	1,290	$7,519,850	$231,693
Seawater Desalination	7,902	$185,940,937	$8,301,920
Elsa Infrastructure Improvements	105	$8,325,386	$0
Banco Morales Reservoir`	238	$25,790,900	$604,996
Resaca Restoration	877	$52,000,000	$2,229,334
Laredo Low Water Weir	0	$294,400,000	$205,000
Delta Watershed Project	6,017	*$53,788,355*	$8,158,965
Total	387,781	$1,917,149,676	$143,606,265

F.3 Figure 9.1. pg. 9-4



F.4 Table 9.2. pg. 9-4

Table 9.2: Summary of Funding for Municipal Strategies

	Total Capital Costs	Acquisition and Construction	Disadvantaged	Planning, Design, and Permitting	Excess Capacity	Rural	Other
Municipal WMS	$1,917,149,676	2%	73%	0%	24%	1%	3%

G. Chapter 10 Amendments

G.1 Section 10.1, pg. 10-5

An official request for an amendment to the 2011 regional water plan was received from Hidalgo County Drainage District No. 1 (HCDD1) on December 19, 2013 requesting the inclusion of the Delta Watershed Project, and designation of HCDD1 as a wholesale water provider. January 22, the RWPG voted to support HCDD1's pursuit of an amendment, to post public notice, and to hold a public hearing for the proposed plan amendment. After 30 days public notification, a public meeting was held on March 12, 2014 to present the draft Plan Amendment and the Delta Watershed Project. (The Public Notice is included as Attachment

10.1.) After a 30 day comment period, at the April 30, 2014 regularly scheduled Region M meeting, the RWPG voted unanimously to approve and formally adopt the major amendment of the 2011 RWP, to designate HCDD1 as a Wholesale Water Provider in the 2011 RWP, and submittal of the HCDD1 major amendment package to TWDB by LRGVDC.

HCDD1 worked with TCEQ to revise the Nueces-Rio Grande WAM in order to establish a firm yield for the Delta Watershed Project, documented in a letter of approval dated February 13, 2015. On March 10, 2015 the Region M Chairman was notified that the TWDB approved a Hydrologic Variance to the Nueces-Rio Grande WAM, which formed the basis for the revised project supply.

Appendix 1
Decision Documents

a. La Villa
b. North Alamo WSC
c. Irrigation – Hidalgo County
d. WWP Summary
e. Hidalgo County Drainage District #1

WATER SUPPLY AND DEMAND ANALYSIS										
LA VILLA										
Year					**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Total Population				1305	1,361	1,374	1,389	1,405	1,422	1,439
Total Water Demand					250	252	255	258	261	264
Plumbing Code Fixture Replacement (ac-ft)					6	10	15	19	22	22
Net Water Demand (ac-ft)					**244**	**242**	**241**	**239**	**239**	**242**
Current Water Supply	**Water Right Number**	**Amount**	**Type**							
Amistad-Falcon Water Right/Contracts*	812	500.0	MUNI		500	500	500	500	500	500
Groundwater		0.0	GW							
Total Supply (AF/yr)		**500.0**			**500**	**500**	**500**	**500**	**500**	**500**
Projected Supply Surplus/Deficit					**256**	**258**	**259**	**261**	**261**	**258**

Evaluation of Selected Water Management Strategies					**Additional Supply by Decade**					
Strategy	**Yield (AF/yr)**	**Total Annual Cost**	**Unit Cost ($)**		**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Additional Groundwater	0	$ -	$ 214.96		0	0	0	0	0	0
Advanced Water Conservation Measures	1	$ -	$ -		0	1	1	1	1	1
Non-Potable Water Re-use	0	$ -	$ 150.45		0	0	0	0	0	0
Potable Water Re-use	0	$ -	$ 150.45		0	0	0	0	0	0
Brownsville Weir and Reservoir	0	$ -	$ 182.90		0	0	0	0	0	0
Acqusition of Water Rights:										
Purchase	0	$ -	$ 430.13		0	0	0	0	0	0
Urbanization	0	$ -	$ 430.13		0	0	0	0	0	0
Contract	0	$ -	$ 430.13		0	0	0	0	0	0
Desalination:										
Brackish Groundwater Desalination	0	$ -	$ 465.10		0	0	0	0	0	0
Seawater Desalination	0	$ -	$ 1,050.61		0	0	0	0	0	0
Banco Morales Reservoir	0	$ -	$ 2,542.00		0	0	0	0	0	0
Resaca Restoration	0	$ -	$ 4,825.00		0	0	0	0	0	0
Laredo Low Water Weir	0	$ -	$ 4,460.00		0	0	0	0	0	0
Proposed Elsa Tank	0	$ -			0	0	0	0	0	0
Delta Watershed Project	400	$ 688,089	$ 1,720.22		400	400	400	400	400	400

*Supplied by HCCID #9

	2010	2020	2030	2040	2050	2060
Surplus/Deficit after WMS's	656	659	660	662	662	659

WATER SUPPLY AND DEMAND ANALYSIS										
NORTH ALAMO WSC (Hidalgo County)										
Year					**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Total Population				80960	114,538	153,770	197,713	245,263	297,197	350,473
Total Water Demand					12,317	16,535	21,261	26,374	31,959	37,688
Plumbing Code Fixture Replacement (ac-ft)					642	1,378	2,215	3,022	3,662	4,318
Net Water Demand (ac-ft)					**11,675**	**15,158**	**19,046**	**23,352**	**28,297**	**33,369**
Current Water Supply	**Water Right Number**	**Amount**	**Type**							
Amistad-Falcon Water Right/Contracts	240, 461, 804, 805, 808, 808, 816		MUNI		19400	19520	19627	19728	19831	19927
Groundwater			GW		1,258	1,265	1,272	1,279	1,286	1,292
Contracts										
Total Supply (AF/yr)					**20,658**	**20,785**	**20,899**	**21,007**	**21,117**	**21,219**
Projected Supply Surplus/Deficit*					**8,983**	**5,627**	**1,853**	**-2,345**	**-7,180**	**-12,150**
Evaluation of Selected Water Management Strategies					**Additional Supply by Decade**					
Strategy	**Yield (AF/yr)**	**Total Annual Cost**	**Unit Cost ($)**		**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Additional Groundwater	0	$ -	$ 214.96		0	0	0	0	0	0
Advanced Water Conservation Measures	4,000	$ -	$ -		248	538	863	1,215	3,098	4,000
Non-Potable Water Re-use	0	$ -	$ 150.45		0	0	0	0	0	0
Potable Water Re-use	0	$ -	$ 150.45		0	0	0	0	0	0
Brownsville Weir and Reservoir	0	$ -	$ 182.90		0	0	0	0	0	0
Acquisition of Water Rights:										
Purchase	902	$ 387,977.26	$ 430.13		0	0	0	0	0	902
Urbanization	0	$ -	$ 430.13		0	0	0	0	0	0
Contract	48	$ 20,646.24	$ 430.13		0	0	0	0	0	48
Desalination:										
Brackish Groundwater Desalination	11,201	$ 5,209,585.10	$ 465.10		11,201	11201	11201	11201	11201	11201
Seawater Desalination	0	$ -	$ 1,050.61		0	0	0	0	0	0
Banco Morales Reservoir	0	$ -	$ 2,542.00		0	0	0	0	0	0
Resaca Restoration	0	$ -	$ 4,825.00		0	0	0	0	0	0
Laredo Low Water Weir	0	$ -	$ 4,460.00		0	0	0	0	0	0
Proposed Elsa Tank	0	$ -			0	0	0	0	0	0
Delta Watershed Project	2,000	$ 2,420,409	$ 1,210.20		2,000	2,000	2,000	2,000	2,000	2,000

WATER SUPPLY AND DEMAND ANALYSIS								
Irrigation: Hidalgo County								
Year		**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Total Water Demand		611,399	583,030	525,971	453,772	453,772	453,772	453,772
Current Water Supply	**Source**							
Surface Water	AMISTAD/FALCON	360,331	357,532	353,969	350,661	347,353	344,045	340,991
Surface Water	AMISTAD/FALCON	2,928	2,905	2,877	2,850	2,823	2,796	2,771
Surface Water	REUSE	166	4,288	4,288	4,288	4,288	4,288	4,288
Surface Water	REUSE	166	4,288	4,288	4,288	4,288	4,288	4,288
Surface Water	RRIGATION LOCAL SUPPLY	79	79	79	79	79	79	79
Ground Water	GULF COAST	4,330	19,383	19,383	19,383	19,383	19,383	19,383
Ground Water	GULF COAST	185	1,020	1,020	1,020	1,020	1,020	1,020
Total Supply (AF/yr)	**0**	**368,185**	**389,495**	**385,904**	**382,569**	**379,234**	**375,899**	**372,820**
Projected Supply Surplus/Deficit		**-243,214**	**-193,535**	**-140,067**	**-71,203**	**-74,538**	**-77,873**	**-80,952**

Evaluation of Selected Water Management Strategies					**Additional Supply by Decade**					
Strategy	**Yield (AF/yr)**	**Total Annual Cost**	**Unit Cost ($)**		**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
On-Farm Water Conservation	130,229	$ 32,997,424.02	$ 253.38		21,699	43,416	65,114	86,815	108,529	130,229
Conveyance System Conservation	118,959	$ 14,355,972.12	$ 120.68		49,566	99,132	104,089	109,045	114,002	118,959
Delta Watershed Project	3,617	$ 5,335,125	$ 1,475.01		3,617	3,617	3,617	3,617	3,617	3,617

WATER SUPPLY AND DEMAND ANALYSIS

Wholesale Water Providers: Summary

Year		2010	2020	2030	2040	2050	2060
Total Water Demand		241723	241688	241688	241689	241688	241695
Current Water Supply	**Source**						
Total Supply (AF/yr)		**281,320**	**234,839**	**234,839**	**234,842**	**234,840**	**234,847**
Projected Supply Surplus/Deficit		**39,597**	**-6,849**	**-6,849**	**-6,847**	**-6,848**	**-6,848**

Evaluation of Selected Water Management Strategies — **Additional Supply by Decade**

Strategy	Yield (AF/yr)	Total Annual Cost	Unit Cost ($)		2010	2020	2030	2040	2050	2060
Additional Groundwater	0	$ -	$ 214.96		0	150	350	588	875	1450
Advanced Water Conservation Measures	2,878	$ -	$ -		381	815	1,290	1,795	2,334	2,878
Non-Potable Water Re-use	17,734	$ 2,668,080.30	$ 150.45		0	447	4047	7950	13128	17734
Potable Water Re-use	0	$ -	$ 150.45		0	0	0	0	0	0
Brownsville Weir and Reservoir	0	$ -	$ 182.90		0	0	0	0	0	0
Acqusition of Water Rights:										
Purchase	12,608	$ 5,423,079.04	$ 430.13		0	955	2864	5796	8290	12608
Urbanization	0	$ -	$ 430.13		0	0	0	0	0	0
Contract		$ -	$ 430.13		0	50	151	305	434	661
Desalination:										
Brackish Groundwater Desalination	20,642	$ 9,600,594.20	$ 465.10		18,189	18742	19042	19642	20142	20642
Seawater Desalination	864	$ 907,727.04	$ 1,050.61		100	100	118	424	796	864
Banco Morales Reservoir	0	$ -	$ 2,542.00		0	0	0	0	0	0
Resaca Restoration	0	$ -	$ 4,825.00		0	0	0	0	0	0
Laredo Low Water Weir	0	$ -	$ 4,460.00		0	0	0	0	0	0
Proposed Elsa Tank	0	$ -			0	0	0	0	0	0
On-Farm Conservation	100	$ 25,338.00	$ 253.38		100	100	100	100	100	100
Conveyance System Conservation	100	$ 12,068.00	$ 120.68		100	100	100	100	100	100
Delta Watershed Project	6,017	$ 8,158,964.88	$ 1,403.29		6,017	6,017	6,017	6,017	6,017	6,017

WATER SUPPLY AND DEMAND ANALYSIS

Hidalgo County Drainage District #1

Year			**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
North Alamo WSC	HIDALGO	NUECES-RIO GRANDE	2,000	2,000	2,000	2,000	2,000	2,000
La Villa	HIDALGO	NUECES-RIO GRANDE	400	400	400	400	400	400
IRRIGATION	HIDALGO	NUECES-RIO GRANDE	3,617	3,617	3,617	3,617	3,617	3,617
Total Water Demand			6,017	6,017	6,017	6,017	6,017	6,017
Current Water Supply	**Source**							
Total Supply (AF/yr)			**0**	**0**	**0**	**0**	**0**	**0**
Projected Supply Surplus/Deficit			**-6,017**	**-6,017**	**-6,017**	**-6,017**	**-6,017**	**-6,017**

Evaluation of Selected Water Management Strategies					**Additional Supply by Decade**					
Strategy	**Yield (AF/yr)**	**Total Annual Cost**	**Unit Cost ($)**		**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Additional Groundwater	0	$ -	$ 214.96		0	0	0	0	0	0
Advanced Water Conservation Measures	0	$ -	$ -		0	0	0	0	0	0
Non-Potable Water Re-use	0	$ -	$ 150.45		0	0	0	0	0	0
Potable Water Re-use	0	$ -	$ 150.45		0	0	0	0	0	0
Brownsville Weir and Reservoir	0	$ -	$ 182.90		0	0	0	0	0	0
Acqusition of Water Rights:										
Purchase	0	$ -	$ 430.13		0	0	0	0	0	0
Urbanization	0	$ -	$ 430.13		0	0	0	0	0	0
Contract		$ -	$ 430.13		0	0	0	0	0	0
Desalination:	0									
Brackish Groundwater Desalination	0	$ -	$ 465.10		0	0	0	0	0	0
Seawater Desalination	0	$ -	$ 1,050.61		0	0	0	0	0	0
Banco Morales Reservoir	0	$ -	$ 2,542.00		0	0	0	0	0	0
Resaca Restoration	0	$ -	$ 4,825.00		0	0	0	0	0	0
Laredo Low Water Weir	0	$ -	$ 4,460.00		0	0	0	0	0	0
Proposed Elsa Tank	0	$ -			0	0	0	0	0	0
On-Farm Conservation	0	$ -	$ 253.38		0	0	0	0	0	0
Conveyance System Conservation	0	$ -	$ 120.68		0	0	0	0	0	0
Delta Watershed Project	6,017	$ 8,443,623	$ 1,403.29		6,017	6,017	6,017	6,017	6,017	6,017

Appendix 2
2012 Database Revisions

WMS Project

DBPROJECTID	WMS Project ID	Project Name	WMS Description	WMS Type	WMS Infrastru	WMS Spons	Regional Comments	Selected WUG WWP	Include In SWP
		Delta Watershed Project	Capture and reuse of runoff wate	expanded use of existing	reservoir, pum	Hidalgo County Drainage District #1			

WMSRwpgProject

DBPROJECTID	WMS Project ID	Project Name	Project RWPG	Is Sponsor
		Delta Watershed Project	M	Y

WMSSource

DBWMSSOID	DBPROJECTID	WMS Project ID	Project Name	WMS Sponsor RWPG	DBSOID	SRC Name	SRC Type	SRC RWPG	SRC County Nam	SRC Basin	SRC ID	Water Qua	Online Dat	Regional Comments	Include In SWP
			Delta Watershed Project	M		Nueces-Rio	SURFACE WATER	M	Hidalgo	Nueces-Ric	230A0	NO WATER	2010		

WMSWug

DBWMSWUGID	DBPROJECTID	WMS Project ID	Project Name	WMS Sponsor RWPG	DBWMSSOID	DBSOID	SRC Name	SRC Type	SRC RWPG	SRC County Name	SRC Basin Name	SRC ID	Online Date	WMS Type Description	SRC Use Description	DBWUGID	WUG ID	WUG Name	WUG TYPE	WUG RWPG	WUG County Name	WUG Basin Name	WUG Detail	DBWMSWUG COSTID	DBSELLERID	Seller Name	Seller RWPG	Seller WWP ID	Seller WUG ID	Is Selected	Is Used To Meet Need	Also Selected WWP	Is IBT	Regional Comments	SS2010	SS2020	SS2030	SS2040	SS2050	SS2060	Include Supply
953			Delta Watershed Project	M			Nueces-Rio Grand Run-of-Rive	SURFACE WATER	M	HIDALGO	NUECES-RIO GRANDE		2010	expanded use of existing	USING WATER NOT BEING USED FROM CURRENT A			North Alamo WSC	MUN-CO	M	HIDALGO	NUECES-RIO GRAND	NONE							R	Y	Y	N		2000	2000	2000	2000	2000	2000	Y
5609			Delta Watershed Project	M			Nueces-Rio Grand Run-of-Rive	SURFACE WATER	M	HIDALGO	NUECES-RIO GRANDE		2010	expanded use of existing	USING WATER NOT BEING USED FROM CURRENT A			La Villa	MUN-CO	M	HIDALGO	NUECES-RIO GRAND	NONE							R	Y	Y	N		400	400	400	400	400	400	Y
952			Delta Watershed Project	M			Nueces-Rio Grand Run-of-Rive	SURFACE WATER	M	HIDALGO	NUECES-RIO GRANDE		2010	expanded use of existing	USING WATER NOT BEING USED FROM CURRENT A			Irrigation	Irrigation	M	HIDALGO	NUECES-RIO GRAND	NONE							R	Y	Y	N		3617	3617	3617	3617	3617	3617	Y

WMSWugCost

DBWMSWUGCOS	DBPROJECTID	WMS Project ID	Project Name	WMS Sponsor RWPG	DBWMSSOID	DBSOID	SRC Name	SRC Type	SRC RWPG	SRC Count	SRC Basin Name	SRC ID	Online Dat	WMS Type Description	SRC Use Description	WUG ID	WUG Name	WUG Type	City ID	Is Selected	Term of Deb	Capital Cost	AC2010	AC2020	AC2030	AC2040	AC2050	AC2060	Include Cost
			Delta Watershed Project	M			Nueces-Rio Grand Run-of-Rive	SURFACE WATER	M	HIDALGO	NUECES-RIO GRANDE		2010	expanded use of existing	USING WATER NOT BEING USED FRON		North Alamo	MUN-CO	0003	R	40	$ 53,788,355	$ 2,420,409	$ 2,420,409	$ 1,594,325	$ 1,594,325	$ 1,304,134	$ 1,304,134	Y
			Delta Watershed Project	M			Nueces-Rio Grand Run-of-Rive	SURFACE WATER	M	HIDALGO	NUECES-RIO GRANDE		2010	expanded use of existing	USING WATER NOT BEING USED FRON		La Villa	MUN-CO		R	40	$ 53,788,355	$ 688,089	$ 688,089	$ 474,684	$ 474,684	$ 296,008	$ 296,008	Y
			Delta Watershed Project	M			Nueces-Rio Grand Run-of-Rive	SURFACE WATER	M	HIDALGO	NUECES-RIO GRANDE		2010	expanded use of existing	USING WATER NOT BEING USED FRON		Irrigation	Irrigation		R	40	$ 53,788,355	$ 5,335,125	$ 5,335,125	$ 3,614,909	$ 3,614,909	$ 2,523,703	$ 2,523,703	Y

WMSWwp

DBWMSWWPID	DBPROJECTID	WMS Project ID	Project Name	WMS Sponsor RWPG	DBWMSSOID	DBSOID	SRC Name	SRC Type	SRC RWPG	SRC County Name	SRC Basin Name	SRC ID	Online Date	WMS Type Description	SRC Use Description	DBWWPID	WWP ID	WWP Name	WWP RWPG	Is Selected	Is Used To Meet Need	Also Selected WUG	Is IBT	DBWMSWWP CustID	DBCUSTID	DBWUGID	WUG ID	WUG Name	Recipient Name	WUG Type	WUG RWPG	WUG County Name	WUG Basin Name	WUG Detail	Regional Comments	SS2010	SS2020	SS2030	SS2040	SS2050	SS2060	Include Supply
			Delta Watershed Project	M			Nueces-Rio Grand Run-of-Rive	SURFACE WATER	M	HIDALGO	NUECES-RIO GRANDE		2010	expanded use of existing	USING WATER NOT BEING USED FROM CURRENT A			Hidalgo County Drainage	M	R	Y	Y	N					North Alamo W	North Alamo	MUN-CO	M	HIDALGO	NUECES-RIO GRANDE			2000	2000	2000	2000	2000	2000	Y
			Delta Watershed Project	M			Nueces-Rio Grand Run-of-Rive	SURFACE WATER	M	HIDALGO	NUECES-RIO GRANDE		2010	expanded use of existing	USING WATER NOT BEING USED FROM CURRENT A			Hidalgo County Drainage	M	R	Y	Y	N					La Villa	La Villa	MUN-CO	M	HIDALGO	NUECES-RIO GRANDE			400	400	400	400	400	400	Y
			Delta Watershed Project	M			Nueces-Rio Grand Run-of-Rive	SURFACE WATER	M	HIDALGO	NUECES-RIO GRANDE		2010	expanded use of existing	USING WATER NOT BEING USED FROM CURRENT A			Hidalgo County Drainage	M	R	Y	Y	N					Irrigation	Irrigation	Irrigation	M	HIDALGO	NUECES-RIO GRANDE			3617	3617	3617	3617	3617	3617	Y

WMSWwpCost

DBWMSWWPID	DBPROJECTID	WMS Project ID	Project Name	WMS Sponsor RWPG	DBWMSSOID	DBSOID	SRC Name	SRC Type	SRC RWPG	SRC Count	SRC Basin Name	SRC ID	Online Dat	WMS Type Description	SRC Use Description	DBWWPID	WWP ID	WWP Name	WWP RWPG	Is Used To M	Also Selecte	Is Selected	Is IBT	Regional Comm	Term of Debt $	Capital Cost	AC2010	AC2020	AC2030	AC2040	AC2050	AC2060	Include Cost
			Delta Watershed Project	M			Nueces-Rio Grand Run-of-Rive	SURFACE WATER	M	HIDALGO	NUECES-RIO GRANDE		2010	expanded use of existing	USING WATER NOT BEING USED FROM CURRENT A			Delta Watershed Project	M	R	Y	Y	N		$ 40	$ 53,788,355	$ 8,443,623	8443622.921	5683918.7	5683918.7	4123844.7	4123844.7	Y

Appendix 3
Region M Planning Group
Amendment Approval Letter, 1/8/2016

RIO GRANDE
REGIONAL WATER PLANNING GROUP

January 8, 2016

Connie Townsend
Texas Water Development Board
1700 N. Congress Avenue
Austin, TX 78711-3231

RE: Amendment to the 2011 Regional Water Plan;
Hidalgo Drainage District No.1, including revisions

Dear Ms. Townsend:

The Rio Grande Regional Water Planning Group (Region M) has reviewed, considered, and approved a major amendment to the 2011 Regional Water Plan (RWP) so that the Delta Watershed Project, sponsored by Hidalgo Drainage District No. 1 (HCDD#1), is included as a recommended strategy and to designate HCDD#1 as a Wholesale Water Provider. The Region M Group took action to consider the amendment request at their meeting on January 22, 2014. On March 12, 2014 a public hearing was held at LRGVDC's Transportation Center in Weslaco, TX, and final approval was granted by Region M's Executive Committee on January 8, 2016.

HCDD#1 and TCEQ have revised the Nueces-Rio Grande Basin Water Availability Model (WAM) to establish a firm yield for the proposed reservoirs. It has been determined for the Delta Project area that there is a firm yield of 7,522 acre-feet per year available. Kathy Alexander at TCEQ sent a letter supporting the WAM revisions comprising a Hydrologic Variance request on February 13, 2015 and TWDB approved this request on March 10, 2015.

This draft amendment has been prepared for the consideration of the public and the members of Region M. The Public Hearing pertaining to this amendment was held March 12, 2014 at 3:00 p.m. The Public Hearing was followed by a 30-day comment period and no comments were received. The Region M Group approved the amendment after the comment period, contingent on revisions made in response to TWDB comments. The revisions have been considered and approved by the Region M Executive Committee January 8, 2016.

Stewards of water resources from Amistad to the Gulf

Administrative Agent: Lower Rio Grande Valley Development Council, Kenneth N. Jones, Executive Director
301 W Railroad – Weslaco, Texas 78596
Telephone: 956-682-3481 Fax: 956-631-4670 Website: riograndewaterplan.org

Based on the materials submitted to Region M an amendment to the 2011 Rio Grande Regional Water Plan has been developed for TWDB's consideration. Please find the following documents included:

- HCDD#1 Draft Amendment document
- HCDD#1 Amendment Data spreadsheet
- 2011 Regional Water Plan Prioritization
- Attachment 4-3 Hidalgo County Drainage District No. 1 Delta Watershed Project materials
    - TEDSI Report 2011
    - TEDSI Water Availability Report
    - TCEQ WAM approval (2/13/14)
    - TWDB WAM Hydrologic Variance approval
    - Unified Cost Model, converted to 2011 RWP standards including 2008 dollars
- TWDB Comments, 5/22/2015 and responses

Sincerely,

Ken Jones
LRGVDC Executive Director

Enclosures

cc: Tomas Rodriguez, RGRWPG Chairman
Sara Eatman, Black & Veatch Corporation

Appendix 4
RWPG Approval of HCDD1 Designation as WWP

RIO GRANDE
REGIONAL WATER PLANNING GROUP

Date: July 24, 2014

To: Connie Townsend – Texas Water Development Board

From: Mr. Glenn Jarvis – Region M Planning Group

CC: Ken Jones – Lower Rio Grande Valley Development Council
Godfrey Garza, Jr. – Hidalgo County Drainage District No. 1

Re: Hidalgo County Drainage District No. 1 Designation as WWP

Hidalgo County Drainage District No. 1 has requested that the Rio Grande Regional Water Planning Group designate them as a Wholesale Water Provider. This designation would apply both retroactively in the 2012 State Water Plan, and in the 2016 Regional Water Plan. The District intends to meet the definition as described in 31TAC357.10(30). The planning group has approved the District's request at a regularly scheduled meeting on April 30, 2014, and requests that TWDB designate Hidalgo County Drainage District #1 as a Wholesale Water Provider both in the 2012 SWP and for the planning process, currently underway.

Thank you,

Glenn Jarvis

Appendix 5

Public Comment and Meeting Notice

NOTICE OF PUBLIC MEETING
RIO GRANDE REGIONAL WATER PLANNING GROUP (RGRWPG)
REGIONAL WATER PLAN AMENDMENT

Notice is hereby given that the Rio Grande Regional Water Planning Group (RGRWPG) will hold a public meeting to review projects submitted to amend the Plan. The RGRWPG planning area encompasses the eight county region of Cameron, Hidalgo, Jim Hogg, Maverick, Starr, Webb, Willacy and Zapata. The RGRWPG will be accepting comments on the Plan Amendment until 5:00 p.m. Friday, April 11, 2014. The RGRWPG will be conducting a public meeting on the Plan as follows.

Notice is given that a public meeting will be held on:

Date of Public Meeting:	**March 12, 2014**
Time of Public Meeting:	**2:00 p.m.**
Location of Public Meeting:	**LRGVDC Transit Center** **510 Pleasantview** **Weslaco, Texas**

Printed copies of the Plan Amendment are available for review at LRGVDC Office and in RGRWPG website and LRGVDC website. The RGRWPG will be accepting written and oral comments and will be acknowledging these comments and reporting to the Texas Water Development Board (TWDB) how these comments are to be incorporated in the plan to be submitted for approval by the TWDB. The public can submit written comments to the following.

Mr. Kevin Patteson
Executive Administrator
Texas Water Development Board
1700 N. Congress
Austin, Texas 78711-3231

Mr. Kenneth N. Jones
Executive Director
Lower Rio Grande Valley Development Council
301 W. Railroad Street
Weslaco, Texas 78596

The Deadline for submission of written comments is 5:00 p.m. Friday, April 11, 2014.

The following locations are where copies of the RGRW Plan are available for inspection by the general public.

County Clerk's Office
Cameron County
964 E. Harrison
Brownsville, Texas 78520
(956) 544-0815

County Clerk's Office
Hidalgo County
100 N. Closner
Edinburg, Texas 78539
(956) 318-2100

County Clerk's Office
Jim Hogg County
102 E. Tilley
Hebbronville, Texas 78042
(361) 527-3015

County Clerk's Office
Maverick County
500 Quarry St.
Eagle Pass, Texas 78853
(830) 773-3824

County Clerk's Office
Starr County
401 N. Briggon
Rio Grande City, Texas 78582
(956) 487-2101

County Clerk's Office
Webb County
1000 Houston St.
Laredo, Texas 78042
(956) 721-2640

County Clerk's Office Willacy County 540 W. Hidalgo Raymondville, Texas 78580 (956) 689-2710	County Clerk's Office Zapata County 600 Hidalgo Blvd. Zapata, Texas 78076 (956) 765-9915	

The Public Libraries located at the following:

McAllen Public Library 4001 N. 23rd St. McAllen, Texas 78504	Brownsville Public Library 2600 Central Blvd. Brownsville, Texas 78520	Reber Memorial Library 193 N. 4th Raymondville, Texas 78580
Eagle Pass Public Library 589 Main St. Eagle Pass, Texas 78853	Starr County Library 700 E. Canales Rio Grande City, Texas 78582	Zapata County Library 901 Kennedy St. Zapata, Texas 78076
Laredo Public Library 1120 E. Calton St. Laredo, Texas 78042	Jim Hogg County Library 210 S. Smith Hebbronville, Texas 78361	

The Regional Water Plan can be found on the Region M web site at www.riograndewaterplan.org and the Offices of the LRGVDC at 301 W. Railroad Street, Weslaco, Texas 78501.

All meetings of the RGRWPG are open to the public and include opportunities for public comment.

For further questions or additional information, please contact Kenneth N. Jones (956) 682-3481 / FAX (956) 631-4670

Appendix 6
TWDB Approval of Hydrologic Variance #2

Texas Water Development Board

P.O. Box 13231, 1700 N. Congress Ave.
Austin, TX 78711-3231, www.twdb.texas.gov
Phone (512) 463-7847, Fax (512) 475-2053

March 10, 2015

Mr. Glenn Jarvis, Chairman Region M
Mr. Kenneth Jones, Designated Political Subdivision Region M
c/o Lower Rio Grande Valley Development Council
301 West Railroad
Weslaco, Texas 78596

Re: Rio Grande Regional Water Planning Group (Region M) Hydrologic Variance Request #2

Dear Chairman Jarvis and Mr. Jones:

In regards to the Nueces-Rio Grande Basin, the Texas Water Development Board (TWDB) approves Region M's request to use the proposed WAM model revisions prepared by TEDSI Infrastructure Group, Inc. for the development of firm diversion existing supplies within the Main Floodwater Channel watershed within the HCDD1's service boundary for inclusion in the 2011 and 2016 Region M Water Plans. Specifically, the Executive Administrator approves:

- Revised watershed delineation of the Main Floodwater Channel sub-basin;
- Revised irrigation return flows and wastewater discharges in order to determine naturalized flows at the Panchita Control Structure; and,
- Estimated modified NRG WAM firm diversion supply for the Main Floodwater Channel sub-basin (7,522 acre-feet/year).

This approval is based on a letter from the Texas Commission on Environmental Quality (TCEQ) dated February 13, 2015 and a subsequent phone call with TCEQ staff on March 6, 2015.

While TWDB authorizes these variances to the hydrologic modelling to evaluate existing water supplies and for evaluating WMS supplies for development of the 2011 and 2016 regional water plans, it is the responsibility of Region M to ensure that the resulting estimates of water availability are reasonable for drought planning purposes and will reflect conditions expected in the event of actual drought conditions; and, that in all other regards water availability will be evaluated in accordance with the contract Exhibit C, General Guidelines for Regional Water Plan Development and Exhibit D, Guidelines for Regional Water Planning Data Deliverables associated with each individual regional water plan.

If you have any questions, please do not hesitate to contact Connie Townsend, TWDB's Project Manager for Region M, at (512) 463-8290 or via email at connie.townsend@twdb.texas.gov .

Sincerely,

Jeff Walker,
Deputy Executive Administrator
Water Supply and Infrastructure

cc: Sara Eatman, Black & Veatch
David Carter, TWDB
Connie Townsend, TWDB

Appendix 7
TCEQ Support of Hydrologic Variance #2

THE STATE OF TEXAS

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

February 13, 2015

Connie Townsend, P.E.
Regional Water Planning
Texas Water Development Board
PO Box 13231
Austin, Texas 78711-3231

Dear Ms. Townsend:

The Water Availability Division (WAD) of the Texas Commission on Environmental Quality has completed its review of the updated naturalized flow information and modified watershed delineations submitted by Hidalgo County Drainage District No. 1 (HCDD1) in support of its proposed water management strategy to utilize water in the HCDD1's canal system as a new water supply for Region M. After reviewing the most recent information submitted by HCDD1, WAD staff finds the updated naturalized flows and modified watershed delineations acceptable. WAD staff is currently finalizing an updated water availability model for the Nueces-Rio Grande Coastal Basin. Although HCDD1 has not submitted an application for a water rights permit at this time, WAD staff's preliminary review of the updated model outputs indicates that unappropriated water is available to support the HCDD1 application for unappropriated water. Please contact me at kathy.alexander@tceq.texas.gov or by phone at 512-239-0778 if you have any further questions.

Sincerely,

for Kathy Alexander

Kathy Alexander, Ph.D.
Technical Specialist
Water Availability Division
Texas Commission on Environmental Quality

Appendix 8
TDWB Amendment Comments

Texas Water Development Board

P.O. Box 13231, 1700 N. Congress Ave.
Austin, TX 78711-3231, www.twdb.texas.gov
Phone (512) 463-7847, Fax (512) 475-2053

May 22, 2015

Mr. Glenn Jarvis, Region M Chairman
Mr. Kenneth Jones, Designated Region M Political Subdivision
c/o Lower Rio Grande Valley Development Council
301 W. Railroad
Weslaco, Texas 78596

RE: Review Comments on the 2011 Region M Water Plan Major Amendment

Dear Chairman Jarvis and Mr. Jones,

Texas Water Development Board (TWDB) staff have completed a review of the submitted 2011 Region M Water Plan Major Amendment to add the Hidalgo County Drainage District No.1 Delta Watershed Project as a new Recommended Water Management Strategy. This amendment was received on April 13, 2015 and supplemental information was received on May 13, 2015. ATTACHMENT 1 provides the comments resulting from this review. These comments must be addressed prior to the Board's consideration of approval of this amendment.

If you have any questions concerning this plan amendment, please do not hesitate to contact Connie Townsend, TWDB's Project Manager for Region M, at (512) 463-8290 or connie.townsend@twdb.texas.gov.

Sincerely,

Jeff Walker
Deputy Executive Administrator
Water Supply & Infrastructure

Enclosures

cc: Sara Eatman, Black & Veatch
Connie Townsend, TWDB

ATTACHMENT 1

2011 Rio Grande (Region M) Regional Water Plan Major Amendment
Addition of a New Recommended Water Management Strategy (WMS)
Hidalgo Drainage District No.1 (HCDD1) Delta Watershed Project
TWDB Contract No. 1148301324

TWDB Amendment Review Comments

1. The amendment does not include all relevant information intended to be a part of the amendment. Please incorporate all information on which the WMS yield, cost, and reliability is based, as appropriate, into the amendment including, but not limited to, information contained in the submitted Black & Veatch (B&V) Technical Memorandum and Appendices A-D; modelling information based on Region M's Hydrologic Variance #2. *[31 TAC §357.34 (d)]*

2. Please provide all changes to the 2011 Region M Plan as a result of this amendment. *[31 TAC §357.51(b)]* This may include but may not be limited to the following amended plan information:
   a. The relevant *Executive Summary* text and exhibits, which include but are not limited to:
      i. Page ES-9, paragraph 1 text update;
      ii. Page ES-11, *Exhibit 10*;
      iii. Page ES-12, *Exhibit 11*;
      iv. Page ES-13, *Exhibit 12, portion for "Dams, Weirs, and Storage"*; and,
      v. Same revisions listed above for the Spanish version of the *Executive Summary.*
   b. *Section 4.3 Overview of Recommended WMSs, Figure 4.8*, page 4-21.
   c. *Section 4.3.1.1 Implementation of Recommended WMS Currently Using Amistad-Falcon Reservoir* – all relevant revisions, which include, but are not limited to *Table 4.20.*
   d. *Section 4.3.6 Recommended Strategies for Reducing Projected Irrigation Needs* – all relevant revisions, which include, but are not limited to *Table 4.24.*
   e. *Section 4.7 Quantitative Environmental Analysis* – all relevant revisions, which include, but are not limited to *Table 4.53.*
   f. *Section 4.11 Strategies for Reducing Irrigation Shortages* – all relevant revisions, which include, but are not limited to the addition of information from this new Recommended WMS, where appropriate.
   g. *Attachment 4-1* (begins on plan page 4-142 & *Errata #2* page 42 of 42) – revisions to table of *Unmet Irrigation Water Needs with the Implementation of WMS.*
   h. *Section 9.2 Water User Group Summaries* – all relevant revisions, which include, but are not limited to *Table 9.1.*
   i. *Section 10 Public Participation, Facilitation, and Plan Implementation Issues* – a summary of the associated RWPG actions taken (including WWP designation, Hydrologic Variance #2 approval, and major amendment adoption); and documentation of the public notice and public hearing process.
   j. *Appendices 1* and *2* – all relevant "WUG & WWP Decision Documents" tables.
   k. *Appendix 7* – all relevant "WMS Cost Analyses" tables.

l. References to plan *Errata #1* and *#2* locations for all affected items in the 2011 Region M Water Plan Major Amendment, as appropriate. In these instances, it is the errata item that is the most current approved plan item on which amendment revisions should be based.

3. Amendment item # 8: *Section 4.5.1.2, Table 4.26, page 4.37*: For the Acquisition of Water Rights WMS group (M9, M10 & M11), it appears that the share of the project's firm yield that is associated with municipal supply (5,600 acre-feet/year) is exceeded by the 27,385 acre-feet/year that is characterized in the amendment as being substituted (on a 1:1 basis) for the new project supply. Please limit the volume associated with this replacement to the volume of water available from the project. *[31 TAC §357.34 (d)(3)(A)]*

4. Amendment item #10: *Section 4.5.8.5 HCDD1 WWP Delta Watershed WMS Evaluations:* Unit costs presented in Tables 4.51-3 & 4.51-4 do not appear to be based on the project firm yield volume of 7,522. For example, Table 4.51-4 presents a total annual cost of $4,888,419 and a unit cost of $872 per acre-foot which is based on a volume of 5,605 acre-feet per year. Please present unit costs that address the full firm yield of 7,522 acre-feet/year. *[31 TAC §357.32 (c); 31 TAC §357.34 (b); 31 TAC §357.34 (d)(3)(A)]*

5. Amendment item #10: *Section 4.5.8.5.1 Strategy Description*: The strategy information presented in the plan amendment does not adequately describe the project location and layout of the associated infrastructure. Please include additional information regarding the locations of the proposed reservoirs and associated infrastructure, for example, using a map/figure. *[31 TAC §357.34 (e)]*

6. Amendment item #10: *Section 4.5.8.5.4*: Please provide a quantitative reporting of environmental factors and agricultural resources impacted by this amendment. *[TAC §357.34 (d)(3)(B&C)]*

7. Please submit all specific DB12 database revisions to reflect the amendment to the plan.

8. Please submit the required 2011 regional prioritization score for the HCDD1 Delta Watershed Project.

2011 RIO GRANDE REGIONAL WATER PLAN AMENDMENT

The following amendment is requested to the 2011 Rio Grande Regional Water Plan (insertions in italics, deletions in strikethrough), in order to include the Delta Watershed Project as a Water Management Strategy, sponsored by the Hidalgo County Drainage District No. 1.

Contents

1. Section 1.7, pg. 1-49 and 1-50

Replace table 1.6 with:

Table 1.6: Water User Groups[1] and Wholesale Water Providers

Water User Group
Irrigation
Water User Group Subdivision
Irrigation District
Cameron County Irrigation
Adams Garden Irrigation District No. 19
Bayview Irrigation District No. 11
Brownsville Irrigation District
Cameron County Irrigation District No. 3
Cameron County Irrigation District No. 4

[1] Individual irrigation districts are not classified as water user groups but rather are addressed as subset of the associated county irrigation water user group (per Amendment no. 1 to Final Study No. 2 as approved by TWDB on April 5, 2010).

Cameron County Irrigation District No. 16		
Cameron County Irrigation District No. 2		
Cameron County Irrigation District No. 6		
Harlingen Irrigation District No. 1		
Hidalgo and Cameron Counties Irrigation District No. 9		
Valley Acres Irrigation District		
Hidalgo County Irrigation		
Hidalgo and Cameron Counties Irrigation District No. 9		
Valley Acres Irrigation District		
Donna Irrigation District No. 2		
Engleman Irrigation District		
Hidalgo County Improvement District No. 19		
Hidalgo County Irrigation District No. 1		
Hidalgo County Irrigation District No. 13		
Hidalgo County Irrigation District No. 16		
Hidalgo County Irrigation District No. 2		
Hidalgo County Irrigation District No. 5		
Hidalgo County Irrigation District No. 6		
Hidalgo County Water Control and Improvement District No. 18		
Hidalgo County Water Irrigation District No. 3		
Santa Cruz Irrigation District		
United Irrigation District		
Delta Lake Irrigation District		
Willacy County Irrigation		
Delta Lake Irrigation District		
Wholesale Water Providers		
WWPs	**County Name**	**River Basin**
Brownsville Irrigation and Drainage District	Cameron County	Nueces-Rio Grande, Rio Grande
Cameron County WCID #2	Cameron County	Nueces-Rio Grande
Delta Lake Municipal Authority	Willacy, Hidalgo County	Nueces-Rio Grande
Donna Irrigation District Hidalgo County #1	Hidalgo County	Nueces-Rio Grande
City of Eagle Pass	Maverick County	Rio Grande
Harlingen Irrigation District	Cameron County	Nueces-Rio Grande
Harlingen Waterworks System	Cameron County	Nueces-Rio Grande, Rio Grande
Hidalgo County Drainage District #1	*Hidalgo County*	*Nueces-Rio Grande*
Hidalgo County Irrigation District #6	Hidalgo County	Nueces-Rio Grande, Rio Grande
Hidalgo County WCID #1	Hidalgo County	Nueces-Rio Grande
Hidalgo County WCID #16	Hidalgo County	Nueces-Rio Grande, Rio Grande

Hidalgo County WCID #2	Hidalgo County	Nueces-Rio Grande, Rio Grande
Hidalgo County WCID #3	Hidalgo County	Nueces-Rio Grande, Rio Grande
Hidalgo-Cameron County WCID #9	Hidalgo County	Nueces-Rio Grande
La Feria WCID #3	Cameron, Hidalgo County	Nueces-Rio Grande
La Joya WSC	Hidalgo County	Nueces-Rio Grande, Rio Grande
Laguna Madre WD	Cameron County	Nueces-Rio Grande
City of McAllen	Hidalgo County	Nueces-Rio Grande, Rio Grande
Military Highway WSC	Cameron & Hidalgo County	Nueces-Rio Grande, Rio Grande
North Alamo Water Supply Corporation	Willacy, & Hidalgo County	Nueces-Rio Grande, Rio Grande
Sharyland WSC	Hidalgo County	Nueces-Rio Grande
Southmost Regional Water Authority	Cameron County	Nueces-Rio Grande, Rio Grande
United ID	Hidalgo County	Nueces-Rio Grande, Rio Grande
Valley MUD #2	Cameron County	Nueces-Rio Grande
Webb County Water Utility	Webb County	Rio Grande

2. Section 2.3.7, pg 2-24, Table 2.21

Insert into table between Harlingen Water Works System and Hidalgo County Irrigation District No. 6.

HARLINGEN WATER WORKS SYSTEM	19,238	19,238	19,238	19,238	19,238	19,238
HIDALGO COUNTY DRAINAGE DISTRICT #1	*0*	*7,522**	*7,522**	*7,522**	*7,522**	*7,522**
HIDALGO COUNTY IRRIGATION DISTRICT #6	8,291	8,291	8,291	8,291	8,291	8,291
HIDALGO COUNTY WCID #1	1,437	1,437	1,437	1,437	1,437	1,437
HIDALGO COUNTY WCID #16	1,047	1,047	1,047	1,047	1,047	1,047
HIDALGO COUNTY WCID #2	24,667	24,667	24,667	24,667	24,667	24,667
HIDALGO COUNTY WCID #3	13,980	13,980	13,980	13,980	13,980	13,980
HIDALGO-CAMERON WCID #9	11,500	11,500	11,500	11,500	11,500	11,500
LA FERIA WCID #3	4,852	4,852	4,852	4,852	4,852	4,852
LA JOYA WSC	1,554	2,057	2,599	2,996	2,996	2,996
LAGUNA MADRE WD	7,480	7,480	7,480	7,480	7,480	7,480
MCALLEN CITY OF	33,548	33,548	33,548	33,548	33,548	33,548
NORTH ALAMO WSC	22,338	22,338	22,338	22,338	22,338	22,344
MILITARY HIGHWAY WSC	3,620	4,020	4,130	4,254	4,369	4,502
SHARYLAND WSC	12,140	12,139	12,139	12,140	12,139	12,140
SOUTHMOST REGIONAL	11,844	11,844	11,844	11,844	11,844	11,844
UNITED IRRIGATION	24,009	24,009	24,009	24,009	24,009	24,009
VALLEY MUD #2	1,382	1,382	1,382	1,382	1,382	1,382
WEBB COUNTY WATER	2,311	2,311	2,311	2,311	2,311	2,312
REGION M TOTAL	254,432	255,313	255,975	256,505	256,626	256,773

* Available from Firm Yield as approved by TCEQ

3. Section 2.3.8, pg. 2-27.

Delete the section discussing the Project from the "Other Potential Water Demands" section.

~~Hidalgo County Drainage District No. 1~~

~~Another potential project is being conducted by Hidalgo County Irrigation District which is studying the possibility of developing municipal water within the drainage network of the county. The potential of this project could approximate 10% more water for the total needs of the county.~~

4. Attachment 2.1, pg. 2-34, Water Demand Projections for Wholesale Water Providers (Table)

Insert into table between Harlingen Water Works System and Hidalgo County Irrigation District No. 6.

WHOLESALE WATER PROVIDERS	COUNTY	RIVER BASIN	DEMAND					
Hidalgo County Drainage District #1			2010	2020	2030	2040	2050	2060
MCALLEN	HIDALGO	RIO GRANDE	4	5	5	6	7	8
ALAMO	HIDALGO	NUECES-RIO GRANDE	2,319	3,022	3,808	4,675	5,667	6,684
SAN JUAN	HIDALGO	NUECES-RIO GRANDE	3,501	4,665	5,956	7,384	9,031	10,720
PHARR	HIDALGO	NUECES-RIO GRANDE	9,420	11,550	13,948	16,595	19,445	22,491
MISSION	HIDALGO	NUECES-RIO GRANDE	11,065	14,063	17,419	20,960	25,064	29,269
MCALLEN	HIDALGO	NUECES-RIO GRANDE	29,797	34,925	40,898	47,254	54,356	61,877
IRRIGATION	HIDALGO	NUECES-RIO GRANDE	560,291	505,458	436,074	436,074	436,074	436,074
IRRIGATION	HIDALGO	RIO GRANDE	22,739	20,513	17,698	17,698	17,698	17,698
TOTAL			639,136	594,201	535,806	550,646	567,342	584,821

5. Section 4.2, pg. 4-6. Replace Table 4.3

Table 4.3: Wholesale Water Providers Surplus/Deficit Analysis

	2010	2020	2030	2040	2050	2060
Delta Lake Municipal Authority	0	0	0	0	0	0
City of Eagle Pass	0	0	0	0	0	0
Harlingen Waterworks System	0	0	1	0	0	0
Laguna Madre WD	0	0	0	0	0	0

City of McAllen	0	0	0	0	0	0
Sharyland WSC	0	0	0	0	0	0
Southmost Regional Water Authority	-6,888	-6,888	-6,888	-6,888	-6,888	-6,888
Valley MUD#2	0	0	0	1	0	1
North Alamo WSC	0	0	0	0	0	0
Brownsville Irrigation and Drainage District Needs	-34	-34	-34	-34	-34	-34
Hidalgo County Drainage District #1	*0*	*0*	*0*	*0*	*0*	*0*

6. Section 4.3, pg. 4-22. Replace Table 4.18.

Add in the HCDD1 project and reduce the Acquisition of Water Rights WMS volume for all entities served by the Project. Adjust costs accordingly.

Replace with:

Table 4.18: Recommended Water Management Strategies Capital Cost and Water Supply

WMS Project ID	Strategy	Total Capital Cost	First Decade of Water Strategy	First Decade Water Supply Volume (ac-ft/yr)	First Decade Estimated Annual Average Unit Cost ($/ac-ft/yr)	Year 2060 Water Supply Volume (ac-ft/yr)	Year 2060 Estimated Annual Average Unit Cost ($/ac-ft/yr)
M10	Acquisition of Water through Contract	$16,263,877	2010	312	$430	4,671	$430
M9	Acquisition of Water Rights Through Purchase	$631,081,709	2010	9,611	$294	151,237	$424
M11	Acquisition of Water Rights through Urbanization	$56,167,089	2010	299	$430	16,406	$430
M12	Advanced Water Conservation	$22,583,710	2010	2,917	$248	32,793	$599
M14	Banco Morales Reservoir`	$25,790,900	2020	238	$2,542	238	$2,542
M5	Brackish Desalination	$267,290,631	2010	38,364	$465	92,212	$468
M6	Brownsville Weir and Reservoir	$98,411,077	2020	20,643	$183	23,643	$183
M3	Groundwater Development	$27,474,302	2010	3,772	$215	24,520	$254
M8	Irrigation Conveyance System Conservation	$131,899,803	2010	91,160	$3	139,217	$15
M16	Laredo Low Water Weir	$294,400,000	2010	0	$0	0	$0
M1	Non-Potable Reuse	$174,944,916	2010	2,417	$101	64,116	$130
M7	On-Farm Water Conservation	$194,569,720	2010	36,528	$128	114,619	$29
M2	Potable Reuse	$7,519,850	2010	1,120	$150	1,290	$180
M13	Elsa Infrastructure Improvements	$8,325,386	2010	105	$102	105	$102
M15	Resaca Restoration	$52,000,000	2010	877	$2,542	877	$2,542

WMS Project ID	Strategy	Total Capital Cost	First Decade of Water Strategy	First Decade Water Supply Volume (ac-ft/yr)	First Decade Estimated Annual Average Unit Cost ($/ac-ft/yr)	Year 2060 Water Supply Volume (ac-ft/yr)	Year 2060 Estimated Annual Average Unit Cost ($/ac-ft/yr)
M4	Seawater Desalination	$185,940,937	2010	125	$1,051	7,902	$1,051
	Delta Watershed Project	*$47,658,114*	*2010*	*5,600*	*$873*	*5,600*	*$873*
	TOTAL	*$2,242,322,021*		*214,088*		*679,446*	

It should be noted, however, that irrigation yields less than municipal rights by a factor of two to one when comparing irrigation Class A rights to the of municipal rights. With the acquisition of water rights accounting for over 40% of the municipal strategies *by 2060*, the Rio Grande will remain the dominant source of water for the Region.

Alternate sources of water will also play an important part in providing the needs for the area. Brackish Groundwater Desalination will provide an alternate source of water not previously used and planned in the previous Rio Grande Regional Plan. Over 22% of the *municipal* supplies will be from brackish desalination. The remaining strategies are shown below.

For DMI users, the strategies that were further evaluated according to TWDB standards for this plan are:

- Municipal Water Conservation
- Non-Potable Reuse of Reclaimed Water
- Acquisition of Additional Rio Grande Water Through Water Rights Purchase, Urbanization & Contract
- Desalination of Brackish Groundwater
- Desalination of Seawater
- Groundwater Development
- Dams, Weir and Storage
  - Brownsville Weir and Reservoir
  - Banco Morales Reservoir
  - Resaca Restoration
  - Laredo Low Water Weir
  - *Delta Watershed Project*
- Water Infrastructure and Distribution
  - Proposed Elsa Tank

7. **Revise section 4.5, pg. 4-34 to include the name of the project:**

Opportunities for the development of additional water supplies for municipal use are limited in the Rio Grande Region, both because of the hydrologic characteristics of the region and by economics. As previously noted, there are few opportunities to increase the water supply yield of the Rio Grande. However, a number of strategies for augmenting municipal water supplies have been examined as part of this planning effort. These include: Advanced Municipal Water Conservation; Banco Morales Reservoir; Laredo Low Water Weir; Resaca Restoration; Infrastructure Improvements for City of Elsa; Brownsville Weir and Reservoir; *Delta Watershed Project,* Reuse of Reclaimed Water; Optimizing Surface Water Supply from the Rio Grande; Groundwater Development; Brackish and Seawater Desalination; and Acquisition of Additional Rio Grande Supplies for domestic-municipal-industrial (DMI) uses. The evaluations of these strategies are presented in the sections that follow. More detailed back-up information is provided in the appendix and in technical appendices to this plan.

8. Replace table 4.26 section 4.5.1.2, pg. 4-37

Table 4.26: Water Yield for Acquisition of Rio Grande Water Rights

	Cameron	Hidalgo	Jim Hogg	Maverick	Starr	Webb	Willacy	Zapata
Purchase (ac-ft)	15,121	65,663	7	2,226	11,149	55,060	198	1,813
Urbanization (ac-ft)	0	16,406	0	0	0	0	0	0
Contract (ac-ft)	892	2,201	0	0	235	1,338	5	0
Total:	16,013	84,270	7	2,226	11,384	56,398	203	1,813

With:

Table 4.26: Water Yield for Acquisition of Rio Grande Water Rights

	Cameron	Hidalgo	Jim Hogg	Maverick	Starr	Webb	Willacy	Zapata
Purchase (ac-ft)	15121	53534	7	2226	11149	55060	198	1813
Urbanization (ac-ft)	0	1174	0	0	0	0	0	0
Contract (ac-ft)	892	2177	0	0	235	1338	5	0
Total:	16013	56885	7	2226	11384	56398	203	1813

9. Revise section 4.5.8, pg. 4-66

4.5.8 Dams, Weirs, and Storage

This Water Management Strategy is actually a combination of four individual strategies: Brownsville Weir and Reservoir, Resaca Restoration, Laredo Low Water Weir, ~~and~~ Banco Morales Reservoir, *and the Delta Watershed Project*. Due to the uniqueness of each individual project, the analysis of each in terms of strategy description, water supply yield, cost, environmental impact, implementation issues, and recommendations were evaluated separately. However, there are common themes that each strategy shares. The main intent of each project is to increase the volume of available raw water storage for the end user. This could be the result of constructing an on-channel weir and reservoir, removing sediment from existing storage, or constructing an off-channel reservoir. Each individual strategy is analyzed in more detail below.

10. Add section 4.5.8.5, pg. 4-79

4.5.8.5 Delta Watershed Project

4.5.8.5.1 Strategy Description

The Delta Watershed Project is being proposed by the Hidalgo County Drainage District No. 1 as a new source of water for the region in the Lower Rio Grande in Hidalgo County. The strategy for this project is to reclaim raw water from storm water rainfall & irrigation runoff into HCDD#1 Master Drainage System ditches and retain this water in various reservoirs adjacent to the main floodwater channel within Hidalgo County, Texas. This raw water will be sold to various municipal utilities, water supply corporations, irrigation districts, etc. for potable water treatment and raw water distribution for agricultural uses, respectively.

As a major storm approaches some of these reservoirs water levels can be reduced in volume to provide for Storm water control/management during major rainfall events for detention reasons. This project will also provide educational benefits to the general public schools to educate the public under the MS4 program. The project can provide economic development in the development around said reservoirs. In Phase 2 this project could provide for water treatment of the raw water for distribution to smaller municipalities/ water supply entities within the LRGV Region.

4.5.8.5.2 Water Supply Yield

The firm yield at the proposed water development site was measured at 10.3 cfs (6.7 MGD/7,522 acre-feet/year). As recommend in the Regional Water Supply Facilities Plan prepared for TWDB in 2011, conservatively 16,785 acre-feet/year of water could be developed for beneficial uses. The proposed development strategy can be phased based on the needs of water. The amount of developable water could be increased by capturing floodwater during wet season. The proposed development strategy was based on historical base flow data and water quality sampling as documented in two previous studies – Regional Water Supply Facilities Plan for TWDB in 2011 and Hidalgo County Water Development Project for Hidalgo County Drainage District No.1 in 2006 by Civil Systems Engineering, Inc.

4.5.8.5.3 Cost

Conceptual cost estimates, capital and annual O&M, were developed for each alternative treatment process as detailed in the 2011 TWDB Regional Water Supply Facilities Plan. HCDD#1 updated this plan in 2015 to reflect the firm yield of 7,522 acre-feet/year that was approved by TCEQ. Capital cost estimates included *construction components such as excavation and site work, equipment, concrete and steel, labor, pipe and valves, power supply access and instrumentation, and housing that are expended in the construction activities of the project, and other expenses such as engineering, engineering service during construction, financial and legal services, permitting, commissioning and startup. The capital cost estimates include a 30 percent contingency. This estimate includes the cost for land and right-of-way, proposed pump structures and improvements, and proposed weirs. Annual O&M cost estimates included all labor and materials required to run the treatment plant.*

It should be noted that the cost estimates for this study are based on conceptual designs. Detailed cost estimates are required for final engineering design. The final cost estimates for the project will depend on actual labor and material costs, competitive market conditions, actual site conditions, final project scope, implementation schedule, continuity of personal and engineering, and other variable factors. The final project costs will likely vary from the estimate presented. All costs indexed to September 2008 dollars.

Table 4.51-1: Revised Cost of Water Rights

WUG Name	WMS	Capital Cost	AC2010	AC2020	AC2030	AC2040	AC2050	AC2060
Alamo	Acquisition Of Water Rights Through Contract	$83,565	$0	$2,151	$4,301	$6,022	$8,172	$10,323
McAllen	Acquisition Of Water Rights Through Contract	$1,504,172	$0	$0	$96,779	$141,513	$169,041	$185,816
Pharr	Acquisition Of Water Rights Through Contract	$1,928,962	$0	$38,282	$88,177	$133,770	$181,945	$238,292
San Juan	Acquisition Of Water Rights Through Contract	$1,340,524	$0	$35,271	$63,229	$93,768	$129,039	$165,600
Alamo	Acquisition Of Water Rights Through Purchase	$713,549	$0	$0	$0	$0	$34,841	$73,552
McAllen	Acquisition Of Water Rights Through Purchase	$26,476,416	$0	$430	$430	$1,326,951	$2,030,644	$2,729,175
Pharr	Acquisition Of Water Rights Through Purchase	$35,030,656	$0	$85,166	$850,797	$1,815,579	$2,832,836	$3,610,941
San Juan	Acquisition Of Water Rights Through Purchase	$27,173,274	$0	$326,899	$854,238	$1,437,925	$2,111,078	$2,801,007
Alamo	Acquisition Of Water Rights Through Urbanization	$7,189,770	$0	$86,026	$301,091	$572,073	$731,221	$903,273
Mission	Acquisition Of Water Rights Through Urbanization	$31,217,297	$0	$0	$817,677	$1,822,031	$3,016,932	$3,921,925
Pharr	Acquisition Of Water Rights Through Urbanization	$6,857,671	$0	$172,052	$329,480	$399,161	$458,949	$861,550

Table 4.51-2: Cost of DWP Water to WUG's

WUG Name	WUG County Name	WUG Basin Name	DWP Annual Supply	AC2010	AC2011	AC2012	AC2013	AC2014	AC2015
Alamo	Hidalgo	Nueces-Rio Grande	300	$261,826	$261,826	$261,826	$261,826	$261,826	$261,826
McAllen	Hidalgo	Nueces-Rio Grande	1,000	$872,753	$872,753	$872,753	$872,753	$872,753	$872,753
Mission	Hidalgo	Nueces-Rio Grande	3,000	$2,618,260	$2,618,260	$2,618,260	$2,618,260	$2,618,260	$2,618,260
Pharr	Hidalgo	Nueces-Rio Grande	500	$436,377	$436,377	$436,377	$436,377	$436,377	$436,377
San Juan	Hidalgo	Nueces-Rio Grande	800	$698,203	$698,203	$698,203	$698,203	$698,203	$698,203
Irrigation	Hidalgo		11,185	$4,251,704	$4,251,704	$4,251,704	$4,251,704	$4,251,704	$4,251,704

Table 4.51-3: Delta Watershed Project Cost Details

Costs for Raw Water		
1	Cost of the Basin	$ 20,000,000.00
2	Pumping System	$ 2,000,000.00
3	Weir	$ 1,500,000.00
4	Right of Way	$ 3,000,000.00
	Total	$ 26,500,000.00
Untreated Annualized $/1000		$ 0.35
Untreated Annualized $/AF		$ 114.70
Untreated Annualized estimate of Total Cost		$ 1,925,196.22

Treatment Plant (5 MGD, Alternative C, Blending)		
1	General Items	$ 3,140,750.00
2	Operations and Maintenance Facilities	$ 625,000.00
3	High Rate Clarification (ACTIFLO)	$ 1,537,095.00
4	NF Filter + Complex + DMF	$ 4,280,248.00
5	Clearwell & Effluent Pumping Facilities	$ 693,941.00
6	Plant Waste Handling	$ 512,975.00
7	Chlorine Feed System Building	$ 163,750.00
8	Sludge Drying Beds	$ 241,970.00
9	Other	$ 2,367,165.00
10	Construction Contingency (30%)	$ 4,068,868.00
11	Engineering, Surveying, and Construction Management (20%)	$ 3,526,352.00
	Total	$ 21,158,114.00

Operation and Maintenance		
1	Labor	$ 464,000.00
2	Operations	$ 1,904,000.00
3	Maintenance	$ 240,000.00
4	Professional Services	$ 45,000.00
5	Other	$ 55,000.00

	Total Annual O&M Cost	$ 2,708,000.00
Total Capital		$ 47,658,114.00
Treated Annualized $/1000 gal		$ 2.68
Treated Annualized $/AF		$ 872.75
Treated Annualized estimate of Total Cost		$ 4,887,419.56

Table 4.51-4: Delta Watershed Summary Project Costs

Total Capital	$	47,658,114.00
O&M	$	2,708,000.00
Annualized $/1000 gal	$	2.68
Annualized $/AF	$	872.75
Annualized estimate of Total Cost	$	4,888,419.56

4.5.8.5.4 Environmental Impact

The potential impacts associated with the Hidalgo County Water Supply development include construction and operation of transmission pipelines and a conventional water treatment plant and or reverse osmosis plant which could impact sensitive environmental resources (e.g., native brush clearing) and such streams and resacas. There are no environmental flow standards adopted for Nueces-Rio Grande Coastal Basin or for the Hidalgo County Drainage District's flood ways. The Delta Watershed Project, however, is consistent with the recommendations of the Rio Grande, Rio Grande Estuary, and Lower Laguna Madre Basin and Bay Expert Science Team. In its study, "Environmental Flows Recommendations Report," the Rio Grande, Rio Grande Estuary, and Lower Laguna Madre Basin and Bay Expert Science Team indicated a reduction in freshwater entering the Laguna Madre would benefit the natural aquatic plant life by maintaining the salinity.

At this time there are no known impacts to Navigation, Natural Resources, or Third Party Social and Economic Impacts. The Delta Watershed Project will result in additional water supplies for Agricultural use.

4.5.8.5.5 Implementation Issues

The main implementation issue for Hidalgo County collection system and future water treatment plant would be funding for the project.

Another issue as with any project, necessary state and federal permits must be obtained before construction can begin, potentially including a Section 404, Clean Water Act Permit. Additionally, the project may need to comply with the National Environmental Policy Act if federal funding is involved and with the Endangered

Species Act if any threatened and endangered species are impacted. However, the project has received a non-jurisdictional determination from the U.S. Army Corps of Engineers. In addition, a study, "Environmental Flows Recommendations Report" was prepared by Rio Grande, Rio Grande Estuary, and Lower Laguna Madre Basin and Bay Expert Science Team indicating a reduction in freshwater entering the Laguna Madre would benefit the natural aquatic plant life by maintaining the salinity.

The Delta Watershed Project currently has Memorandums of Understanding with two Irrigation Districts, Engleman and Delta Lake. HCDD#1 is submitting a water rights application to TCEQ. This application is pending approval from the HCDD#1 board for submittal.

The largest potential impact on cultural resources associated with this option comes from pipeline construction and operation. Therefore, pipelines should follow existing and shared rights-of-way whenever possible to minimize the area of disturbance.

The Drainage District will seek a new water right from the TCEQ that authorizes the appropriation and diversion of water directly from the South, North, and Main Flood Way, diversion of water to and storage of water in existing and proposed off-channel reservoirs along the flood ways, and diversion of water from the perimeter of those existing and proposed off-channel reservoirs.

The Delta Watershed WMS will rely on both existing off-channel reservoirs and a proposed off-channel reservoir. The proposed Panchita off-channel reservoir will be located adjacent to the Main Flood Way east of Mile 17 with a center at 26°19'28"N and 97°54'8" W, which is located two (2) miles north from the City of La Villa, Texas. The existing off-channel Santa Cruz Irrigation Reservoir is located six (6) miles northwest of the City of Edinburg. The center of the reservoir is at 26°23'17.98" N and 98°10'10.86" W. The existing off-channel Engleman Irrigation / Carlton Barth Reservoir (Certificate of Adjudication No. 22-4524) is located ten (10) miles northeast of the City of Edinburg. The center of the reservoir is at 26°19'17.77" N and 98°01'14.39" W.

There are no negative impacts on existing water rights, water contracts, and option agreements. The South, North, and Main Flood Ways that are part of the Delta Watershed WMS make up an independent drainage system owned by the Drainage District. There are a few existing water rights with diversions from the drainage system (see for example Certificate of Adjudication No. 22-4524). Any water right issued to the Drainage District will be junior to those water rights, and thus those senior water rights will be protected.

Both phases of the Delta Watershed WMS will take place in the 2010 decade.

4.5.8.5.6 Recommendations

The District is finalizing the water rights application with TCEQ based on the revised WAM Run 3 model within the Nueces Rio Grande Watershed. The Delta Watershed WMS is a recommended WMS.

11. Revise section 4.6, pg. 4-83

4.6 WATER MANAGEMENT STRATEGIES FOR WHOLESALE WATER PROVIDERS

Texas Water Development Board guidelines in Exhibit B state that a Wholesale Water Provider (WWP) is any person or entity, including river authorities, that has contracts to sell more than 1,000 acre-ft of water wholesale in any one year during the five years immediately preceding the adoption of the last regional water plan. Table 4.3 indicates the water providers that follow the TWDB guidelines to designate them as Wholesale Water Providers for this region. This table also shows the projected water surplus/deficit for each WWP.

Out of the ~~nine~~ *eleven* Wholesale Water Providers there are ~~two~~ *three* that have a deficit in this region. They are Southmost Regional Water Authority (SRWA), ~~and~~ North Alamo Water Supply Corporation, *and Hidalgo County Drainage District No. 1.* SRWA has a deficit of 11,844 acre-ft from 2010 to 2060. SRWA has Brackish Desalination as a water management strategy to alleviate the deficit from the Nueces-Rio Grande Basin and Rio Grande Basin. North Alamo Water Supply Corporation has a deficit of 2,345 acre-ft starting in the decade 2040 and growing to 12,150 acre-ft in 2060. The two water management strategies are being recommended to alleviate the deficit on the Nueces-Rio Grande Basin are Brackish Desalination and the Acquisition of Water Rights through Purchase. *Hidalgo County Drainage District No.1 will serve a municipal population with an aggregated need of 74,018 AF by 2060 and irrigators with a county-wide aggregated need of 80,952 by 2060.* Since WWPs supply water to WUGs, numerical comparisons of WMS Yields needed to overcome a deficit can be seen by looking at each applicable WUG in the decision documents located in the appendix.

12. Make the following deletions from Section 4.9, pg. 4-104.

4.9 STRATEGIES CONSIDERED BUT NOT FULLY EVALUATED

Section 4.9 discusses various projects that are in the process of being fully analyzed by the Region. In order to be recommended as a Water Management Strategy to meet future demands, each WMS must be evaluated in terms of water supply yield, cost, environmental impact, and implementation issues. Due to significant components of each of the following projects still pending and lack of information, they cannot be fully recommended as Water Management Strategies. The projects are listed below:

- ~~Hidalgo County Drainage District No. 1 Project~~
- Proposed Pipeline in Dimmit County, Texas into Region
- Ethanol Production Plants

~~4.9.1 Hidalgo County Drainage District No. 1 Project~~

~~4.9.1.1 Strategy Description~~

~~The Hidalgo County Water Supply Project is being proposed by the Hidalgo County Drainage District as a new source of water for the region in the Lower Rio Grande in Hidalgo County. The proposed project is intended to provide additional dependable water supplies to water users by using the extensive drainage network in Hidalgo County and the existing drainage/flood control systems to collect rainfall runoff and shallow groundwater and use and treat the water and eventually serve to water users. The proposed project is to help meet the demands of water for the future. It is to comprise 10% of the water in Hidalgo County in the year 2050.~~

~~4.9.1.2 Water Supply Yield~~

~~No firm information on water supply yield is available at this time.~~

~~4.9.1.3 Cost~~

~~No firm information on cost is available at this time.~~

~~4.9.1.4 Environmental Impact~~

~~The potential impacts associated with the Hidalgo County Water Supply development include construction and operation of transmission pipelines and a conventional water treatment plant and or reverse osmosis plant which could impact sensitive environmental resources (e.g., native brush clearing) and such streams and resacas.~~

~~4.9.1.5 Implementation Issues~~

~~The main implementation issue for Hidalgo County collection system and future water treatment plant would be funding for the project. Another issue as with any project, necessary state and federal permits must be obtained before construction can begin, potentially including a Section 404, Clean Water Act Permit. Additionally, the project~~

~~may need to comply with the National Environmental Policy Act if federal funding is involved and with the Endangered Species Act if any threatened and endangered species are impacted.~~

~~The largest potential impact on cultural resources associated with this option comes from pipeline construction and operation. Therefore, pipelines should follow existing and shared rights-of-way whenever possible to minimize the area of disturbance.~~

~~4.9.1.6 Recommendations~~

~~Due to a lack of information detailing cost and water availability, the Rio Grande RWPG cannot recommend the Hidalgo County Water Supply project as a water management strategy for Hidalgo County users. Should final determinations be made in regards to water supply, cost, and potential end users, future water planning efforts could potentially include the project as a recommended water management strategy.~~

13. Revise Attachment 4-1, page 4-131 Water User Group's Water Management Strategies:

						WMS Supply (ac-ft/yr)					
Region	WMS Project ID	WMS Project Name	WUG Basin Name	WUG County	WUG Name	2010	2020	2030	2040	2050	2060
~~M~~	~~M10~~	~~Acquisition of Water Rights Through Contract~~	~~Nueces-Rio Grande~~	~~Hidalgo~~	~~San Juan~~	~~24~~	~~82~~	~~147~~	~~218~~	~~300~~	~~385~~
~~M~~	~~M9~~	~~Acquisition of Water Rights Through Purchase~~	~~Nueces-Rio Grande~~	~~Hidalgo~~	~~Alamo~~	-	~~100~~	~~200~~	~~277~~	~~381~~	~~471~~
~~M~~	~~M9~~	~~Acquisition of Water Rights Through Purchase~~	~~Nueces-Rio Grande~~	~~Hidalgo~~	~~McAllen~~	-	-	~~998~~	~~4,083~~	~~5,718~~	~~7,341~~
~~M~~	~~M9~~	~~Acquisition of Water Rights Through Purchase~~	~~Nueces-Rio Grande~~	~~Hidalgo~~	~~Pharr~~	-	~~698~~	~~2,478~~	~~4,721~~	~~7,086~~	~~8,895~~
~~M~~	~~M9~~	~~Acquisition of Water Rights Through Purchase~~	~~Nueces-Rio Grande~~	~~Hidalgo~~	~~San Juan~~	~~454~~	~~1,560~~	~~2,786~~	~~4,143~~	~~5,708~~	~~7,312~~
~~M~~	~~M11~~	~~Acquisition of Water Rights Through~~	~~Nueces-Rio Grande~~	~~Hidalgo~~	~~Alamo~~	-	~~400~~	~~800~~	~~1,330~~	~~1,700~~	~~2,100~~

		~~Urbanization~~									
~~M~~	~~M11~~	~~Acquisition of Water Rights Through Urbanization~~	~~Nueces-Rio Grande~~	~~Hidalgo~~	~~Mission~~	~~299~~	~~2,633~~	~~4,901~~	~~7,236~~	~~10,014~~	~~12,118~~

	WMS Supply (ac-ft/yr)					
	2010	2020	2030	2040	2050	2060
WMS WUG Supply Total:	~~72,454~~	~~163,552~~	~~252,415~~	~~361,233~~	~~492,089~~	~~634,536~~

						WMS Supply (ac-ft/yr)					
Region	WMS Project ID	WMS Project Name	WUG Basin Name	WUG County	WUG Name	2010	2020	2030	2040	2050	2060
M	*M10*	*Acquisition of Water Rights Through Contract*	*Nueces-Rio Grande*	*Hidalgo*	*San Juan*	-	*82*	*147*	*218*	*300*	*385*
M	*M9*	*Acquisition of Water Rights Through Purchase*	*Nueces-Rio Grande*	*Hidalgo*	*Alamo*	-	-	-	-	*81*	*171*
M	*M9*	*Acquisition of Water Rights Through Purchase*	*Nueces-Rio Grande*	*Hidalgo*	*McAllen*	-	-	-	*3,083*	*4,718*	*6,341*
M	*M9*	*Acquisition of Water Rights Through Purchase*	*Nueces-Rio Grande*	*Hidalgo*	*Pharr*	-	*198*	*1,978*	*4,221*	*6,586*	*8,395*
M	*M9*	*Acquisition of Water Rights Through Purchase*	*Nueces-Rio Grande*	*Hidalgo*	*San Juan*	-	*760*	*1,986*	*3,343*	*4,908*	*6,512*
M	*M11*	*Acquisition of Water Rights Through Urbanization*	*Nueces-Rio Grande*	*Hidalgo*	*Alamo*	-	*200*	*700*	*1,307*	*1,700*	*2,100*
M	*M11*	*Acquisition of Water Rights Through Urbanization*	*Nueces-Rio Grande*	*Hidalgo*	*Mission*	-	-	*1,901*	*4,236*	*7,014*	*9,118*
M		*Delta Watershed Project*	*Nueces-Rio Grande*	*Hidalgo*	*Alamo*	*300*	*300*	*300*	*300*	*300*	*300*

M		*Delta Watershed Project*	*Nueces-Rio Grande*	*Hidalgo*	*McAllen*	*1,000*	*1,000*	*1,000*	*1,000*	*1,000*	*1,000*
M		*Delta Watershed Project*	*Nueces-Rio Grande*	*Hidalgo*	*Mission*	*3,000*	*3,000*	*3,000*	*3,000*	*3,000*	*3,000*
M		*Delta Watershed Project*	*Nueces-Rio Grande*	*Hidalgo*	*Pharr*	*500*	*500*	*500*	*500*	*500*	*500*
M		*Delta Watershed Project*	*Nueces-Rio Grande*	*Hidalgo*	*San Juan*	*800*	*800*	*800*	*800*	*800*	*800*

	WMS Supply (ac-ft/yr)					
	2010	2020	2030	2040	2050	2060
WMS WUG Supply Total:	*77,277*	*164,919*	*252,417*	*361,233*	*492,089*	*634,536*

14. Revise Attachment 4-1, page 4-138 Water User Group's Water Management Strategies:

County WUG	Amount Description	2010	2020	2030	2040	2050	2060
Hidalgo							
Alamo	Deficit	~~-59~~	~~-762~~	~~-1548~~	~~-2415~~	~~-3407~~	~~-4424~~
	WMS	~~59~~	~~763~~	~~1548~~	~~2415~~	~~3507~~	~~4624~~
	Total	**~~0~~**	**~~1~~**	**~~0~~**	**~~0~~**	**~~100~~**	**~~200~~**
McAllen	Deficit	~~2627~~	~~-2502~~	~~-8475~~	- ~~14832~~	- ~~21935~~	- ~~29457~~
	WMS	~~3551~~	~~3743~~	~~8775~~	~~15232~~	~~22935~~	~~31457~~
	Total	**~~6178~~**	**~~1241~~**	**~~300~~**	**~~400~~**	**~~1000~~**	**~~2000~~**
Mission	Deficit	~~-1470~~	~~-4468~~	~~-7824~~	- ~~11365~~	- ~~15469~~	- ~~19674~~
	WMS	~~1471~~	~~4669~~	~~7824~~	~~11365~~	~~15877~~	~~20134~~
	Total	**~~1~~**	**~~201~~**	**~~0~~**	**~~0~~**	**~~408~~**	**~~460~~**
Pharr	Deficit	~~376~~	~~-1754~~	~~-4152~~	~~-6799~~	~~-9649~~	- ~~12695~~
	WMS	~~293~~	~~1779~~	~~4152~~	~~6799~~	~~9649~~	~~12695~~
	Total	**~~669~~**	**~~25~~**	**~~0~~**	**~~0~~**	**~~0~~**	**~~0~~**
San Juan	Deficit	~~-478~~	~~-1754~~	~~-4152~~	~~-6799~~	~~-9649~~	- ~~12695~~
	WMS	~~573~~	~~1779~~	~~4152~~	~~6799~~	~~9649~~	~~12695~~
	Total	**~~95~~**	**~~25~~**	**~~0~~**	**~~0~~**	**~~0~~**	**~~0~~**

With:

County WUG	Amount Description	2010	2020	2030	2040	2050	2060

Hidalgo							
Alamo	Deficit	-59	-762	-1548	-2415	-3407	-4424
	WMS	359	763	1548	2438	3507	4624
	Total	***300***	***1***	***0***	***23***	***100***	***200***
McAllen	Deficit	2627	-2502	-8475	-14832	-21935	-29457
	WMS	4551	4743	8777	15232	22935	31457
	Total	***7178***	***2241***	***302***	***400***	***1000***	***2000***
Mission	Deficit	-1470	-4468	-7824	-11365	-15469	-19674
	WMS	4172	5036	7824	11365	15877	20134
	Total	***2702***	***568***	***0***	***0***	***408***	***460***
Pharr	Deficit	376	-1754	-4152	-6799	-9649	-12695
	WMS	793	1779	4152	6799	9649	12695
	Total	***1169***	***25***	***0***	***0***	***0***	***0***
San Juan	Deficit	-478	-1642	-2933	-4361	-6008	-7697
	WMS	895	1848	3263	4826	6620	8459
	Total	***417***	***206***	***330***	***465***	***612***	***762***

00827556;2

Appendix 9

HCDD1 Response to TWDB Comments

HIDALGO COUNTY DRAINAGE DISTRICT No. 1

RAUL E. SESIN, PE, CFM
General Manager
Floodplain Administrator

902 N. Doolittle Road
Edinburg, Texas 78542
Off 956 292.7080
Fax 956 292.7089

Date: December 21, 2015
To: Connie Townsend- Texas Water Development Board
From: Raul Sesin, PE,CFM- Hidalgo County Drainage District
CC: Ken Jones – Lower Rio Grande Valley Development Council
Tomas Rodriguez – Rio Grande Regional Water Planning Group
Sara Eatman- Black & Veatch

Re: Amendment to the 2011 Regional Water Plan; Hidalgo County Drainage District No. 1 revisions

Ms. Townsend,

Please find included the following documents for submittal to the TWDB:

- HCDD1 Draft Amendment document,
- HCDD1 Amendment Data spreadsheet,
- 2011 Regional Water Plan Prioritization ,
- Attachment 4-3 Hidalgo County Drainage District No. 1 Delta Watershed Project materials,
    - TEDSI Report 2011,
    - TEDSI Water Availability Report,
    - TCEQ WAM approval (2/13/14),
    - TWDB WAM Hydrologic Variance approval ,
    - Unified Cost Model, converted to 2011 RWP standards including 2008 dollars, and
- TWDB Comments, 5/22/2015.

Additionally, a summary of our response to TWDB comments are provided at the end of this document.

Thank you,

Mr. Raul Sesin, PE, CFM
HCDD#1 General Manager

HIDALGO COUNTY DRAINAGE DISTRICT No. 1

RAUL E. SESIN, PE, CFM
General Manager
Floodplain Administrator

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Response to TWDB Comments, 05/22/2015

1. Additional information has been included as appendices.

2. All changes to the 2011 RWP as a result of this amendment are provided

a. Executive summary, and the Spanish Executive summary revisions are included in Section A and B of the amendment document, respectively.

b. Figure 4.8 has been updated

c. Section 4.3.1.1 *Implementation of Recommended WMS Currently Using Amistad-Falcon Reservoir* is no longer required, as the revised amendment does not include a reduction in acquisition of water rights WMS.

d. Section 4.3.6 and Table 4-24 have been revised

e. Section 4.7 discusses only the conversion of water rights, which is no longer included in the revised amendment. Environmental Impacts are discussed and quantified in Section 4.5.8.5.4 *Environmental Impact*

f. Section 4.11.3 has been created, which refers to the WMS description in Section 4.5.8.5.

g. Attachment 4-1 has been revised in three tables showing WMS volume to each WUG, cost to each WUG, and Unmet Needs, based on Errata #2.

h. Section 9.2 has been revised and is included and the amendment document Section F.

i. Section 10.1 has been revised and is included and the amendment document Section G.

j. Appendices 1 and 2 have been revised, and are included in the Excel Spreadsheet, *HCDD1 Amendment Data* under tabs labeled A1 and A2

k. Appendix 7 has been revised, and is included as A7. Delta Watershed Cost

l. All revisions were checked against the Errata to ensure that the most current version was used as the basis of revision.

3. Section 4.5.1.2 was revised to include corrected costs and revised firm yield (7.522 AFY), and supply (6,017 AFY).

4. Section 4.5.8.5 was revised to include corrected costs and revised firm yield (7.522 AFY), and supply (6,017 AFY).

5. Project location and layout information has been added to Section 4.5.8.5.

HIDALGO COUNTY DRAINAGE DISTRICT No. 1

RAUL E. SESIN, PE, CFM
General Manager
Floodplain Administrator

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6. Environmental Impacts are discussed and quantified in Section 4.5.8.5.4
7. All DB12 database information has been included in the HCDD1 Amendment Data file.
8. The 2011 Prioritization file has been updated and included.

Appendix 10

TEDSI Water Availability Study, 9/25/2014

TEDSI INFRASTRUCTURE GROUP
Consulting Engineers
1201 E. Expressway 83 ♦ Mission, Texas 78572

September 25, 2014

Mr. Godfrey Garza Jr., CFM
District manager
Hidalgo County Drainage District No.1
902 N. Doolittle Rd.
Edinburg, Texas 78542

RE: Delta Region Water Management Project - Water Availability Study

Dear Mr. Garza,

TEDSI Infrastructure Group, Inc. (TEDSI) in association with Civil Systems Engineering Inc. (CSE) has prepared this technical letter report to summarize the results of the water availability modeling analysis performed for the above referenced study. This letter report also presents the study approach, data and assumptions used in estimating the water availability within the Main Floodwater Channel Watershed of the Nueces-Rio Grande River Basin.

DELTA REGION WATER MANAGEMENT PROJECT

The purpose of the Delta Region Water Management Project is to develop innovative practices and strategies for water conservation and management within the Delta Region. The project is based on a continual effort by Hidalgo County to identify and develop alternative water development strategies to meet future needs of the region. Multiple investigations have been previously performed by federal, state, and local agencies for the county and the Lower Rio Grande Valley Region including:

- *2011 Region M Regional Water Plan*, Texas Water Development Board (TWDB).
- *Hidalgo County Water Development Project, Hidalgo County, Texas,* dated September 2006 by Civil Systems Engineering, Inc.
- *Regional Water Supply Facilities Plan*, dated April 2011 by Civil Systems Engineering, Inc.

One of the major components of the project is to capture and reclaim stream flows within the Hidalgo County Drainage District No. 1 (HCDD1) drainage system for beneficial uses. The concept of utilizing drainage water as a potential alternative water management strategy was noted within the TWDB *2011 Region M Regional Water Plan*. In order to advance this water development concept into an implementable strategy, HCDD1 is conducting the Delta Region Water Management Project.

As part of the implementation strategy, HCDD1 is currently in the process of preparing an application to obtain a water rights permit from Texas Commission on Environmental Quality (TCEQ) to capture and develop the available drainage water within the Main Floodwater Channel Watershed. One of the important requirements for the water rights permitting process is to estimate the water availability within the studied watershed. The Nueces-Rio Grande River Basin Water Availability Model (WAM) Run3 is required by TCEQ to perform the water availability analysis. Initial review of the existing WAM shows that the Main Floodwater Channel Watershed is not structured within the model for the purpose of the project. The Main Floodwater Channel watershed was not delineated separately from the overall Nueces-Rio Grande Basin. The primary control point used for naturalized flow extrapolation within the project study watershed does not reflect the existing hydrology and hydraulic connectivity of the watershed. Also, there is no sufficient stream gage data on the Main Floodwater Channel. To determine the water availability at various locations within the Main Floodwater Channel Watershed for the purpose of the project, a set of data processing and modeling analysis are needed including watershed delineations, rainfall data processing, stream gage data analysis, irrigation return flow and wastewater discharge analysis, naturalized flow estimation, and modification of WAM RUN3 and simulation analysis.

PROJECT APPROACH

The Nueces-Rio Grande River Basin Water Availability Model (WAM) Run3 is required by TCEQ to perform the water availability analysis. Review of the existing WAM shows that the Main Floodwater Channel is not structured for the purpose of this project analysis. For the purpose of this study, the existing WAM model was modified to include the control points necessary for this project. Additionally rainfall and stream gage data was processed to generate the required Naturalized Flow data for the WAM model.

The current TCEQ Nueces-Rio Grande River Basin WAM covers a hydrologic period of 51 years from 1948 to 1998. The available stream flow recorded data within the Main Floodwater Channel Watershed consist of a maximum period of 6 years, as discussed in detail in later sections. With consideration of the very short stream gage data record, naturalized flow data was required to be synthesized based on rainfall gage data in correlation with the available stream gage data for the current WAM hydrologic simulation period.

WATERSHED DELINEATION

For the purpose of this study, the Main Floodwater Channel Watershed was delineated based on the USGS National Elevation Data (NED) and Hidalgo County LiDAR Digital Elevation Model (DEM) data. The watershed delineation was performed using ArcHydro tools within ArcGIS (v 10.2). The resulting watershed delineation is shown in **Figure 1**. Control points were identified within the watershed at potential diversion locations for the project and the Main Floodwater Channel outfall to Laguna Madre. The potential diversion locations include Edinburg Lake, Engleman, Panchita Control Structure. The contributing drainage area at each of these control point locations is listed in **Table 1**. The drainage areas are required as input data within the WAM model to relate the flow computations of the secondary control points to the primary control point at the Panchita Control Structure.

TABLE1. Control Point Contributing Drainage Area

Location	Contributing Drainage Area (sq.mi.)
Edinburg Lake	250
Engleman	106
Panchita Control Structure	385
Outfall to Laguna Madre	537

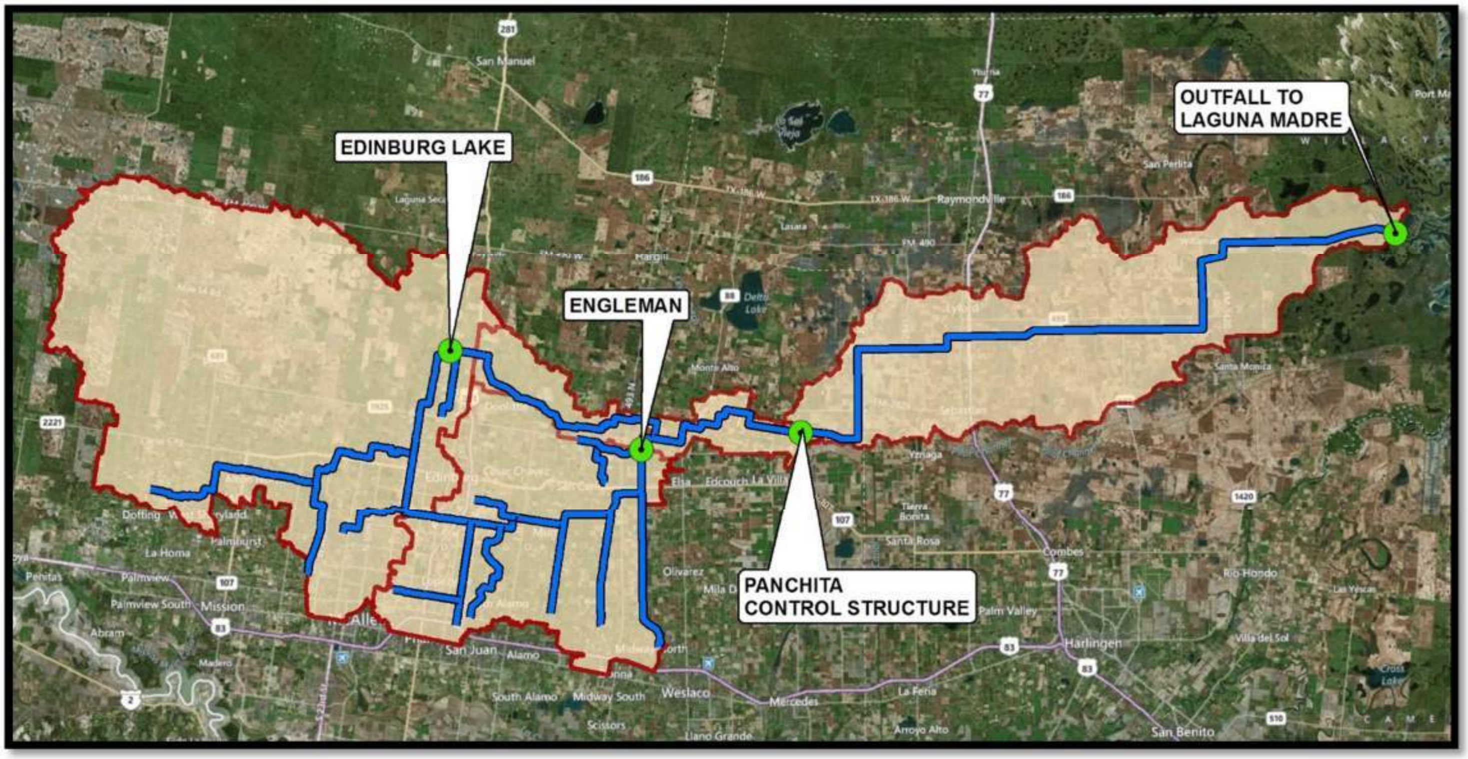

Figure 1. Main Floodwater Channel Watershed Delineation and Control Points

RAINFALL DATA PROCESSING

Historical daily precipitation data was obtained from National Climatic Data Center of the National Oceanic and Atmospheric Administration (NOAA) for the purpose of this study. There are total 30 rain gages within the general Main Floodwater Channel Watershed area within Hidalgo County, as shown in **Figure 2**. The length of rainfall data record for each station varies from 1 year to 68 years with the recorded time periods from 1946 to 2014. These rain gage stations data are provided as an Excel spreadsheet (filename: precipdailydata1946_2014.csv) in the **Appendix A**.

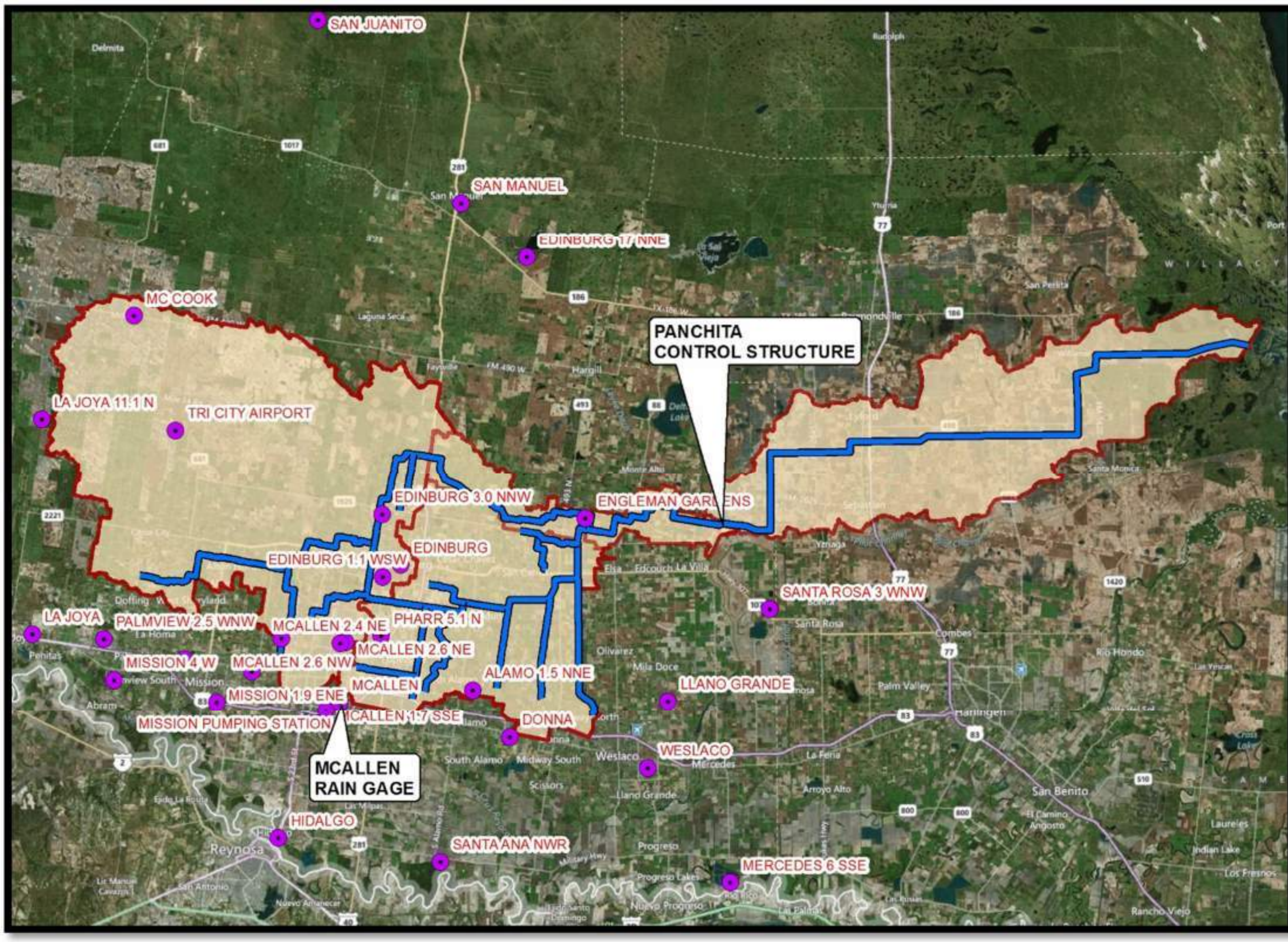

Figure 2. Rain Gage Locations

Various rain gages located within the Main Floodwater Channel Watershed have fairly short duration of recorded data with many having less than 20 years. There are six (6) rain gages within the general vicinity of the Main Floodwater Channel Watershed that have over 50 years of continuously historical daily rainfall data, including McCook, McAllen Miller International Airport, McAllen, Mercedes 6 SSE, San Manual, and Weslaco. By comparing the rainfall data time series at each gage station, there is a general concurrence of rainfall events within the proximity of the study area. With consideration of the length and completeness of the data record, McAllen gage station was chosen as the base station for this study. McAllen gage is not physically located within the Main Floodwater Channel Watershed; however, it is located adjacent to the southern watershed boundary within the general vicinity of the study area. Additionally the station location is the closest of these referenced gages to the Main Floodwater Channel Watershed centroid.

Examination of the McAllen rain gage revealed missing recorded data for the time period from October 1, 1993 through November 30, 1994. The missing rainfall data were supplemented with data from the McAllen International Airport gage station in order to provide a complete daily rainfall data set from 1946 to 2014. The McAllen International Airport gage station is located approximately 1.5 miles southwest of the McAllen station and has historic representative data similar to the McAllen station data. A comparison of the rainfall data within the region was performed in an excel spreadsheet (filename: precipdailydata1946_2014_data processing.xlsx), which is provided in **Appendix A**.

The resulting McAllen rain gage station daily rainfall time series from 1946 to 2014 was utilized as the primary hydrologic data source in generating stream flow data at the Panchita stream gage station location. The McAllen rainfall data is provided in **Appendix A** as an Excel spreadsheet (filename: precipdailydata1946_2014_mcallen gage.xlsx). The McAllen rain gage station provides sufficient data with the supplemented short time period (as discussed above) to span the current Nueces-Rio Grande River Basin WAM analysis hydrologic simulation period from 1948 to 1998.

Based on the monthly average rainfall data for Hidalgo County from 1940 to 2013 provided by Texas Water Development Board (TWDB), the 2011 Year was the driest year of record with an average precipitation depth of 8.76 inches. Based on the NOAA rain gage station data within the project vicinity, the cumulative recorded rainfall for 2011 varies from 3.7 inches at the McAllen station to 12.0 inches at the Mission 1.9 ENE station with an average annual rainfall of 8.5 inches across the study area.

STREAM GAGE DATA

Hidalgo County Drainage District No. 1 (HCDD1) operates 13 stream gage stations within the Main Floodwater Channel Watershed, as shown in **Figure 3**. These stations are located along the Main Floodwater Channel and its main laterals. These stream gage stations were installed by HCDD1 within the last 30 years. One of the stream gage stations is located at the Panchita Control Structure, which was installed in 1984 by HCDD1; however, there is only 7 years of recorded stream flow data (in water depth) available for the period from 2007 to 2014. The available stream gage data is provided in **Appendix B** as an Excel spreadsheet (filename: panchita stream gage data.xlsx). The stream gage data along with daily rainfall data was used to identify and quantify baseflow and the overland flow. It should be noted that the period of record for this stream gage covers 2011, the driest year of record for Hidalgo County.

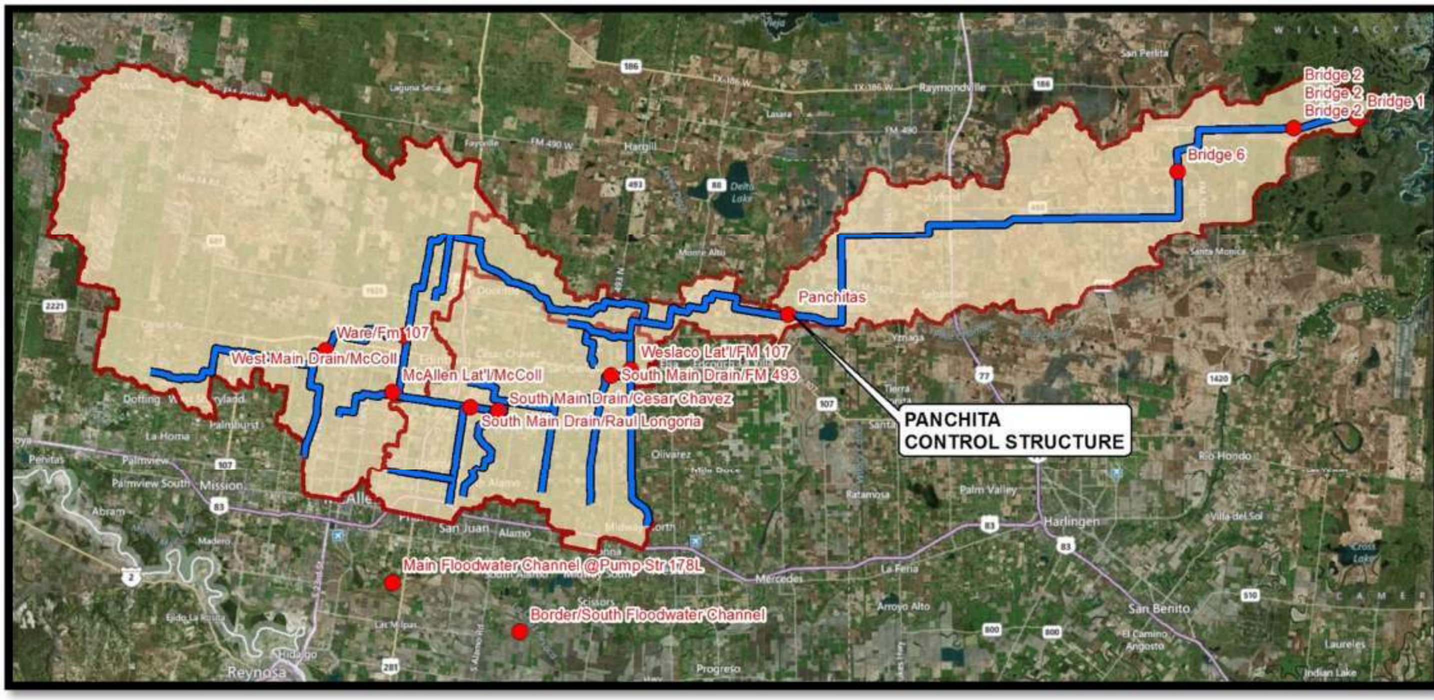

Figure 3. Main Floodwater Channel Watershed Stream Gage Locations

STREAMFLOW CHARACTERIZATION

The stream flow within the Main Floodwater Channel consists of two primary components: base flow and overland flow from rainfall runoff. The following sections discuss the methods and assumptions in identifying and quantifying the base flow component and overland flow component. Since the recorded stream gage data is measured in water depth within the stream channel, the base flow and overland flow components were first defined and estimated in terms of water depths within the channel. The resulting water depths were then converted to stream flow using hydraulic computations based on the physical geometry of the stream at the study point. The base flow and overland flow component parameters and computations are provided in **Appendix B** with the computations provided as excel spreadsheet (filename: panchita base flow calcs.xlsx).

BASEFLOW

Base flow within the Main Floodwater Channel was identified and quantified by analyzing the Panchita stream gage recorded average daily water depths and the daily rainfall data within the watershed. By examining the recorded daily average water depth data at Panchita stream gage in comparison with the recorded daily rainfall data within the study area, statistically there is a strong correlation between average daily water depth (feet) and daily rainfall depth (inch). The comparison showed water depth increases following a rainfall storm event. The impact to the water depth generally last four (4) days. To establish the base flow conditions within the channel, the recorded water depth data was first filtered by removing the daily average water depth data which was affected by rainfall events.

A plot of the filtered daily average water depths data for the recorded time period shows that data for Year 2009 is inconsistent with the remaining recorded data. Daily average water depth data for Year 2009 was removed from the filtered water depth data set. Further examination of the resulting water depth data set shows a semiannual (six month duration) cyclic pattern in stream base flow. The semiannual base flow cycle consists of periods P1 (March through August) and P2 (September through February). The semiannual base flow cyclic pattern is repeated from year to year as noticed from the recorded data at the Panchita stream flow station. The resulting base flows (depth in feet) are estimated and listed in **Table 2**.

TABLE 2. Base flow (Water Depth)

PERIOD	BASEFLOW(ft)
P1	1.74
P2	2.61

<u>*RAINFALL/ WATER DEPTH IMPACT RELATIONSHIP*</u>

As discussed earlier, stream flow consists of two components: base flow and overland flow from rainfall runoff. This section discusses the component of overland flows caused by rainfall events. As discussed in the previous section, a single rainfall event generally resulted in water level increases for approximately four (4) days. For all single storm event (1 day rainfall), corresponding stream gage data at Panchita Stream Gage for 4 days beginning at the storm event day were identified. Water depth increases for each day following a storm event was computed by subtracting the water depth from the water depth prior the storm event. Statistical analysis was performed to develop a set of relationships between the rainfall depth for the single daily rainfall event and the water depth increase for each day of the four-day period with the rainfall event day defined as "Day 0". The daily rainfall to daily water depth increase relationship is given in *Equation 1*, and the relationship coefficients from the single rainfall event are listed in **Table 3**. The water depth impact relationship calculations are provided in **Appendix B**.

$$\Delta h = \alpha * P \qquad \text{Equation 1}$$

Where: Δh = increase in water depth (ft)
α = water depth coefficient
P = daily rainfall depth (in)

TABLE 3. Coefficient of Rainfall to Water Depth Increase

Day from Rainfall Event	α
0	0.641
1	1.716
2	1.025
3	0.511

The total water depth within the Main Floodwater Channel at the Panchita Control Structure for a given day was computed by summing the base flow depth and the overland flow from rainfall runoff. For multiple days of rainfall events, total water depth increase for a day is the summation of water depths increase caused by multiple single daily events.

<u>*STREAMFLOW HYDRAULIC COMPUTATION*</u>

The stream flow in cubic feet per second (cfs) was computed using Manning's equation (shown in *Equation 2*), the water depth, and the generalized channel section at the Panchita Control Structure. The channel section geometric parameters were conservatively estimated based on LiDAR topography and field observations as a 50-foot bottom width, earthen-rectangular section channel with a Manning's coefficient of n = 0.045 and a channel invert slope of 0.02-percent.

$$Q = \frac{1.486}{n} S^{\frac{1}{2}} R^{\frac{2}{3}} A \qquad \textit{Equation 2}$$

Where: Q = computed flow (cfs)
S = channel slope (ft/ft)
R = Hydraulic Radius (ft) = area / wetted perimeter
A = flow area (sq ft)

MONTHLY FLOW GENERATION

As described in the previous sections, the average daily water depth was computed as the summation of baseflow depth plus any total daily water depth increases due to rainfall events. The average daily water depth was used to compute the average daily stream flow using the Manning's equation and geometric relationship as previously discussed. The computed average daily stream flow was converted to a daily volume in acre-feet using the relationship shown in *Equation 3*.

$$V = Q * \frac{86400\ (\frac{sec}{day})}{43560\ (\frac{cf}{ac-ft})} \qquad \textit{Equation 3}$$

Where: V = daily volume (acre-feet)
Q = average daily flow (cfs)

The data was further processed to determine the estimated monthly and annual flow volumes at the Panchita Control Structure for the analysis period of 1947 to 2013, and is summarized in **Table 4**. This resulting monthly flow data set was used for WAM modeling analysis. The daily volumetric calculations for the flow data generation is presented in an Excel spreadsheet (filename: naturalized flow computations.xlsx) in **Appendix B**.

TABLE 4. Estimated Monthly Flows at Panchita Control Structure (Acre-Feet)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR TOTAL
1947	7,125	6,146	3,462	4,275	4,698	3,668	3,836	7,736	6,436	6,739	7,099	7,201	68,420
1948	6,839	8,156	4,111	3,581	5,280	3,743	4,637	3,827	13,068	7,689	6,556	6,650	74,138
1949	7,395	7,268	3,795	5,121	3,818	3,630	3,795	3,789	7,156	6,972	6,727	6,941	66,407
1950	6,716	6,111	3,795	4,361	4,864	3,909	3,544	3,464	6,829	7,597	6,466	6,650	64,307
1951	6,238	6,112	3,991	3,515	4,695	6,547	3,673	3,925	10,589	7,178	6,728	6,672	69,863
1952	6,752	6,911	3,744	3,552	4,904	5,378	4,804	3,545	6,703	6,650	7,672	7,031	67,648
1953	7,166	6,657	3,648	3,691	4,099	3,361	3,575	5,714	6,665	9,433	6,729	7,181	67,918
1954	6,737	6,027	3,580	10,461	3,736	5,488	3,551	4,190	8,843	11,352	7,130	6,650	77,747
1955	7,144	6,262	3,502	3,391	3,520	3,371	4,731	3,759	8,594	7,078	6,731	6,939	65,022
1956	6,667	6,557	3,705	3,818	4,177	3,728	3,523	3,571	7,089	7,926	6,658	7,253	64,672
1957	6,799	7,850	4,235	5,220	4,784	4,219	3,456	3,707	7,139	6,802	7,990	7,080	69,281
1958	13,501	7,995	3,962	3,379	3,819	4,331	4,408	3,477	8,997	14,375	7,250	7,249	82,743
1959	7,458	7,303	3,528	3,882	3,488	4,655	3,494	4,184	6,582	8,556	7,250	6,670	67,052
1960	7,237	7,166	3,797	4,478	3,746	5,230	3,688	5,496	9,530	8,813	6,963	7,843	73,988
1961	7,048	6,233	3,456	4,110	3,770	5,031	4,301	3,882	9,144	6,667	6,690	6,650	66,983
1962	6,824	6,007	3,968	3,505	3,755	5,474	3,456	3,563	7,934	7,612	6,732	7,737	66,567
1963	6,704	6,258	3,497	3,367	4,734	3,542	4,963	3,828	9,293	7,856	7,361	7,793	69,195
1964	6,717	6,719	3,467	3,820	5,373	3,760	4,333	3,456	7,203	7,084	6,983	7,235	66,151
1965	6,860	6,730	3,529	3,532	6,669	3,525	3,490	3,865	9,753	8,806	7,387	8,919	73,065
1966	8,118	6,663	3,735	5,692	8,148	8,335	3,485	3,936	6,607	14,504	6,436	6,650	82,310
1967	7,395	6,206	3,692	3,557	4,440	4,728	3,497	6,774	6,885	13,757	8,637	7,873	77,439
1968	8,150	6,707	3,833	4,224	5,235	4,540	4,166	3,581	7,231	8,737	6,462	6,745	69,610
1969	6,732	6,730	3,675	3,466	4,319	3,507	3,462	5,165	9,248	7,230	7,295	6,994	67,822
1970	8,068	6,465	3,521	3,595	6,844	6,987	4,127	5,385	10,274	7,920	6,487	6,704	76,377
1971	6,736	6,282	3,486	3,947	4,130	5,317	3,922	4,749	12,490	8,493	6,711	6,992	73,255
1972	6,763	6,769	5,139	4,134	6,042	7,289	4,272	3,926	7,129	7,355	7,207	6,819	72,845
1973	9,418	8,497	3,578	3,683	3,815	8,390	3,851	4,192	14,442	8,438	6,715	6,944	81,963
1974	6,980	6,007	4,782	4,259	3,558	3,533	5,051	3,510	10,729	11,782	6,473	6,865	73,530
1975	7,184	6,496	3,507	3,368	6,092	5,345	8,764	6,353	9,737	7,686	6,436	7,133	78,101
1976	6,951	6,255	3,817	5,204	3,989	3,952	7,999	5,577	9,226	10,730	8,689	7,526	79,915
1977	7,428	7,415	3,487	4,294	3,881	4,702	3,558	6,185	10,183	7,838	6,986	6,656	72,612
1978	9,205	6,338	3,469	3,706	3,519	3,625	3,489	3,961	8,661	9,589	6,600	7,208	69,370
1979	7,218	6,419	3,495	4,384	5,107	4,754	3,875	6,635	8,104	6,660	6,686	8,809	72,145
1980	6,691	6,922	3,505	3,358	6,044	3,345	3,532	3,480	7,907	8,368	7,559	6,933	67,644
1981	8,159	6,395	4,435	5,013	6,686	4,932	4,391	5,250	6,898	7,897	6,608	6,750	73,413
1982	6,671	7,062	3,462	3,646	6,770	3,358	3,456	4,021	7,719	7,339	6,879	7,229	67,611
1983	6,934	9,560	3,776	3,345	4,093	4,033	5,298	4,512	8,062	7,984	7,173	7,352	72,121
1984	8,696	6,771	3,482	3,345	4,970	3,531	4,703	3,951	10,030	7,283	6,662	7,519	70,942
1985	7,485	6,894	3,925	3,752	5,168	6,097	3,985	3,624	7,322	9,406	6,808	7,435	71,900
1986	7,126	7,163	3,497	3,685	7,017	5,056	3,614	3,891	7,387	7,316	7,410	8,480	71,641
1987	8,379	6,817	3,675	3,580	6,059	6,169	4,715	3,622	8,439	7,316	6,819	6,947	72,538
1988	7,781	7,175	3,664	3,579	3,814	3,861	4,036	4,738	10,100	7,241	6,714	6,687	69,389
1989	6,830	6,313	3,469	3,863	3,619	4,539	3,552	3,558	6,671	6,708	6,509	8,279	63,911
1990	6,793	6,658	3,589	3,866	5,734	3,475	3,569	4,319	13,700	6,745	7,142	6,683	72,272
1991	6,916	7,261	3,612	3,943	5,683	4,879	4,798	4,469	8,773	7,615	6,935	7,769	72,654
1992	8,735	6,746	3,493	6,625	6,943	3,726	4,060	3,723	9,146	8,271	7,341	7,052	75,861
1993	6,801	6,175	4,881	3,476	4,576	9,753	3,456	3,752	8,933	6,921	6,870	7,150	72,744
1994	8,590	6,149	4,357	3,485	4,620	5,664	3,475	3,632	9,340	8,896	6,452	7,689	72,351
1995	6,398	6,056	3,978	3,629	3,688	4,387	4,081	5,431	9,950	8,308	7,193	7,785	70,882
1996	6,658	6,252	3,470	3,918	4,010	3,461	3,493	4,512	8,237	8,465	6,832	6,967	66,274
1997	6,786	6,429	8,545	5,720	4,184	4,829	3,678	3,456	9,081	10,553	7,159	6,478	76,899
1998	6,691	7,781	3,628	3,352	3,457	3,353	3,515	3,829	12,396	8,287	7,963	6,801	71,052
1999	6,672	6,013	4,678	3,358	4,043	3,564	5,644	5,202	7,983	7,472	6,615	7,074	68,319
2000	6,913	6,485	4,153	3,616	3,472	5,122	4,169	4,872	8,146	8,251	7,005	7,588	69,791
2001	6,883	6,806	3,683	3,398	3,709	5,352	4,714	5,067	10,709	6,702	9,408	7,349	73,780
2002	6,703	6,138	3,539	3,705	3,884	4,179	4,129	3,537	11,335	11,211	8,645	6,756	73,761
2003	7,141	6,618	4,256	3,872	4,065	4,355	4,093	5,124	15,478	11,206	6,842	6,658	79,709
2004	7,245	6,585	5,774	6,686	4,054	5,322	3,615	4,668	10,727	7,052	6,581	7,104	75,412
2005	7,157	6,504	3,661	3,353	4,045	3,868	7,884	4,247	7,134	7,328	6,675	6,890	68,746
2006	6,687	6,060	3,701	3,352	3,795	3,492	5,325	3,781	14,060	7,598	6,483	8,191	72,525
2007	8,016	6,138	3,592	3,722	3,989	3,947	9,057	4,658	7,687	7,316	6,570	6,650	71,341
2008	7,531	6,232	3,469	3,952	3,572	3,382	8,137	7,851	8,448	7,504	6,569	6,737	73,383
2009	6,700	6,261	3,594	3,407	4,466	4,357	3,480	3,553	8,683	8,338	6,791	10,404	70,034
2010	6,991	7,528	3,595	5,707	5,155	6,273	9,796	3,563	8,598	6,650	6,446	6,697	77,000
2011	7,220	6,007	3,590	3,345	3,472	5,616	4,449	3,641	6,484	6,782	6,499	8,019	65,123
2012	6,760	8,089	6,066	4,730	4,534	3,579	3,599	3,577	7,474	7,476	6,908	6,650	69,443
2013	7,182	6,013	3,456	3,912	4,025	3,731	3,975	3,657	10,343	6,725	8,328	7,903	69,251

NATURALIZED FLOW GENERATION

The estimated monthly flows at Panchita Control Structure were modified to get naturalized flows by subtracting the return flow and waste water discharge within the watershed. The detailed calculations are presented in an Excel spreadsheet (filename: naturalized flow computations.xlsx) in **Appendix B**.

RETURN FLOW

The irrigation return flows were calculated from available water diversion records for irrigation obtained from TCEQ for the irrigation districts within the project area for years 2012 and 2013. The irrigation districts that contributing potential return flows to the project watershed are shown in **Figure 4**. Based on a study report by Texas A&M University on conveyance losses of irrigation networks in the Lower Rio Grande Valley in January 2000, there is an estimated conveyance efficiency of 75% in the LRGV. The amounts of water diverted from the Lower Rio Grande River to each irrigation district were first reduced by 25-percent to account for conveyance losses. The reduction percentage is a measurement of all losses in an irrigation network from the diversion point to the field. The remaining water after conveyance loss reduction was further reduced based on the percentage of each irrigation district within the project watershed. Based on the amounts of water that potentially contribute to return flows, monthly return flows were estimated assuming a 10 percent return flow factor during years 2012 and 2013. By examining the estimated return flow data, statistically there is not a clear relationship between monthly return flow and estimated monthly flow at Panchita Control Structure, with consideration of the limited data available, an average (constant) monthly return flow of 1,146 acre-feet was used in computing naturalized flows.

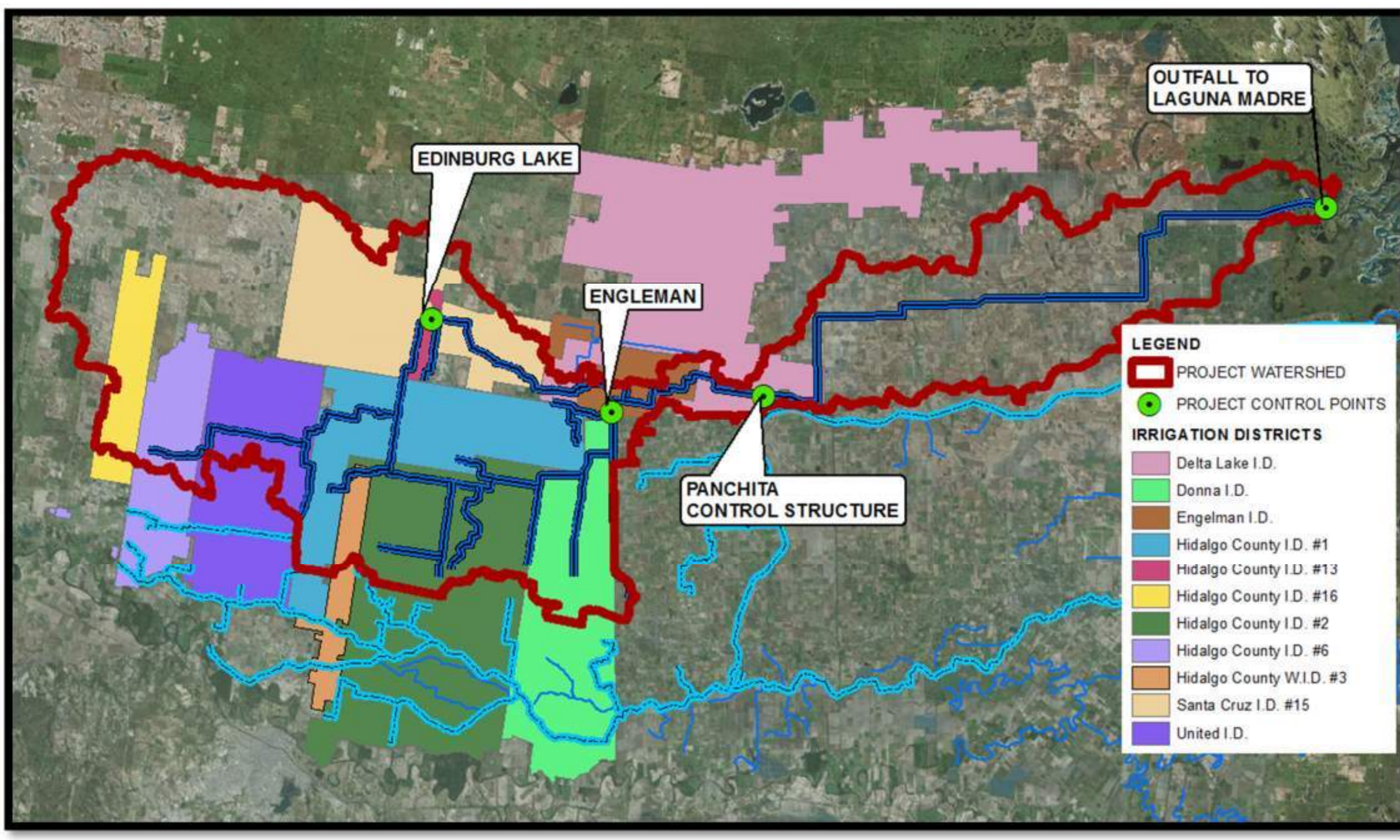

Figure 4. Main Floodwater Channel Watershed Irrigation Districts

Wastewater Discharge

The wastewater effluent discharge generated within the watershed was also estimated based on wastewater discharge data from TCEQ. Based on the wastewater discharge records from each wastewater treatment within the project watershed, monthly wastewater discharge within the watershed were estimated. The estimated monthly average wastewater discharge of 1,522 acre-feet was used for naturalized flow calculations.

Naturalized Flow Summary

The estimated monthly return flows and wastewater discharges (a total of 2668 acre-foot per month) were subtracted from the computed monthly flows to compute the monthly naturalized flow data for the WAM modeling analysis. The naturalized flow data at the Panchita Control Structure for the analysis period of 1947 to 2013 is summarized in **Table 5**.

TABLE 5. Naturalized Flows at Panchita Control Structure (Acre-Feet)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR TOTAL
1947	4,457	3,478	794	1,607	2,030	1,000	1,168	5,068	3,768	4,071	4,431	4,533	36,405
1948	4,171	5,488	1,443	913	2,612	1,075	1,969	1,159	10,400	5,021	3,888	3,982	42,121
1949	4,727	4,600	1,127	2,453	1,150	962	1,127	1,121	4,488	4,304	4,059	4,273	34,391
1950	4,048	3,443	1,127	1,693	2,196	1,241	876	796	4,161	4,929	3,798	3,982	32,290
1951	3,570	3,444	1,323	847	2,027	3,879	1,005	1,257	7,921	4,510	4,060	4,004	37,847
1952	4,084	4,243	1,076	884	2,236	2,710	2,136	877	4,035	3,982	5,004	4,363	35,630
1953	4,498	3,989	980	1,023	1,431	693	907	3,046	3,997	6,765	4,061	4,513	35,903
1954	4,069	3,359	912	7,793	1,068	2,820	883	1,522	6,175	8,684	4,462	3,982	45,729
1955	4,476	3,594	834	723	852	703	2,063	1,091	5,926	4,410	4,063	4,271	33,006
1956	3,999	3,889	1,037	1,150	1,509	1,060	855	903	4,421	5,258	3,990	4,585	32,656
1957	4,131	5,182	1,567	2,552	2,116	1,551	788	1,039	4,471	4,134	5,322	4,412	37,265
1958	10,833	5,327	1,294	711	1,151	1,663	1,740	809	6,329	11,707	4,582	4,581	50,727
1959	4,790	4,635	860	1,214	820	1,987	826	1,516	3,914	5,888	4,582	4,002	35,034
1960	4,569	4,498	1,129	1,810	1,078	2,562	1,020	2,828	6,862	6,145	4,295	5,175	41,971
1961	4,380	3,565	788	1,442	1,102	2,363	1,633	1,214	6,476	3,999	4,022	3,982	34,966
1962	4,156	3,339	1,300	837	1,087	2,806	788	895	5,266	4,944	4,064	5,069	34,551
1963	4,036	3,590	829	699	2,066	874	2,295	1,160	6,625	5,188	4,693	5,125	37,180
1964	4,049	4,051	799	1,152	2,705	1,092	1,665	788	4,535	4,416	4,315	4,567	34,134
1965	4,192	4,062	861	864	4,001	857	822	1,197	7,085	6,138	4,719	6,251	41,049
1966	5,450	3,995	1,067	3,024	5,480	5,667	817	1,268	3,939	11,836	3,768	3,982	50,293
1967	4,727	3,538	1,024	889	1,772	2,060	829	4,106	4,217	11,089	5,969	5,205	45,425
1968	5,482	4,039	1,165	1,556	2,567	1,872	1,498	913	4,563	6,069	3,794	4,077	37,595
1969	4,064	4,062	1,007	798	1,651	839	794	2,497	6,580	4,562	4,627	4,326	35,807
1970	5,400	3,797	853	927	4,176	4,319	1,459	2,717	7,606	5,252	3,819	4,036	44,361
1971	4,068	3,614	818	1,279	1,462	2,649	1,254	2,081	9,822	5,825	4,043	4,324	41,239
1972	4,095	4,101	2,471	1,466	3,374	4,621	1,604	1,258	4,461	4,687	4,539	4,151	40,828
1973	6,750	5,829	910	1,015	1,147	5,722	1,183	1,524	11,774	5,770	4,047	4,276	49,947
1974	4,312	3,339	2,114	1,591	890	865	2,383	842	8,061	9,114	3,805	4,197	41,513
1975	4,516	3,828	839	700	3,424	2,677	6,096	3,685	7,069	5,018	3,768	4,465	46,085
1976	4,283	3,587	1,149	2,536	1,321	1,284	5,331	2,909	6,558	8,062	6,021	4,858	47,899
1977	4,760	4,747	819	1,626	1,213	2,034	890	3,517	7,515	5,170	4,318	3,988	40,597
1978	6,537	3,670	801	1,038	851	957	821	1,293	5,993	6,921	3,932	4,540	37,354
1979	4,550	3,751	827	1,716	2,439	2,086	1,207	3,967	5,436	3,992	4,018	6,141	40,130
1980	4,023	4,254	837	690	3,376	677	864	812	5,239	5,700	4,891	4,265	35,628
1981	5,491	3,727	1,767	2,345	4,018	2,264	1,723	2,582	4,230	5,229	3,940	4,082	41,398
1982	4,003	4,394	794	978	4,102	690	788	1,353	5,051	4,671	4,211	4,561	35,596
1983	4,266	6,892	1,108	677	1,425	1,365	2,630	1,844	5,394	5,316	4,505	4,684	40,106
1984	6,028	4,103	814	677	2,302	863	2,035	1,283	7,362	4,615	3,994	4,851	38,927
1985	4,817	4,226	1,257	1,084	2,500	3,429	1,317	956	4,654	6,738	4,140	4,767	39,885
1986	4,458	4,495	829	1,017	4,349	2,388	946	1,223	4,719	4,648	4,742	5,812	39,626
1987	5,711	4,149	1,007	912	3,391	3,501	2,047	954	5,771	4,648	4,151	4,279	40,521
1988	5,113	4,507	996	911	1,146	1,193	1,368	2,070	7,432	4,573	4,046	4,019	37,374
1989	4,162	3,645	801	1,195	951	1,871	884	890	4,003	4,040	3,841	5,611	31,894
1990	4,125	3,990	921	1,198	3,066	807	901	1,651	11,032	4,077	4,474	4,015	40,257
1991	4,248	4,593	944	1,275	3,015	2,211	2,130	1,801	6,105	4,947	4,267	5,101	40,637
1992	6,067	4,078	825	3,957	4,275	1,058	1,392	1,055	6,478	5,603	4,673	4,384	43,845
1993	4,133	3,507	2,213	808	1,908	7,085	788	1,084	6,265	4,253	4,202	4,482	40,728
1994	5,922	3,481	1,689	817	1,952	2,996	807	964	6,672	6,228	3,784	5,021	40,333
1995	3,730	3,388	1,310	961	1,020	1,719	1,413	2,763	7,282	5,640	4,525	5,117	38,868
1996	3,990	3,584	802	1,250	1,342	793	825	1,844	5,569	5,797	4,164	4,299	34,259
1997	4,118	3,761	5,877	3,052	1,516	2,161	1,010	788	6,413	7,885	4,491	3,810	44,882
1998	4,023	5,113	960	684	789	685	847	1,161	9,728	5,619	5,295	4,133	39,037
1999	4,004	3,345	2,010	690	1,375	896	2,976	2,534	5,315	4,804	3,947	4,406	36,302
2000	4,245	3,817	1,485	948	804	2,454	1,501	2,204	5,478	5,583	4,337	4,920	37,776
2001	4,215	4,138	1,015	730	1,041	2,684	2,046	2,399	8,041	4,034	6,740	4,681	41,764
2002	4,035	3,470	871	1,037	1,216	1,511	1,461	869	8,667	8,543	5,977	4,088	41,745
2003	4,473	3,950	1,588	1,204	1,397	1,687	1,425	2,456	12,810	8,538	4,174	3,990	47,692
2004	4,577	3,917	3,106	4,018	1,386	2,654	947	2,000	8,059	4,384	3,913	4,436	43,397
2005	4,489	3,836	993	685	1,377	1,200	5,216	1,579	4,466	4,660	4,007	4,222	36,730
2006	4,019	3,392	1,033	684	1,127	824	2,657	1,113	11,392	4,930	3,815	5,523	40,509
2007	5,348	3,470	924	1,054	1,321	1,279	6,389	1,990	5,019	4,648	3,902	3,982	39,326
2008	4,863	3,564	801	1,284	904	714	5,469	5,183	5,780	4,836	3,901	4,069	41,368
2009	4,032	3,593	926	739	1,798	1,689	812	885	6,015	5,670	4,123	7,736	38,018
2010	4,323	4,860	927	3,039	2,487	3,605	7,128	895	5,930	3,982	3,778	4,029	44,983
2011	4,552	3,339	922	677	804	2,948	1,781	973	3,816	4,114	3,831	5,351	33,108
2012	4,092	5,421	3,398	2,062	1,866	911	931	909	4,806	4,808	4,240	3,982	37,426
2013	4,514	3,345	788	1,244	1,357	1,063	1,307	989	7,675	4,057	5,660	5,235	37,234

WATER AVAILABILITY MODELING ANALYSIS

The existing base WAM model for this analysis was obtained from TCEQ (filename NRG3). Since the overall watershed and delineations are not available for the WAM model, the existing WAM structure and physical network topology was not modified. The Panchita Control Structure location was added into the WAM as a primary control point. The other control points at Edinburg, Engleman, and Outfall to Laguna Madre were added as secondary control points. The control points added for this study are stand alone and do not affect the computations of the existing control points within the WAM. The updated WAM model (filename NRG3) for this analysis is provided in **Appendix C**.

The NRG3.DAT was modified to include the Panchita primary control point (PAN100) as well as the secondary control points: Edinburg Lake (END100), Engleman (ENG100), Outfall (MOUTH). The following presents the added cards for this project analysis.

```
** PROJECT CONTROL POINTS
CPPAN100   MOUTH                     1             ZERO      -3
CPENG100  PAN100                     7             ZERO      -3
CPEND100  ENG100                     7             ZERO      -3
CPMOUTH      OUT                     7             ZERO      -3
```

The NRG3.DAT was modified to reflect the existing modeled Engleman Irrigation District Reservoir water rights at Engleman Control Point (ENG100). This existing reservoir is physically located adjacent to the control point location. The water rights for this reservoir are currently modeled to the corresponding control point 'Z10200'. The reservoir modeling and storage values were not modified, only the related control point and reservoir identification number. The following presents the added cards for this project analysis.

```
** DELTA WATERSHED PROJECT (ENGLEMAN WATER RIGHTS MODELING)
** ENGLEMAN IRRIGATION DISTRICT RESERVOIR
** ASSOCIATE ENGLEMAN I.D. 250 AF RES TO ENG100/PAN100 CP'S
WRENG100       0        19280710   1                              FILL4524_1
WSENGRES     250  0.6024   0.813
SO           714   254.5
** FILL 2ND OCR
WRENG100       0        19280710   1                              FILL4524_2
WSENGRES     300  0.6024   0.813
SO           714   254.5
**
WRENG100   254.5     IRR19280710   2                               62204524001 62204524 Z60000
WSENGRES     250  0.6024   0.813
OR             0
WSENGRES     300  0.6024   0.813
OR             0
```

The NRG3.DIS was modified to include the project control point drainage areas and the flow distribution relationship of the secondary control points to the Panchita primary control point. The following presents the added cards for this project analysis.

```
FD MOUTH  PAN100      -1
FDENG100  PAN100       0
FDEND100  PAN100       0
```

```
** PAN100 ENTERED FOR PANCHITA DRAINAGE AREA
WPPAN100     385
```

```
WP MOUTH      537
WPEND100      250
WPENG100      106
```

The NRG3.FLO was modified to include the computed naturalized flow at the Panchita primary control point for years 1948 through 1998. The following presents an example of the added card for Year 1948 for this project analysis.

```
INPAN100    1948    4171    5488    1443     913    2612    1075    1969    1159   10400    5021    3888    3982
```

WAM Computed Results

The computed flow-frequency for naturalized streamflows at each of the project control points are summarized in **Table 6**. The potential maximum water rights for the Main Floodwater Channel Watershed at Panchita Control Structure was computed as ***39,336 acre-feet/ year***. This is computed based on the WAM monthly average naturalized flow at the Panchita Control Structure control point. The potential maximum water rights for the Main Floodwater Channel Watershed was computed as ***54,972 acre-feet/ year***. This is computed based on the WAM monthly average naturalized flow at the Main Floodwater Channel Watershed Outfall to Laguna Madre control point.

TABLE 6. Flow-Frequency for Naturalized Streamflows (Acre-Feet/Monthly)

CP	END100	ENG100	PAN100	MOUTH
Mean	2121	887	3278	4581
Std Dev	1375	589	2112	2942
Minimum	389	136	627	894
99.50%	400	141	643	912
99%	408	154	652	922
98%	444	167	703	994
95%	491	184	777	1098
90%	529	212	823	1158
85%	583	231	907	1279
80%	659	266	1034	1461
75%	745	302	1165	1639
70%	893	356	1399	1966
60%	1447	598	2253	3162
50%	2429	1024	3745	5226
40%	2625	1111	4047	5647
30%	2792	1181	4304	6013
25%	2929	1236	4513	6296
20%	3057	1294	4711	6575
15%	3375	1424	5203	7260
10%	3765	1592	5802	8095
5%	4338	1833	6687	9332
2%	5227	2212	8054	11237
1%	6996	2964	10776	15033
0.50%	7572	3207	11664	16271
Maximum	7680	3253	11830	16503

The Annual Firm Yield at each project control points was calculated and summarized in **Table 7**. There is annual firm yield of ***7,522 acre-feet*** at the Panchita Control Structure.

TABLE 7. Annual Firm Yield
Project Control Points (Acre-Feet)

END100	ENG100	PAN100	MOUTH
4,674	1,635	7,522	10,730

Thank you for the opportunity to provide services for this important project. Please let me know if you have any questions regarding this study.

Sincerely,
TEDSI Infrastructure Group, Inc.

STATE OF TEXAS
MARK W. LUPHER
64514
LICENSED
PROFESSIONAL ENGINEER

Mark W. Lupher, P.E, CFM
Executive Vice President

Appendix 11

Hidalgo County Drainage District #1 Regional Water Supply Facilities Plan, 4/5/2011

a. Transmittal Letter
b. Report
c. TWDB Comments
d. Response to Comments
e. Appendix A – Baseline Environmental Study Report
f. Appendix B – Raw Water Quality Sampling and Laboratory Analysis Report
g. Appendix C – National and State Drinking Water Standards
h. Appendix D – Detailed Cost Estimates

CSE Civil Systems Engineering, Inc.

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April 5, 2011

Ms. Connie Townsend, P.E.

Project Manager - Regions E, J, &M

Water Resources Planning Division

Texas Water Development Board

1700 North Congress Ave.

Austin, Texas 78701

Re: Final Regional Water Supply Facilities Plan Report - Hidalgo County, Texas
TWDB Contact No. 0804830848

Dear Ms. Townsend,

Submitted are six hard copies with diskettes of the final Regional Water Supply Facilities Plan Report. The final report addressed TWDB's comments to the draft plan report outlined in a letter to Mr. Godfrey Garza, Jr., District Manager of Hidalgo County Drainage District No.1, dated February 14, 2011. Our responses to the TWDB's comments are summarized in a memorandum which is included as an attachment to this letter.

Should you have any questions or need additional information, please contact me at (713) 782-3811.

Sincerely,

Deren Li, Ph.D., P.E., D.WRE, CFM
President

Enclosures

c: Godfrey Garza, Jr., District Manager of Hidalgo County Drainage District No.1

Regional Water Supply Facilities Plan

prepared by

Civil Systems Engineering, Inc.

April 2011

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Appendices
(Attached CD-ROM)

A. Baseline Environmental Study Report

B. Raw Water Quality Sampling and Laboratory Analysis Report

C. National and State Drinking Water Standards

D. Detailed Cost Estimates

E. Responses to TWDB Comments on the July 2010 Draft Report

EXECUTIVE SUMMARY

The purpose of this Regional Water Supply Facilities Plan was to identify and evaluate potential project sites, drinking water treatment processes, and facilities required to develop drainage water within the Hidalgo County Drainage District No.1 drainage systems as a potential alternative water source to supply treated water to areas within the Hidalgo County in the near future through 2060. Specific objectives included:

- § Develop a baseline raw drainage water quality conditions
- § Identify and evaluate potential project locations (sites) for diversion, storage, and treatment of the drainage water
- § Develop finished water quality targets by reviewing the current U.S. Environmental Protection Agency (EPA) and Texas Commission in Environmental Quality (TCEQ) drinking water quality standards and regulations
- § Identify and evaluate alternative drinking water treatment technologies and processes
- § Identify and evaluate facilities for raw water diversion, storage, and conveyance
- § Develop conceptual designs for each of the identified treatment processes
- § Develop probable cost estimates for each of the treatment processes and perform cost comparison analysis.

Water quality samples were collected for the raw water from the drainage ditches and water quality parameters were determine by laboratory test analysis. The raw drainage water has a high level of TDS at approximately 2000 mg/L. The water is considered very hard with a hardness of approximately 600 mg/L as $CaCO_3$. Also the raw water is brackish with a concentration of Chloride of 400-500 mg/L.

Three potential project sites were identified and evaluated to divert and treat raw drainage water. Each site was evaluated with consideration of availability of dependable water, floodplain, topography, accessibility, land use and land cover, and environmental concerns. Two of the three sites, SITE I and SITE II, are located on the North Main Drain and one site (SITE III) is located on the Main Floodwater Channel. Based on the evaluation with consideration of all the evaluation factors, SITE II and SITE III were recommended for future further investigation. SITE III, located on the Main Floodwater Channel, was considered as the most preferred site which has the most reliable water supply and potential for future expansion. The second preferred site was SITE II which is located on the North Main Drain between SITE I and SITE III.

Facilities related to raw water diversion, storage, and conveyance were proposed. The proposed facilities include a weir structure located just downstream of the diversion intake structure on the drainage ditch to ensure a steady water level for diversion during normal base flow conditions, a diversion intake structure with screen to divert raw water from the drainage ditch to a wet well (concrete vault) via a pipeline by gravity, a pump station (Pump Station I) to lift the raw water from the wet well to a raw water storage basin with a capacity for seven (7) days water supply to reliable water supply the treatment plant, a second pump station (Pump Station II) to provide feed water to the water treatment plant, a floodwater detention basin to store floodwater during wet season and supplement normal base flow drainage water during dry season, a side weir structure to divert floodwater to the floodwater detention basin via a open channel by gravity, and a pipeline between the floodwater detention basin and the raw water storage basin and a pipe between the floodwater detention basin and wet well to convey floodwater to the raw water storage basin by gravity.

EPA and TCEQ current drinking water standards and rules were extensively reviewed and target finished water quality targets were developed.

Four alternative water treatment processes were identified and evaluated. Both conventional and membrane treatment process units were considered. The four alternative processes are A - ACTIFLO clarification followed by dual media filtration (DMF), B - ACTIFLO clarification followed Nanofiltration (NF) membrane filtration, C - ACTIFLO followed by DMF and NF, and D - ACTIFLO followed by DMF and Reverse Osmosis (RO) membrane filtration. Blending of water from DMF and NF or RO was proposed Alternatives C and D respectively.

Conceptual designs were developed for each of the four alternative treatment processes. Process trains were developed for each alternative processes with conceptual design data, such as tank sizes and numbers required, building sizes, pipe sizes, pump sizes, etc. Also, three alternative building arrangement layouts were developed.

Probable capital costs and annual O&M costs were developed for each alternative treatment process with four (4) treatment capacities. Cost comparison analysis was performed based on annual costs. Annualized capital cost and annual O&M cost were summed to obtain the total annual cost for each alternative and treatment capacity. An interest rate of 6% was assumed for the analysis. Life cycle present value analysis was not performed for the purpose of this study. Costs are presented in 2010 dollars.

Capital costs include construction components such as excavation and site work, equipment, concrete and steel, labor, pipe and valves, power supply access and instrumentation, and housing that are expended in the construction activities of the project, and other expenses such as engineering, engineering service during construction, financial and legal services, permitting, commissioning and startup. The capital costs include a 30 percent contingency, which is appropriate for this level of project definition. The capital costs in this estimate do not include costs for land and rights-of-way.

Based on the annual cost estimates ($/1000 gallon) and the performance of each alternative treatment process, with consideration of blending treated water from DMF and NF or RO, alternatives C (ACTIFLO+DMF+NF) and D (ACTIFLO+DMF+RO) were identified as the two preferred alternatives. Alternatives A and B were kept as two potential candidates with considering that the potential integration with existing water supply systems were not determined at this stage of the project.

1 Introduction

Background

Hidalgo County is located in the Lower Rio Grande Valley of South Texas, as shown in **Figure 1-1**. It covers 1,583 square miles and is bordered by Cameron and Willacy Counties on the east, Brooks County on the North, Starr County on the west and Mexico on the South with the Rio Grande River forming its border with Mexico. Based on the Texas Water Development Board (TWDB) regional water planning area delineations, Hidalgo County is located within the Rio Grande Regional Water Planning Area (Region M). Also, the majority of the County lies within the Nueces-Rio Grande Coastal Basin.

The Rio Grande is the County's primary source of water. More than 99 percent of the total water supply for the county is associated with water rights to releases from the Amistad/Falcon Reservoir System on the Rio Grande River. Water availability to the county is decreasing from the reduced water yields on Rio Grande due to sedimentation the development and operation of reservoirs on Mexican tributaries that contribute to the Rio Grande. Increased urbanization and the conversion of irrigation water rights to domestic, municipal and industrial rights also reduce the availability of water to the county. The water rights conversion could potentially reduce return flows to be available to downstream water users. According to Section 5.2 of the 2011 Region M Regional Water Plan, it takes a minimum 2 acre-feet of irrigation water rights to convert to 1 acre-feet of municipal water rights.

From a municipal perspective, the County has a total deficit of over 3,276 acre-feet per year in the year 2010 and this deficit is projected to increase to nearly 139,930 acre-feet per year by 2060 based on projections made by the Texas Water Development Board (TWDB).

The Hidalgo County Drainage District No.1 has jurisdiction over more than 50 percent of Hidalgo County, as shown **Figure 1-1**. It has a desire to investigate potential water supply facilities plans to utilize its existing drainage and flood control systems to capture and treat drainage water (storm water runoff, shallow groundwater discharges and irrigation runoff) within its drainage systems to provide water for beneficial uses within the County. As discussed in the Hidalgo County Water Development Project (2006), the main water sources within the drainage systems are from stormwater and shallow groundwater. HCDD No.1 drainage system does not receive floodwater from Rio Grande River under normal flood events. The primary driving force for this project is to address the severe water shortage issues facing the County in the near future.

Purpose and Objectives

The ultimate purpose of this project is to assist Hidalgo County Drainage District No.1 (HCDD No.1) to develop drainage water within the district's drainage system as an alternative water source to supply treated water to areas within Hidalgo County in the near future through 2060. Specifically, the objectives of this project include: (1) to identify alternative diversion and storage components of a Regional Water Supply Facilities Plan to capture and store drainage water (rainfall runoff and shallow groundwater) constantly flowing within the existing drainage systems, (2) to evaluate alternative water treatment facilities plans to treat the captured drainage water to drinking water standards to supply the treated water to the potential water users within the County.

The evaluation and development of the facilities plan was based on the water shortfall projections made by the TWDB as presented in the 2011 Region M Regional Water Plan, and the water availability estimates presented in the Hidalgo County Water Development Project Report, September 2006. The proposed water facilities plan will address potential water shortages in the cities of McAllen, Mission, Pharr, Edinburg, Alamo, San Juan, Hidalgo City, Weslaco, and other water user groups such as the North Alamo Water Supply Corporation.

Project Need

Hidalgo County, the largest county in the Texas Rio Grande Valley, is one of the fastest growing counties in the State of Texas. It also located in one of the most economically distressed areas in the State of Texas and the United States.

According to the U.S. Census Bureau, the county's population increased 30 percent from approximately 569,463 in 2000 to 741,152 in 2009. The TWDB (2011 Region M Regional Water Plan) has projected a population of 2,048,911 by year 2060 for Hidalgo County. Municipal water needs for the county are projected to increase more than 41-fold in 50 years. Based on TWDB's projections, both municipal and agricultural water uses in Hidalgo County will face significant shortages through the year 2060.

In response to the future water shortages faced by Hidalgo County, several investigations have been conducted by federal, state, and local agencies for the county and the Rio Grande Valley as a whole. The most comprehensive studies is the 2011 Region M Regional Water Plan prepared by the TWDB. A range of water management strategies were evaluated and recommended to meet future water supply needs, primarily including water conservation, acquisition of existing Rio Grande water rights, reuse of reclaimed water, and desalination of seawater and brackish groundwater.

The opportunity for developing drainage water (rainfall runoff and shallow groundwater) within the HCDD No1 drainage system, specifically this project, was considered as a potential water management strategy in the 2011 Region M Regional Water Plan but was not evaluated due to the preliminary status of the project and the lack of pertinent information at the time.

The constantly flowing drainage water within the HCDD No.1 drainage system network has long been observed and is believed to be an unexploited alternative water source for the county. In 2006, the district initiated a preliminary investigation on the opportunity to develop the drainage water within its existing drainage system, specifically along the North Main Drain and the Main Floodwater Channel. The conclusions are presented in a report entitled "*Hidalgo County Water Development Project*", HCDD No.1, 2006. It was estimated there is a dependable base flow of 58 cfs in the Main Floodwater Channel, which translates to approximately 42,300 ac-ft/year. Fully development of this amount of water could meet 16 percent of the total projected 2060 water supply need of Hidalgo County or approximately 100 percent of the projected water needs for the Cities of McAllen and Mission in 2060.

Developing the drainage water within the existing drainage system is consistent with the National Economic Development (NED) objective of Water Resources Council's Principles and Standards adopted by Presidential Order in 1973 and revised in 1979, by maximizing the outputs of the County's existing drainage/flood control systems. The use of the existing drainage facilities for multiple purposes (drainage/flood control and water supply) will increase benefits without a proportional increase in costs and thus enhance the economic justification for the project.

Study Guiding Principles

The following guiding principles have been followed for the development of this water supply facility plan:

1. Consistency with the objectives of the 2011 Region M Regional Water Plan.
2. Non-compromise of the primary functions of the existing drainage systems to provide outfalls for developments within the county and to provide flood protection.
3. Compatibility with the future mix of water supplies.
4. Cost effectiveness.
5. Minimization of potential adverse environmental impacts.
6. Compliance with federal, state, and local pertinent regulations.

Public Involvement

Public involvement is an integral part of the project to ensure that the water facilities plan is publically supported. Public involvement activities for this project include two advisory committee meetings/public meetings (October 28, 2008 and December 15, 2009), press releases for the meetings on the local The Monitor news paper, broadcast of the meetings on local KMBH-TV, live online of the meetings at www.co.hidalgo.tx.us/cclive, coordination with TCEQ regarding water rights issues, contacts and discussions with water utility districts regarding potential water users. The project received positive responses by the public and potential stakeholders.

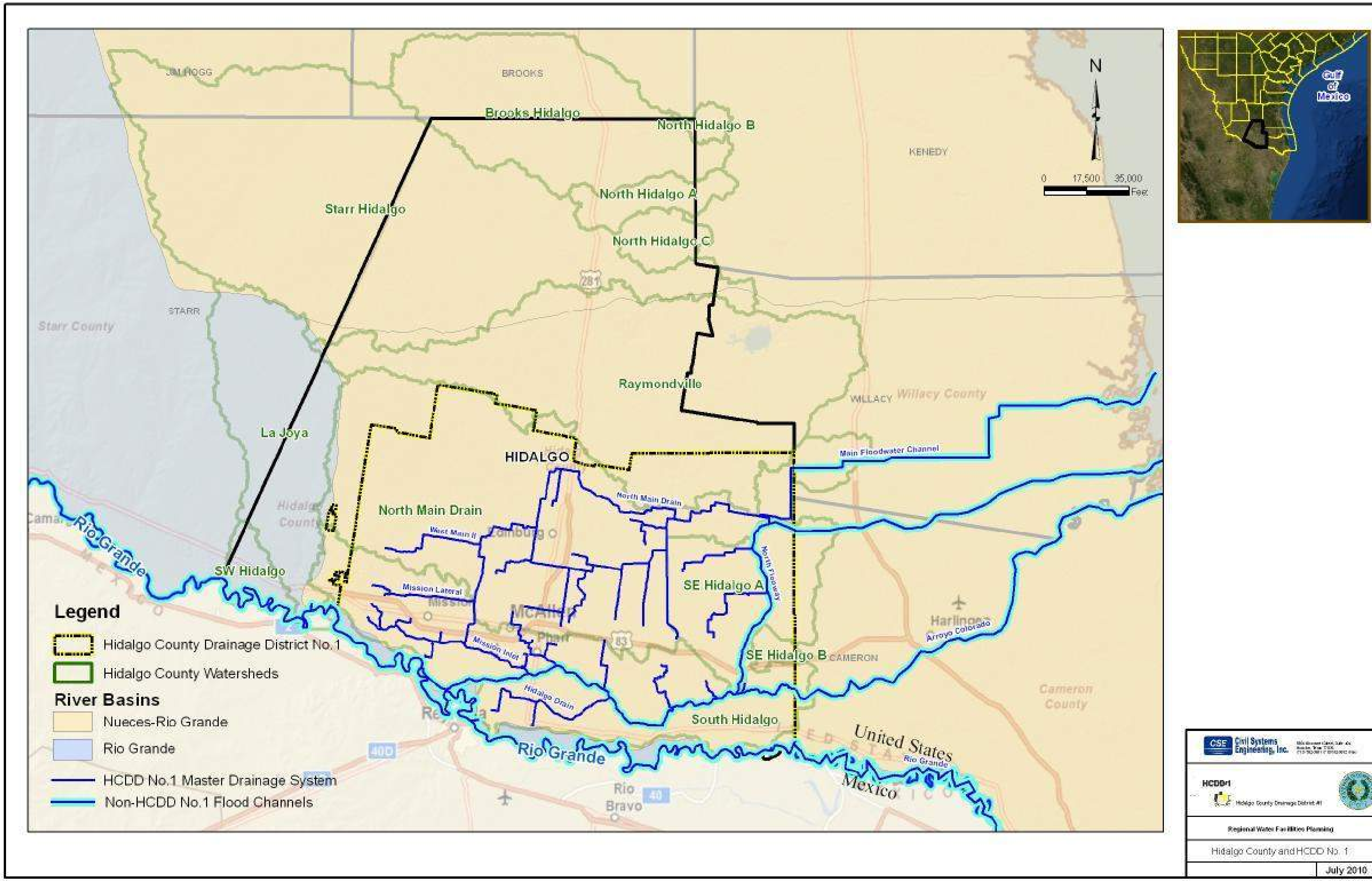


Figure 1-1. Hidalgo County and Hidalgo County Drainage District No.1

2 Water Rights

Texas Water Rights Regulations

In Texas, surface water bodies are the property of the state but the right to use surface water for specific purposes such as irrigation or industrial is a private property right. Today these water rights are regulated by the Texas Commission on Environmental Quality (TCEQ) which is responsible for issuing and administering water rights in Texas. Groundwater is privately owned by the owner of the land above it and the owners may pump all the water they can from beneath their land regardless of the impact to nearby landowners unless the water is regulated.

According to the Texas Water Code, Section 11.021, water owned by the state includes water of ordinary flow, underflow, and tides of every flowing water, natural stream, and lake; and of every bay or arm of the Gulf of Mexico; and the storm water, floodwater, and rainwater of every river, natural stream, canyon, ravine, depression, and watershed in the State, and the water imported from any source outside the boundaries of the state for use in the state which is transported through the beds and banks of any navigable stream within the state or by utilizing any facilities owned or operated by the state.

In general, all users that divert or store water in Texas are required to possess a water right that authorizes, as necessary, a specified amount of water that can be diverted from a particular stream or reservoir, the maximum rate of diversion, the maximum storage capacity of a reservoir, and in the case of irrigation, the location of the fields that are to be irrigated.

Texas law states that diffused surface water - stormwater runoff and sheet flow - is not state water. These waters do not flow in any defined water course, but rather cross the surface of the earth in variant and unregulated ways. Diffused surface water is subject to capture and use by the landowner. Once this water enters a stream, river, or other state water body, it becomes state water.

As discussed in Section 4.8.4 of 2011 Region M Regional Water Plan, captured stormwater could be made available for local use provided it has not been appropriated to any existing water rights. The 2011 Region M Regional Water Plan considers all stormwater flowing into the Rio Grande or the Arroyo Colorado as having been appropriated to existing water rights and unavailable for development.

Project Water Rights

The proposed water development projects are located within the preliminary FEMA North Main Drain Watershed as delineated for the Hidalgo County Flood Map Modernization Project, with a total drainage area of 444 square miles. Depending on the locations of the proposed project sites, the percentage of watershed contributing storm runoff flows ranges from 59 percent (263 square miles) to 91 percent (403 square miles). As shown in **Figure 2-1**, there are no hydrologic connections between the HCDD No.1 drainage systems within the North Main Drain Watershed and the Rio Grande River or the Arroyo Colorado.

The proposed projects do not capture any stormwater contributing to flows into the Rio Grande and Arroyo Colorado. The proposed projects divert drainage water from the North Main Drain and Main Floodwater Channel which drain to Laguna Madre and subsequently into the Gulf of Mexico.

There are no existing water rights associated with the Rio Grande River and Arroyo Colorado to be affected by the proposed water development projects. The drainage water within the Hidalgo County Drainage District Master Drainage System is a potential water source and should be developed for future drinking water needs within Hidalgo County.

The water rights database of Texas Commission on Environmental Quality (TCEQ) has been reviewed and analyzed in the 2006 Hidalgo County Water Development Project report. All water rights authorizing surface water diversions and use within Hidalgo County were identified. The total municipal water rights in the county at that time were 135,123 acre-ft per year with the total for all uses being 1,081,031 acre-ft per year.

Legal Investigation and Coordination

For the purpose of the project, extensive research was made on the rights of Hidalgo County to utilize the water within the Hidalgo County Drainage District No.1 drainage systems. Texas Water Code and other water rights regulations related to this project were reviewed. Existing water rights data within the study area was obtained from TCEQ water rights GIS database and mapped. Coordination with TCEQ was made. At this time of the report, there is still a disagreement between TCEQ and Hidalgo County. Hidalgo County is of the opinion that the subject water is diffused water captured in a manmade drainage ditch system (not a natural water course) and Hidalgo County has the rights of developing the drainage water within the drainage system for beneficial uses. Hidalgo County believes a water rights permit will not be required to develop the drainage water and the drainage water belongs to the County.

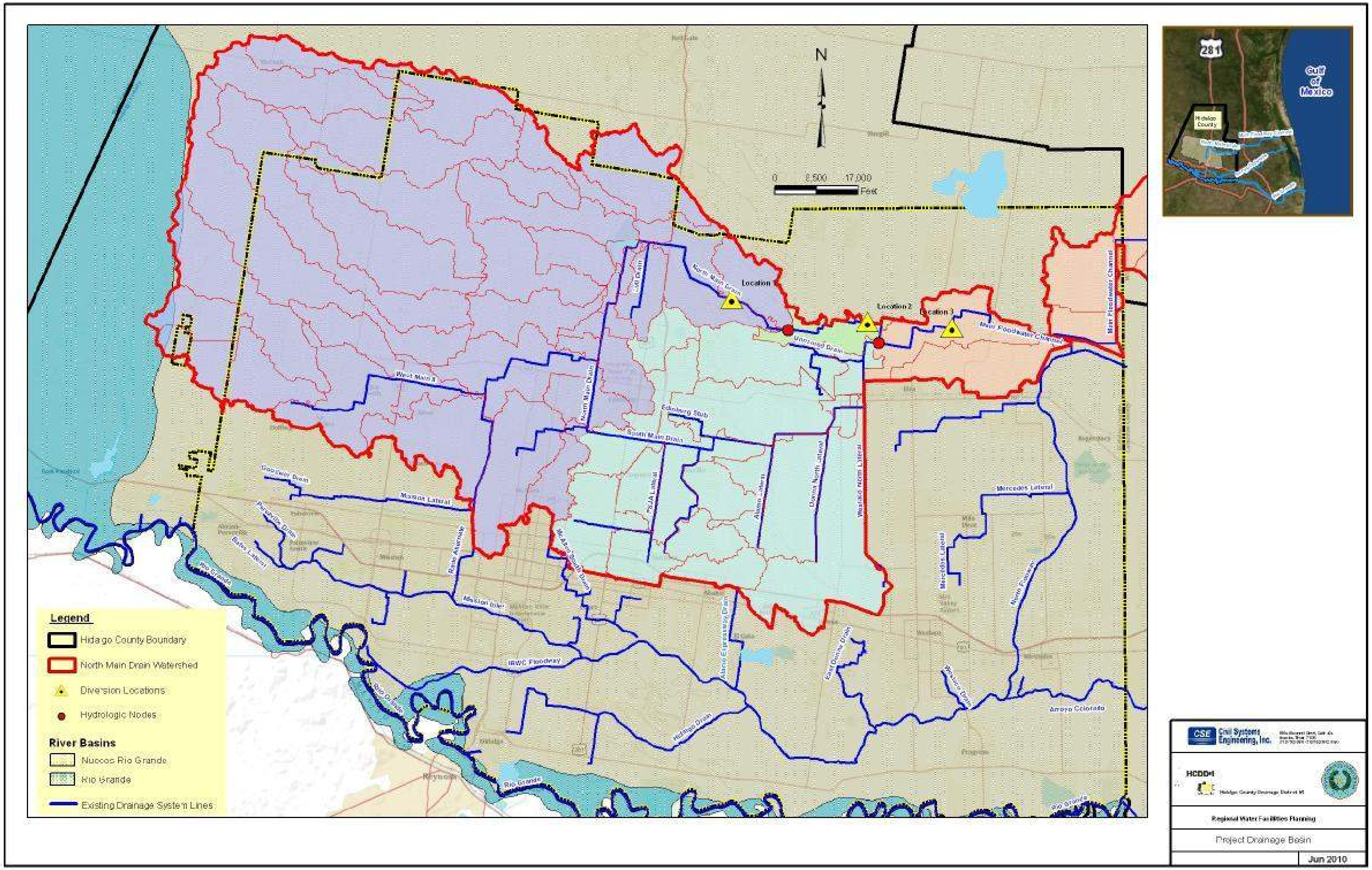


Figure 2-1. North Main Drain Drainage Basin Delineations

3 Water Supply and Demand Analysis

HCDD No.1 and Hidalgo County Master Drainage Systems

In accordance with Article 16, Section 59 of the State Constitution of Texas, Hidalgo County Drainage District No.1 is charged with responsibility to provide management for conservation and development of natural resources of the State including storage, preservation, and distribution of its stormwaters. Outfall drainage in Hidalgo County is provided by a network of large drainage ditches that were constructed during the late 1970s through the middle 1980s. These drainage ditches are collectively referred as the Hidalgo County Master Drainage System (HCMDS). Outfall drainage ditches generally related to the Mission Ridge and the natural levee system which extends along the north bank of the Rio Grande from a point southwest of Mission to the mouth of the river at the Gulf of Mexico. Mission Ridge is a minor rise whose crest forms a drainage divide extending generally along U.S. Highway 83 from a short distance west of Mission to a point about midway between Weslaco and Mercedes. The ditches south of U.S. 83 outfall into the IBWC Main Floodway which then splits into the Arroyo Colorado and North Floodway, which carries flows into the Laguna Madre. The ditches in the northern portion of U.S. 83 outfall into either the HCMDS Main Floodwater channel or IBWC North Floodway, which carries flow through Willacy County to the Laguna Madre.

The HCMDS was initiated in the summer of 1981 by constructing the Main Floodwater channel which outfalls into the Laguna Madre extending 36 miles from Panchita. Other constructed drainage channels include: South Main Drain, North Main Drain, East Lateral Drain, Southwest Lateral, Pharr-McAllen Lateral, Mission Lateral, Edinburg Lateral, Mission Inlet and Rado Drain, Weslaco Drain, West Mercedes Drain, and East Donna Drain. The HCMDS has been expanded in recent years by the construction of South Floodwater Channel, Hidalgo Drain, South Pharr Drain, West Main Drain, Edcouch-Elsa Lateral, and others. The District is responsible for the continued development and maintenance of the HCMDS.

These drainage outfall ditches collect and convey runoff from various storm events. Also, many sections of the drainage ditches provide linear detention to attenuate flood peak discharges.

HCMDS has a depth varying from 12 to 15 feet. Since the shallow groundwater within the district limit has an average depth of 10 feet, HCMDS drainage ditches have year- round shallow groundwater discharges.

Figure 3-1 shows the Hidalgo County Master Drainage System network.

Water Supply

Availability of existing water supplies in Hidalgo County and in the Lower Rio Grande Basin as a whole were analyzed in several studies including the 2011 Region M Regional Water Plan and the 2006 Hidalgo County Water Development Project. Practically all of the dependable surface water supply that is available to Hidalgo County is from the yield of the Amistad and Falcon International Reservoirs on the Rio Grande River. These reservoirs are operated as a system by the International Boundary and Water Commission (IBWC) for flood control and water supply purposes. Groundwater from the Gulf Coast Aquifer is used to supplement surface water sources under severe drought conditions.

The dependable firm water supply available from the Amistad/Falcon Reservoir System during drought-of-record conditions is projected to decrease significantly as a consequence of reduced conservation storage capacity due to sedimentation of the reservoir system. It was projected that the firm yield of the Amistad/Falcon Reservoir System will decrease by nearly 115,000 acre-feet or by nearly 10 percent by 2060.

Also the dependable yield of the reservoir system is projected to reduce due to the failure of Mexico to maintain its minimum inflow requirement to the Rio Grande as stipulated in a 1944 treaty between Mexico and the United States. Based on records published annually by the IBWC, there was a deficit of inflows of 1,024,000 acre-feet allotted to the United States from the Mexico tributaries during the five-year accounting cycle ending October 2, 1997.

The Arroyo Colorado is located in the Nueces-Rio Grande River Basin. It drains eastward into the Gulf of Mexico via the Laguna Madre. It is partly used as a navigational body for commercial shipping to the Port of Harlingen and its flows are critical to sustaining the ecology of the Laguna Madre. The Arroyo Colorado as a water supply source for domestic, municipal, and industrial uses has been limited due to economic, environmental, and water quality issues.

Groundwater has been used as a secondary source of water supply in the county. The Gulf Coast Aquifer is the main source of groundwater in Hidalgo County.

Based on the 2011 Region M Regional Water Plan, total water supply of Hidalgo County is projected to decrease from approximately 548,932 acre-feet per year in 2010 to approximately 533,826 acre-feet per year in 2060. Municipal water is expected to increase slightly during the 50-year period from 144,029 to 145,215 acre-feet per year.

Water Demand

According to the 2011 Region M Regional Water Plan, Hidalgo County's population is expected to increase by more than 164 percent between 2010 and 2060 to approximately 2,048,911.

The combined demand for municipal, manufacturing, steam electricity, mining, and livestock water uses in the county is expected to increase by 139 percent from 131,124 acre-feet in 2010 to 313,577 acre-feet in 2060. Due to urbanization, irrigation demand is expected to reduce by 22 percent from 583,030 acre-feet in 2010 to 453,772 acre-feet in 2060. During the same period, municipal water demand is expected to increase by 142 percent from 115,410 acre-feet to 278,964 acre-feet. The projected 2060 water demand for all uses is 767,349 acre-feet.

Water Needs

Water needs (shortage of water) were determined in the 2011 Region M Regional Water Plan by comparing the projected water demands with projected water supplies. The comparison was made with consideration of each water user group. Projected municipal water shortages for Hidalgo County for each water user group and decade of the planning period (2010 - 2060) are summarized in **Table 3-1**. As shown in the table, the City of McAllen will face a water supply shortage of approximately 29,457 acre-feet in 2060. The City of Mission will have a water shortage of approximately19,674 acre-feet in 2060. For the same planning year, The City of Pharr, the City of Edinburg, and the City of San Juan will all face water shortages. The sum of all municipal deficit projections for the county in the year 2060 is approximately 139,930 acre-feet. Hidalgo County is anticipated to face significant water supply shortages in the future.

Development Opportunity

To address the projected future water shortages facing the county, significant study efforts have been made. A range of water management strategies were identified, evaluated, and recommended in the 2011 Region M Regional Water Plan. The following is a list of the recommended alternative strategies:

1. Water conservation.
2. Reuse of wastewater flow.
3. Acquire additional Rio Grande water through water right purchase and contract.
4. Purchase additional Rio Grande water through irrigation water rights conversion.
5. On-farm conservation with conveyance improvement.
6. Conveyance efficiency improvement.

As discussed in the 2011 Region M Regional Water Plan, the utilization of the existing HCMDS facilities (large manmade drainage channels and detention basins) and additional new facilities to capture, convey, and treat constantly flowing water within the drainage system of Hidalgo County Drainage District No.1, as an optional drinking water source was not recommended as an alternative water management strategy due to lack of technical information at the time. For any funding to be available from the TWDB, the proposed project will need to be added as a viable water management strategy in the 2011 Region M Regional Water Plan or will require support from the Region M Regional Water Planning Group for a consistency waiver.

The use of the existing drainage facilities for both drainage/flood control and water supply will be more cost effective without a proportional increase in costs and thus enhance the economic justification for the project. Additional storage and diversion facilities will provide flood control benefits in conjunction with water supply. Based on the 2006 Hidalgo County Water Development Project, there is a dependable base flow rate of 58.5 cfs in the Main Floodwater Channel, which translates to 42,300 acre-feet per year. **Figure 3--2** shows the field measurement locations performed for the 2006 Hidalgo County Water Development Project.

With consideration of potential rainfall runoff from the contributing drainage basin, the available water to be developed could be significantly increased. Conservatively estimated, there is an approximate annual runoff of 160 acre-feet per square mile per year within the study area. **Figure 3-3** shows the existing gauge locations located within the study area.

Current Water Supply Network and Service Areas

A study entitled “The Municipal Water Supply Network of The Lower Rio Grande Valley” was conducted in 2004 by the Irrigation District Team (IDEA) of the Irrigation Technology Center of the Texas Water Resources Institute at Texas A&M University. The study report showed that the existing municipal water supply network in the region consists mainly of lined and unlined canals, pipelines, resacas, and reservoirs that belong to irrigation districts but also carry water for municipal uses.

There are several municipal water providers in the area to provide treated water to end users. Each water utility has its service area delineated by its Certificate of Convenience and Necessity (CCN) as regulated by the Texas Commission on Environmental Quality (TCEQ). The CCN service areas from the TCEQ Water Utility Database (WUD) for Texas Water Districts and Public Drinking Water Systems are shown in **Figure 3-4**.

Three alternative project locations were selected. Two locations are along the North Main Drain and one location is further downstream at the transition to the Main Floodwater Channel. Although all three proposed locations are within the CCN service area boundaries of the North Alamo WSC, potential service areas also include the Cities of Alamo, Edcouch, Edinburg, Hidalgo, La Joya, McAllen, Mission, Pharr, San Juan, Sharyland WSC, Weslaco, and other Hidalgo County areas which have a combined projected near-term water deficit of 38,126 acre-feet in year 2030. These cities and surrounding non-incorporated areas can potentially be served from any of these three locations via the North Alamo WSC or any of the other water utility districts. As shown in **Table 3-1**, the North Alamo WSC service to Hidalgo County is also projected to experience water shortages of up to 2,345 acre-feet in 2040.

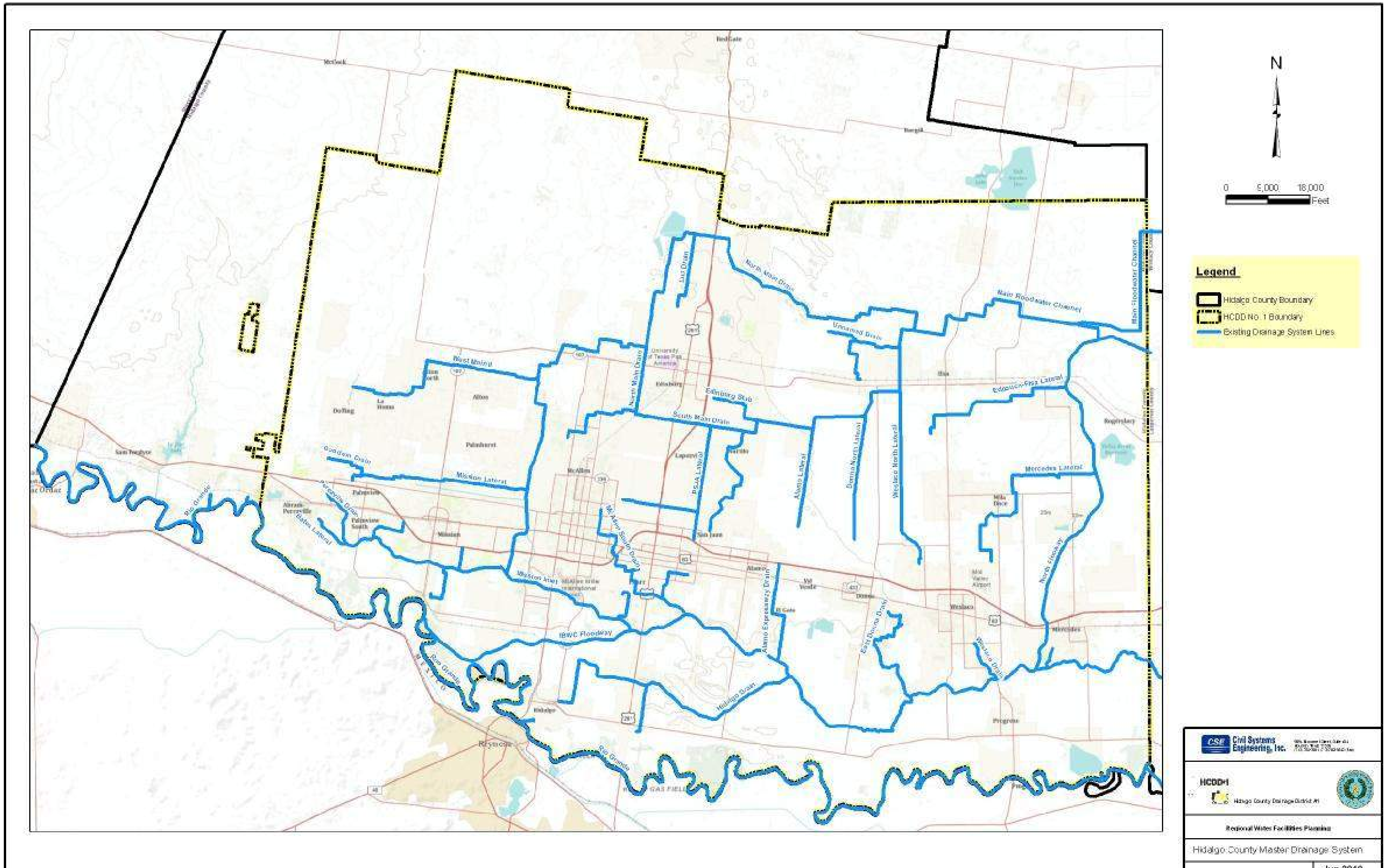


Figure 3-1. Hidalgo County Master Drainage Systems

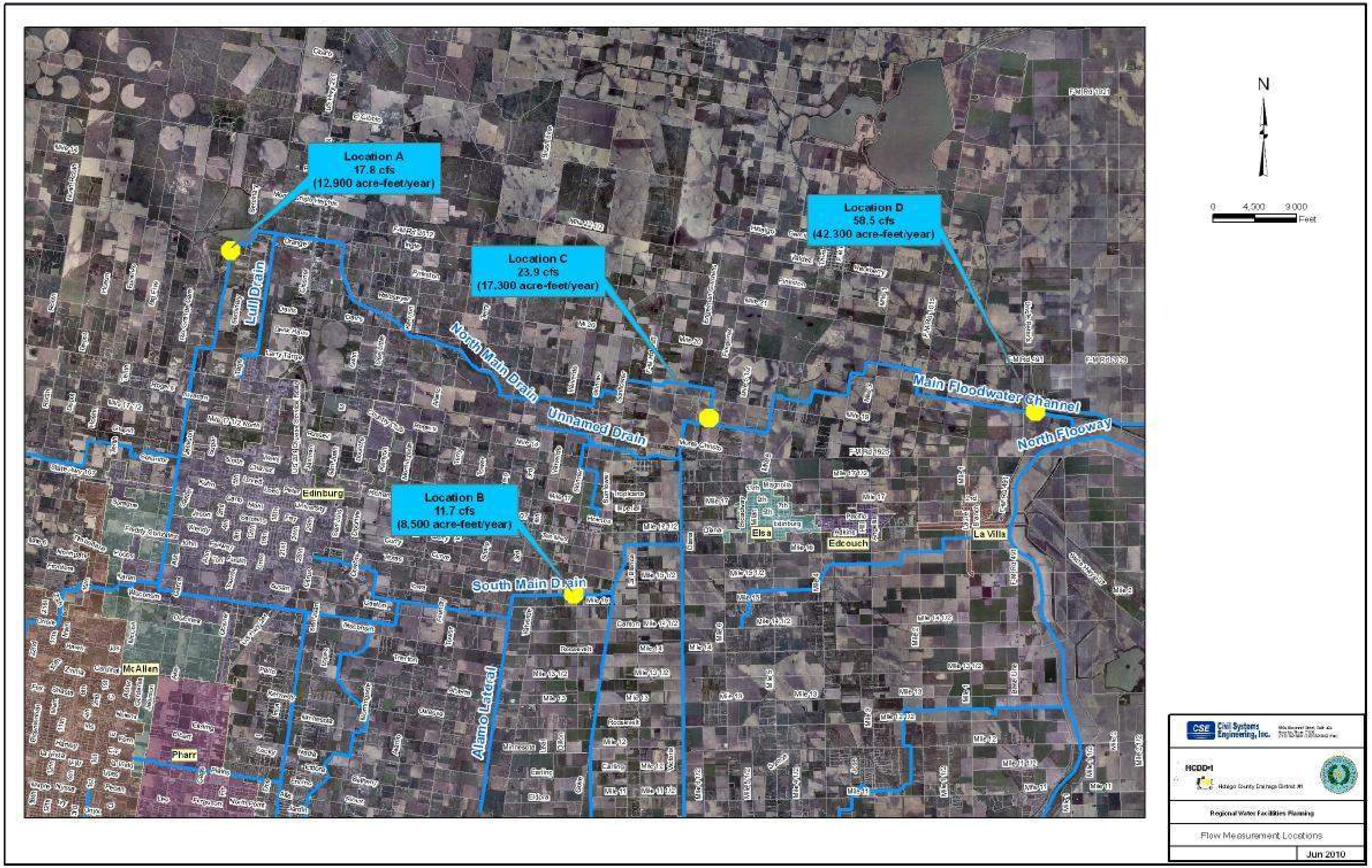


Figure 3-2. Base Flow Measurement Locations

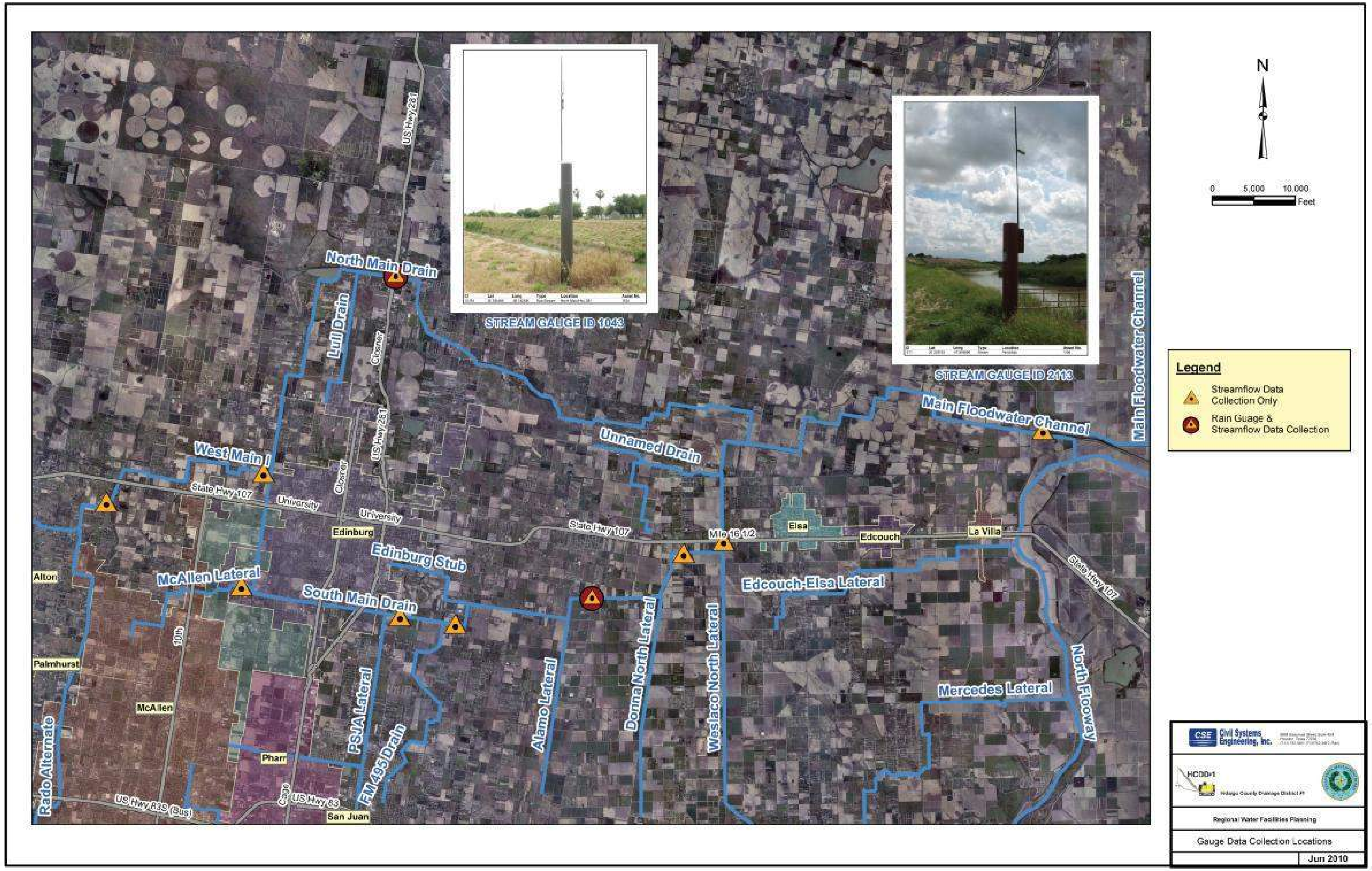


Figure 3-3. Stream Gauge Stations

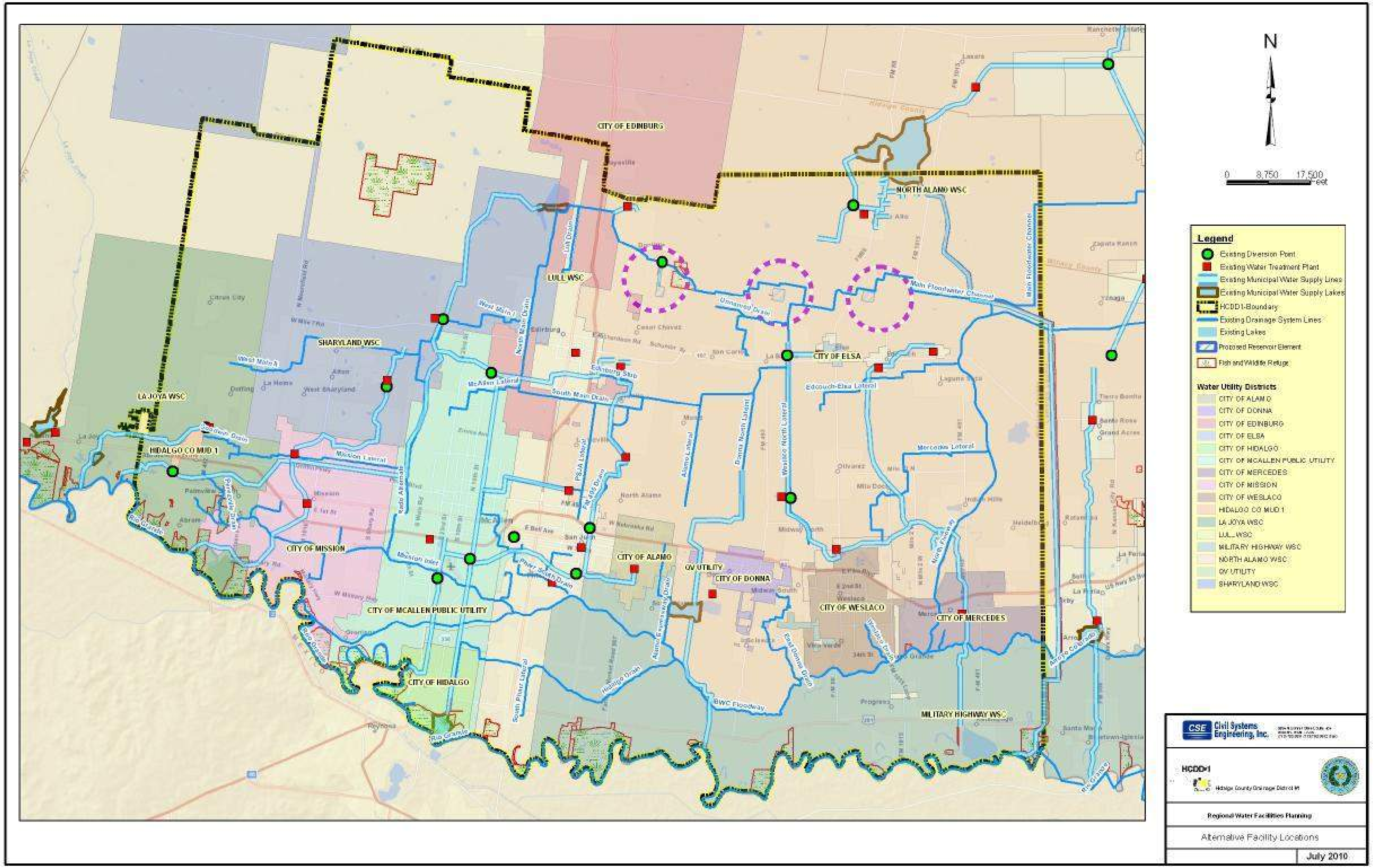


Figure 3-4. Current Water Supply Network and Service Areas

Table 3-1. Hidalgo County Projected Municipal Water Surplus and Needs (AF)

Water User Group	River Basin	Surplus/Deficit (ac-ft/yr)					
		2010	2020	2030	2040	2050	2060
Alamo	Nueces-Rio Grande	-59	-762	-1,548	-2,415	-3,407	-4,424
Alton	Nueces-Rio Grande	0	0	-2,446	-3,419	-4,482	-5,602
Donna	Nueces-Rio Grande	1,729	1,435	1,117	759	347	-103
Edcouch	Nueces-Rio Grande	-129	-188	-255	-332	-420	-516
Edinburg	Nueces-Rio Grande	6,216	3,826	1029	-1,805	-5,151	-8,580
Elsa	Nueces-Rio Grande	659	603	534	460	364	258
Hidalgo	Nueces-Rio Grande	594	209	-219	-685	-1,206	-1,740
Hidalgo	Rio Grande	-2	-18	-20	-27	-49	-71
Hidalgo City MUD	Nueces-Rio Grande	-1,130	-1,814	-2,588	-3,421	-4,342	-5,287
La Joya	Nueces-Rio Grande	46	-5	-59	-120	-189	-265
La Joya	Rio Grande	19	-2	-25	-51	-80	-113
La Villa	Nueces-Rio Grande	256	258	259	261	261	258
McAllen	Nueces-Rio Grande	2,627	-2,501	-8,474	-14,830	-21,932	-29,453
McAllen	Rio Grande	0	-1	-1	-2	-3	-4
Mercedes	Nueces-Rio Grande	3,231	3,123	2,988	2,846	2,652	2,434
Military Hwy WSC	Nueces-Rio Grande	-8	-143	-422	-780	-1120	-1479
Military Hwy WSC	Rio Grande	0	0	0	0	-4	-9
Mission	Nueces-Rio Grande	-1,470	-4,468	-7,824	-11,365	-15,469	-19,674
North Alamo WSC	Nueces-Rio Grande	8,983	5,627	1,853	-2,345	-7,180	-12,150
Palmhurst	Nueces-Rio Grande	0	0	209	-296	-929	-1,633
Palmview	Nueces-Rio Grande	0	0	0	0	-447	-906
Pen itas	Nueces-Rio Grande	5	3	2	-1	-7	-16
Pharr	Nueces-Rio Grande	376	-1,754	-4,152	-6,799	-9,649	-12,695
Progresso	Nueces-Rio Grande	0	0	0	0	0	0
San Juan	Nueces-Rio Grande	-478	-1,642	-2,933	-4,361	-6,008	-7,697
Sharyland WSC	Nueces-Rio Grande	1,624	-391	-397	-1,331	-2,296	-3,335
Sullivan City	Rio Grande	159	186	184	13	-197	-411
Weslaco	Nueces-Rio Grande	1,043	286	-579	-1537	-2,622	-3,787
County-Other	Nueces-Rio Grande	1,028	-2,179	-5,775	-9,722	-14,197	-18,779
County-Other	Rio Grande	60	-187	-409	-652	-927	-1,210
SUM OF DEFICITS		**-3,276**	**-16,055**	**-38,126**	**-66,296**	**-102,313**	**-139,930**
SUM OF EXCESS SUPPLIES		**28,655**	**15,556**	**8,175**	**4,339**	**3,624**	**2,950**

4 Siting Analysis

This section presents the potential intake and water treatment plant sites (Project Sites) identified and evaluated for the project. The purpose of siting analysis is to assess feasibility and suitability of the proposed project sites. The following considerations were given in identifying and evaluating the potential project sites:

- Dependable water source
- Proximity to source water and service areas
- Site topography and accessibility
- Land use/land cover
- Environmental
- Floodplain

Three (3) alternative project sites (SITE I, II, and III) were first identified based on available information on aerial photography, water availability, floodplain maps, topographic data, land use/land cover, oil and gas pipeline map, roadway map, and local knowledge of the study area. The three potential project sites are named as SITE I, SITE II, and SITE III, as shown in **Figure 4-1**. SITE I and II are located on the North Main Drain, and SITE III is located on the Main Floodwater Channel. Following the desktop analysis, a baseline environmental investigation was performed for each site.

To assist the project development, ArcGIS 9.3 was used consistently throughout the entire project for analysis and presentation. Digital data were obtained from various sources for this siting analysis. Recent aerial photography was obtained from the Hidalgo County Drainage District No.1

and was used as the primary base map data. The aerial photo map has a ground resolution of 1.5 feet, which provides the necessary information on land use and land cover for the study area. LiDAR DEM dataset (15-foot resolution) developed for the Hidalgo County Flood Map Modernization Project was obtained, which provided the precision topographic data needed for the siting analysis. FEMA effective floodplain map data was obtained from FEMA and Hidalgo County Drainage District No.1. Roadway map, land use/land cover map, and soil map were downloaded from the Texas Natural Resources Information System (TNRIS) website. Oil and gas pipeline data was also obtained Texas Railroad Commission.

Figure 4-2 illustrates the FEMA effective 100-year floodplain and the proposed project sites.

Water Availability

Based on the 2006 Hidalgo County Water Development Project, historical observations, and local knowledge, the North Main Drain and Main Floodwater Channel have constantly flowing drainage water. During the 2006 study, flow measurements were made at four

(4) locations within the HCDD No.1 Mater Drainage System to determine base flow conditions within the drainage network, as shown in **Figure 3-2**. The measured base flow rates along the North Main Drain and Main Floodwater Channel are 17.3, 23.9, and 53.8 cfs, respectively at location A, C, and D from upstream to downstream. These flow rates translate to 12,900, 17,300, and 42,300 acre-feet/year, respectively at each location.

To further demonstrate the availability of drainage water within the North Main Drain and the Main Floodwater Channel. Stream gauge data was obtained from Hidalgo County Drainage District No.1. There is one stream gage station on the North Main Drain at US 281 (ID 1043) and one on the Main Floodwater Channel at Panchitas (ID 2113), as shown in **Figure 3-3**. A plot of water surface elevations at the Panchitas stream gage station for the period of September 29, 2008 to September 30, 2009 is shown in **Figure 4-3.** As illustrated, there is water constantly flowing within the Main Floodwater Channel. The average water depth at Panchitas stream gauge station location was 4 feet varying from 1.5 feet to 18.5 feet during the water year.

To quantify the storm water runoff within the drainage system (specifically along the North Main Drain and the Main Floodwater Channel), which can be potentially captured for water supply, the HEC-HMS hydrologic model developed for the Hidalgo County Flood Map Modernization Project was obtained to estimated runoff at the potential project sites. **Figure 4-4** shows the resulting runoff variations within the North Main Drain at Brush Line Road for the driest year of 1950 on record. As shown, even for the driest year on record, there were still significant runoff flows within the North Main Drain drainage ditch. During a storm event, rainfall runoff or floodwater can be diverted to a storage basin (floodwater detention basin) which can later be used to supplement the base flow to augment the available water supply and reliability. The floodwater detention basin also provides flood control benefit by reducing flood risk along the drainage channel.

Components of Raw Water Conveyance System

Same components for water diversion, conveyance, storage, treatment and operation strategy were proposed at all potential project sites. The facility components include:

§ Diversion weir structure on the drainage channel to regulate water level with the drainage ditch
§ Inlet structure with screens to withdraw base flow water to the raw water storage basin
§ Wet well for the diversion transfer pump station
§ Diversion transfer pump station to pump drainage ditch water to the raw water storage basin
§ Force main I from the diversion transfer pump station to the raw water storage basin
§ Raw water storage basin to regulate and provide water to the water treatment plant
§ Floodwater side weir structure to divert floodwater to the floodwater detention basin
§ Diversion channel to convey floodwater from the side weir

structure to floodwater detention basin

- Conveyance channel I to convey floodwater within the floodwater storage basin to the raw water storage basin by gravity when water level in the floodwater detention basin is higher than the raw water storage basin for water supply to the water treatment plant.
- Conveyance channel II to convey floodwater within the detention basin to the wet well and to be pumped to the raw water storage base for water supply to the water treatment plant.
- Water treatment plant intake pump station to supply water to the water treatment plant.
- Force main II from raw water storage basin to water treatment plant

SITE I

Figure 4-5 shows the diversion and water treatment plant location of SITE I. The proposed diversion is located on the North Main Drain approximately 2,700 feet east of Kenyon Road. The raw water storage basin, floodwater detention basin, and water treatment plant as a whole are located north of Monte Cristo Road west of Alamo Road.

All components except the diversion structures are located outside the FEMA effective 100-year floodplain, except the diversion intake structures, as illustrated in **Figure 4-2**.

The topography at this site is very flat with an elevation (NAVD 88) varying from 78 to 82 feet from the diversion to the water treatment plant. Due to the flat topography nature, pumping is required to transfer water from the drainage ditch to the raw water storage basin. Pumping is also required from the raw water storage basin to the water treatment plant.

There is a total contributing drainage area of 263 square miles to this location. Based on the flow measurements performed for the 2006 Hidalgo County Water Development Project, the approximate base flow is 17.3 cfs at this diversion location.

A Baseline Environmental Study was performed for each project site with the following environmental considerations:

- Land Use and Socioeconomic Issues
- Coastal Zone Management Act
- Farmland Protection Policy
- Floodplains
- Air and Water Quality Issues
- Wild and Scenic Rivers Act
- Natural Resources Issues
- Endangered Species
- Archeological and Historical Resources
- Hazardous Material Issues
- Environmental Justice

As concluded in the baseline environmental study in **Appendix A** (attached CD-ROM), there are no major environmental concerns at project SITE I.

This project site is relative proximity to the major Cities of Edinburg, McAllen, Mission, and Pharr. It is located very close to Monte Cristo Road, a major east-west thoroughfare in Hidalgo County. There are other alternative roads to access to the site. The proposed floodwater detention basin has a higher flood control benefit since it is located relatively upstream of the channel.

The water treatment plant capacity is limited to approximately 10 MGD with consideration of the availability of dependable base flows at the location.

SITE II

Figure 4-5 shows the diversion and water treatment plant location of SITE II. The proposed diversion is located on the North Main Drain approximately 2,500 feet east of FM Rd 493. The raw water storage basin, floodwater detention basin, and water treatment plant as a whole are located just south of Mile 19 between FM Rd 493 and Engerman Gardens Road.

The proposed water treatment plant is located outside of the FEMA effective 100-year floodplain. Portion of the proposed raw water storage basin is located in the 100-year floodplain and the entire floodwater detention basin is located within the 100-year floodplain. The potential impact of the raw water storage basin on floodplain storage will be mitigated by the construction of the floodwater detention basin.

Like SITE I, the topography at this site is very flat with an elevation (NAVD 88) varying from 66 to 68 feet from the diversion to the water treatment plant. Pumping is required to transfer water from the drainage ditch to the raw water storage basin. Pumping is also required from the raw water storage basin to the water treatment plant.

There is a total contributing drainage area of 290 square miles to this location. Based on the flow measurements performed for the 2006 Hidalgo County Water Development Project, the approximate base flow is 23.9 cfs at this diversion location. There is a contributing drainage area of 283 square miles to this location.

As concluded in the baseline environmental study in **Appendix A** (attached CD-ROM), there are no major environmental concerns at project SITE II.

This project site is also relative proximity to the major Cities of Edinburg, McAllen, Mission, and Pharr, compared with SITE III, and small Cities of Elsa, Edcouch, and La Villa. It is located approximately 3,000 feet north of Monte Cristo Road. There are other alternative roads to access to the site. .

The water treatment plant capacity at this location is limited to approximately 15 MGD with consideration of the availability of dependable base flows.

SITE III

Figure 4-6 shows the diversion and water treatment plant location of SITE III. The proposed diversion is located on the Main Floodwater Channel, 6,200 feet downstream of FM Rd 88. The raw water storage basin, floodwater detention basin, and water treatment plant as a whole are located just south of Mile 19 between FM Rd 88 and Mile 3.

All components except the diversion structures are located outside FEMA effective 100-year floodplain, except the diversion intake structures.

Like SITE I and II, the topography at this site is very flat with an elevation (NAVD 88) varying from 62 to 72 feet from the diversion to the water treatment plant. Pumping is required to transfer water from the drainage ditch to the raw water storage basin. Pumping is also required from the raw water storage basin to the water treatment plant.

There is a total contributing drainage area of 403 square miles to this location. As discussed earlier, there is an approximate base flow of 58.5 cfs at this diversion location.

As concluded in the baseline environmental study in **Appendix A** (attached CD-ROM), there are no major environmental concerns at project SITE III.

This project site is proximity to Cities of Elsa, Edcouch, and La Villa. It is located approximately 5,000 feet north of Monte Cristo Road. There are other alternative roads to access to the site.

There is a more reliable water source at this site. The potential capacity of the proposed treatment plant can be much larger than the 15 MGD with consideration of the availability of dependable base flows at the location.

There is an approximate distance of 9 miles between SITE I and SITE III. The elevation difference between these two sites is approximate of 16 feet. The overland slope is very flat, approximately 1.7 feet per mile.

Comparing the three potential project sites, SITE III has the most reliable water supply of the three sites. To provide treated water to the cities such as Edinburg, McAllen, Pharr, and Mission. longer transmission lines are required. With consideration of the primary purpose of this project for water supply, SITE III is probably the most favorable site. However, the final selection will also depend on the potential service areas, land values, and legal and political considerations.

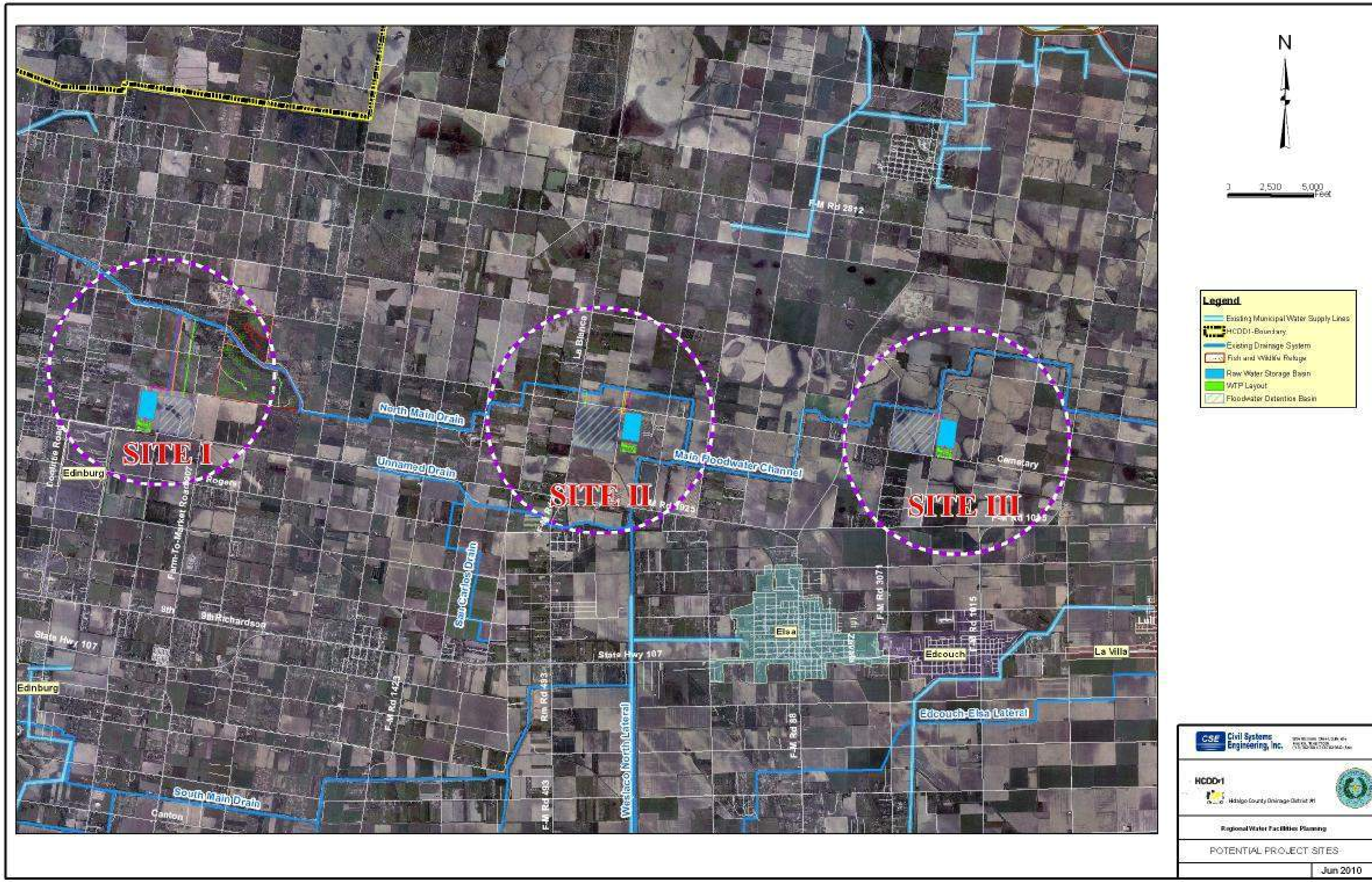


Figure 4-1. Potential Project Sites

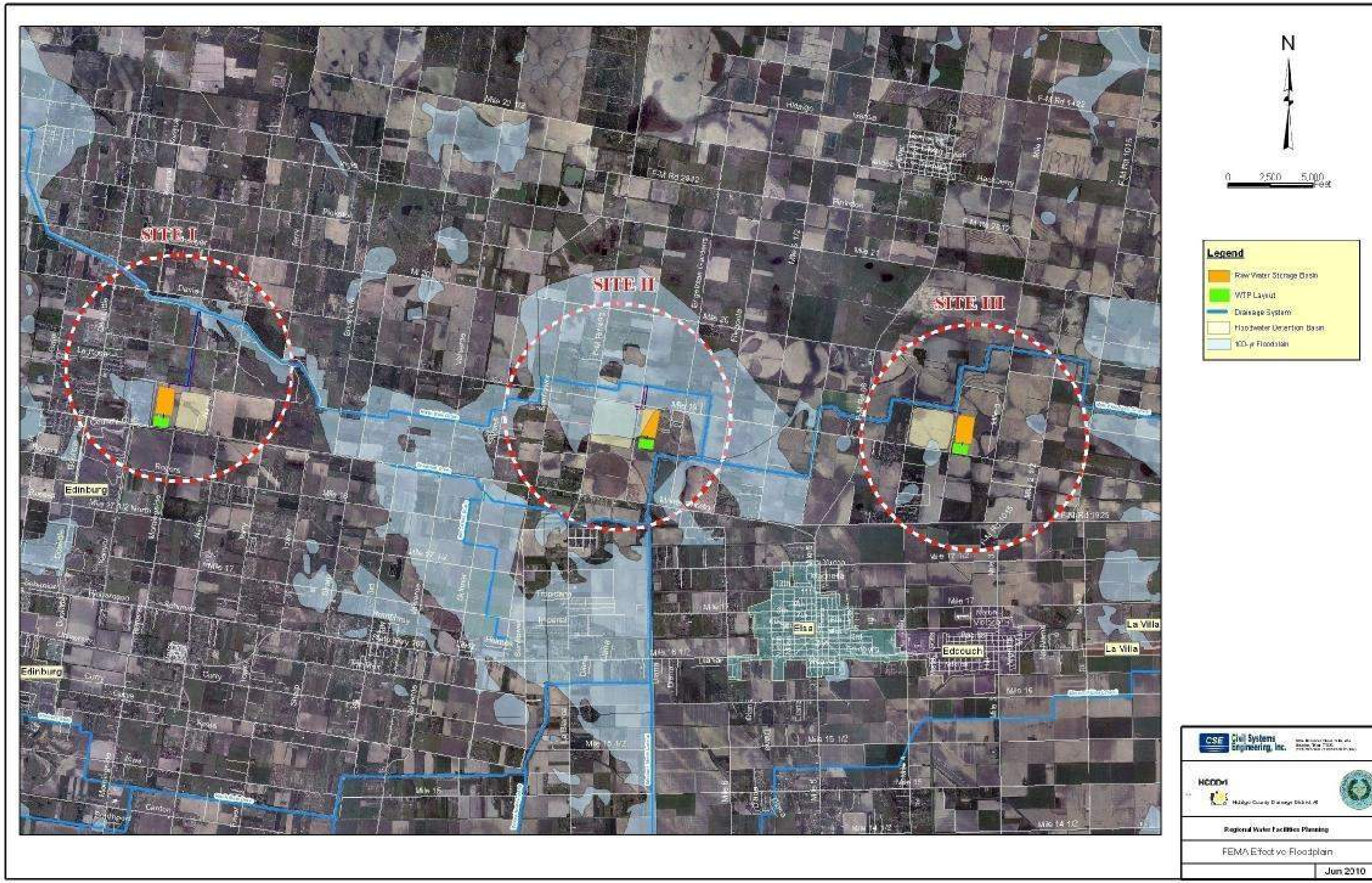


Figure 4-2. FEMA Effective 100-Year Floodplain Map

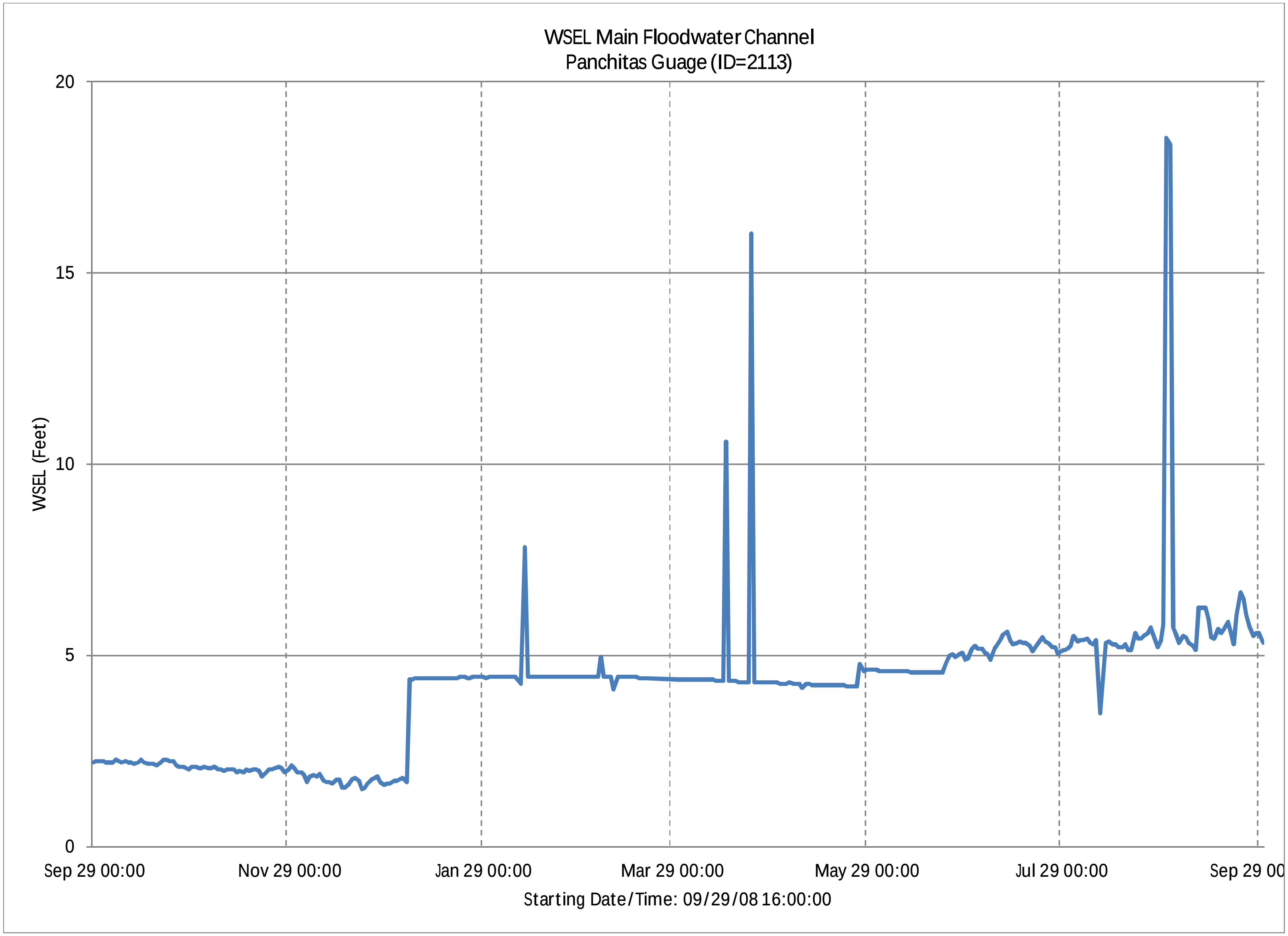


Figure 4-3. Stream Gauge Data (Sep. 29, 2008 – Sep. 30, 2009)

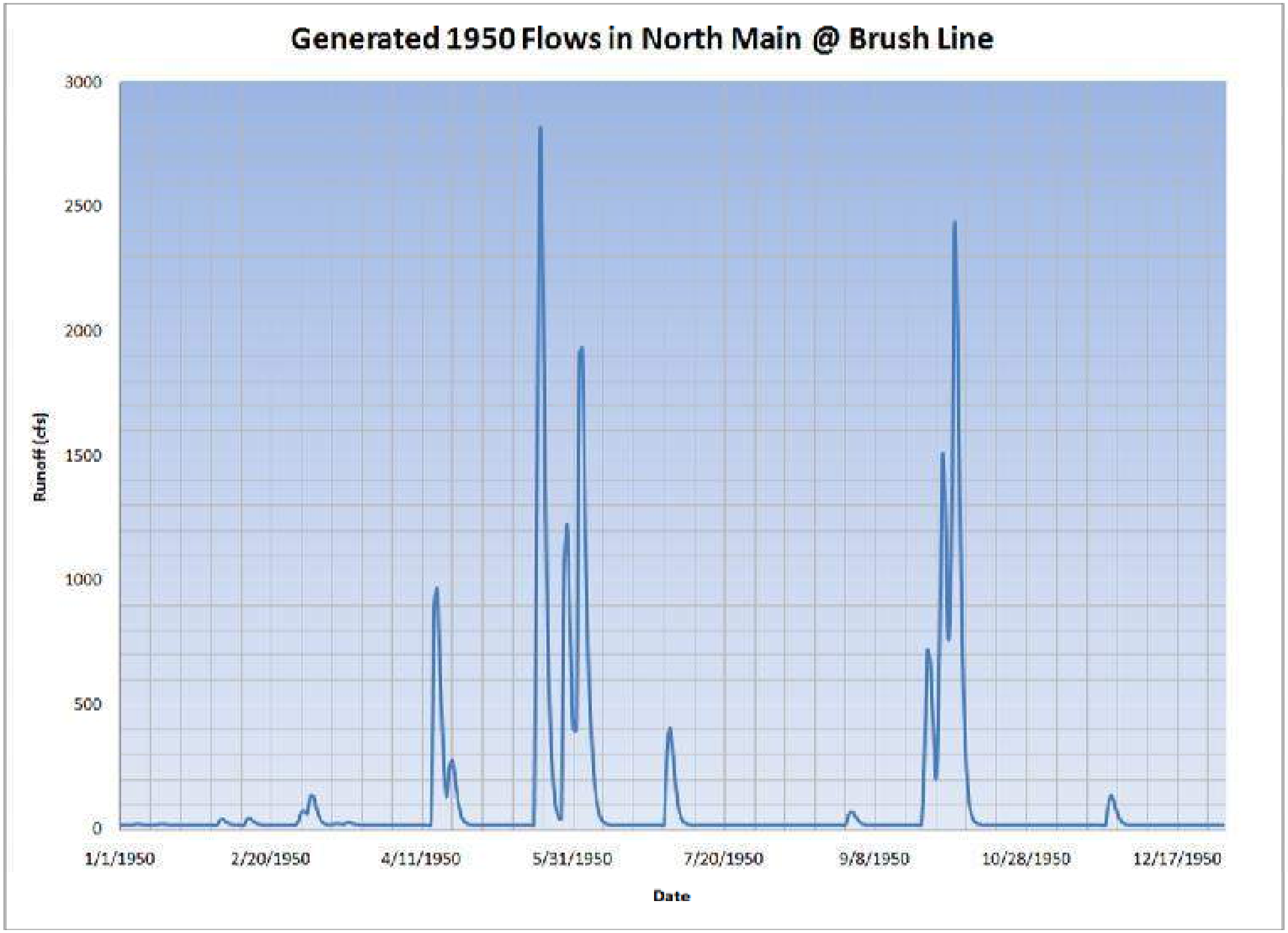


Figure 4-4. Synthetic Hydrograph (Combined Shallow Ground Water and Rainfall Runoff)

Figure 4-5. SITE I Facilities Plan Layout

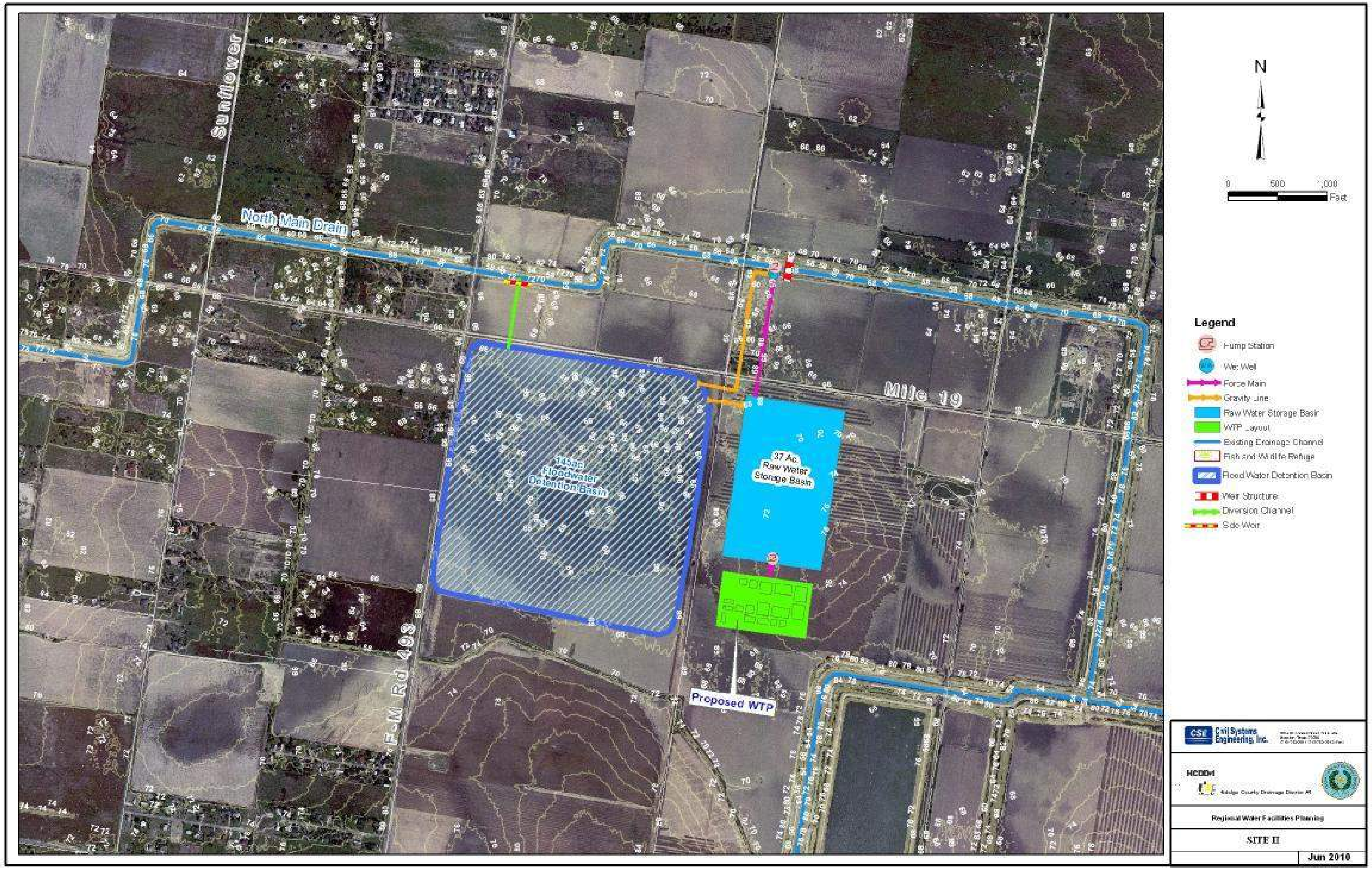


Figure 4-6. SITE II Facilities Plan Layout

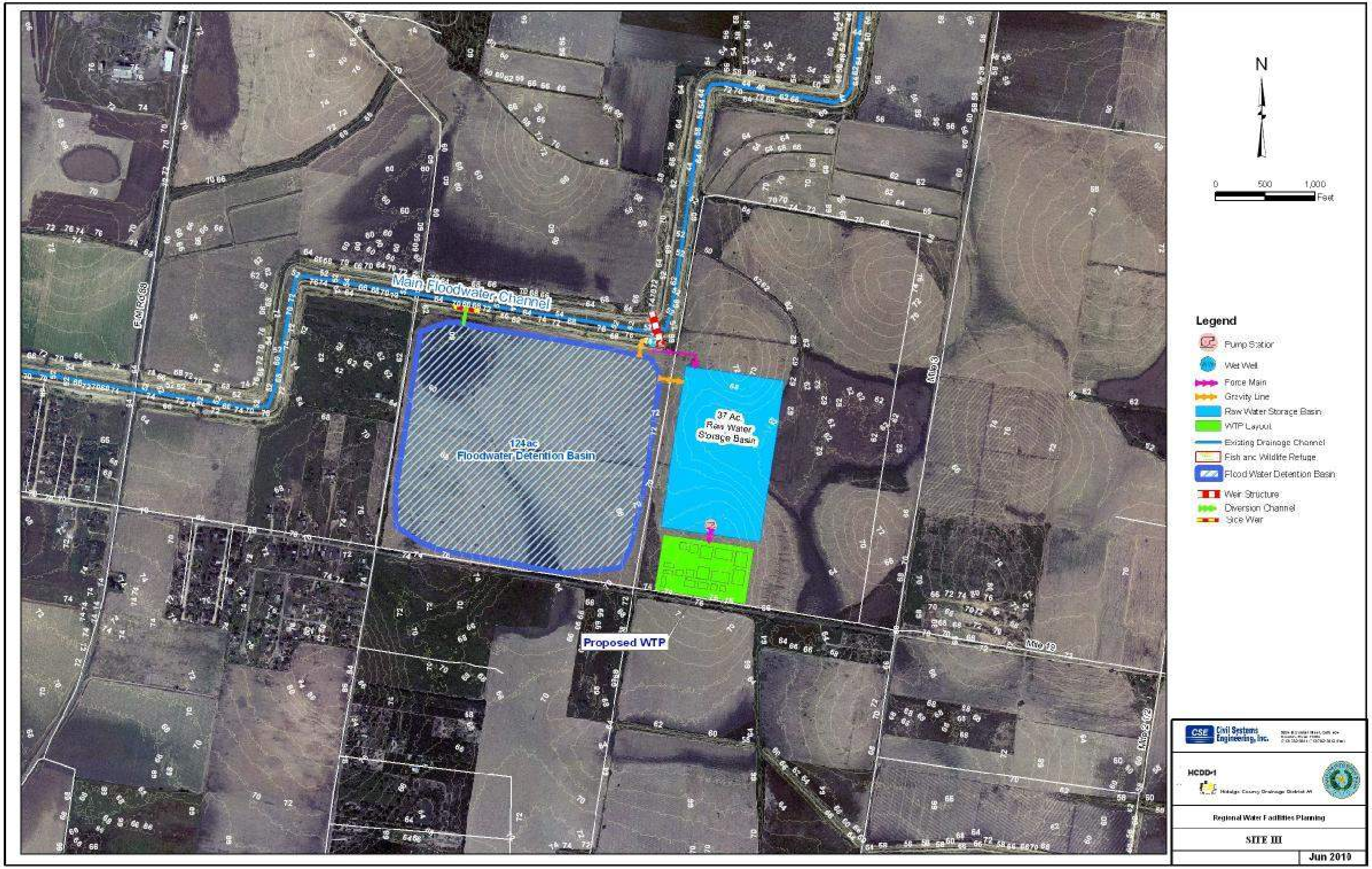


Figure 4-7. SITE III Facilities Plan Layout

5 Raw Water Conveyance Systems

The proposed raw water conveyance system at each diversion location is a combination of a weir structure on the ditch, intake inlet structure, intake pipes, a wet well, pump stations, raw water storage basin (RWSB), a side weir structure, and floodwater detention basin (FWDB).

Weir Structure

A weir structure on the drainage ditch was proposed just downstream of each potential diversion point. The weir structure regulates the water level within the ditch to provide a more steady condition for raw water diversion under normal operating conditions.

Intake Inlet

An intake inlet structure with screens was proposed to divert raw water by gravity via a intake pipe with diameter of 36 inches to a concrete vault (wet well). The diverted water first flows through the intake screens that remove large objects such as plants and logs. The proposed inlet structure has a capacity of 15 MGD.

Wet Well

A concrete vault (wet well) was proposed for a intake pump station to lift the raw water to a raw water storage basin. The wet well has 35 feet in diameter and 25 feet in depth.

Pump Stations

Two pump stations were proposed. The first pump station lift the raw water from the proposed wet well to the proposed RWSB. The second pump station deliver the raw water within the RWSB to the proposed water treatment plant (WTP).

The first pump station (Pump Station I) consists of two pumps (1 duty and 1 standby). Each has a capacity of 15 mgd.

The second pump station (Pump Station II) consists of four (3 duty and 1 standby). Each pump has a flow capacity of 5.5 mgd. Two of the pumps should be operated with variable drives (VFD). The proposed discharge pipe has a diameter of 36 inches.

Raw Water Storage Basin

At project site, a RWDB was proposed to store raw water (diverted base flows) from the drainage ditch under normal operation conditions. The basin was sized with a 7-day storage at 15 MGD, which equates to approximately 244 acre-feet of volume. The RWSB will provide protection and reliability against interruption in the raw water supply to the WTP which could result from planned or unplanned outages of the raw water diversion and conveyance facilities; reduce fluctuations in the raw water quality entering the WTP caused by rapid changes in raw water turbidity that can occur during rainfall events, and provide flow equalization.

Floodwater Detention Basin

As part of the overall project, a FWDB was proposed at each location to store floodwater. Floodwater within the FWDB can be used to supplement the base flow water for water supply purpose during drought season. Also, the FWDB provides flood protection downstream along the ditch by reducing flood water flow rates.

At SITE I, the proposed FWDB has a total capacity of 616 acre-feet with a surface area of 88 acres. A diversion channel of 4,800 feet was proposed to convey floodwater to the basin. .

At SITE II, an FWDB of 797 acre-feet was proposed with a surface area of 145 acres. A diversion channel of 200 feet was proposed to convey floodwater to the basin by gravity. The function and operation of the proposed at this site are the same as the SITE I.

At SITE III, a FWDB of 625 acre-feet with a surface area of 124 acres was proposed. The function and operation of the proposed at this site are the same as the SITE I and SITE II.

Flow diagrams and design data for the intake facilities are illustrated in **Figures 5-1, 5-2**, and **5-3** respectively for SITE I, SITE II, and SITE III. Figure 5-4 shows the dimensions of the RWSB, and Figure 5-4 shows the layout for pump station II.

Operating Strategy of RWSB and FWDB

The proposed RWSB can selectively withdraw raw water from the drainage ditch or from the proposed FWDB when floodwater is available in the basin. Water within the FWDB can be regulated to flow to the RWSB by gravity when the water level in the detention basin is higher than the water level in the RWSB, or flow to the wet well by gravity and pumped to the RWSB when the water level in the FWDB is lower than the water level in the RWSB. Screening will be required at the discharge to the wet well and RWSB from FWDB.

Water Quality Monitoring System

A water quality monitoring system should be installed at the diversion site on the ditch to monitor the water quality conditions within the ditch in order to optimize treatment operations.

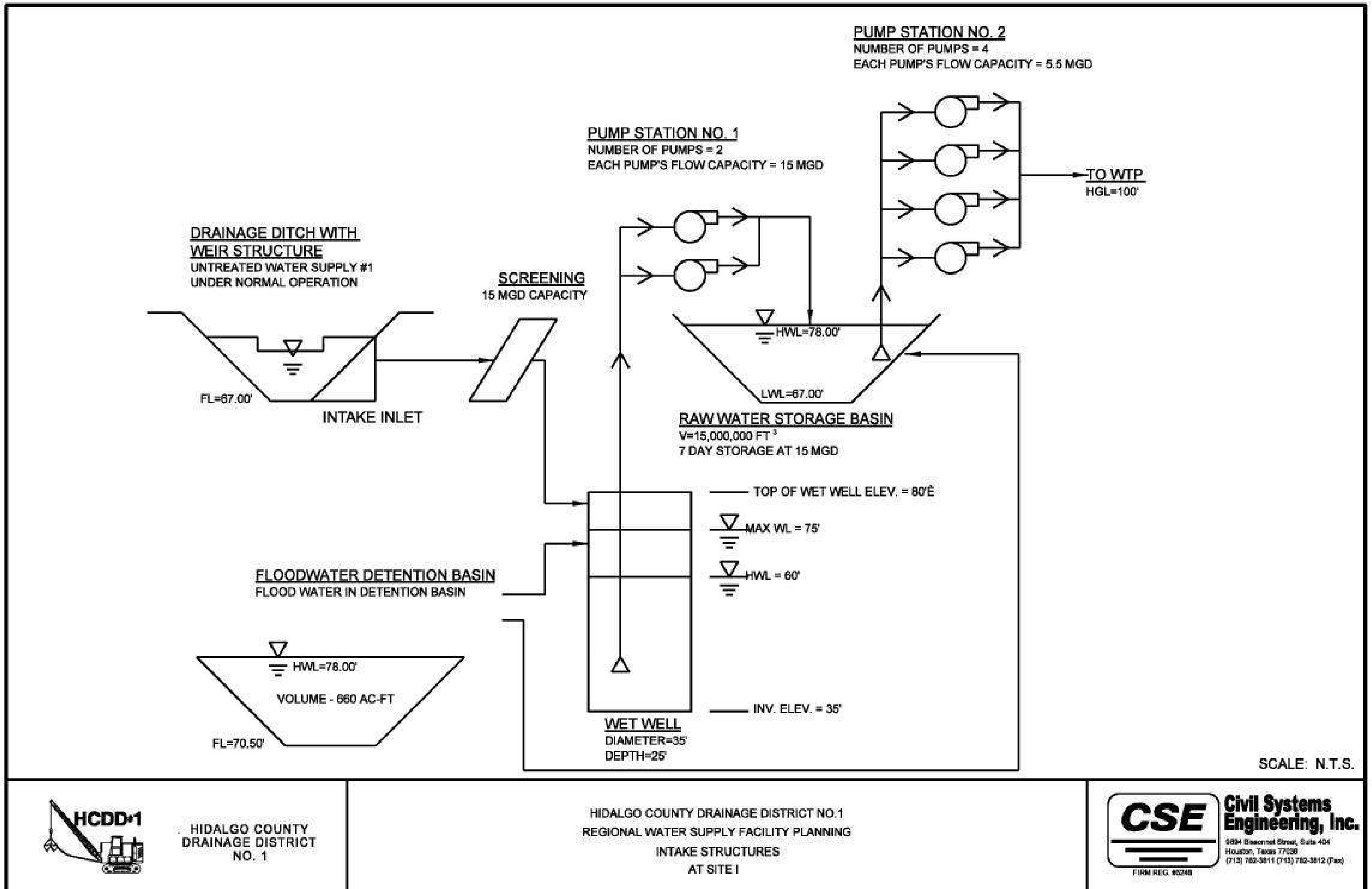


Figure 5-1. Intake Structures and Design Data at SITE I

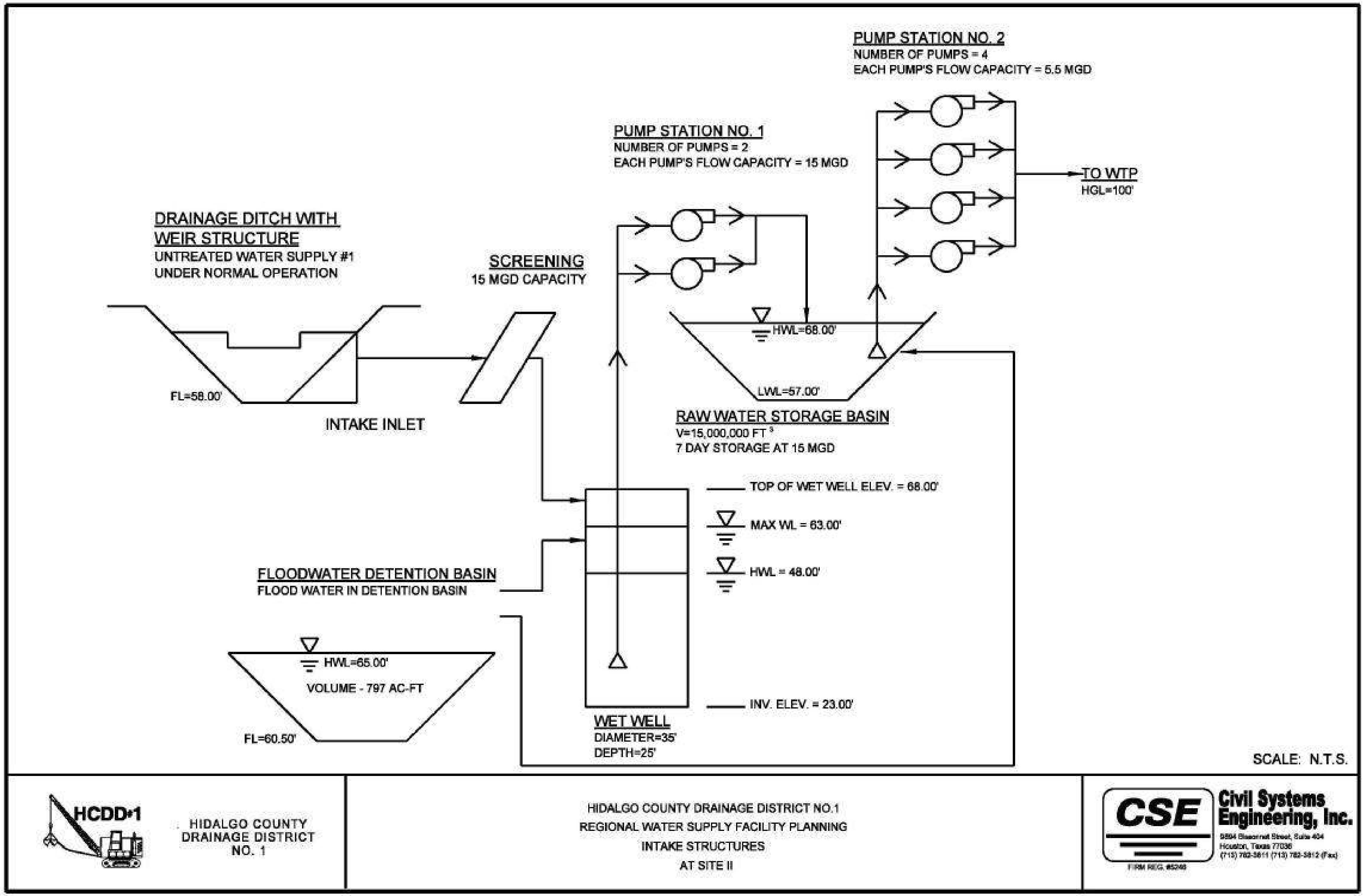


Figure 5-2. Intake Structures and Design Data at SITE II

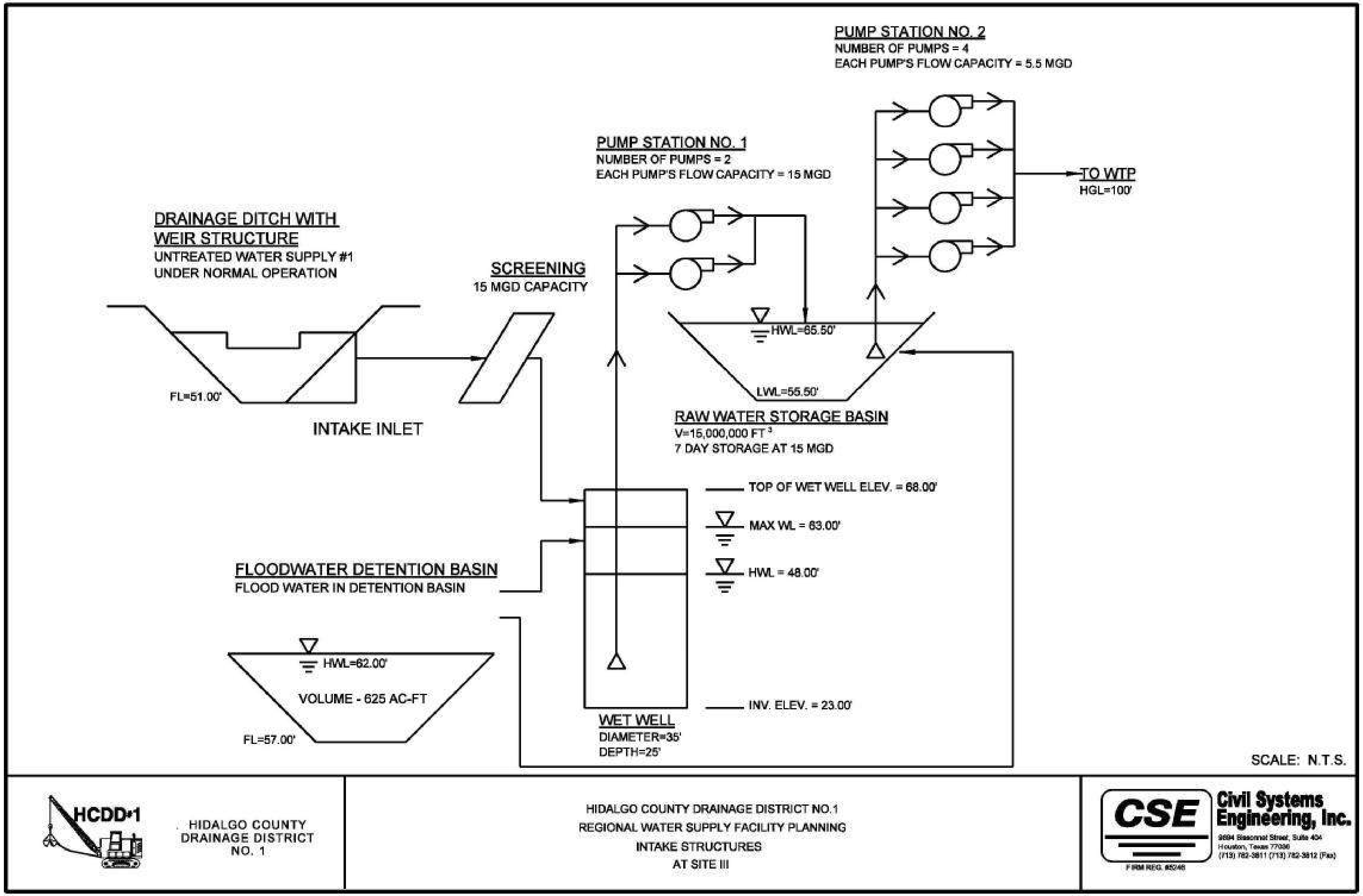


Figure 5-3. Intake Structures and Design Data at SITE III

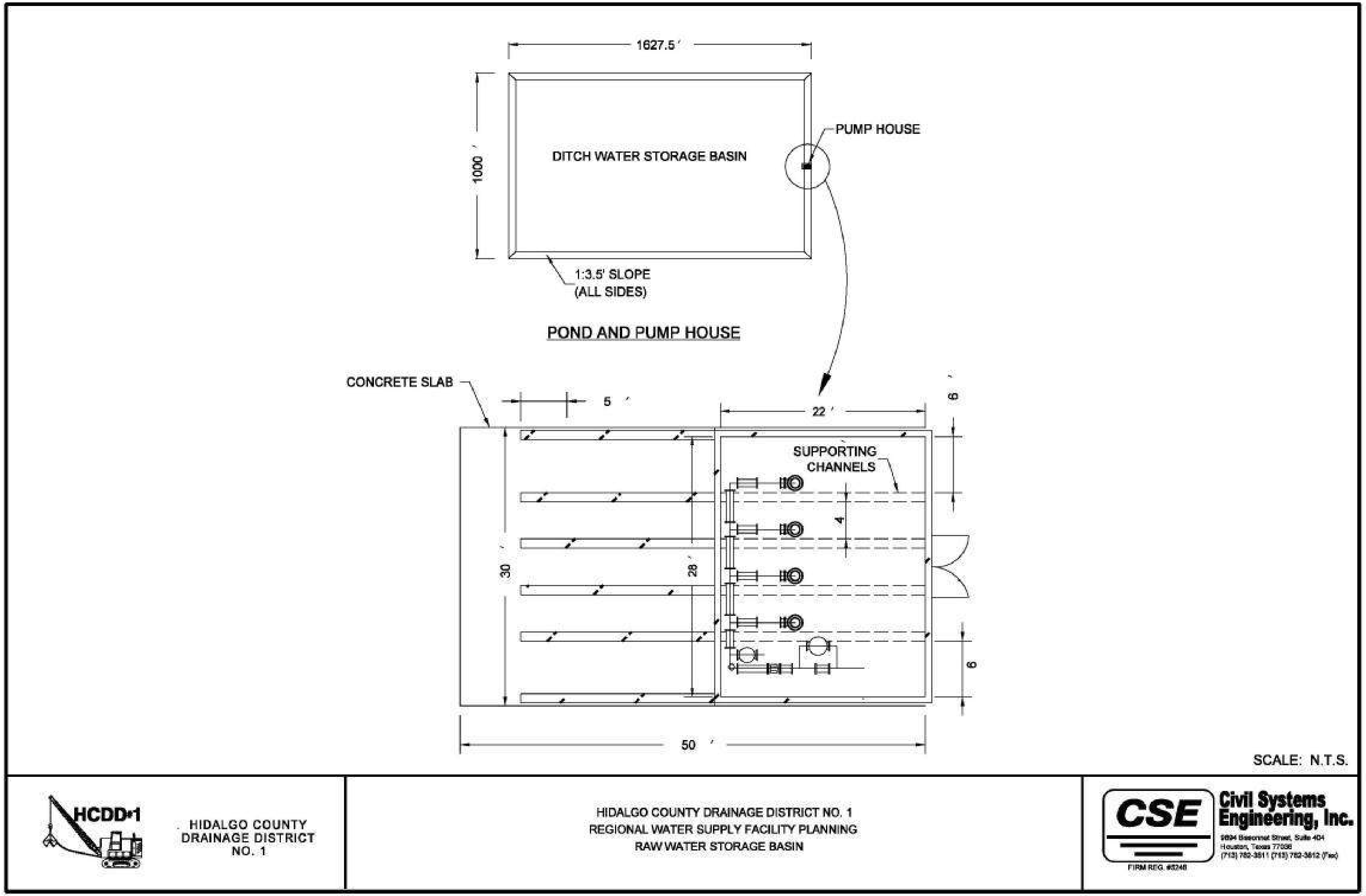


Figure 5-4. Raw Water Storage Basin

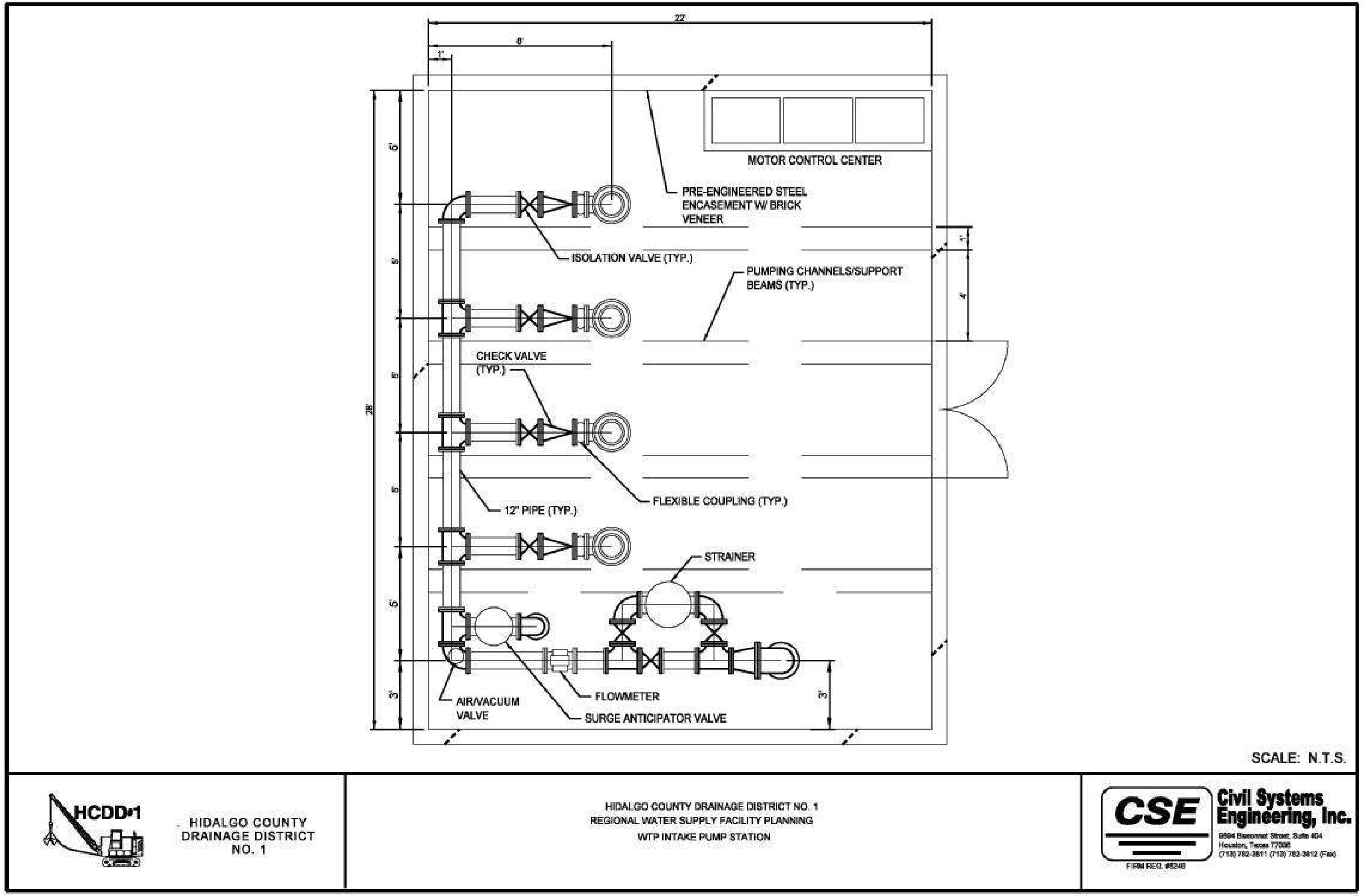


Figure 5-5. Pump Station II

6 Treatment Process Evaluation

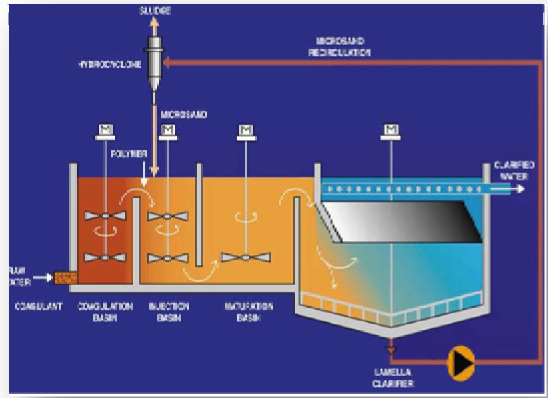
There are a number of factors that must be considered in evaluating and selecting a drinking water treatment process, including untreated water quality (contaminants in the water), drinking water standards, size of treatment system, strengths and weakness of each process unit, and long-term costs.

Source Water Quality

The water treatment process to be chosen greatly depends on the number and type of contaminants or aesthetic problems of the source water. For the purpose of this project, water quality samplings were performed at four (4) locations along the drainage ditches where proposed project sites were located to acquire untreated raw base flow water quality information. The four sampling locations are illustrated in **Figure 6-1**.

The collected water samples were tested at each project site to determine the levels of various contaminants in the untreated source water. **Table 6-1**. summarizes the results of water sampling and analysis results are five (5) water quality parameters were identified to be key in evaluating and selecting the water treatment processes, including TDS, Hardness, Sodium, Sulfate, and TOC.

A brief description to each of the five parameters is given below.



Total Dissolved Solids (TDS)

The TDS concentrations, varying among the four sampling locations, are 2000 mg/L, 1700 mg/L, 1600 mg/L, and 1900 mg/L respectively at Location 1, Location 2, Location 3, and Location 4.

TDS does not have a set Maximum Contaminant Level (MCL) and is therefore not regulated by the Environmental Protection Agency (EPA). A Secondary MCL of 500 mg/L is set for TDS, but it is not an enforceable limit.

The raw water from the drainage ditch is considered moderately brackish. Brackish water generally has a TDS concentration of 1,000-10,000 mg/L. Water is considered fresh when its TDS concentration is below 500 mg/L.

Hardness

The hardness concentrations are 600 mg/L as $CaCO_3$, 520 mg/L as $CaCO_3$, 610 mg/L as $CaCO_3$, and 570 mg/L as $CaCO_3$ respectively at Location 1, Location 2, Location 3, and Location 4. The raw water is considered very hard based on classification by the U.S.

Department of Interior and the Water Association (>180 mg/L).

Both US and the current American Water Works Association (AWWA) drinking water standards do not require hardness removal. Since the raw water is very hard. It is reasonable to provide some degree of acceptable hardness to the consumers. A total hardness of 80 to 100 mg/L as $CaCO_3$ was recommended.

A softening process is required to lower the hardness of the raw water. The benefits of the softening process include (1) reducing TDS and scale-formation tendencies, (2) reducing consumption of household cleaning agent, and (3) removing TOC.

Sodium

Sodium concentrations were determined as 460 mg/L, 410 mg/L, 420 mg/L, and 550 mg/L for respectively at Location 1, Location 2, Location 3, and Location 4. Sodium concentration is high in the untreated water.

Sulfate

Sulfate concentrations were determined as 510 mg/L, 430 mg/L, 380 mg/L, and 360 mg/L respectively at Location 1, Location 2, Location 3, and Location 4.

Total Organic Carbon (TOC)

TOC concentrations vary among the four sampling locations. They are 40 mg/L, 25 mg/L, 36 mg/L, and 78 mg/L respectively at Location 1, Location 2, Location 3, and Location 4.

Detailed water sampling data and laboratory analysis report are included in **Appendix B** (attached CD-ROM).

Figure 6-1. Source Water Quality Sampling Locations

Table 6-1: Raw Water Sampling and Water Quality Parameters

Parameter	Unit	Untreated Water Quality			
		Site 1	Site 2	Site 3	Site 4
Color	Pt-Co units	30	30	40	30
Alkalinity (mg/L)	mg/L	120	140	230	180
Silica	mg/L as $CaCO_3$	32	27	25	31
Hardness Total	mg/L as $CaCO_3$	600	520	610	570
Sodium, Na	mg/L	460	410	420	500
Magnesium, Mg	mg/L	55	48	50	54
Calcium, Ca	mg/L	150	130	160	140
Potassium, K	mg/L	13	12	12	15
Chloride, Cl	mg/L	510	450	410	370
Aluminum, Al	mg/L	1.98	1.35	<0.1	1.68
Iron, Fe (Total and Dissolve)	mg/L	0.662(T), <0.05 (D)	0.630(T), <0.05(D)	4.49(T), <0.05(D)	0.952(T), <0.05(D)
Manganese, Mn (Total and Dissolved)	mg/L	<0.005 (T), <0.005(D)	<0.005(T), <0.005(D)	0.354 (T), <0.005(D)	<0.005(T), <0.005(D)
Total NO_2^- N, NO_3^- N	mg/L	6.3	5.467	4.382	6.45
Sulfate, SO_4	mg/L	510	430	380	360
Total Organic Carbon (TOC)	mg/L	40	25	36	78
Bacterial Analysis	total plate count	55,000	25,000	51,000	40,000
Carbonate, CO_3	mg/L	<1	<1	<1	<1
Bicarbonate, HCO_3^-	mg/L	120	140	230	180
Pesticides	mg/L				
Ammonium, NH_3^-	mg/L	0.16	0.116	0.177	0.151
Turbidity	NTU	13	11	60	17
Total Dissolved Solids (TDS)	mg/L	2000	1700	1600	1900
pH		7.62	7.8	7.81	7.73

Key Parameters

Finished Water Targets

The Safe Drinking Water Act (SDWA) is the main federal law that ensures the quality of drinking water. Under SDWA, set standards for drinking water quality and oversees the states, localities, and water suppliers who implement those standards.

EPA and TCEQ Primary
and Secondary Contaminant Levels

The Primary Drinking Water regulations of EPA and TCEQ are the same as summarized in **Appendix C** (attached CD-ROM), except that EPA has more primary minimum contaminant levels listed than TCEQ standard table. The Secondary Drinking Water regulations differ on four contaminant levels: Chloride, pH, Sulfate, and total Dissolved Solids.

Although the primary and secondary contaminant level regulations are quite comprehensive, to meet the minimum regulations and standards set by EPA and TCEQ, emphasis will be placed on the following key contaminants and standards for this project:

- TTHM: Less than 0.08 mg/L per Stage 2 D/DBP Rule
- HAA5: Less than 0.06 mg/L per Stage 2 D/DBP Rule
- Iron: Less than 0.3 mg/L (State and National Secondary Drinking Water Standards)
- Manganese: Less than 0.05 mg/L (State and National Secondary Drinking Water Standards)
- Turbidity: 0.3 NTU
- TDS: Less than 500 mg/L (State and National Secondary Drinking Water Standards)
- TOT Removal (see Table 6-2)

Major Treated Water Rules for Water Treatment Plant

Enhanced Coagulation Requirements (ECR) **-** The purpose is to add excess coagulant to remove total organic carbons (TOC) and reduce the formation of disinfection by-products. The guided criteria for ECR are the required TOC removal as shown in table below.

Table 6-2. Required TOC Removal

Source Water TOC, mg/L	**Source Water Alkalinity (%)**		
	0-60 mg/L	**>60–120 mg/L**	**>120 mg/L**
2 - 4	35	25	15
> 4 - 8	45	35	25
> 8	50	40	30

Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR) **-** The purpose of this rule is to reduce illness linked with the contaminant ***Cryptosporidium*** and other pathogenic microorganisms in drinking water. The LT2ESWTR will supplement existing regulations by targeting additional ***Cryptosporidium*** treatment requirements for higher risk systems. This rule also contains provisions to reduce risks from uncovered finished water reservoirs and provisions to ensure that systems maintain microbial protection when steps are taken to decrease the formation of disinfection byproducts that result from chemical water treatment. Rule requirements for water treatment include:

(1) Monitoring: Under the LT2ESWTR, systems will monitor their water sources to determine treatment requirements. This monitoring includes an initial two years of monthly sampling for

Cryptosporidium. To reduce monitoring costs, small filtered water systems will first monitor for E. coli—bacterium which is less expensive to analyze than ***Cryptosporidium***—and will monitor for Cryptosporidium only if their E. coli results exceed specified concentration levels.

(2) ***Cryptosporidium*** treatment: Filtered water systems will be classified in one of four treatment categories (bins) based on their monitoring results. The majority of systems will be classified in the lowest treatment bin, which carries no additional treatment requirements. Systems classified in higher treatment bins must provide 90 to 99.7 percent (1.0 to 2.5-log) additional treatment for ***Cryptosporidium***. Systems will select from a wide range of treatment and management strategies in the "microbial toolbox" to meet their additional treatment requirements. All unfiltered water systems must provide at least 99 or 99.9 percent (2 or 3-log) inactivation of Cryptosporidium, depending on the results of their monitoring. These ***Cryptosporidium*** treatment requirements reflect consensus recommendations of the Stage 2 Microbial and Disinfection Byproducts Federal Advisory Committee.

(3) Other requirements: Systems that store treated water in open reservoirs must either cover the reservoir or treat the reservoir discharge to inactivate 4-log virus, 3-log ***Giardia lamblia***, and 2-log ***Cryptosporidium***. These requirements are necessary to protect against the contamination of water that occurs in open reservoirs. In addition, systems must review their current level of microbial treatment before making a significant change in their disinfection practice. This review will assist systems in maintaining protection against microbial pathogens as they take steps to reduce the formation of disinfection byproducts under the Stage 2 Disinfection Byproducts Rule, which the EPA is finalizing along with the LT2ESWTR.

<u>*Ground Water Rule*</u> **-** The purpose of this rule is to reduce the risk of exposure to fecal contamination that may be present in public water systems that use ground water sources. Rule requirements include:

(1) Periodic sanitary surveys of ground water systems that require the evaluation of eight critical elements and the identification of significant deficiencies (e.g., a well located near a leaking septic system). States must complete the initial survey by December 31, 2012 for most community water systems (CWSs) and by December 31, 2014 for CWSs with outstanding performance and for all non-community water systems.

(2) Source water monitoring is required to test for the presence of E. coli, enterococci, or coliphage in the sample. There are two monitoring provisions: (a) Triggered monitoring for systems that do not already provide treatment that achieves at least 99.99 percent (4-log) inactivation or removal of viruses and that have a total coliform-positive

routine sample under Total Coliform Rule sampling in the distribution system.

(3) Assessment monitoring - As a complement to triggered monitoring, a State has the option to require systems, at any time, to conduct source water assessment monitoring to help identify high risk systems.

(4) Corrective actions are required for any system with a significant deficiency or source water fecal contamination. The system must implement one or more of the following correction action options: (a) Correct all significant deficiencies, (b) Eliminate the source of contamination, (c) Provide an alternate source of water, or (d) Provide treatment which reliably achieves 99.99 percent (4-log) inactivation or removal of viruses.

(5) Compliance monitoring to ensure that treatment technology installed to treat drinking water reliably achieves at least 99.99 percent (4-log) inactivation or removal of viruses.

Stage 2 Disinfectants and Disinfection Byproduct Rule - The purpose of this rule is to reduce potential cancer and reproductive and developmental health risks from disinfection byproducts (DBPs) in drinking water, which form when disinfectants are used to control microbial pathogens. Over 260 million individuals are exposed to DBPs. Rule requirements include:

(1) Systems need to have an evaluation of their distribution systems, known as an Initial Distribution System Evaluation (IDSE), to identify the locations with high disinfection byproduct concentrations. These locations will then be used by the systems as the sampling sites for Stage 2 DBP rule compliance monitoring.

(2) Compliance with the maximum contaminant levels for two groups of disinfection byproducts (TTHM and HAA5) need to be calculated for each monitoring location in the distribution system. This approach, referred to as the locational running annual average (LRAA), differs from current requirements which determine compliance by calculating the running annual average of samples from all monitoring locations across the system.

(3) Each system is required to determine if it has exceeded an operational evaluation level, which is identified using the compliance monitoring results. The operational evaluation level provides an early warning of future MCL violations, which allows the system to take proactive steps to remain in compliance. A system that exceeds an operational evaluation level is required to review their operational practices and submit a report to the state that identifies actions that may be taken to mitigate future high DBP levels, particularly those that may jeopardize its compliance with the DBP MCLs.

Total Coliform Rule - The purpose of this rule is to improve public health protection by reducing fecal pathogens to minimal levels through control of total coliform bacteria, including fecal coliforms and Escherichia coli (E. Coli). Rule requirements include routine sample requirements, repeat sampling requirements, and additional routine sample requirements:

Filter Backwash Recycling Rule (FBRR) **-** The purpose of this rule is to improve public health protection by assessing and changing, where needed, recycle practices for improved contaminate control, particularly microbial contaminants. Rule requirements include reporting, recycle return location, and recordkeeping.

Lead and Copper Rule (LCR) - The purpose of this rule is to protect public water system consumers from exposure to lead and copper in drinking water. The revisions to the LCR will: Enhance the implementation of the LCR in the areas of monitoring, treatment, customer awareness and lead service line replacement. Improve compliance with the public education requirements of the LCR and ensure drinking water consumers receive meaningful, timely, and useful information needed to help them limit their exposure to lead in drinking water.

A summary of applicable rules and regulations are as follows:

- Safe Drinking Water Act (SDWA) – Principal Federal Law
- EPA Primary Drinking Water Regulations
- EPA Secondary Drinking Water Standards
- Title 30 Texas Administrative Code, Chapter 290
- Long Term 1 Enhanced Surface Water Treatment Rule (LT1 Rule)
- Long term 2 Enhanced Surface Water Treatment Rule (LT2 Rule)
- Enhanced Coagulation Requirements (ECR)
- Stage 1 Disinfectants and Disinfection Byproducts Rule (Stage 1 D/DBPR)
- Stage 2 Disinfectants and Disinfection Byproducts Rule (Stage 2 D/DBPR)
- Arsenic Rule
- Lead and Copper Rule
- Radionuclide Rule
- Total Coliform Rule

Water Treatment Technologies

Drinking water treatment requires a multi-barrier approach to ensure treated water meets federal and state drinking water quality regulations. Each treatment barrier provides an additional step to add safety to the drinking water. The effectiveness is cumulative. Each unit process helps the subsequent unit process work more effectively than if operated alone. The primary multiple drinking water treatment barriers include coagulation/flocculation, sedimentation, filtration, and disinfection.

Coagulation/Flocculation

The first step in water treatment is coagulation. The coagulation is a necessary step to reduce the organics and turbidity in the water consists of a rapid mixing with coagulant addition. Particles and organics in natural water systems are negatively charged. The purpose of the rapid mixer is to achieve the initial contact between the water and coagulant added to the water to form the positively charged coagulant complexes that neutralize (destabilize) the negatively charged particles.

Flocculation is the process of producing interparticle contacts, which is defined as the bonding of coagulated particles following the removal of forces that kept them apart, i.e. coagulation. Once the negatively charged particles in the water have been destabilized, these particles begin to stick together and form floc. As more particles stick together, the floc grows and becomes dense enough to settle from the water as sludge in the clarification (or sedimentation) step. In most cases, a flocculent is used after the addition of a coagulant to enhance floc formation and to increase the strength of the floc structure. Sometimes, the flocculent is also called a coagulant aid.

As discussed earlier, the raw water supply source for this project is from drainage water in the existing drainage ditches of Hidalgo County Drainage District No.1. The suspended solids could be very high during flood events. Also, the particles in the raw water contain colloids, dissolved solids, bacteria, and other organisms. The characteristics of the raw water supply require more efficient formation of large particles in the coagulation and flocculation process.

Sedimentation

Sedimentation (or clarification) is a physical water treatment process used to settle out the floc formed in the coagulation/flocculation process by gravity. Clarification has been used at water treatment plants (WTPs) for many years as an effective means to treatment to produce a clarified effluent for further treatment by filtration. The primary parameter for conventional sedimentation basin design is the acceptable surface loading rate (hydraulic overflow rate). Surface loading rates are normally very low to achieve proper operation and an acceptable effluent. Typical hydraulic overflow rate for conventional sedimentation ranges from 800 to 1,200 gpd per ft^2. Conventional sedimentation usually utilizes very large basins and has long detention times (3 to 4 hours for gravity settling).

Several high-rate clarification processes were investigated for primary clarification, including:

- Tube settlers
- Plate settlers
- Sludge blanket clarifier
- ACTIFLO

The hydraulic overflow rates for the four high-rate clarification processes are 2,880 2,880-8,640, 2,880-7,200, and 21,600-28,800 gpd/ft^2, respectively. ACTIFLO has the highest hydraulic overflow rate, which is more than 30 times of the conventional sedimentation hydraulic overflow rate. Using ACTIFLO technology will significantly reduce the construction costs of the sedimentation basin.

ACTIFLO is a proven, compact, clarification system what utilizes microsand enhanced flocculation and lamellar settling to produce high quality, filterable effluent. The microsand improves both the flocculation through its large specific surface and the sedimentation through its high specific density.

ACTIFLO process consists of a rapid mix in which a coagulant is added, followed by an injection tank, where micro-sand and a polymer are added in a high energy mixing environment. Following this is a maturation zone. The detention time for all these steps is about 6 minutes. The water then enters the settling tank where the micro-sand flocs settle out quickly.

Advantages of ACTIFLO process include very high loading rates (up to 30 gpm/ft^2) that can significantly reduce surface area requirements. The system is very flexible in handling extreme flow variations with a wide range of turbidity and organics levels. The process is quick to respond to changing conditions and have a range of "forgiveness" if chemical dosages are not precisely known. The process consistently displays efficient removals of turbidity, color, TOC, algae, particle counts, cryptosporidium, iron, manganese, arsenic and other typical undesirable water contaminants from raw waters.

In summary, the benefits of using ACTIFLO include small footprint, high performance, stability and ability to treat variations in influent quality, flexibility, reliability, rapid start up, reduced chemical consumption, and reduced costs. **Figure 6-2** illustrates the ACTIFLO settling process.

The EPA's Disinfectants and Disinfection By-Products Rule requires enhanced coagulation to remove a specified percentage of organic material from the source water measured by TOC as shown in **Table 6-2**. The use of ACTIFLO process will meet or exceed the EPA TOC removal requirement. ACTIFLO process has a 95-99% removal rate of turbidity in raw water influent with a turbidity of 0-2000 NTU. ACTIFLO process was recommended as a pretreatment process for this project.

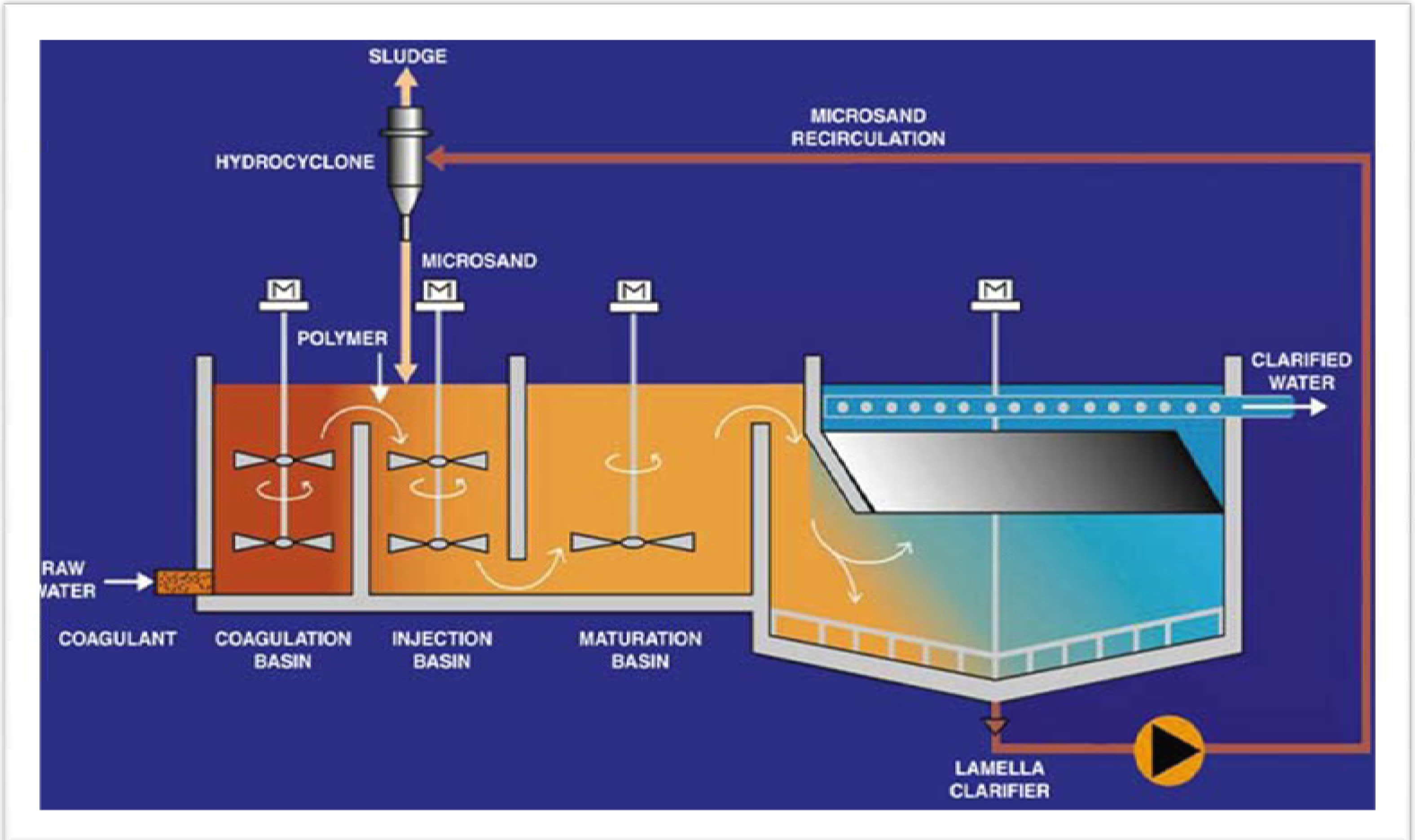


Figure 6-2. ACTIFLO® Process

Filtration Technologies

Filtration is a required process after coagulation/flocculation. Coagulation, flocculation, and sedimentation processes are not sufficient to remove all particles and flocs from water. Filtration process is required to remove additional suspended solids and associated contaminants from water. The filtration technologies considered in this project are granular media filters or membranes.

Granular Media Filters - The most common filtration is granular media filtration and dual media filters (DMF) are the most common filters found at water treatment plants today. With consideration of the untreated water quality and objectives of this project, the dual-media filter was considered and evaluated for this project.

DMF, like other conventional granular media filtration, is a simple mechanical process, actually involves the mechanisms of adsorption (physical and chemical), straining, sedimentation, interception, diffusion, and inertial compaction. It uses two layers, a top one of anthracite and a bottom one of sand, to remove turbidity and suspended solids. DMF does not remove dissolved solids.

With consideration of the high level of contaminant contents in the raw water in terms of high levels of TDS, hardness, and TOC, DMF alone could not meet all the finished water requirements. However, DMF can applied in conjunction with membrane technologies such as RO or Nanofiltration (NF), which function as a pretreatment process.

Membrane Filtration - The membrane filtration is a technique which uses a semipermeable membrane for removing suspended and dissolved solids from water. The principle is quite simple: the membrane acts as a very specific filter that will let water flow through, while it catches suspended solids and other substances. Most membrane filtration processes currently used in the water treatment are pressure driven technology with pore sizes ranging from 100 molecular weight to 5 microns. Membrane processes have become more attractive for drinking water treatment in recent years due to the increased stringency of drinking water regulations. Microfiltration (MF), ultrafiltration (UF), nanofiltration (NF), and reverse osmosis (RO) are all membrane filtration techniques having applications in drinking water treatment.

Microfiltration (MF) is a low pressure means of separating large molecular weight suspended or colloidal compounds from dissolved solids. It is the most popular type of membrane filter and removes particle size of approximately 0.1 µm and larger in diameter. MF usually employs a pore size of 0.2 µm for water treatment and generally requires a driving pressure of 30 to 40 psi. MF does not have small enough pores to remove TDS or salts as chloride, viruses and disinfection byproducts, and is typically used as a pretreatment process for water treatment.

Ultrafiltration (UF) is also a low pressure driven membrane separation process that separates particulate matter from soluble components in the water. UF membranes typically have pore sizes in the range of 0.01 - 0.10 µm and have a high removal capability for colloids, bacteria, virus, and high-molecular-weight organic compounds. UF generally requires a driving pressure ranging from 10 to 40 psi for drinking water treatment. Like MF, US does not effectively remove TDS or salts, disinfection byproducts and is typically used as a pretreatment process for water treatment.

Nanofiltration (NF) membranes have a nominal pore size of approximately 0.001 micros. A frequent application of NF membrane is to produce drinking water from water sources where TDS is too high to meet drinking water standards. NF membrane can be used to replace lime softening process because selected NF membranes can reduce hardness (calcium and magnesium). NF can more efficiently remove divalent versus monovalent ions, which are sometimes called "softening membranes." NF membranes can also remove TOC without generating undesirable chemical compounds such as chlorinated hydrocarbons produced by chlorine oxidation processes. NF membranes also have certain desalting capability to remove some dissolved salts.

NF generally requires a driving pressure ranging from 70- to 150 psi for drinking water treatment. More energy is required for NF than MF or UF. Due to the high levels of particles and TOC in the raw water, in order to operate NF on surface water, the feed water must be pretreated with conventional filtration treatment such as DMF or equivalent such as MF or UF.

Reverse Osmosis (RO) is a high pressure means for water treatment. RO can reduce the same constituents that NF can, as well as salinity. It can effectively remove nearly all inorganic contaminants from water. The process is relatively insensitive to flow and TDS level. RO System capacity depends on the water temperature, TDS in feed water, operating pressure and the overall recovery of the system. The required pressure requirement for RO is greater than 300 psi. The system requires high capital and operating costs. Like NF, to apply RO system on surface water, the feed water must be pretreated with conventional treatment or equivalent.

Figure 6-3 shows the pressure-driven membrane application guide, and **Figure 6-4**. illustrates the effectiveness of membrane filtration techniques.

Integrated Membrane Systems (IMS)

To meet the water quality requirements, membranes are often employed within a multi-process water treatment system, which are referred to as integrated membrane systems. There are many integrated membrane systems with various combination of treatment processes. For the purpose of this project, the following two IMS were considered and evaluated:

A. Dual Media Filtration followed by Nanofiltration (NF)
B. Dual Media Filtration followed by Reverse Osmosis (RO).

Dual Media Filtration and Nanofiltration: This integrated membrane system (DMF+NF) would be a cost-effective solution to this project based on the untreated water quality conditions. This process involves treating the raw water to a high level of purity with the NF process, enabling blending of the permeate with treated water from the DMF to reduce the quantity of water that must be treated by the NF system. The DMF functions as a pretreatment process for the NF process. Following the DMF, some of the water is applied to the NF membranes with some bypassing the NF system to be blended The bypass is used since 100 percent will not be required to meet the finished water requirements. The proposed blending will significantly reduce chemical usage, and operating and capital costs, and provide a better finished water quality than the DMF alone. With this IMS operating at a blending ratio of 70% NF and 30% DMF., it is expected to have a TDS level of 500 mg/L to 1,000 mg/L of the finished water.

Dual Media Filtration and Reverse Osmosis: This integrated membrane system would be another cost-effective solution. With consideration of the high cost of RO system, a Low-Pressure Reverse Osmosis (LPRO) was recommended. LPRO system is different from traditional RO system by its requirement of low driving force. The driving pressure can be as low as 125 to 300 psi.

Like the DMF+NF option,. this process involves treating the raw water to a high level of purity with the RO system, enabling blending of the permeate with treated water from the DMF to reduce the quantity of water that must be treated by the RO system. It is expected to have a TDS level of 500 mg/L to 600 mg/L of the finished water with this integrated process at a blending ratio of 50% NF and 50% DMF

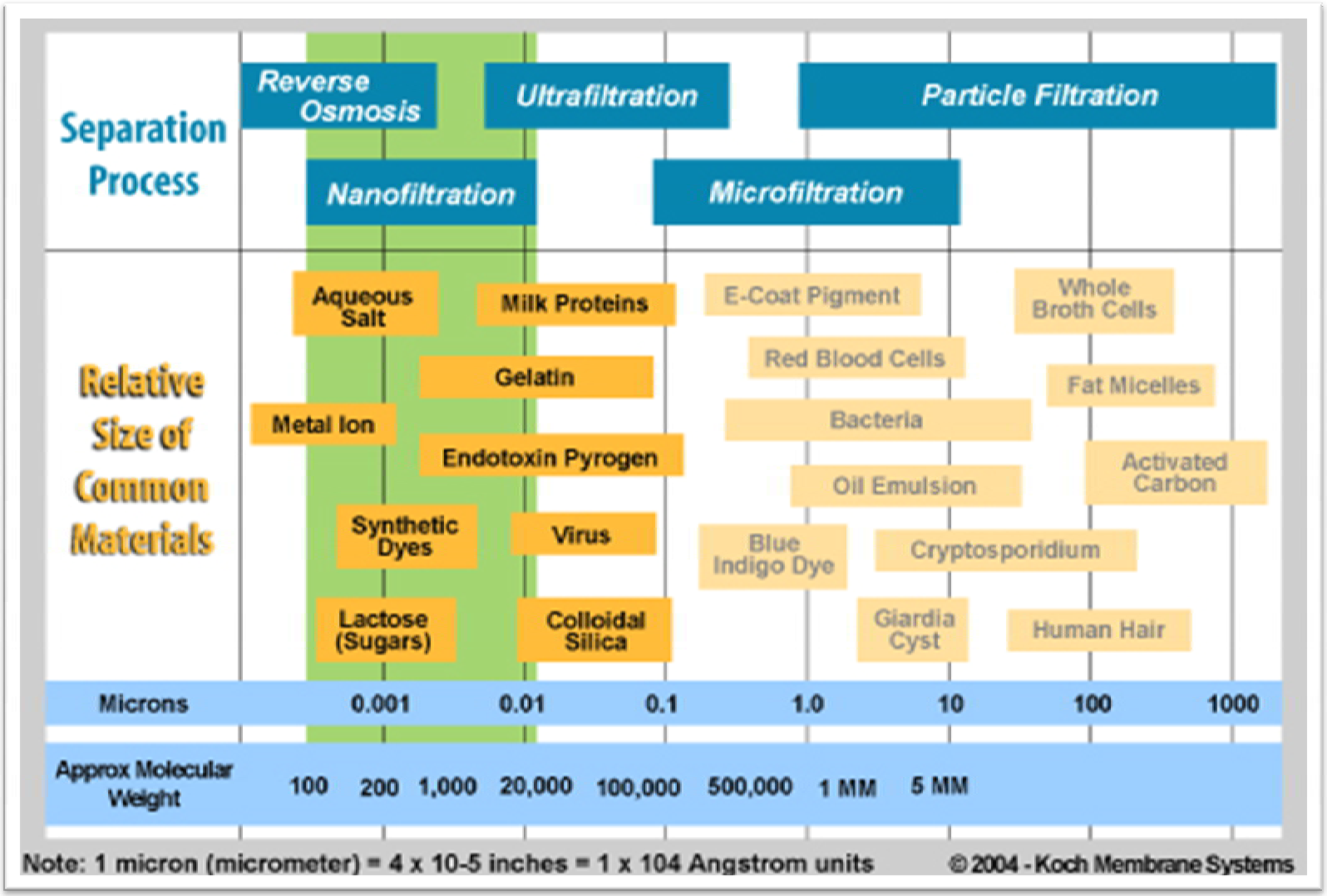


Figure 6-3. Pressure-Driven Membrane Process Application Guide

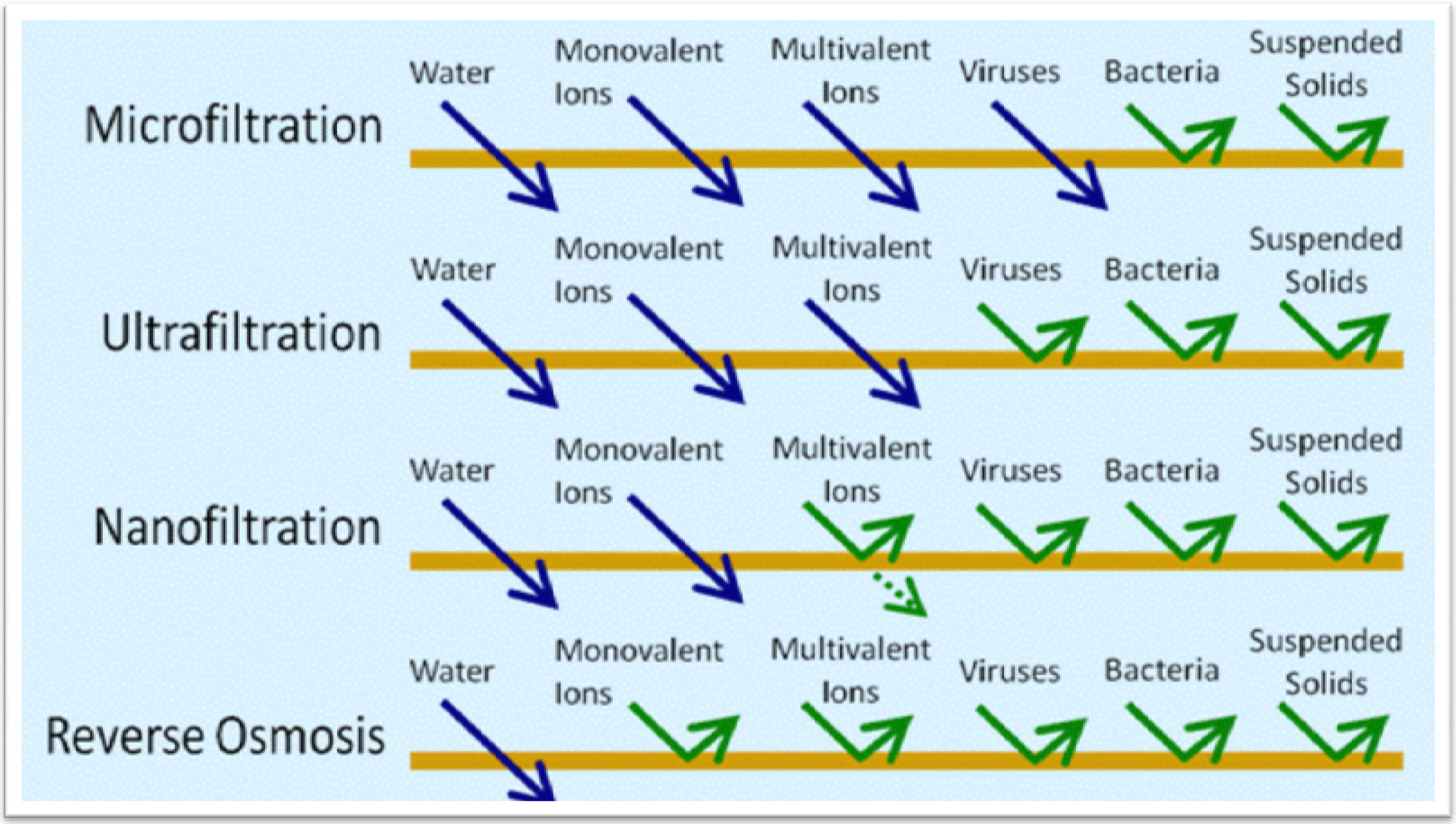


Figure 6-4. Effectiveness of Pressure-Driven Membrane Processes

Disinfection

The final water treatment process is the disinfection process. A disinfection system is required in a drinking water treatment process in order to prevent waterborne diseases and microbial contamination. Disinfection is the process by which pathogens in the water are inactivated or rendered harmless by the use of chemicals, such as chlorine or physical processes such as UV.

Under the regulation of the Surface Water Treatment Rule (SWTR), the disinfection system must be designed to meet minimum requirements of residual concentration *C* of a disinfectant in mg/L, multiplied by the contact time *T* in minutes, which is termed as *CT*. The level of CT required for disinfection varies as a function of the type of disinfectant. Inactivation within a treatment system is often termed primary disinfection. Secondary or residual disinfection is the process of maintaining a disinfectant residual within the water distribution system to provide disinfecting environment and to compact accidental contamination with pathogens.

In drinking water treatment, disinfectants commonly used disinfection materials used as primary disinfectants include chlorine (gas & liquid), chloramines (liquid). ozone, and ultraviolet light (UV)

Chlorine and UV systems were evaluated for this project with consideration of construction costs, ease of operation, and location of the construction site.

Chlorine

Chlorination has been practiced in water treatment since the early 1900s as an effective disinfectant for the protection of public health against waterborne diseases. It is relatively inexpensive and provides a residual concentration in a distribution system. Today it is the most commonly used disinfectant in water treatment. Chlorine was considered as the first choice of disinfection for this project. There are three sources of chlorine supplies, commercial grade hypochlorite, on-site hypochlorite generation, and gas chlorine.

A commercial sodium hypochlorite system is a chemical feed system with tanks and metering pumps. It is relatively easy to operate and maintain and does not require substantial operator attendance. Sodium hypochlorite is typically supplied as 12 to 15 percent solution. The solution degrades over time, losing some of its disinfection strength and forming chlorate ions in the solution. The following factors could cause a more rapid degradation of the solution: (1) high hypochlorite concentrations, (2) high temperatures, (3) presence of iron, copper, nickel, and cobalt, and (4) exposure to light. Sodium hypochlorite solutions are most stable at a pH of 11, stored in the dark at temperatures less than 70°F, and with iron, copper, nickel and cobalt concentrations less than 0.5 mg/L.

Storage systems are typically sized for a 30-day supply to safeguard against excess chemical degradation. The need for frequent deliveries and limited storage capabilities increase the risk of interrupted supply. In addition, the delivered chemical will be stored and transported under unknown conditions and the degree of degradation that occurs prior to arrival is unknown. Thus, receiving a product from week to week with consistent quality is not guaranteed when using commercially available hypochlorite. Maintaining the solution at 70° F requires a climate controlled building for the storage tanks.

Commercial sodium hypochlorite is produced from caustic soda, water, and chlorine. The pH is generally greater than 11 and can be as high as 13. Scaling of equipment can be a problem due to the presence of caustic and appropriate maintenance and cleaning is required. In particular, feed points require frequent cleaning to ensure delivery of the chemical. Although commercial hypochlorite is safer than chlorine gas, it is highly corrosive, posing a threat to equipment and safety. The EPA requires that secondary containment be provided for hypochlorite concentrations greater than one percent.

In addition to operational and maintenance problems due to scaling, commercial sodium hypochlorite also yields off-gases oxygen. These gases can cause binding in the chemical feed lines and metering pumps. Special design features are necessary to avoid these problems, including the use of peristaltic hose pumps rather than diaphragm pumps for chemical metering.

On-site generation of sodium hypochlorite has been widely used in the United States and Europe for more than 20 years. On-site generation of sodium hypochlorite requires relatively large capital expenditures to purchase the electrolytic cells and rectifiers. On-site generated sodium hypochlorite is produced on an as-needed basis by electrolysis systems utilizing salt, electricity, and softened water. One equivalent pound of chlorine is produced from 15 gallons of softened water, 1.9 pounds of salt, and 1.8 kilowatt-hours of electricity. Because of the low concentration (approximately 0.8% by weight) of sodium hypochlorite produced by on-site generated systems coupled with minimal storage times, the degradation problems of commercial sodium hypochlorite are significantly reduced. In addition, the recent technological advances in the generation of sodium hypochlorite allow for easier operation and maintenance. Typical maintenance would include cleaning the electrodes with a muriatic acid solution twice per year to remove minerals that have "plated-out" onto the cells.

On-site generation produces 0.8 percent sodium hypochlorite that is substantially less corrosive than commercial hypochlorite, thereby posing less threat to workers and equipment and negating the need for secondary containment. Sodium hypochlorite generation produces a by-product of hydrogen gas that is potentially explosive. The quantity produced, however, is not great and the hydrogen gas is easily vented from the equipment, buildings and storage tanks. Because hydrogen gas is lighter than air, conditions where the hydrogen gas could collect in pockets should be avoided. Standard design of on-site generation systems includes venting the hydrogen from the storage tanks and equipment building to the atmosphere where it quickly disperses.

Chlorine gas disinfection systems have demonstrated reliability in thousands of installations across the United States and abroad for almost 100 years. However, the cost advantage of chlorine gas systems over other forms of chlorine for disinfection has decreased substantially in recent years due primarily to increased costs resulting from the adoption of new regulations i.e., Uniform Fire Code and Risk Management Program (RMP) and increased material costs.

Because of safety concerns related to potential accidental releases of chlorine gas during transport and storage, new and stricter federal regulations have been adopted. These regulations have resulted in a substantial increase in the cost of chlorine gas systems. The same quality that makes chlorine gas a good disinfectant also makes it extremely toxic to humans. Although new safety measures are currently in effect, there are still risks associated with the use and transportation of chlorine gas. It is also important to note that the transportation of chlorine gas is highly regulated, and requires special transportation permits and licensing. The trend toward more regulations regarding the transportation and storage of chlorine gas may continue, resulting in increased cost and difficulties associated with its use.

Based on previous similar project experience, for comparison purpose, probable cost estimates were developed and compared for the three chlorine disinfection systems as shown in **Table 6-3**. An on-site hypochlorite generator has the lowest cost for a chlorine disinfection feed system. The on-site hypochlorite generation system was recommended for this project.

Figure 6-5 shows a typical chlorine system plan layout for a 10 MGD water treatment plant.

UV Light

Ultraviolet (UV) disinfection is a physical disinfection process, as opposed to a chemical disinfection process. It uses electromagnetic energy in the 200 to 300 manometers (nm) wavelength range to inactivate microorganisms. The inactivation of microorganisms is based on the UV dose (mWs/cm^2), which is a product of the light intensity (mWs/cm^2), and the exposure time (seconds). The UV dose is analogous to the CT term used for inactivation credit for chemical oxidants. Since the UV dose is primarily based on the light intensity, water quality parameters that have the most effect on UV dose are turbidity and suspended solids that can shield microorganisms from the UV light, and some organic and inorganic compounds that can absorb UV light. **Figure 6-6** illustrates a typical UV disinfection unit.

UV disinfection has a major advantage of little of no production of DBPs. Studies have shown that there is no appreciable increase in TTHM or HAA concentrations as a result of UV disinfection at doses that would be applicable in water treatment. UV does not depend upon typical water quality parameters (pH, temperature) as chemical disinfectants. The disadvantages of UV include: (1) little full-scale experience in surface water treatment, (2) does not hold a residual and must be followed by a residual disinfectant for the distribution system, (3) technology is still evolving.

The SWTR requires that the disinfectant residual of water entering the distribution system be continuously monitored by water systems serving a population of more than 3,300 people. For this project, in order to meet the minimum requirement of free chlorine of less than 0.2 mg/L for no more than four (4) hours, at least 0.5 mg/L of free chlorine residual is required to be added at the high service pump station (HSPS). This requirement, however, contributes a merit of chlorine disinfection system, which confirms the preliminary selection of on-site hypochlorite generation system.

A preliminary cost estimates was developed to compare an on-site hypochlorite system with a UV + on-site hypochlorite combined system, as shown in **Table 6-4**. As shown in the table, the cost of using on-site hypochlorite generator is lower. With consideration of cost and reliability, on-site hypochlorite generation system was recommended for this project. The final selection may vary depending on the actual water quality and TOC removal.

Table 6-3. Cost Comparison for Chlorine Sources[1]

Chlorine Source	Capital Cost			O & M Cost		Total[3]
	Civil, Electrical etc.	Chlorine Equipment	Total [2]	Annual	Total	
Commercial Grade Hypochlorite [4]	$103,000	$28,000	$221,000	$18,000	$203,000	$424,000
On-Site Hypochlorite Generation [5]	$55,000	$85,000	$235,000	$14,000	$164,000	$399,000
Gas Chlorine	$103,000	$1,135,000	$2,080,000	$14,000	$159,000	$2,238,000

Notes:
1. Based on 10-mgd plant capacity and 100-lb of dry chlorine weight per day
2. Adding 40% for construction contingency and 20% for engineering
3. Total cost (present value) equals to total capital cost (present value) + total O & M cost (present value)
4. Commercial grade at 12.5%
5. 100-lb system at 0.8%

Table 6-4. Cost Comparison for Chlorine and UV Systems[1]

Chlorine Source	Capital Cost			O & M Cost		Total[3]
	Civil, Electrical etc.	Chlorine Equipment	Total [2]	Annual	Total	
On-Site Hypochlorite Generation [4]	$55,000	$85,000	$235,000	$14,000	$164,000	$399,000
UV + Chlorine feed	$33,000	$340,000	$627,000	$12,000	$139,000	$766,000

Notes:
1. Based on 10-mgd plant capacity for both systems and 100-lb of dry chlorine weight per day, and dry chlorine weight for chlorine feed system and UV system respectively.
2. Adding 40% for construction contingency and 20% for engineering
3. Total cost (present value) equals to total capital cost (present value) + total O & M cost (present value)
4. 100-lb system at 0.8%

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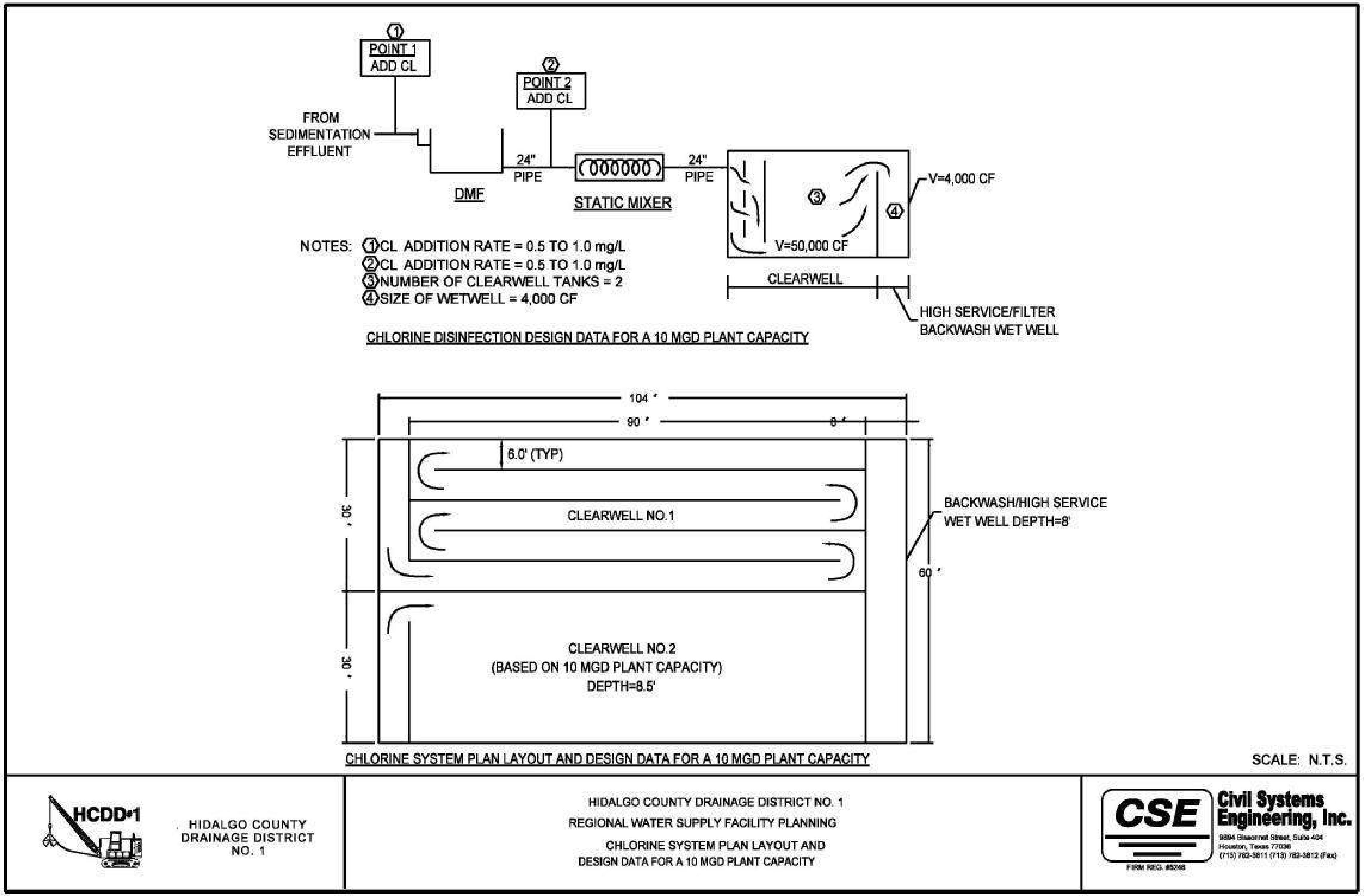

Figure 6-5. Chlorine System Layout

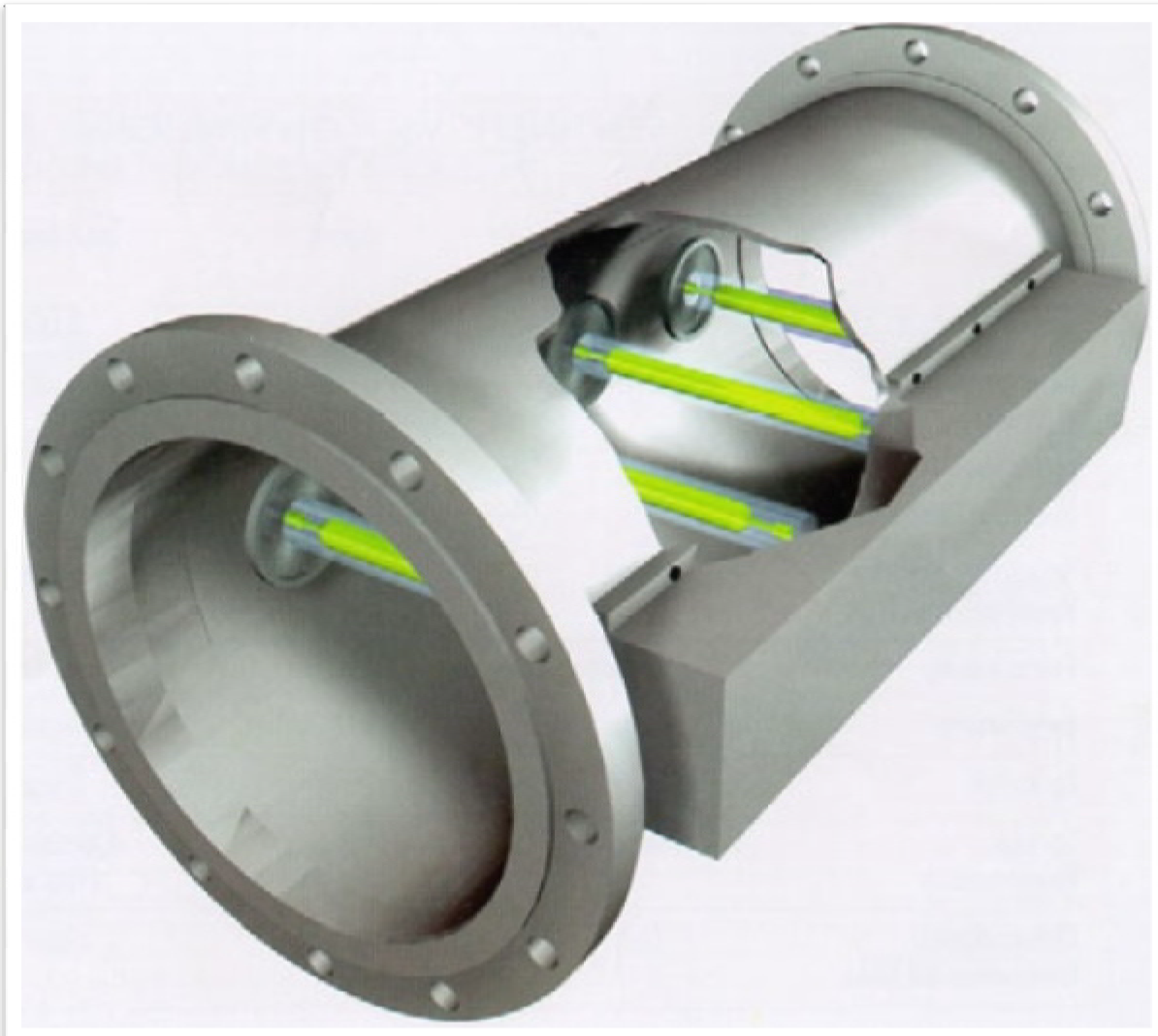

Figure 6-6. UV Disinfection Unit

Softening

Hardness in water is caused by the presence of polyvalent metal ions (cations). Majority of the polyvalent metal ions found in source water are those of calcium and magnesium. Corresponding major anions associated with the calcium and magnesium ions are carbonates (Ca_3^{-2}) and sulfates (SO_4^{-2}).

The untreated water from the drainage ditch for this project has a hardness of approximately 600 mg/L $CaCO_3$. It is considered very hard based on classification by the U.S. Department of Interior and the Water Association (>180 mg/L). Although there are no mandatory removal requirements by both EPA and the current American Water Works Association (AWWA) drinking water standards. Softening is usually employed for waters with hardness greater than 150 mg/L as $CaCO_3$.

Water with high TDS is normally considered hard, because hardness-contributing cations, such as calcium and magnesium, and their counter anions (e.g., carbonate and sulfate) comprise the majority of TDS. The National Secondary Drinking Water Regulations recommend a value of 500 mg/L for TDS in finished water. The untreated water from the ditch has a TDS level of 2,000 mg/L.

Water softening process is required. Water softening is a process used to remove the minerals in the water.

Lime softening is the traditional chemical way to remove hardness ions from water. The process is well understood and relative easy to operate. Although lime is moderately inexpensive, lime and lime-waste solids, which must be recycled or disposed of, could present a safety hazard to operators unless they are properly stored and handled. Also, the lime treatment needs to be followed by other treatments to remove residual particulates, pathogens, and/or organic material.

Membrane filtration process (NF or RO) for softening water has become a viable alternative. In addition to their ability to remove ions that contribute to hardness, high-pressure membranes are capable of removing other contaminants and microorganisms (e.g. Giardia and Cryptosporidium) as well. With consideration of the raw water quality conditions, softening

Residuals Management

Residuals management includes managing the wide variety of waste produces generated from the treatment of drinking water using screening, pre-sedimentation, coagulation/flocculation, sedimentation, filtration, disinfection, and softening processes. These residuals may be organic and inorganic compounds in liquid, solid, and gaseous forms depending on the source of raw water and the type of treatment processes.

Sedimentation Sludge

Aluminum and iron coagulants generate inorganic sludge containing compounds such as clay, silts, and organic and inorganic matters precipitated by the coagulant. The solids content for the sludge discharged from ACTIFLO unit ranges between 0.1% and 2%.

DMF Filter Backwash Waste

Filter backwash waste typically represents 2% to 5% of the total water processed. The quantity of solids depends on filter efficiency and the amount of solids applied to the filter. The concentration generally varies from 50 to 400 mg/L.

Membrane Backwash Waste and Membrane Clean-in-Place (CIP) Waste

Membrane backwash waste generally represents 95% to 99% of the residual waste generated from the low-pressure membrane waste. CIP waste requires unique handling due to the use of chemical cleaning constituents such as sodium hypochlorite, citric acid, and caustic soda. It is assumed that both wastes can be handled through the de-watering facility, and then be disposed to a landfill. Further investigation is required during the design phase.

Membrane Brine Waste

Membrane brine waste is generated from NF or RO. The quantity of the rejected water is highly dependent on the type of membrane and source water quality.

Figure 6-7 shows a typical residual handling process layout for a 10 MGD WTP.

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Dewatering Process Evaluation

Dewatering process can be typically divided into two groups: natural and mechanical. The natural dewatering process removes water by gravity, or induced drainage. It requires a large amount of land area with dry climatic conditions.

Sand Drying Beds - A sand drying bed is the first choice with consideration of the dry weather condition in Hidalgo County and land availability at the three potential treatment sites.

To ensure easy handling, the sand drying bed and concrete slabs with concrete walls need to be installed. This will allow the operator to use a bobcat to remove the dried sludge and haul it to the landfill easily. The solids contents from the sand drying bed can be as high as 20%.

Mechanical Dewatering - There are three types of equipment commonly used in the dewatering process: filter press, belt press, and a centrifuge. All three require power consumption, chemical addition, and odor control. These processes were not recommended for this project.

Brine Disposal Issues

Using membrane separation process (NF or RO), a considerable volume of brine could be generated on a daily basis. It is of particular importance to properly dispose of the large volume of brine.

It is assumed that any brine waste generated by the water treatment plant will be discharged and managed through disposal back to the Hidalgo County drainage systems with the authorization of Hidalgo County Drainage District No. 1.

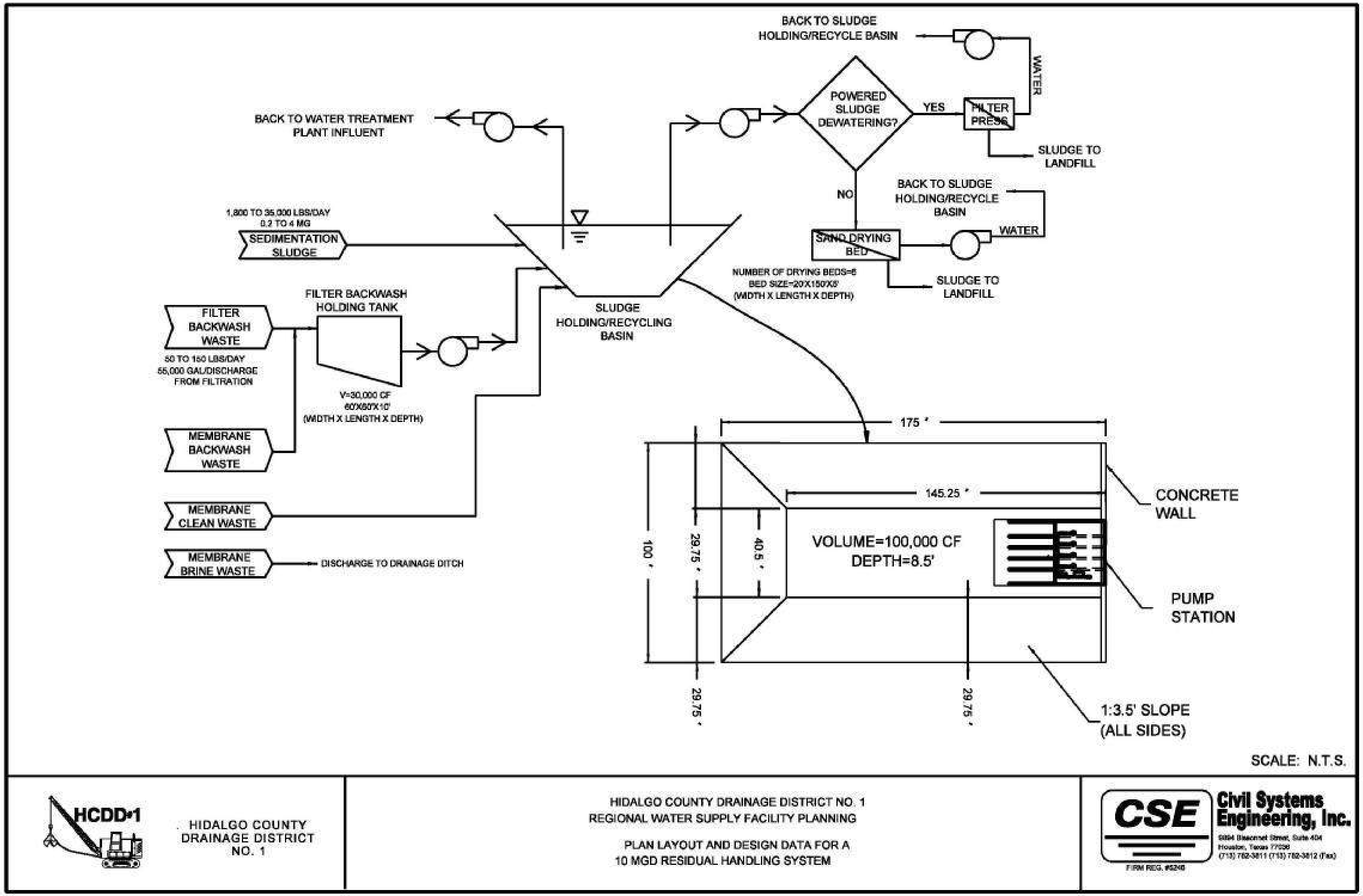

Figure 6-7. Residual Handling Process for a 10 MGD WTP

Chemicals

Special considerations must be considered in selecting and handling chemicals used for the proposed water treatment process.

The most commonly used coagulant chemicals include:

- Alum (aluminum sulfate, $Al_2(SO_4)_3$-$14H_2O$) - the most common coagulant and often used in conjunction with cationic polymers. pH 5.5-7.7 with a typical value of 7.0.
- Polyaluminum chloride, Al(OH)x(Cl)y - effective in some cases, requiring less pH adjustment and producing less sludge
- Ferric chloride, $FeCl_3$, and Ferric sulfate, $Fe_2(SO_4)_3$ - more effective than Alum in some applications. pH 5.0-8.5 with a typical value of 7.5.
- Cationic polymers can be used alone as the primary coagulant or in conjunction with aluminum or iron coagulants.

Flocculants (Flocculation Aids) are needed to form a floc that is more efficiently removed by settling and filtration. Polymers and other additives can often help for flocculation. Typical additives used in flocculants are:

- High molecular weight anionic or nonionic polymers
- Activated silica
- Bentonite.

Additional chemicals are required based on the turbidity and alkalinity of the untreated water quality. The selection of the chemicals is based primarily on the following water conditions:

- High turbidity (> 100 NTU) with high alkalinity (>250 mg/L as $CaCO_3$): Jar test is required for better coagulation/flocculation operation and optimization.
- High turbidity with low alkalinity (< 50 mg/L as $CaCO_3$): The evaluation of cost-effective application of polymers with alum or ferric salts is required through jar test or even bench-scale study.
- Low turbidity (< 10 NTU) with high alkalinity: Polymers cannot work alone for this condition. Additional particles must be added, usually before the polymer. Clays are a suitable target. Alum and ferric salts are effective in relatively large doses. Clay or activated silica added before the alum can reduce the alum dose, and should produce a more settable and dewaterable floc. Polymers (often anionic) or activated silica added after the alum may produce a more settable floc. This condition does not apply to this project.
- Low turbidity and low alkalinity: Polymers will not work alone due to the low turbidity condition, and alum or iron salts are usually ineffective, since pH can be below the neutral range. The flocculation rate is too low to permit aggregation if metal polymers are formed to achieve charge neutralization. This condition does not apply to this project.

pH Adjustment Chemicals - Additional chemicals may be required to adjust either the pH or the alkalinity. The chemicals added are either an acid or a base. In addition, pH adjustment may be required prior to and subsequent to the membrane treatment system. The purpose of pH adjustment is to minimize scaling, to preserve and recover alkalinity, and/or to achieve an optimized pH level for coagulation.

Other chemicals may be needed - filter aid can be selected as for flocculation aid. $KMnO_4$ may also be needed due to high concentrations of iron and manganese. Chemical softening can be used to remove calcium and magnesium and would be a cost-effective solution for hardness reduction. The type and amount of chemicals added should be established by the characteristics of the untreated water. Straight Lime-Soda Ash process for this type of water may be required. Straight Lime-Soda ash is typically a single stage softening process by adding lime (CaO) to remove calcium carbonate hardness, and soda ash (Na_2CO_3) is added to remove noncarbonate calcium hardness. Minor TDS reduction can be achieved since mostly noncarbonate calcium hardness will be ultimately replaced by sodium. The chemical softening process alone cannot remove sodium, potassium and other anions that contribute to the overall TDS level of the raw water.

Storage location, sizing, and feeding points for the chemical feeding system are illustrated in **Figure 6-8** for a 10-mgd WTP.

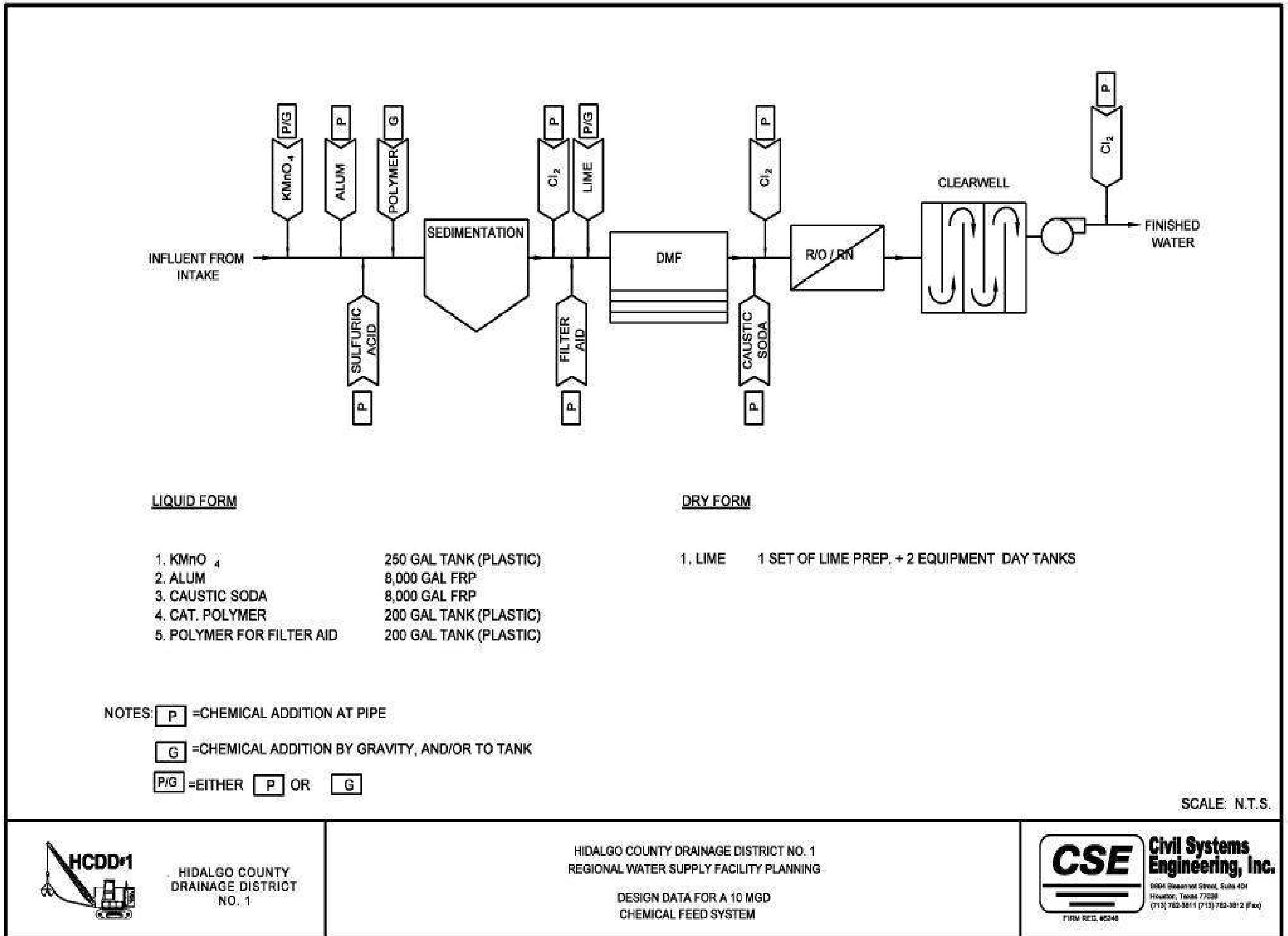

Figure 6-8. Chemical Feed System for a 10 MGD WTP

Laboratory Operations

Water treatment plant cannot be operated properly without a well-installed lab with clear lab procedures to check and evaluate the quality of water being treated and produced to ensure safe treated water for all water users. Laboratory procedures must comply with the approved methods and meet SWDA monitoring requirements.

To meet the water quality control goals, a set of labware and equipments are required, including glassware (beakers, cylinders, pipets, burets, flasks, funnels, tubers, condensers etc), ovens, hot plates, muffle furnace, clamps, test papers, dissolved oxygen meter, pH meter, turbidimeter, color comparator, spectrophotometer, and chlorine residual test kits.

Other than water quality concerns, proper lab quality test can also provide the necessary data to run the treatment processes more cost-effectively. Minimum jar test equipment is required.

Water supply facilities are responsible for operating the laboratory safely. To prevent laboratory accidents, chemicals should be stored in a properly ventilated and well lit room. All bottles and reagents should be clearly labeled and dated. Volatile liquids which may escape as a gas, such as ether, must be kept away from heat sources, sunlight, and electrical switches. Cylinders of gas in storage should also be capped and secured to prevent rolling or tipping.

Figure 6-9 illustrates the recommended water sampling locations.

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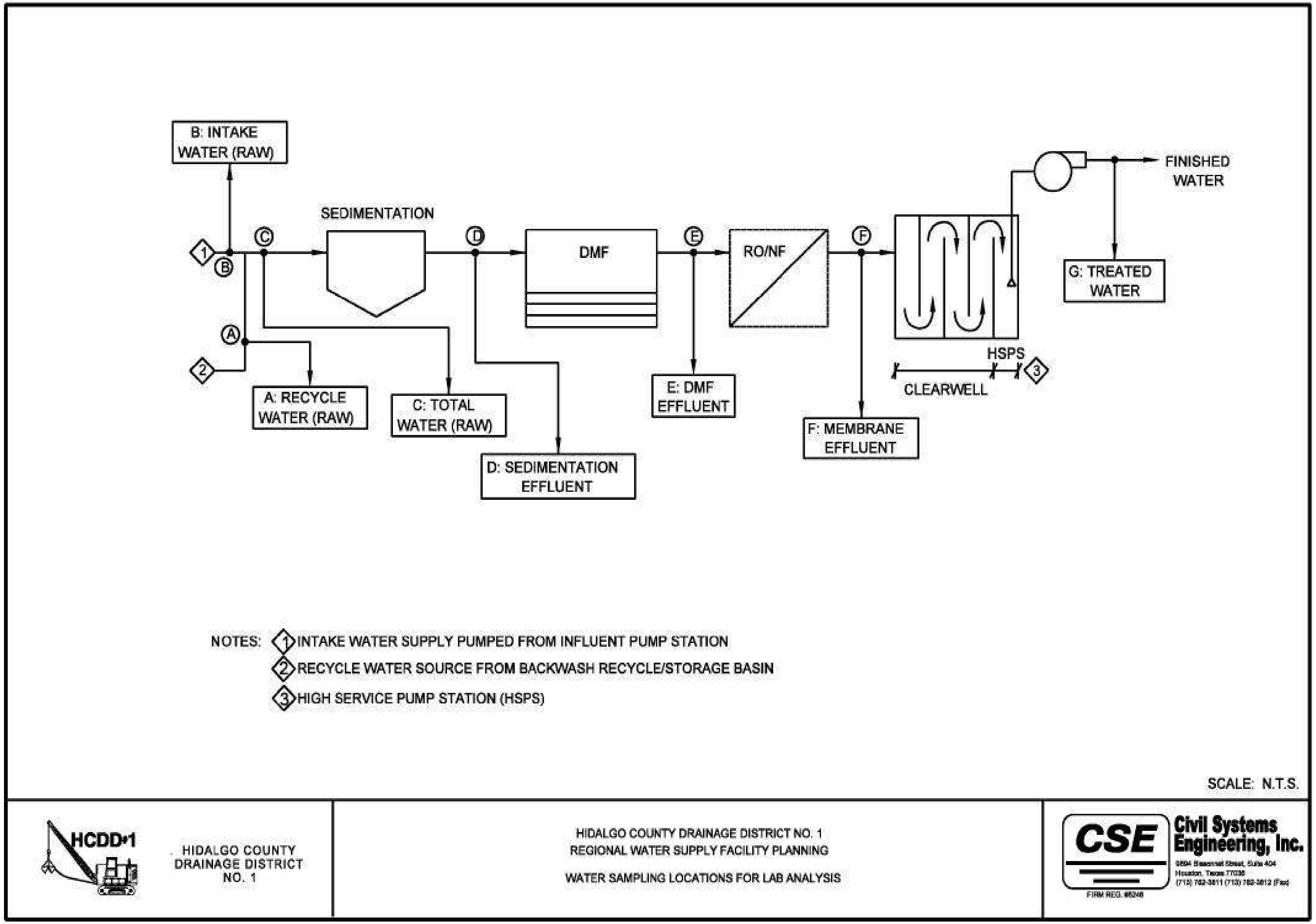


Figure 6-9. WTP Water Sampling Locations

Alternative Water Treatment Processes

Alternative treatment processes were evaluated based on the raw water quality conditions and finished water quality targets.

As discussed earlier, ACTIFLO is required to remove the suspended solids for this project. DMF can cost-effectively remove contaminants. However, to remove the dissolved solids (TDS) or salinity requires the application of membrane process (RO or NF). A decision making process diagram was developed to assist in the overall unit process evaluation, as shown in **Figure 6-10**. As shown, a combination of ACTIFLO with the filtration treatment processes is necessary. Four (4) alternative water treatment processes were considered and evaluated:

A. ACTIFLO + DMF
B. ACTIFLO + NF
C. ACTIFLO + DMF + NF
D. ACTIFLO + DMF + RO

The performances of the four alternatives are compared as shown in **Table 6-5**.

Alternative A (ACTIFLO+DMF) - This alternative is able to meet the turbidity requirement. It also remove certain percentage of hardness and TOC. As discussed earlier, ACTIFLO has proven performance to remove turbidity, total organic carbon (TOC), and color. ACTIFLO is able to remove 30-60 percent of TOC from raw water with TOC of 0-500 mg/L. The raw water from the drainage ditch for this project is about 60 mg/L. For raw water with turbidity of 0-2000 NTU, the NTU level can be reduced to 0.2-2.0 from ACTIFLO and < 0.5 if combined with DMF. This alternative cannot meet the Secondary Drinking Water Standard of 500 mg/L for TDS and cannot remove the high salinity level in the raw water. With considering the conceptual level planning effort of this project and the undecided scheme of how the treated water from this project to be used with the existing water supply systems, this alternative was determined still viable for further consideration.

Alternative B (ACTIFLO+NF) is able to meet the turbidity requirement. It also is able to reduce the hardness level of the raw water from the drainage ditch system. In addition, this system can remove certain percentage of TOC. With consideration of the brackish water quality in the raw water, this alternative cannot remove the salt in the water and probably will not be able to reduce the TDS level below the 1,000 mg/L level. Again, with considering the conceptual level planning effort of this project and the undecided scheme of how the treated water from this project to be used with the existing water supply systems, this alternative was determined still viable for further consideration.

Alternative C (ACTIFLO+DMF+NF) - This alternative is able to meet all finished water requirements as listed in **Table 6-5**. By blending water from DMF and NF processes at a percentage of 30 to 70, a TDS level of 1000 mg/L level can be reached. This alternative is a very promising candidate.

Alternative D (ACTIFLO+DMF+RO) - This alternative is able to meet all finished water requirements as listed in **Table 6-5**. By blending water from

DMF and RO processes at percentage of 50 and 50, a TDS level of 500 mg/L level can be reached. This alternative is also a very promising candidate.

Figure 6-11 illustrates the schematic of the four alternative treatment processes.

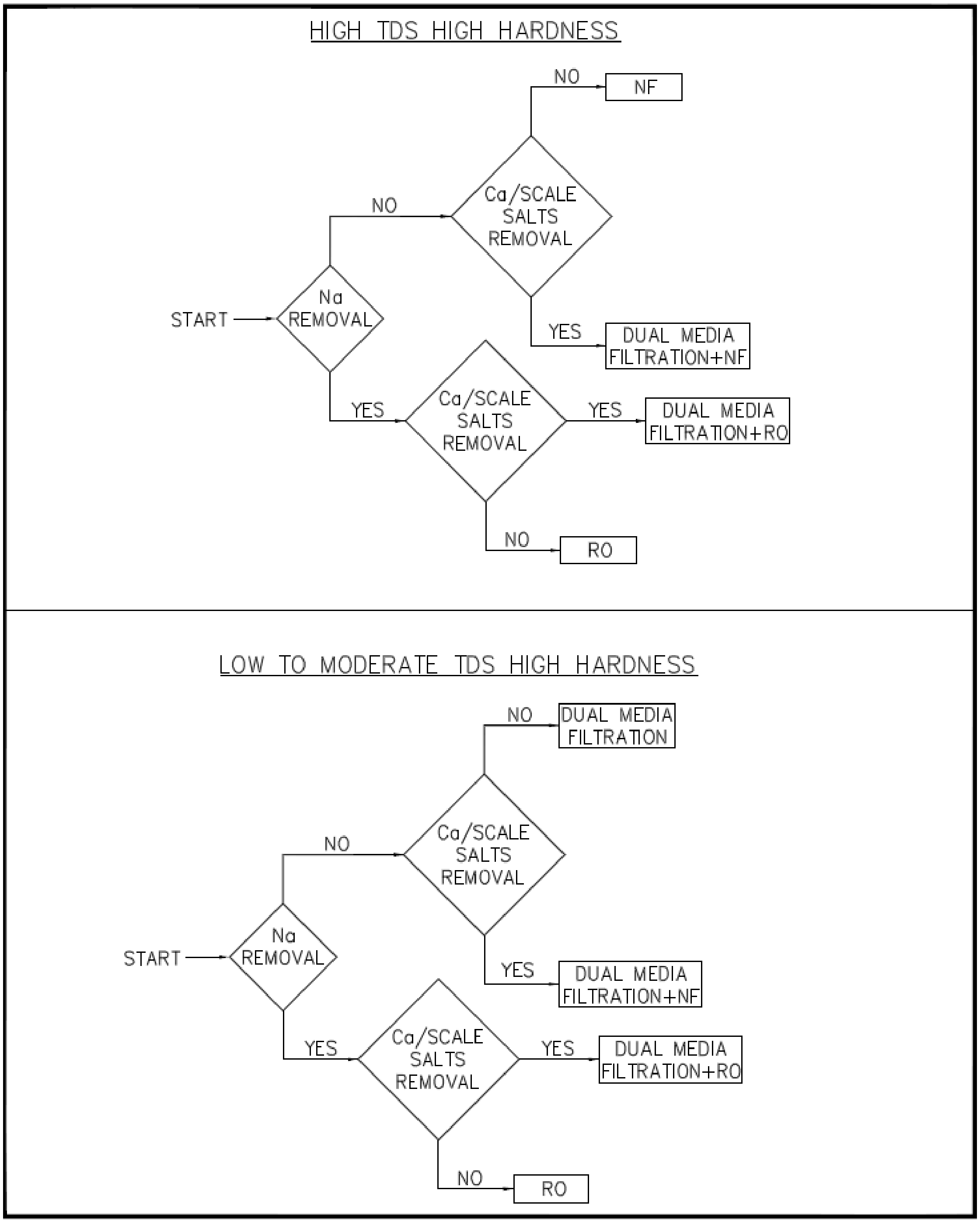


Figure 6-10. Treatment Process Decision Making Process

Table 6-5. Performance of Alternative Water Treatment Processes

Alternative	Description	Turbidity (NTU)	Hardness (mg/L as $CaCO_3$)	TOC (mg/L)	TDS		Salinity
				% removal	<1000 mg/L	<500 mg/L	
A	ACTIFLO+DMF	ü	ü	ü			
B	ACTIFLO+NF	ü	ü	ü			ü
C	ACTIFLO+DMF+NF	ü	ü	ü	ü		ü
D	ACTIFLO+DMF+RO	ü	ü	ü	ü	ü	ü

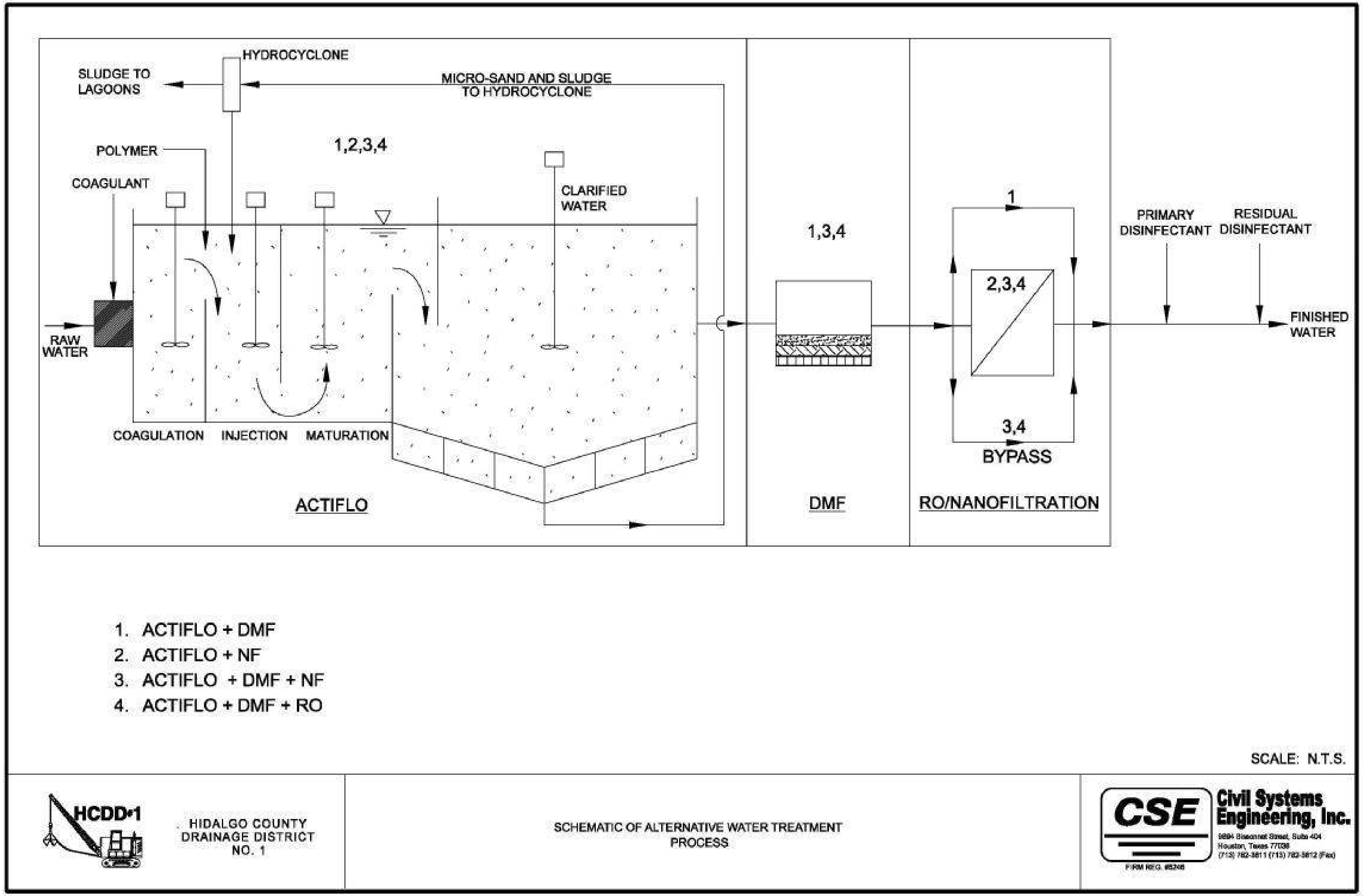
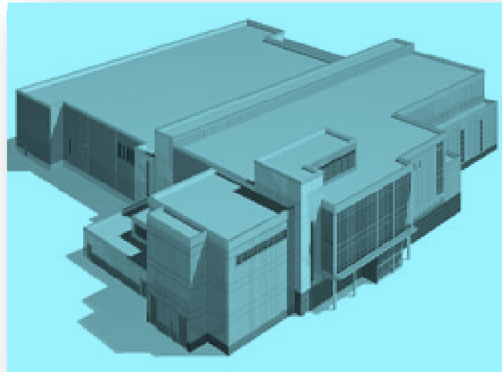


Figure 6-11. Schematic of Alternative Treatment Processes

7 Conceptual Designs



Conceptual designs were developed for each of the four (4) alternative treatment processes. The conceptual designs provided the necessary information for cost estimates. Process train was developed for each alternative with conceptual level design data. For each alternative process, four treatment capacities were considered (3MGD, 5MGD, 10MGD, and 13MGD). Also four (4) different building layouts were developed. To minimize initial capital and O&M costs, blending of treated water from DMF and NF is recommended for Alternative C and DMF and RO for Alternative D. The blending rates are governed by the salinity concentrations in the treated water from the DMF process and NF (Alternative C) or RO (Alternative D) process, as well the acceptable levels of TDS established for the public water supplies. In general, the acceptable level of TDS ranges from 500 to 1,000 mg/l. Pilot testing is recommended to determine the most cost effective alternative for this project.

Alternative A ACTIFLO+DMF

Alternative A is a conventional treatment process with ACTIFLO clarification process followed by DMF (dual media filtration). As discussed earlier, this process could not meet all finished water quality requirements. With consideration of the unknown potential integration with the existing water supply systems, this alternative was still considered as a candidate for the project. Under Alternative A, since there is no membrane process (NF or RO) used, no blending is required. **Figure 7-1** shows the water treatment process flow diagram with conceptual design data for this alternative.

Alternative B ACTIFLO+NF

Alternative B is a integrated membrane system with ACTIFLO clarification process followed by NF (nanofiltration). As discussed earlier, this process could not meet all finished water quality requirements, especially salinity water quality parameter. Like Alternative A, with consideration of the unknown potential integration with the existing water supply systems, this alternative was still considered as a candidate for the project. Under Alternative B, since there is no membrane process (NF or RO) used, no blending is required. **Figure 7-2** shows the water treatment process flow diagram with conceptual design data for this alternative.

Alternative C
ACTIFLO+DMF+NF

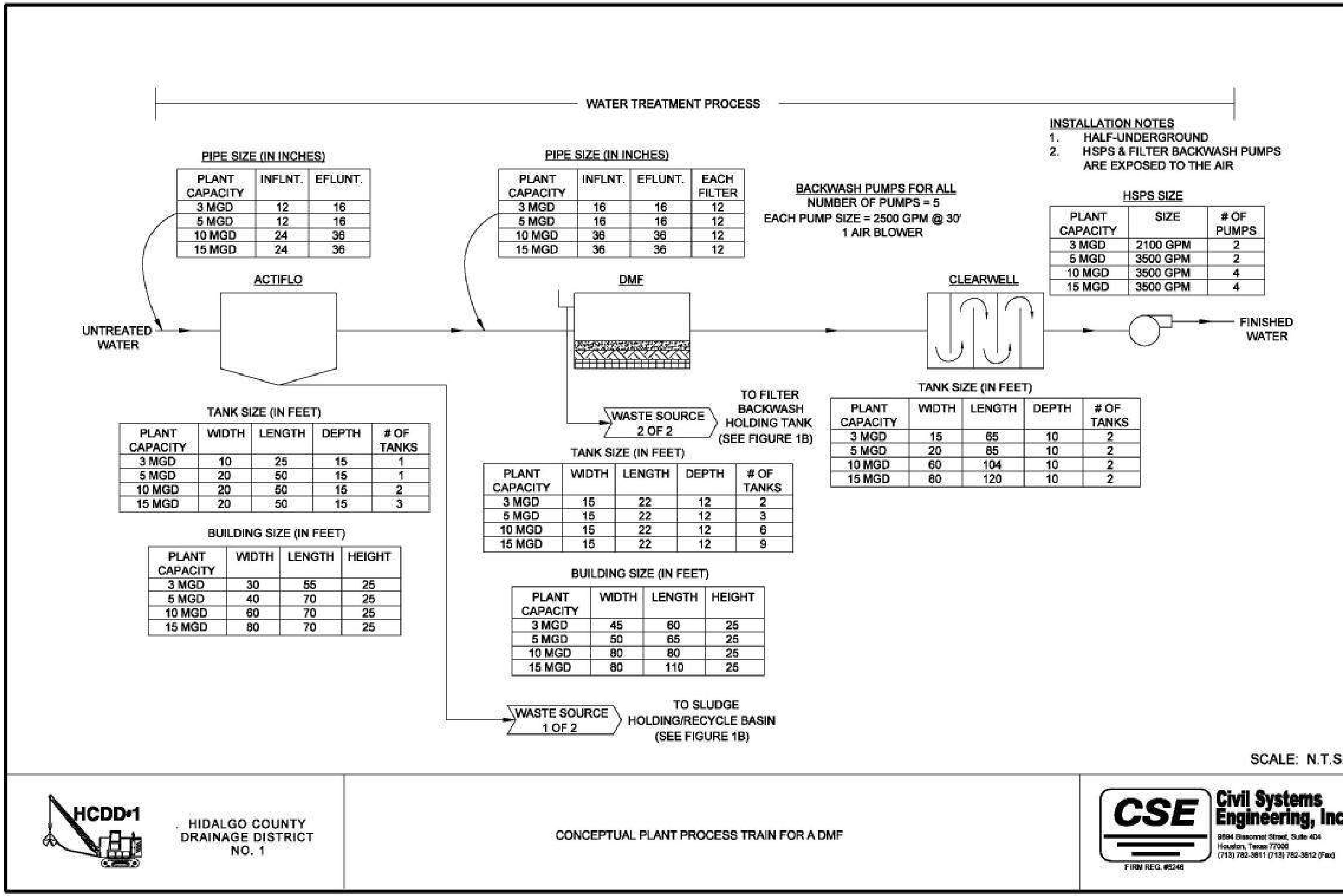
Alternative C is an integrated membrane system with ACTIFLO clarification process followed by DMF (dual media filtration) and NF (nanofiltration). This alternative process can meet all finished water quality requirements. With consideration of blending treated water from DMF and NF, this alternative is economically feasible and was considered as one of the preferred alternatives. **Figure 7-3** shows the water treatment process flow diagram with conceptual design data for this alternative.

Alternative D
ACTIFLO+DMF+RO

Alternative D is an integrated membrane system with ACTIFLO clarification process followed by DMF (dual media filtration) and RO (reverse osmosis). This alternative process can meet all finished water quality requirements. With consideration of blending treated water from DMF and NF, this alternative is economically feasible and was considered as one of the preferred alternatives. **Figure 7-4** shows the water treatment process flow diagram with conceptual design data for this alternative.

Alternative Building Layouts

Four alternative building arrangement layouts were prepared, as shown in ***Figures 7-5*** through ***7-8***.



ACTIFLO – PIPE SIZE (IN INCHES)

PLANT CAPACITY	INFLNT.	EFLUNT.
3 MGD	12	16
5 MGD	12	16
10 MGD	24	36
15 MGD	24	36

ACTIFLO – TANK SIZE (IN FEET)

PLANT CAPACITY	WIDTH	LENGTH	DEPTH	# OF TANKS
3 MGD	10	25	15	1
5 MGD	20	50	15	1
10 MGD	20	50	15	2
15 MGD	20	50	15	3

ACTIFLO – BUILDING SIZE (IN FEET)

PLANT CAPACITY	WIDTH	LENGTH	HEIGHT
3 MGD	30	55	25
5 MGD	40	70	25
10 MGD	60	70	25
15 MGD	80	70	25

DMF – PIPE SIZE (IN INCHES)

PLANT CAPACITY	INFLNT.	EFLUNT.	EACH FILTER
3 MGD	16	16	12
5 MGD	16	16	12
10 MGD	36	36	12
15 MGD	36	36	12

DMF – TANK SIZE (IN FEET)

PLANT CAPACITY	WIDTH	LENGTH	DEPTH	# OF TANKS
3 MGD	15	22	12	2
5 MGD	15	22	12	3
10 MGD	15	22	12	6
15 MGD	15	22	12	9

DMF – BUILDING SIZE (IN FEET)

PLANT CAPACITY	WIDTH	LENGTH	HEIGHT
3 MGD	45	60	25
5 MGD	50	65	25
10 MGD	80	80	25
15 MGD	80	110	25

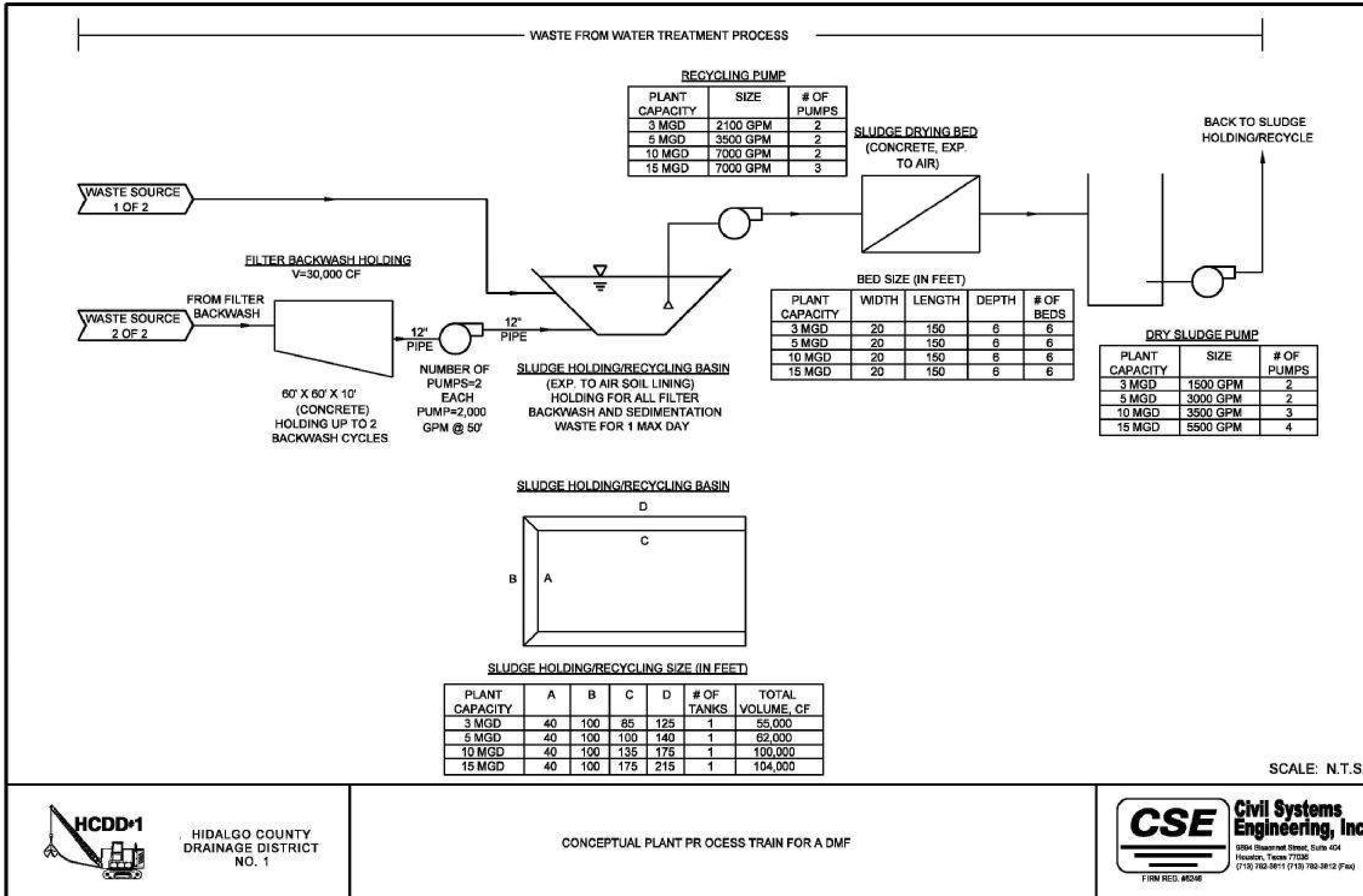
CLEARWELL – TANK SIZE (IN FEET)

PLANT CAPACITY	WIDTH	LENGTH	DEPTH	# OF TANKS
3 MGD	15	65	10	2
5 MGD	20	85	10	2
10 MGD	60	104	10	2
15 MGD	80	120	10	2

HSPS SIZE

PLANT CAPACITY	SIZE	# OF PUMPS
3 MGD	2100 GPM	2
5 MGD	3500 GPM	2
10 MGD	3500 GPM	4
15 MGD	3500 GPM	4

Figure 7-1-1 Conceptual WTP Process Train for Alternative A - ACTIFLO + DMF



RECYCLING PUMP

PLANT CAPACITY	SIZE	# OF PUMPS
3 MGD	2100 GPM	2
5 MGD	3500 GPM	2
10 MGD	7000 GPM	2
15 MGD	7000 GPM	3

BED SIZE (IN FEET)

PLANT CAPACITY	WIDTH	LENGTH	DEPTH	# OF BEDS
3 MGD	20	150	6	6
5 MGD	20	150	6	6
10 MGD	20	150	6	6
15 MGD	20	150	6	6

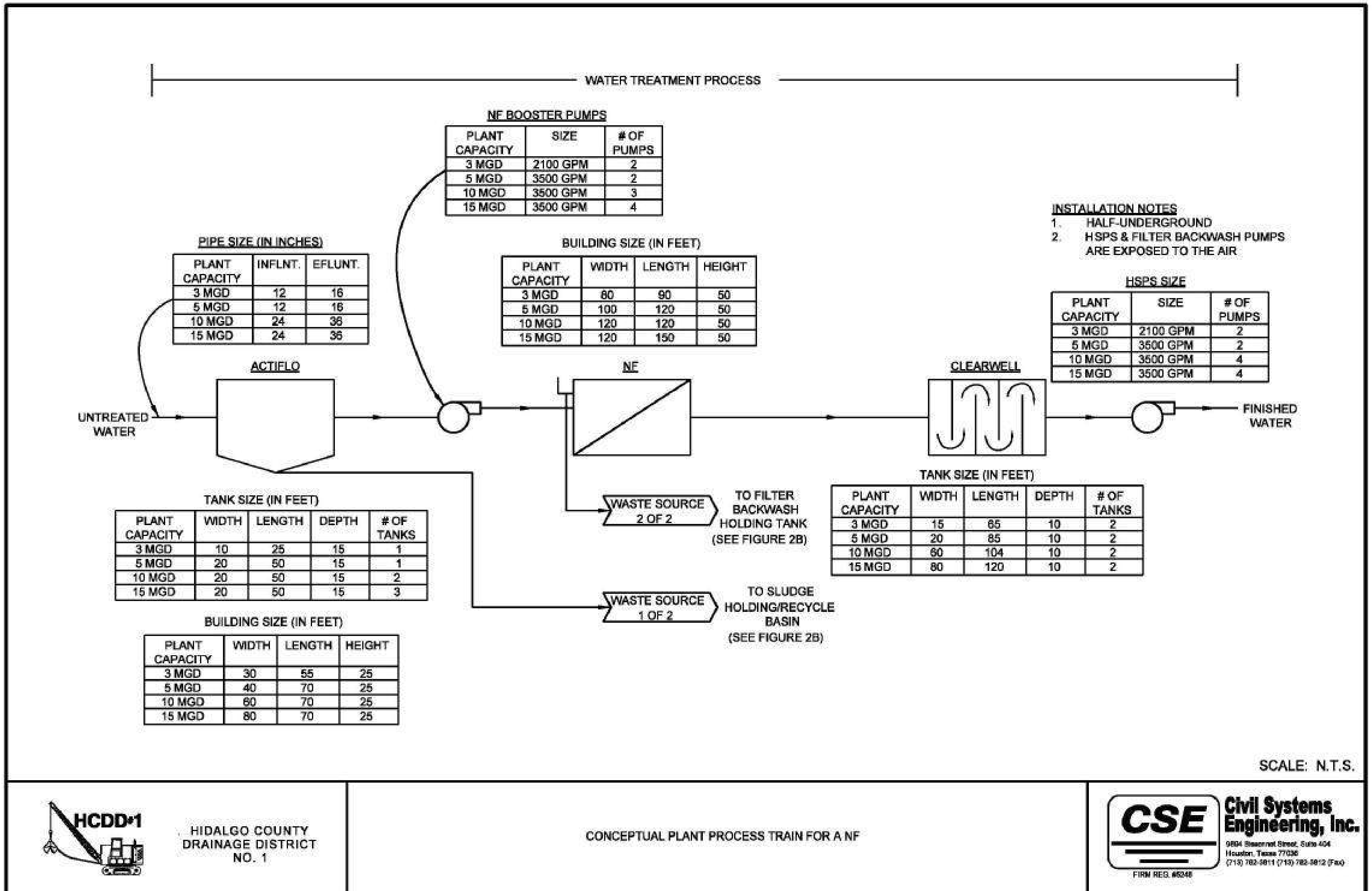
DRY SLUDGE PUMP

PLANT CAPACITY	SIZE	# OF PUMPS
3 MGD	1500 GPM	2
5 MGD	3000 GPM	2
10 MGD	3500 GPM	3
15 MGD	5500 GPM	4

SLUDGE HOLDING/RECYCLING SIZE (IN FEET)

PLANT CAPACITY	A	B	C	D	# OF TANKS	TOTAL VOLUME, CF
3 MGD	40	100	85	125	1	55,000
5 MGD	40	100	100	140	1	62,000
10 MGD	40	100	135	175	1	100,000
15 MGD	40	100	175	215	1	104,000

Figure 7-1-2 Conceptual WTP Process Train for Alternative A - ACTIFLO + DMF



NF BOOSTER PUMPS

PLANT CAPACITY	SIZE	# OF PUMPS
3 MGD	2100 GPM	2
5 MGD	3500 GPM	2
10 MGD	3500 GPM	3
15 MGD	3500 GPM	4

PIPE SIZE (IN INCHES)

PLANT CAPACITY	INFLNT.	EFLUNT.
3 MGD	12	16
5 MGD	12	16
10 MGD	24	36
15 MGD	24	36

BUILDING SIZE (IN FEET)

PLANT CAPACITY	WIDTH	LENGTH	HEIGHT
3 MGD	80	90	50
5 MGD	100	120	50
10 MGD	120	120	50
15 MGD	120	150	50

HSPS SIZE

PLANT CAPACITY	SIZE	# OF PUMPS
3 MGD	2100 GPM	2
5 MGD	3500 GPM	2
10 MGD	3500 GPM	4
15 MGD	3500 GPM	4

TANK SIZE (IN FEET)

PLANT CAPACITY	WIDTH	LENGTH	DEPTH	# OF TANKS
3 MGD	10	25	15	1
5 MGD	20	50	15	1
10 MGD	20	50	15	2
15 MGD	20	50	15	3

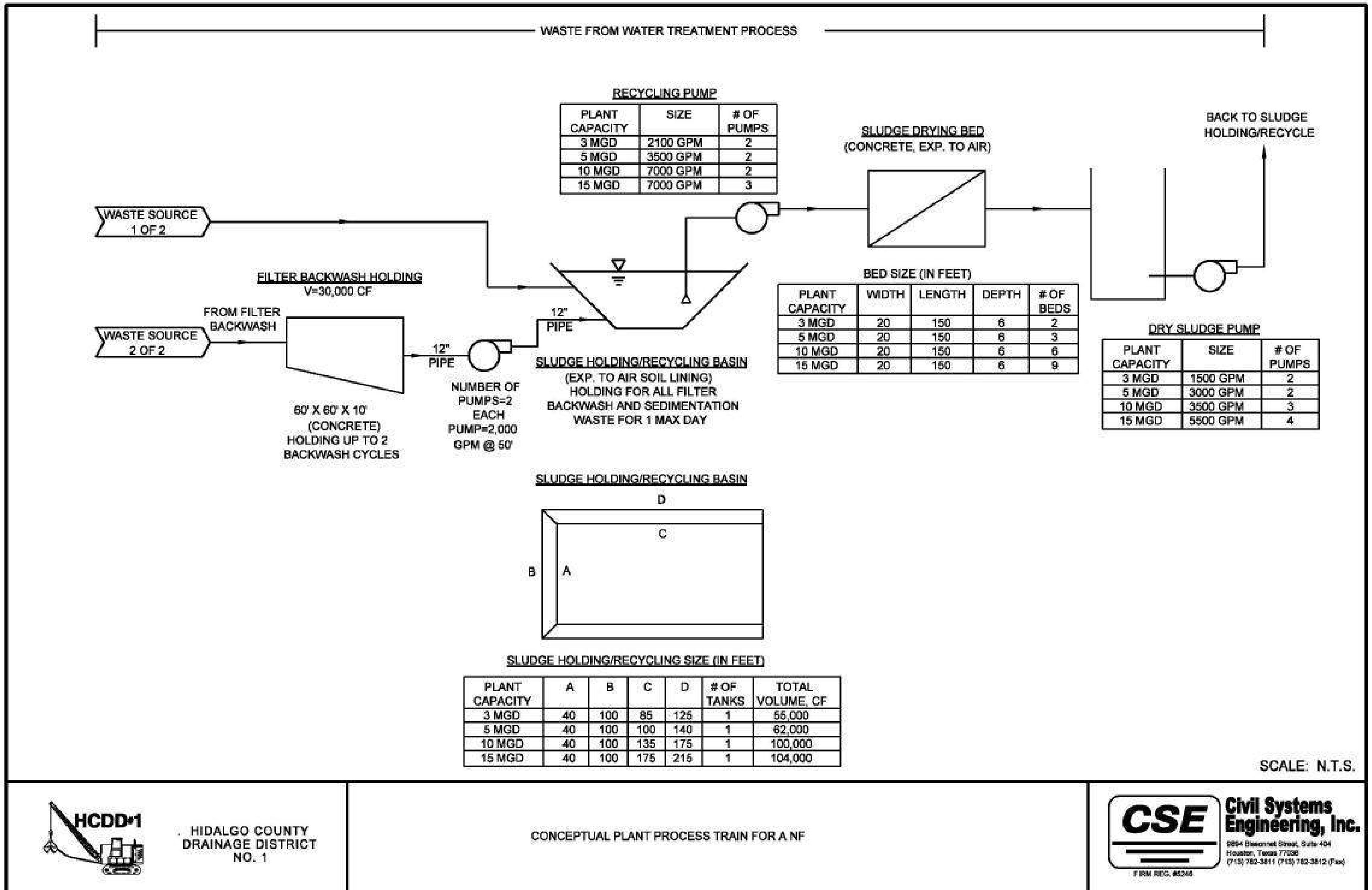
TANK SIZE (IN FEET)

PLANT CAPACITY	WIDTH	LENGTH	DEPTH	# OF TANKS
3 MGD	15	65	10	2
5 MGD	20	85	10	2
10 MGD	60	104	10	2
15 MGD	80	120	10	2

BUILDING SIZE (IN FEET)

PLANT CAPACITY	WIDTH	LENGTH	HEIGHT
3 MGD	30	55	25
5 MGD	40	70	25
10 MGD	60	70	25
15 MGD	80	70	25

Figure 7-2-1 Conceptual WTP Process Train for Alternative B - ACTIFLO + NF



RECYCLING PUMP

PLANT CAPACITY	SIZE	# OF PUMPS
3 MGD	2100 GPM	2
5 MGD	3500 GPM	2
10 MGD	7000 GPM	2
15 MGD	7000 GPM	3

BED SIZE (IN FEET)

PLANT CAPACITY	WIDTH	LENGTH	DEPTH	# OF BEDS
3 MGD	20	150	6	2
5 MGD	20	150	6	3
10 MGD	20	150	6	6
15 MGD	20	150	6	9

DRY SLUDGE PUMP

PLANT CAPACITY	SIZE	# OF PUMPS
3 MGD	1500 GPM	2
5 MGD	3000 GPM	2
10 MGD	3500 GPM	3
15 MGD	5500 GPM	4

SLUDGE HOLDING/RECYCLING SIZE (IN FEET)

PLANT CAPACITY	A	B	C	D	# OF TANKS	TOTAL VOLUME, CF
3 MGD	40	100	85	125	1	55,000
5 MGD	40	100	100	140	1	62,000
10 MGD	40	100	135	175	1	100,000
15 MGD	40	100	175	215	1	104,000

Figure 7-2-2 Conceptual WTP Process Train for Alternative B - ACTIFLO + NF

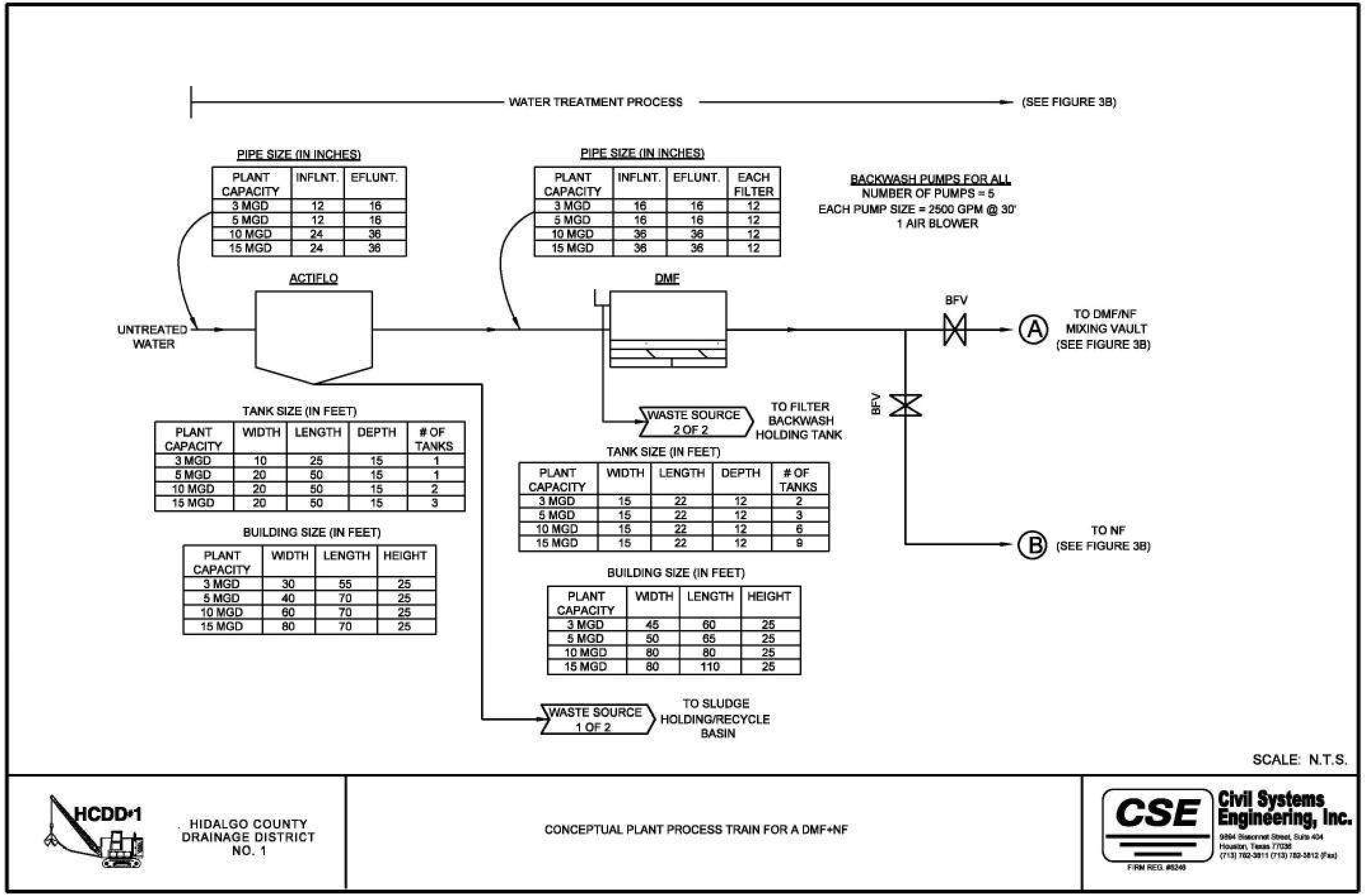
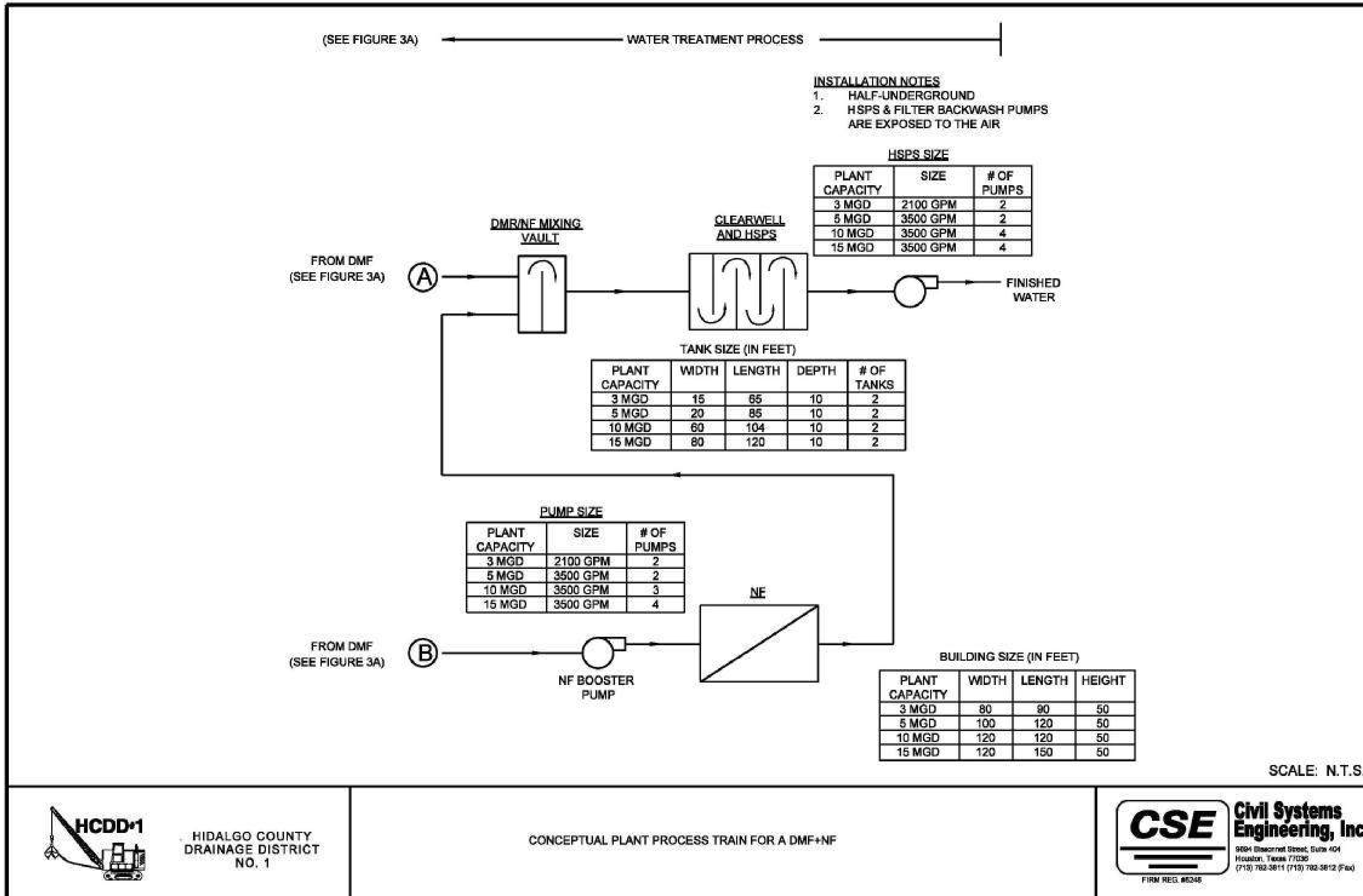


Figure 7-3-1. Conceptual WTP Process Train for Alternative C - ACTIFLO + DMF + NF



HSPS SIZE

PLANT CAPACITY	SIZE	# OF PUMPS
3 MGD	2100 GPM	2
5 MGD	3500 GPM	2
10 MGD	3500 GPM	4
15 MGD	3500 GPM	4

TANK SIZE (IN FEET)

PLANT CAPACITY	WIDTH	LENGTH	DEPTH	# OF TANKS
3 MGD	15	65	10	2
5 MGD	20	85	10	2
10 MGD	60	104	10	2
15 MGD	80	120	10	2

PUMP SIZE

PLANT CAPACITY	SIZE	# OF PUMPS
3 MGD	2100 GPM	2
5 MGD	3500 GPM	2
10 MGD	3500 GPM	3
15 MGD	3500 GPM	4

BUILDING SIZE (IN FEET)

PLANT CAPACITY	WIDTH	LENGTH	HEIGHT
3 MGD	80	90	50
5 MGD	100	120	50
10 MGD	120	120	50
15 MGD	120	150	50

Figure 7-3-2. Conceptual WTP Process Train for Alternative C - ACTIFLO + DMF + NF

8

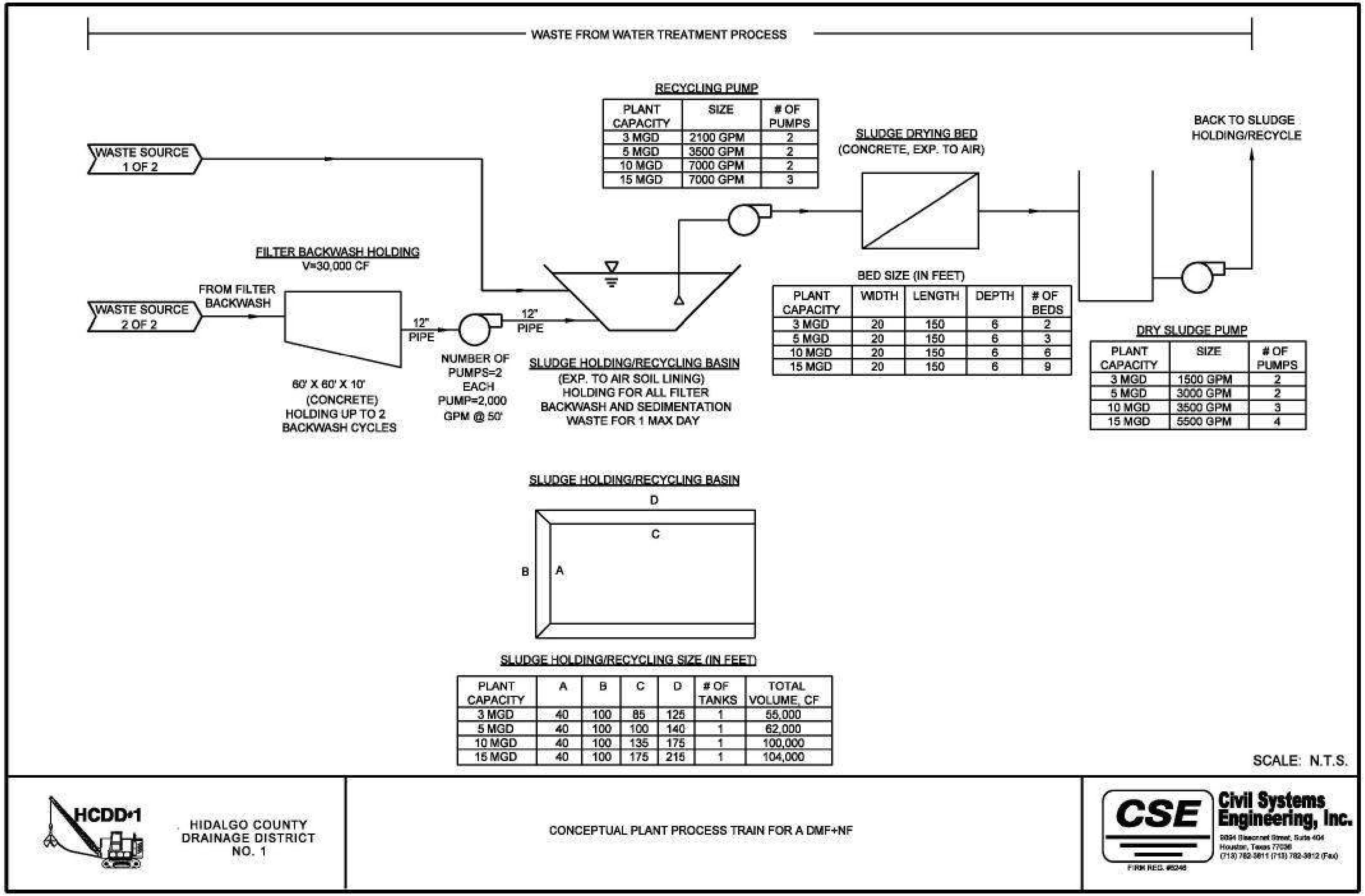
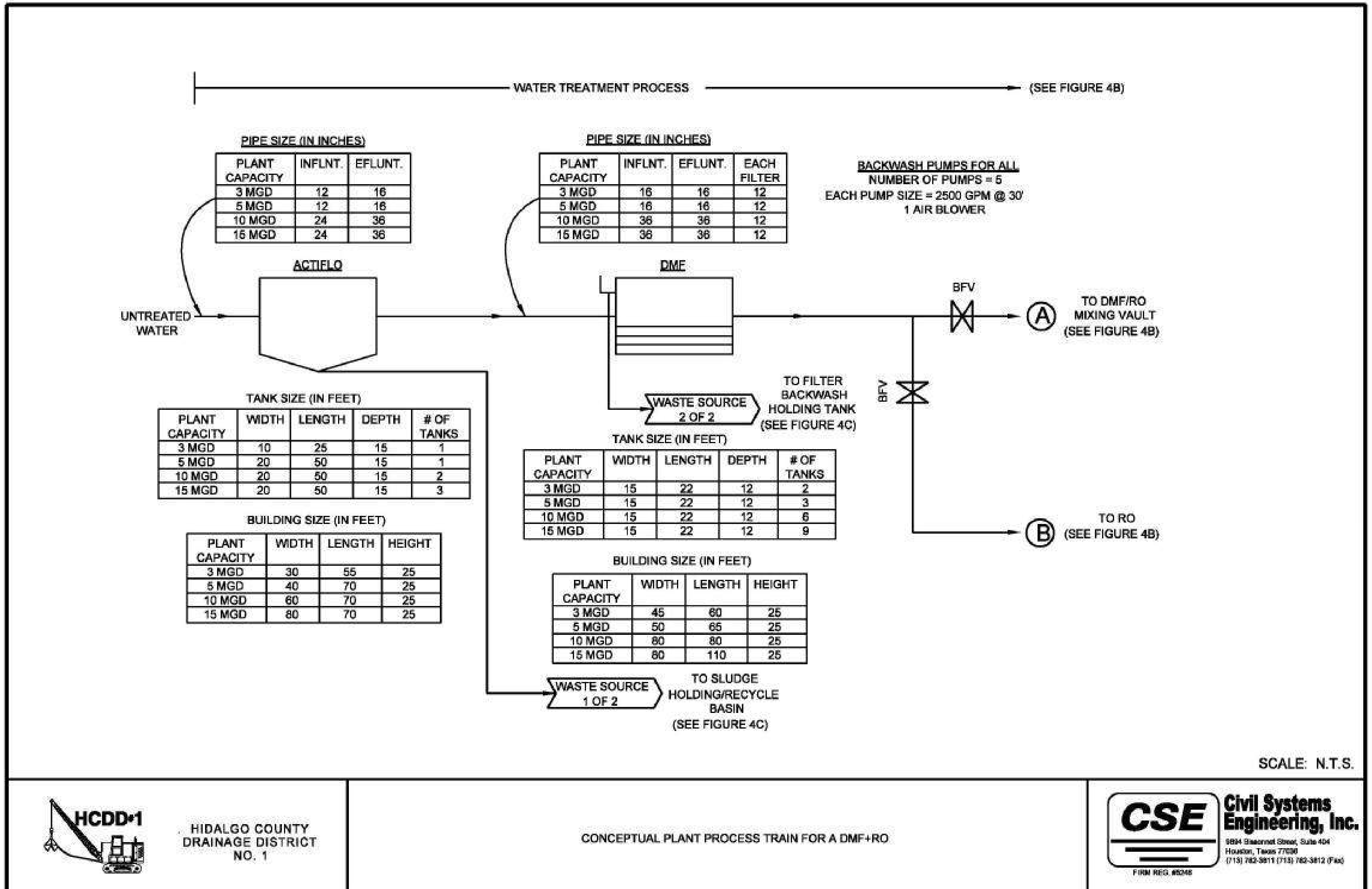


Figure 7-3-3. Conceptual WTP Process Train for Alternative C - ACTIFLO + DMF + NF



ACTIFLO — PIPE SIZE (IN INCHES)

PLANT CAPACITY	INFLNT.	EFLUNT.
3 MGD	12	16
5 MGD	12	16
10 MGD	24	36
15 MGD	24	36

ACTIFLO — TANK SIZE (IN FEET)

PLANT CAPACITY	WIDTH	LENGTH	DEPTH	# OF TANKS
3 MGD	10	25	15	1
5 MGD	20	50	15	1
10 MGD	20	50	15	2
15 MGD	20	50	15	3

ACTIFLO — BUILDING SIZE (IN FEET)

PLANT CAPACITY	WIDTH	LENGTH	HEIGHT
3 MGD	30	55	25
5 MGD	40	70	25
10 MGD	60	70	25
15 MGD	80	70	25

DMF — PIPE SIZE (IN INCHES)

PLANT CAPACITY	INFLNT.	EFLUNT.	EACH FILTER
3 MGD	16	16	12
5 MGD	16	16	12
10 MGD	36	36	12
15 MGD	36	36	12

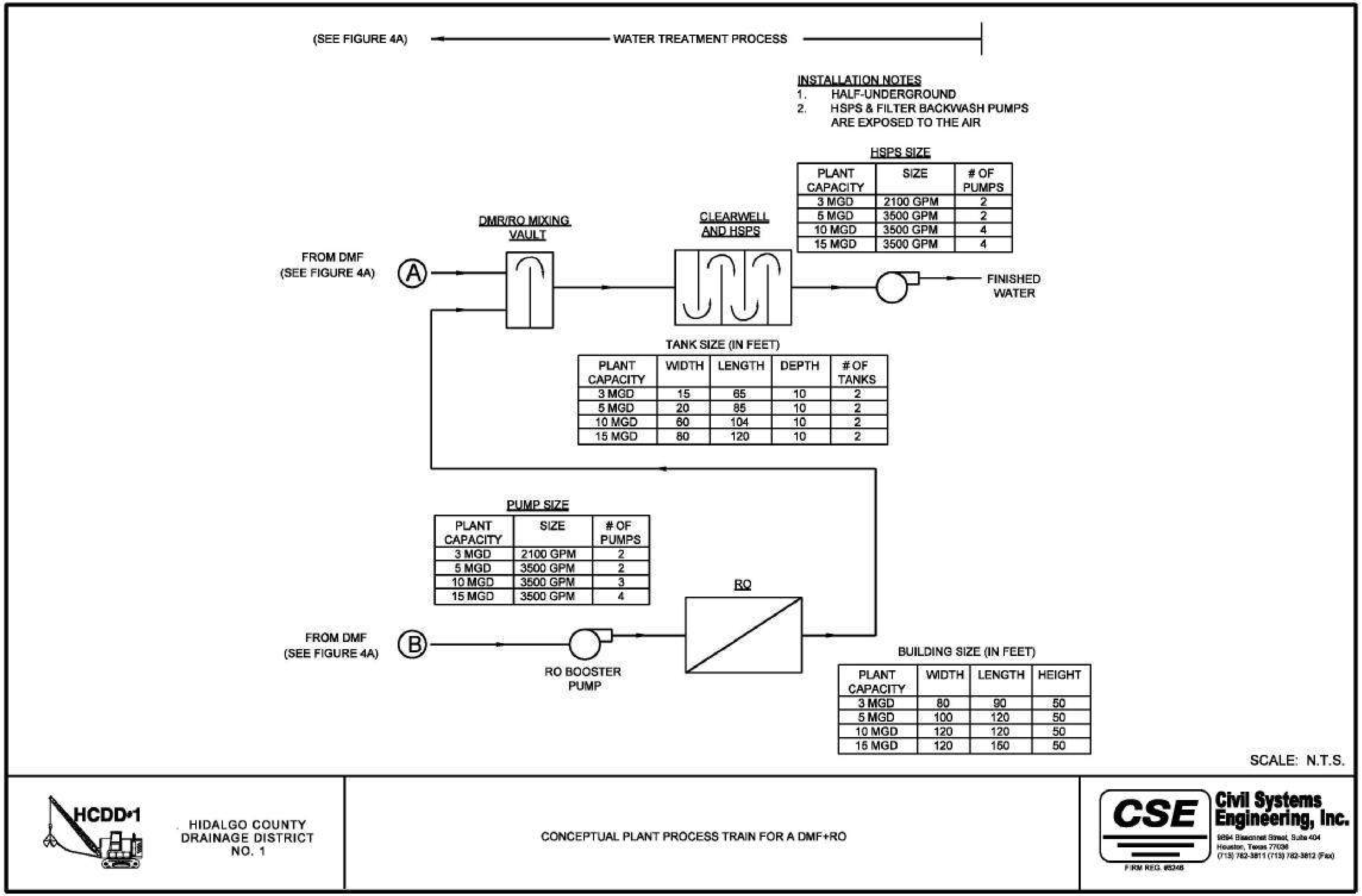
DMF — TANK SIZE (IN FEET)

PLANT CAPACITY	WIDTH	LENGTH	DEPTH	# OF TANKS
3 MGD	15	22	12	2
5 MGD	15	22	12	3
10 MGD	15	22	12	6
15 MGD	15	22	12	9

DMF — BUILDING SIZE (IN FEET)

PLANT CAPACITY	WIDTH	LENGTH	HEIGHT
3 MGD	45	60	25
5 MGD	50	65	25
10 MGD	80	80	25
15 MGD	80	110	25

Figure 7-4-1 Conceptual WTP Process Train for Alternative D - ACTIFLO + DMF + RO



HSPS SIZE

PLANT CAPACITY	SIZE	# OF PUMPS
3 MGD	2100 GPM	2
5 MGD	3500 GPM	2
10 MGD	3500 GPM	4
15 MGD	3500 GPM	4

TANK SIZE (IN FEET)

PLANT CAPACITY	WIDTH	LENGTH	DEPTH	# OF TANKS
3 MGD	15	65	10	2
5 MGD	20	85	10	2
10 MGD	60	104	10	2
15 MGD	80	120	10	2

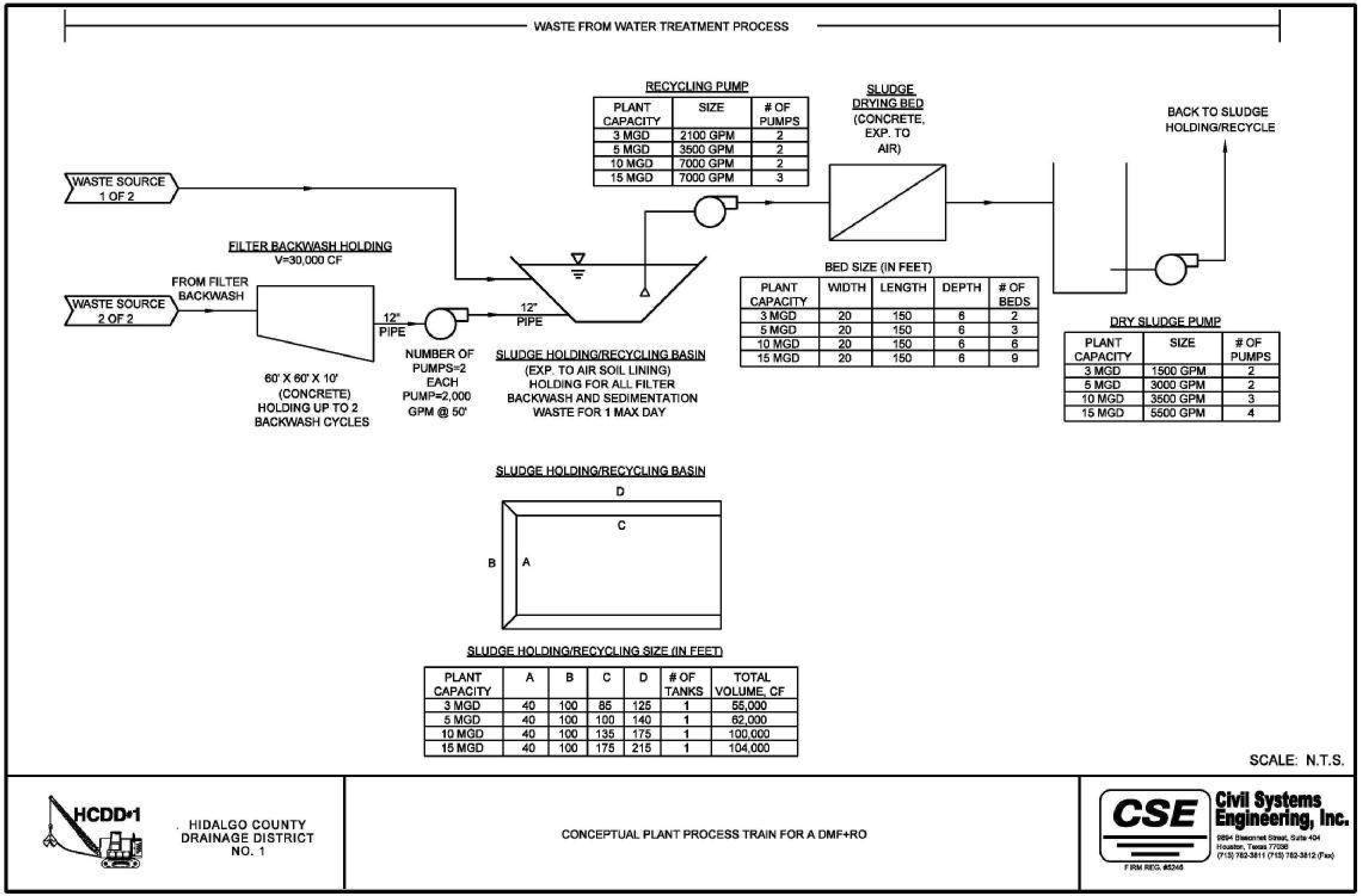
PUMP SIZE

PLANT CAPACITY	SIZE	# OF PUMPS
3 MGD	2100 GPM	2
5 MGD	3500 GPM	2
10 MGD	3500 GPM	3
15 MGD	3500 GPM	4

BUILDING SIZE (IN FEET)

PLANT CAPACITY	WIDTH	LENGTH	HEIGHT
3 MGD	80	90	50
5 MGD	100	120	50
10 MGD	120	120	50
15 MGD	120	150	50

Figure 7-4-2. Conceptual WTP Process Train for Alternative D - ACTIFLO + DMF + RO



RECYCLING PUMP

PLANT CAPACITY	SIZE	# OF PUMPS
3 MGD	2100 GPM	2
5 MGD	3500 GPM	2
10 MGD	7000 GPM	2
15 MGD	7000 GPM	3

BED SIZE (IN FEET)

PLANT CAPACITY	WIDTH	LENGTH	DEPTH	# OF BEDS
3 MGD	20	150	6	2
5 MGD	20	150	6	3
10 MGD	20	150	6	6
15 MGD	20	150	6	9

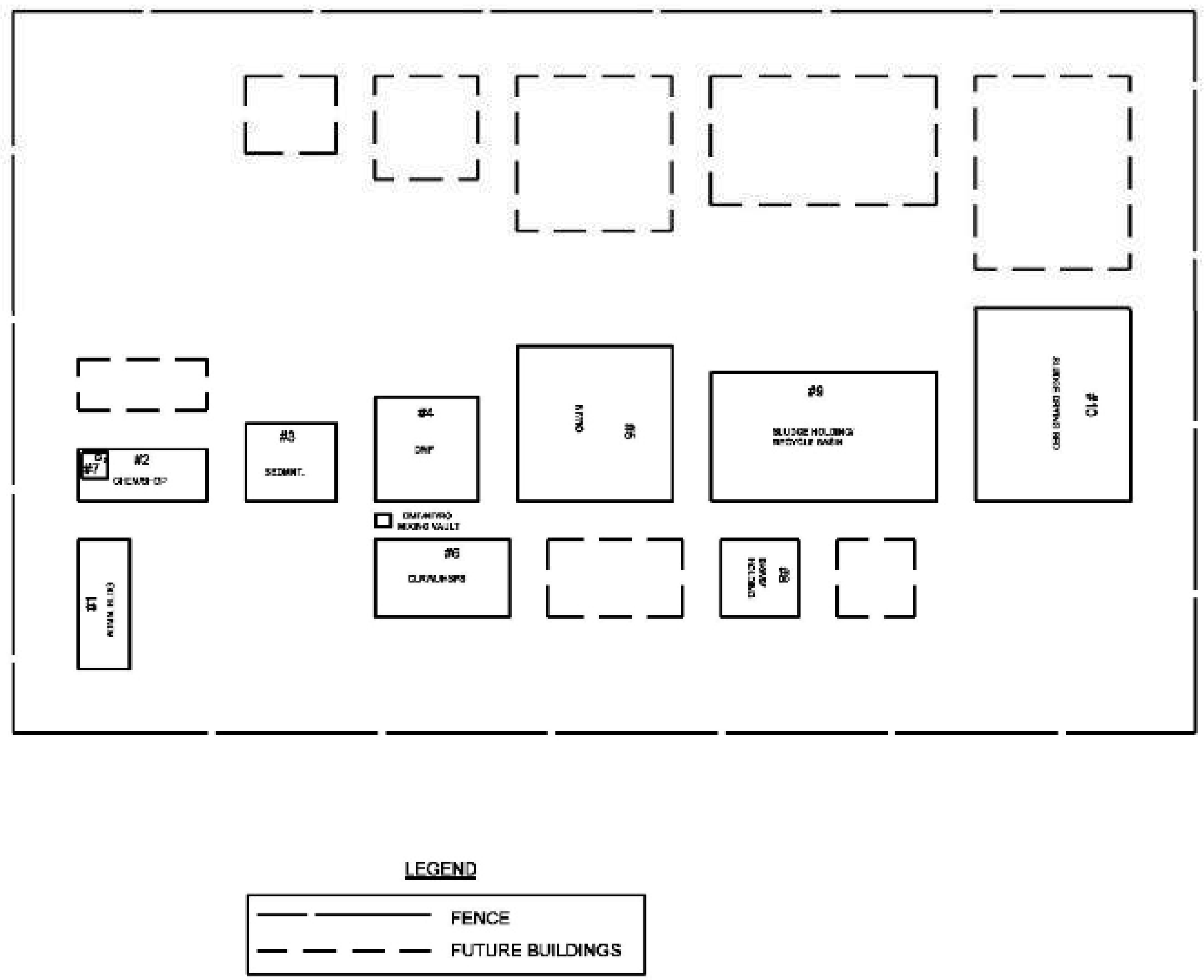
DRY SLUDGE PUMP

PLANT CAPACITY	SIZE	# OF PUMPS
3 MGD	1500 GPM	2
5 MGD	3000 GPM	2
10 MGD	3500 GPM	3
15 MGD	5500 GPM	4

SLUDGE HOLDING/RECYCLING SIZE (IN FEET)

PLANT CAPACITY	A	B	C	D	# OF TANKS	TOTAL VOLUME, CF
3 MGD	40	100	85	125	1	55,000
5 MGD	40	100	100	140	1	62,000
10 MGD	40	100	135	175	1	100,000
15 MGD	40	100	175	215	1	104,000

Figure 7-4-3. Conceptual WTP Process Train for Alternative D - ACTIFLO + DMF + RO



All Measurements in feet				
Building	Width	Length	Height	Below Grade?
1	40	100	15	No
2	40	100	15	No
3	60	70	25	No
4	80	80	25	No
5	120	120	25	No
6	60	104	10	Yes
7	20	20	25	No
8	60	60	10	No
9	100	175	8.5	No
10	120	150	6	No
DMF/NF/RO Mixing Vault	10	12	6	Yes

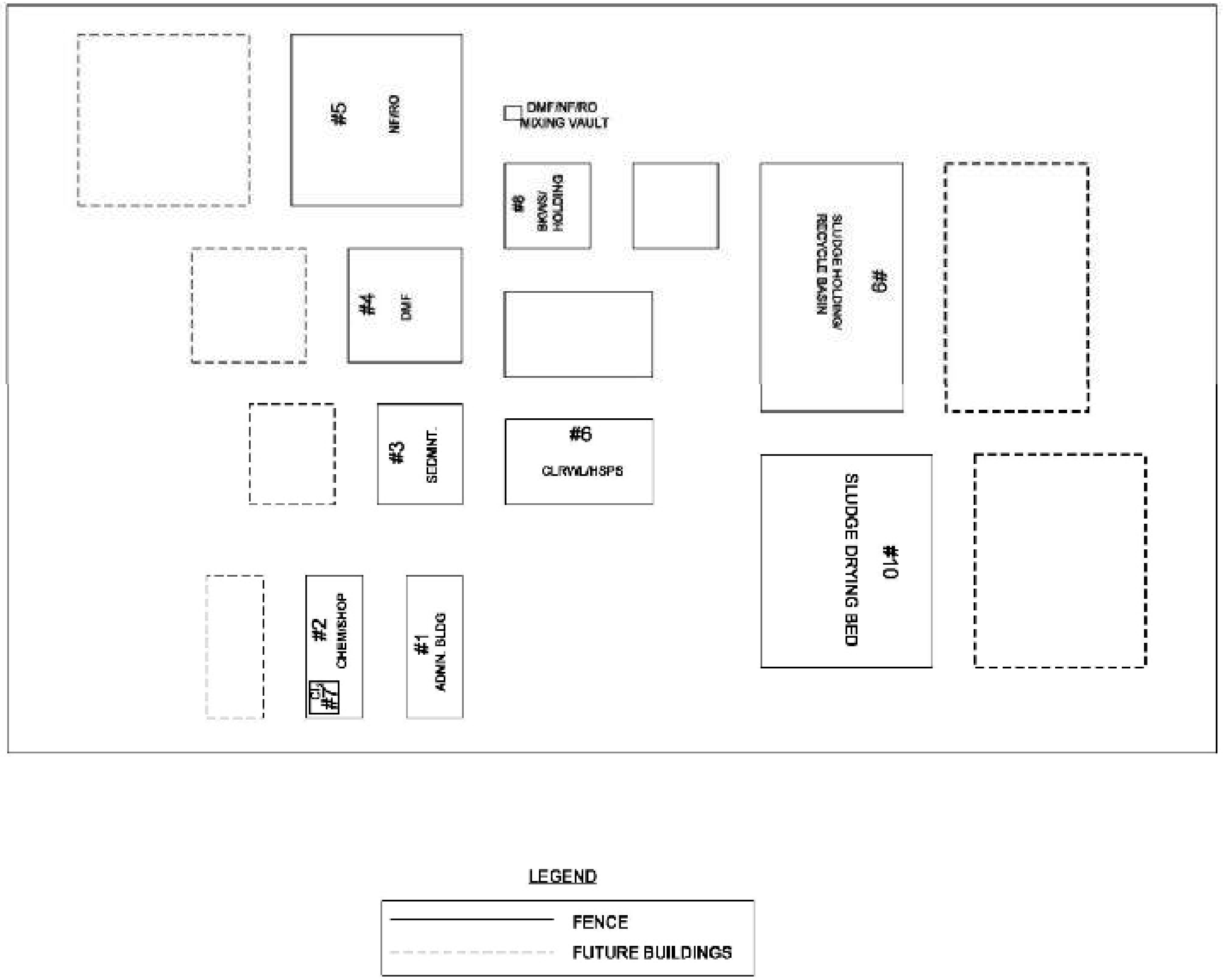
SCALE: N.T.S.

HCDD#1 HIDALGO COUNTY DRAINAGE DISTRICT NO. 1

10 MGD WATER TREATMENT PLANT LAYOUT #1 - LONG STRETCH
TOTAL AREA = 11.76 ACRES

CSE Civil Systems Engineering, Inc.

Figure 7-5. Water Treatment Plant Layout - Long Stretch



All Measurements in feet				
Building	***Width***	***Length***	***Height***	***Below Grade?***
1	40	100	15	No
2	40	100	15	No
3	60	70	25	No
4	80	80	25	No
5	120	120	25	No
6	60	104	10	Yes
7	20	20	25	No
8	60	60	10	No
9	100	175	8.5	No
10	120	150	6	No
DMF/NF/RO Mixing Vault	10	12	6	Yes

SCALE: N.T.S.

HCDD#1

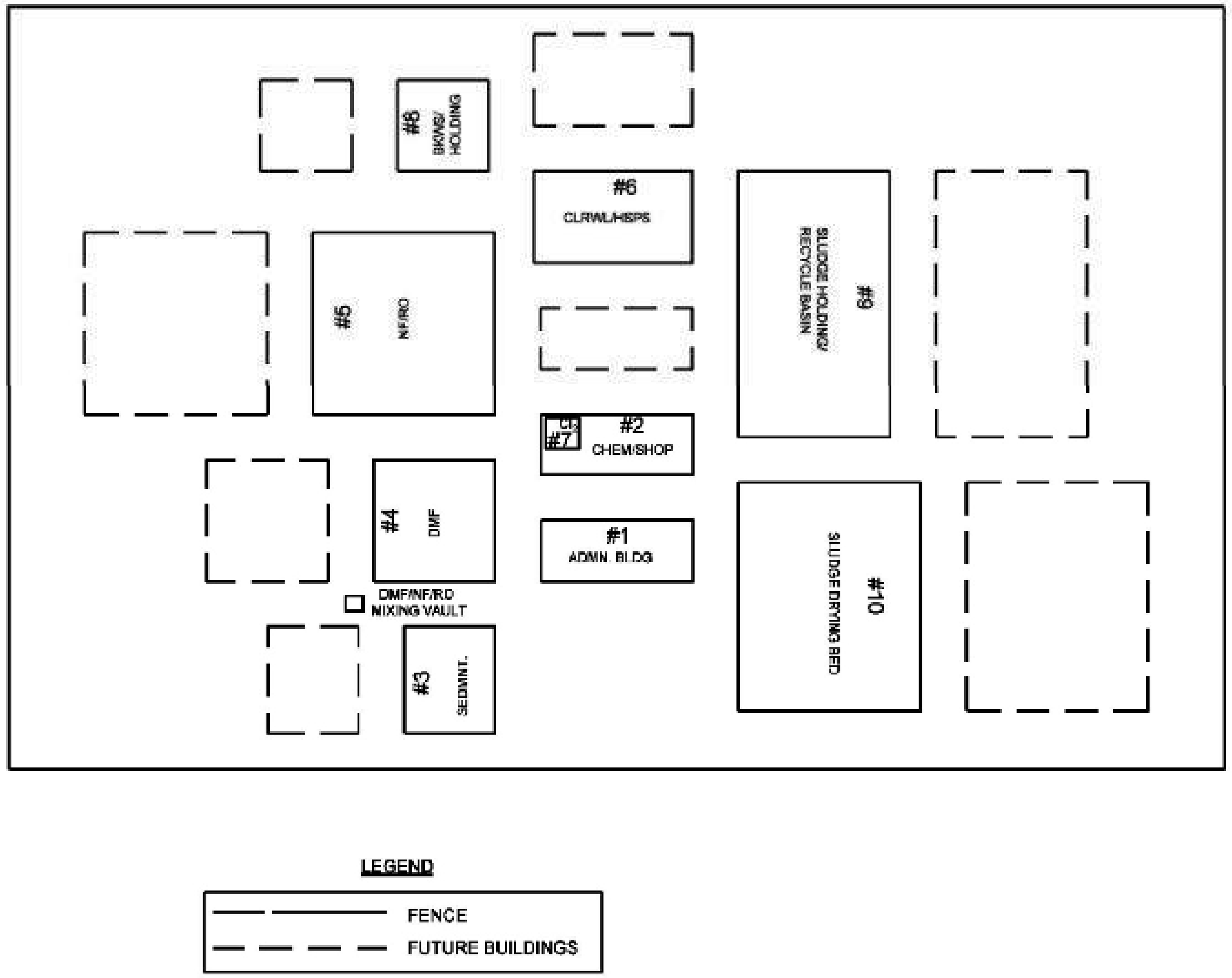
HIDALGO COUNTY
DRAINAGE DISTRICT
NO. 1

10 MGD WATER TREATMENT PLANT LAYOUT #2 - SQUARE
TOTAL AREA = 11.32 ACRES

CSE Civil Systems Engineering, Inc.

FIRM REG. #8240

Figure 7-6. Water Treatment Plant Layout - Square



All Measurements in feet				
Building	***Width***	***Length***	***Height***	***Below Grade?***
1	40	100	15	No
2	40	100	15	No
3	60	70	25	No
4	80	80	25	No
5	120	120	25	No
6	60	104	10	Yes
7	20	20	25	No
8	60	60	10	No
9	100	175	8.5	No
10	120	150	6	No
DMF/NF/RO Mixing Vault	10	12	6	Yes

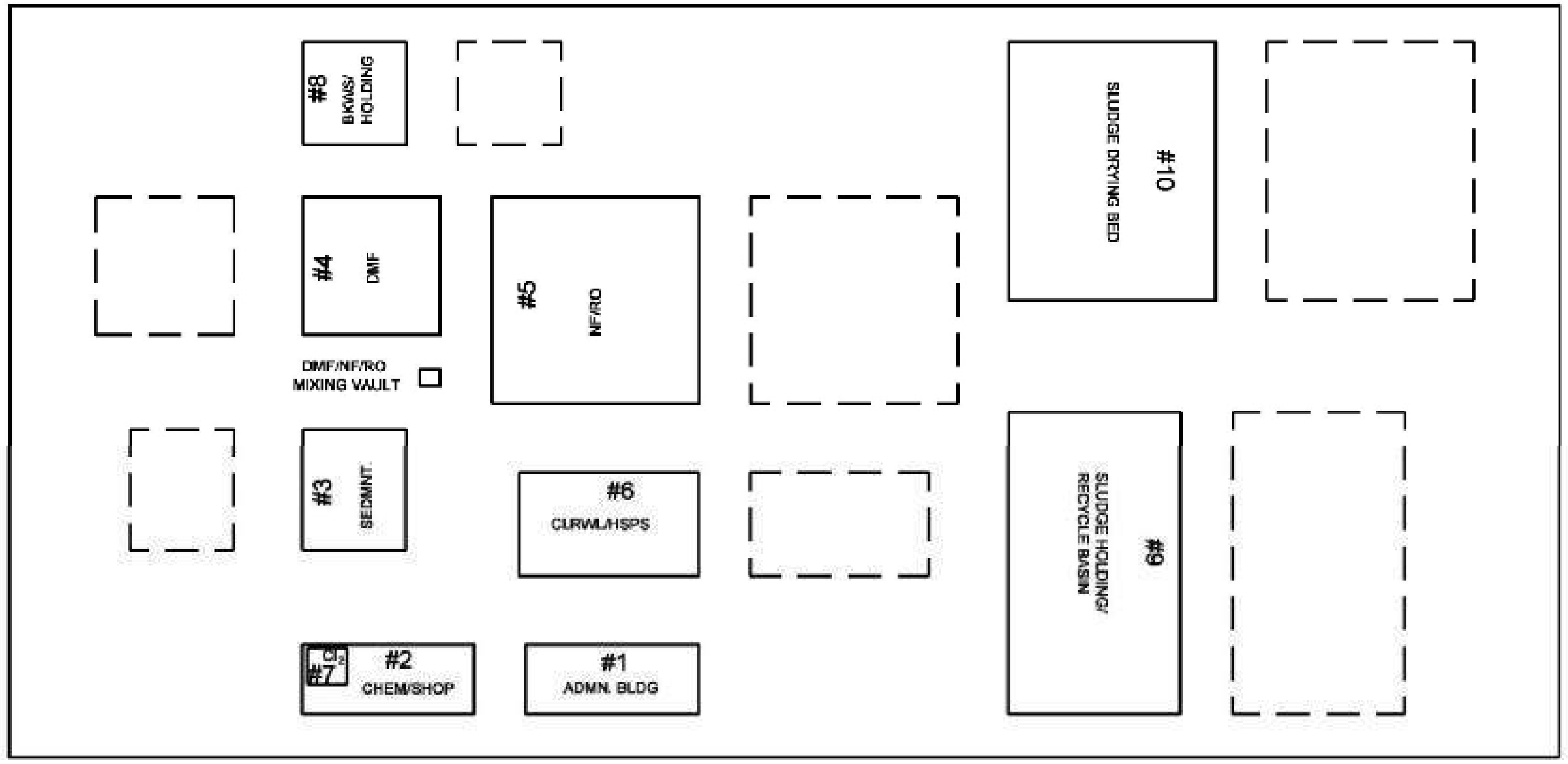
SCALE: N.T.S.

HCDD#1 HIDALGO COUNTY DRAINAGE DISTRICT NO. 1

10 MGD WATER TREATMENT PLANT LAYOUT #3 - RADIAL
TOTAL AREA = 10.28 ACRES

CSE Civil Systems Engineering, Inc.

Figure 7-7. Water Treatment Plant Layout - Radial



LEGEND

————	FENCE
— — — —	FUTURE BUILDINGS

All Measurements in feet				
Building	*Width*	*Length*	*Height*	*Below Grade?*
1	40	100	15	No
2	40	100	15	No
3	60	70	25	No
4	80	80	25	No
5	120	120	25	No
6	60	104	10	Yes
7	20	20	25	No
8	60	60	10	No
9	100	175	8.5	No
10	120	150	6	No
DMF/NF/RO Mixing Vault	10	12	6	Yes

SCALE: N.T.S.

HCDD•1

HIDALGO COUNTY DRAINAGE DISTRICT NO. 1

10 MGD WATER TREATMENT PLANT LAYOUT #4 - RECTANGULAR
TOTAL AREA = 10.12 ACRES

CSE Civil Systems Engineering, Inc.

FIRM REG. #8246

Figure 7-8. Water Treatment Plant Layout - Rectangular

8 Cost Analysis

Methodology

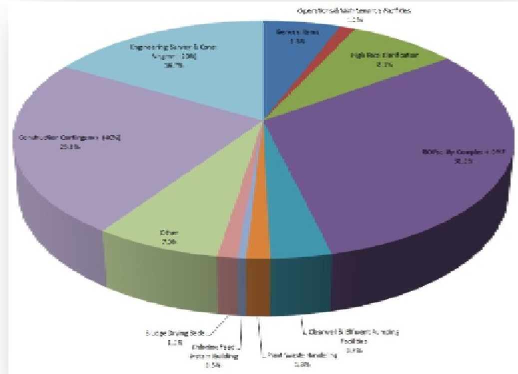
Conceptual cost estimates, capital and annual O&M, were developed for each of the four alternative treatment processes:

A. ACTIFLO + DMF
B. ACTIFLO + NF
C. ACTIFLO +DMF + NF
D. ACTIFLO +DMF + RO

For each alternative, four (4) treatment capacities were considered, including 3MG, 5MG, 10 MGD, and 15 MGD. In addition, two scenarios were evaluated based on the percentage of blending of treated water from DMF and NF or RO respectively for Alternatives C and D.

Under the first scenario, it was assumed that there will be no blending of treated water between DMF and NF or DMF and RO, respectively for Alternatives C and D. Water treated by DMF will be 100 percent treated by NF or RO processes.

Under the second scenario, it was assumed that some of the treated water from DMF will be bypassed the NF or RO system and blended with the treated water from NF or RO to achieve the finished water quality requirements, respectively for Alternative C and D. For Alternative C, it was assumed 30 percent of treated water from DMF will be bypassed and blended with 70 percent of treated water from NF process. For



Alternative D, it was assumed that 50 percent of treated water from DMF will be bypassed and blended with 50 percent of treated water from RO process to meet the finished water quality requirements.

It should be noted that the blending ratio of the treated water is governed by the salinity concentrations of the treated water from DMF and NF or RO processes, as well as the acceptable levels of TDS established for the public water supplies. In general, the acceptable levels of TDS are ranged from 500 to 1,000 mg/L. Pilot testing is recommended to identify the most cost effective alternative for this project.

Capital cost estimates included construction components such as excavation and site work, equipment, concrete and steel, labor, pipe and valves, power supply access and instrumentation, and housing that are expended in the construction activities of the project, and other expenses such as engineering, engineering service during construction, financial and legal services, permitting, commissioning and startup. The capital cost estimates include a 30 percent contingency, which is appropriate for this level of project definition. The capital costs in this estimate do not include costs for land and rights-of-way. Also intake structures, raw water storage basin, and floodwater detention basin, and transfer pump stations were not included.

Annual O&M cost estimates included all labor and materials required to run the treatment plant.

Cost comparison analysis for this study was performed based on annual costs The annualized capital cost and annual O&M cost were summed to obtain the total annualized cost for each alternative and treatment capacity. An interest rate of 6% was assumed for the analysis. Life cycle or present value analysis was not performed for the purpose of this study. Costs are presented in 2010 dollars.

It should be noted that the cost estimates for this study are based on conceptual designs. Detailed cost estimates are required for final engineering design. The final cost estimates for the project will depend on actual labor and material costs, competitive market conditions, actual site conditions, final project scope, implementation schedule, continuity of personal and engineering, and other variable factors. The final project costs will likely vary from the estimate presented.

Itemized Cost Estimates

The itemized cost estimates for each alternative, including capital and annual O&M costs, were developed and are summarized in **Tables 8-1** through **8-12**. As shown in each table, four treatment capacities were considered. **Tables 5** and **6** show itemized capital and O&M costs for Alternative C assuming there is no blending of treated water from DMF and NF. **Tables 7** and **8** show itemized capital and O&M costs for Alternative D assuming there is no blending of treated water from DMF and RO. **Tables 9** and **10** show itemized capital and O&M cost for Alternative C under the assumption of blending of treated water from DMF and NF at a ratio of 30 to 70 percent. **Tables 11** and **12** show itemized capital and O&M costs for Alternative D under the assumption of blending treated water from DMF and RO at a ratio of 50 to 50 percent.

Total capital costs and annual O&M costs are compared in **Tables 13 and 14**, respectively, under no blending scenario for Alternatives C and D. Total capital costs and annual O&M costs are compared in **Tables 15 and 16**, respectively, under blending scenario for Alternatives C and D.

Annual Costs

Total annual costs, including annualized capital cost and annual O&M costs, were developed and are compared in **Table 17** under no blending scenario, and **Table 18** under blending scenario.

The unit cost for each alternative per unit of treated water ($/1000 gallon) was also developed and compared in **Tables 19 and 20** respectively for no blending scenario and blending scenario.

Detailed cost estimates are included in **Appendix D** (attached CD-ROM).

Potential Funding Sources

The federal government has numbers of programs that support the construction and maintenance of drinking water systems. The largest program, the Drinking Water State Revolving Loan Fund (DWSRF) was created by the 1996 amendments of the SDWA. This program provides federal grants from EPA to states. The states, in return, loan money to drinking water systems to install, improve, or maintain treatment facilities.

The Texas Water Development Board (TWDB), the state agency, administers the Drinking Water State Revolving Fund (DWSRF). Through the DWSRF, the TWDB will make low-interest loans for financing public drinking water systems that facilitate compliance with primary and secondary drinking water regulations or otherwise significantly further the health protection objectives of the federal Safe Drinking Water Act (SDWA), as amended in 1996. Loans from the DWSRF finance all costs associated with the planning, design and construction of projects to upgrade or replace water supply infrastructure, to correct exceedances of SDWA health standards, to consolidate water supplies and to purchase capacity in water system.

Funding for drinking water systems is also available through the U.S. Department of Housing and Urban Development's Community Development Block Grants, bonds, and the Rural Utility Service of the U.S. Department of Agriculture that provides funds for rural drinking water and waste water systems.

TWDB currently has various financial assistance programs that could provide funding to implement this project. TWDB's financial assistance programs are funded through state-backed bonds, a combination of state bond proceeds and federal grant funds, or limited appropriated funds. Since 1957, the Legislature and voters approved constitutional amendments authorizing the TWDB to issue up to $2.68 billion in Texas Water Development Bonds. To date, the TWDB has sold nearly $1.55 billion of these bonds to finance the construction of water- and wastewater-related projects.

For any funding to be available from the TWDB, the proposed project will need to be added as a viable water management strategy in the "2011 Adopted Region M Regional Water Plan" or will require support from the Region M Regional Water Planning Group for a consistency waiver.

Table 8-1 Estimate of Probable Capital Costs - Alternative A - ACTIFLO + DMF

No.	Descriptions	3 MGD	5 MGD	10 MGD	15 MGD
1	General Items	$3,140,750	$3,140,750	$3,140,750	$3,140,750
2	Operations & Maintenance Facilities	$625,000	$625,000	$625,000	$625,000
3	High Rate Clarification (Actiflo)	$1,265,879	$1,537,095	$3,001,320	$4,405,055
4	Filter Complex	$1,914,019	$2,272,165	$2,817,430	$3,565,295
5	Clearwell & Effluent Pumping Facilities	$531,965	$693,941	$1,258,882	$1,823,823
6	Plant Waste Handling	$474,505	$512,975	$609,150	$705,325
7	Chlorine Feed System Building	$163,750	$163,750	$213,750	$263,750
8	Sludge Drying Beds	$178,870	$241,970	$434,720	$592,470
9	Other	$20,000	$20,000	$20,000	$20,000
10	Construction Contingency (30%)	$2,494,421	$2,762,294	$3,636,301	$4,542,440
11	Engineering, Survey & Const Mngmnt (20%)	$2,161,832	$2,393,988	$3,151,461	$3,936,782
	Total Capital Cost	**$12,970,991**	**$14,363,928**	**$18,908,763**	**$23,620,690**

Table 8-2 Estimate of Probable O&M Costs - Alternative A - ACTIFLO + DMF

No.	Descriptions	3 MGD	5 MGD	10 MGD	15 MGD
1	Labor	$327,000	$327,000	$422,000	$562,000
2	Operation	$229,500	$280,500	$561,500	$834,000
3	Maintenance	$40,000	$40,000	$60,000	$70,000
4	Professional Services	$45,000	$45,000	$45,000	$45,000
5	Other	$55,000	$55,000	$55,000	$55,000
	Total O&M Cost	**$696,500**	**$747,500**	**$1,143,500**	**$1,566,000**

Table 8-3 Estimate of Probable Capital Costs - Alternative B - ACTIFLO + NF

No.	Descriptions	3 MGD	5 MGD	10 MGD	15 MGD
1	General Items	$3,140,750	$3,140,750	$3,140,750	$3,140,750
2	Operations & Maintenance Facilities	$625,000	$625,000	$625,000	$625,000
3	High Rate Clarification (Actiflo)	$1,265,879	$1,537,095	$3,001,320	$4,405,055
4	NF Filter Complex	$3,897,584	$6,114,640	$11,477,280	$16,249,920
5	Clearwell & Effluent Pumping Facilities	$529,165	$691,941	$1,213,882	$1,825,823
6	Plant Waste Handling	$474,505	$512,975	$560,150	$705,325
7	Chlorine Feed System Building	$163,750	$163,750	$213,750	$263,750
8	Sludge Drying Beds	$178,870	$241,970	$431,720	$592,470
9	Other	$20,000	$20,000	$20,000	$20,000
10	Construction Contingency (30%)	$3,088,651	$3,914,436	$6,205,156	$8,348,428
11	Engineering, Survey & Const Mngmnt (20%)	$2,676,831	$3,392,511	$5,377,802	$7,235,304
	Total Capital Cost	**$16,060,984**	**$20,355,069**	**$32,266,809**	**$43,411,825**

Table 8-4 Estimate of Probable O&M Costs - Alternative B - ACTIFLO + NF

No.	Descriptions	3 MGD	5 MGD	10 MGD	15 MGD
1	Labor	$414,000	$414,000	$422,000	$699,000
2	Operation	$1,596,500	$2,366,500	$4,706,500	$7,051,500
3	Maintenance	$200,000	$200,000	$260,000	$350,000
4	Professional Services	$45,000	$45,000	$45,000	$45,000
5	Other	$55,000	$55,000	$55,000	$55,000
	Total O&M Cost	**$2,310,500**	**$3,080,500**	**$5,488,500**	**$8,200,500**

Table 8-5 Estimate of Probable Capital Costs - Alternative C - ACTIFLO + DMF+NF (No Blending)

No.	Descriptions	3 MGD	5 MGD	10 MGD	15 MGD
1	General Items	$3,140,750	$3,140,750	$3,140,750	$3,140,750
2	Operations & Maintenance Facilities	$625,000	$625,000	$625,000	$625,000
3	High Rate Clarification (Actiflo)	$1,265,879	$1,537,095	$3,001,320	$4,405,055
4	NF Filter Complex + DMF	$3,897,584	$6,114,640	$11,477,280	$16,249,920
5	Clearwell & Effluent Pumping Facilities	$531,965	$693,941	$1,213,882	$1,823,823
6	Plant Waste Handling	$474,505	$512,975	$560,150	$705,325
7	Chlorine Feed System Building	$163,750	$163,750	$213,750	$263,750
8	Sludge Drying Beds	$178,870	$241,970	$431,720	$592,470
9	Other	$1,979,019	$2,367,165	$2,987,430	$3,810,295
10	Construction Contingency (30%)	$3,677,196	$4,619,186	$7,095,385	$9,484,916
11	Engineering, Survey & Const Mngmnt (20%)	$3,186,904	$4,003,294	$6,149,333	$8,220,261
	Total Capital Cost	**$19,121,422**	**$24,019,766**	**$36,896,000**	**$49,321,565**

Table 8-6 Estimate of Probable O&M Costs - Alternative C - ACTIFLO + DMF+NF (No Blending)

No.	Descriptions	3 MGD	5 MGD	10 MGD	15 MGD
1	Labor	$464,000	$464,000	$567,000	$849,000
2	Operation	$1,773,000	$2,594,000	$5,161,500	$7,734,000
3	Maintenance	$240,000	$240,000	$320,000	$420,000
4	Professional Services	$45,000	$45,000	$45,000	$45,000
5	Other	$55,000	$55,000	$55,000	$55,000
	Total O&M Cost	**$2,577,000**	**$3,398,000**	**$6,148,500**	**$9,103,000**

Table 8-7 Estimate of Probable Capital Costs - Alternative D - ACTIFLO + DMF+RO (No Blending)

No.	Descriptions	3 MGD	5 MGD	10 MGD	15 MGD
1	General Items	$3,140,750	$3,140,750	$3,140,750	$3,140,750
2	Operations & Maintenance Facilities	$625,000	$625,000	$625,000	$625,000
3	High Rate Clarification (Actiflo)	$1,265,879	$1,537,095	$3,001,320	$4,405,055
4	RO Filter Complex + DMF	$5,353,840	$6,517,680	$13,127,280	$16,936,880
5	Clearwell & Effluent Pumping Facilities	$531,965	$693,941	$1,213,882	$1,823,823
6	Plant Waste Handling	$474,505	$512,975	$560,150	$705,325
7	Chlorine Feed System Building	$163,750	$163,750	$213,750	$263,750
8	Sludge Drying Beds	$178,870	$241,970	$431,720	$592,470
9	Other	$1,979,019	$2,367,165	$2,987,430	$3,810,295
10	Construction Contingency (30%)	$4,114,073	$4,740,098	$7,590,385	$9,691,004
11	Engineering, Survey & Const Mngmnt (20%)	$3,565,530	$4,108,085	$6,578,333	$8,398,870
	Total Capital Cost	**$21,393,181**	**$24,648,509**	**$39,470,000**	**$50,393,223**

Table 8-8 Estimate of Probable O&M Costs - Alternative D - ACTIFLO + DMF+RO (No Blending)

No.	Descriptions	3 MGD	5 MGD	10 MGD	15 MGD
1	Labor	$704,000	$704,000	$707,000	$981,000
2	Operation	$2,393,000	$3,419,000	$6,811,500	$10,209,000
3	Maintenance	$250,000	$250,000	$400,000	$500,000
4	Professional Services	$45,000	$45,000	$45,000	$45,000
5	Other	$55,000	$55,000	$55,000	$55,000
	Total O&M Cost	**$3,447,000**	**$4,473,000**	**$8,018,500**	**$11,790,000**

Table 8-9 Estimate of Probable Capital Costs - Alternative C - ACTIFLO + DMF+NF (Blending)

No.	Descriptions	3 MGD	5 MGD	10 MGD	15 MGD
1	General Items	$3,140,750	$3,140,750	$3,140,750	$3,140,750
2	Operations & Maintenance Facilities	$625,000	$625,000	$625,000	$625,000
3	High Rate Clarification (Actiflo)	$1,265,879	$1,537,095	$3,001,320	$4,405,055
4	NF Filter Complex + DMF	$2,728,309	$4,280,248	$8,034,096	$11,374,944
5	Clearwell & Effluent Pumping Facilities	$531,965	$693,941	$1,213,882	$1,823,823
6	Plant Waste Handling	$474,505	$512,975	$560,150	$705,325
7	Chlorine Feed System Building	$163,750	$163,750	$213,750	$263,750
8	Sludge Drying Beds	$178,870	$241,970	$431,720	$592,470
9	Other	$1,979,019	$2,367,165	$2,987,430	$3,810,295
10	Construction Contingency (30%)	$3,326,414	$4,068,868	$6,062,429	$8,022,424
11	Engineering, Survey & Const Mngmnt (20%)	$2,882,892	$3,526,352	$5,254,105	$6,952,767
	Total Capital Cost	**$17,297,352**	**$21,158,115**	**$31,524,633**	**$41,716,603**

Table 8-10 Estimate of Probable O&M Costs - Alternative C - ACTIFLO + DMF+NF (Blending)

No.	Descriptions	3 MGD	5 MGD	10 MGD	15 MGD
1	Labor	$464,000	$464,000	$567,000	$849,000
2	Operation	$1,314,000	$1,904,000	$3,781,500	$5,664,000
3	Maintenance	$240,000	$240,000	$320,000	$420,000
4	Professional Services	$45,000	$45,000	$45,000	$45,000
5	Other	$55,000	$55,000	$55,000	$55,000
	Total O&M Cost	**$2,118,000**	**$2,708,000**	**$4,768,500**	**$7,033,000**

Table 8-11 Estimate of Probable Capital Costs - Alternative D - ACTIFLO + DMF+RO (Blending)

No.	Descriptions	3 MGD	5 MGD	10 MGD	15 MGD
1	General Items	$3,140,750	$3,140,750	$3,140,750	$3,140,750
2	Operations & Maintenance Facilities	$625,000	$625,000	$625,000	$625,000
3	High Rate Clarification (Actiflo)	$1,265,879	$1,537,095	$3,001,320	$4,405,055
4	RO Filter Complex + DMF	$3,603,840	$4,267,680	$7,627,280	$9,686,880
5	Clearwell & Effluent Pumping Facilities	$531,965	$693,941	$1,213,882	$1,823,823
6	Plant Waste Handling	$474,505	$512,975	$560,150	$705,325
7	Chlorine Feed System Building	$163,750	$163,750	$213,750	$263,750
8	Sludge Drying Beds	$178,870	$241,970	$431,720	$592,470
9	Other	$1,979,019	$2,367,165	$2,987,430	$3,810,295
10	Construction Contingency (30%)	$3,589,073	$4,065,098	$5,940,385	$7,516,004
11	Engineering, Survey & Const Mngmnt (20%)	$3,110,530	$3,523,085	$5,148,333	$6,513,870
	Total Capital Cost	**$18,663,181**	**$21,138,509**	**$30,890,000**	**$39,083,223**

Table 8-12 Estimate of Probable O&M Costs - Alternative D - ACTIFLO + DMF+RO (Blending)

No.	Descriptions	3 MGD	5 MGD	10 MGD	15 MGD
1	Labor	$704,000	$704,000	$707,000	$981,000
2	Operation	$1,211,000	$1,974,000	$3,921,500	$5,874,000
3	Maintenance	$250,000	$250,000	$400,000	$500,000
4	Professional Services	$45,000	$45,000	$45,000	$45,000
5	Other	$55,000	$55,000	$55,000	$55,000
	Total O&M Cost	**$2,265,000**	**$3,028,000**	**$5,128,500**	**$7,455,000**

Table 8-13. Summary of Estimate of Probable Capital Costs (No Blending)

CAPACITY	Alternative A	Alternative B	Alternative C	Alternative D
	ACTIFLO + DMF	ACTIFLO + NF	ACTIFLO + DMF + NF	ACTIFLO + DMF + RO
3 MGD	$12,970,991	$16,060,984	$19,121,421.70	$21,393,181.06
5 MGD	$14,363,928	$20,355,069	$24,019,766.16	$24,648,508.56
10 MGD	$18,908,763	$32,266,809	$36,895,999.92	$39,469,999.92
15 MGD	$23,620,690	$43,411,825	$49,321,565.28	$50,393,222.88

Table 8-14: Summary of Estimate of Probable Annual O&M Costs (No Blending)

CAPACITY	Alternative A	Alternative B	Alternative C	Alternative D
	ACTIFLO + DMF	ACTIFLO + NF	ACTIFLO + DMF + NF	ACTIFLO + DMF + RO
3 MGD	$696,500	$2,310,500	$2,577,000	$3,447,000
5 MGD	$747,500	$3,080,500	$3,398,000	$4,473,000
10 MGD	$1,143,500	$5,488,500	$6,148,500	$8,018,500
15 MGD	$1,566,000	$8,200,500	$9,103,000	$11,790,000

Table 8-15. Summary of Estimate of Probable Capital Costs (Blending)

CAPACITY	Alternative A	Alternative B	Alternative C	Alternative D
	ACTIFLO + DMF	ACTIFLO + NF	ACTIFLO + DMF + NF	ACTIFLO + DMF + RO
3 MGD	$12,970,991	$16,060,984	$17,297,352.38	$18,663,181.06
5 MGD	$14,363,928	$20,355,069	$21,158,114.64	$21,138,508.56
10 MGD	$18,908,763	$32,266,809	$31,524,632.88	$30,889,999.92
15 MGD	$23,620,690	$43,411,825	$41,716,602.72	$39,083,222.88

Table 8-16: Summary of Estimate of Probable Annual O&M Costs (Blending)

CAPACITY	Alternative A	Alternative B	Alternative C	Alternative D
	ACTIFLO + DMF	ACTIFLO + NF	ACTIFLO + DMF + NF	ACTIFLO + DMF + RO
3 MGD	$696,500	$2,310,500	$2,118,000	$2,265,000
5 MGD	$747,500	$3,080,500	$2,708,000	$3,028,000
10 MGD	$1,143,500	$5,488,500	$4,768,500	$5,128,500
15 MGD	$1,566,000	$8,200,500	$7,033,000	$7,455,000

Table 8-17. Annualized Estimate of Probable Total Costs ($) (No Blending)

CAPACITY	Alternative A ACTIFLO + DMF	Alternative B ACTIFLO + NF	Alternative C ACTIFLO + DMF + NF	Alternative D ACTIFLO + DMF + RO
3 MGD	$1,638,828	$3,477,313	$3,966,150	$5,001,191
5 MGD	$1,791,024	$4,559,274	$5,143,010	$6,263,687
10 MGD	$2,517,201	$7,832,649	$8,828,954	$10,885,953
15 MGD	$3,282,017	$11,354,322	$12,686,158	$15,451,013

Table 8-18. Annualized Estimate of Probable Total Costs ($) (Blending)

CAPACITY	Alternative A ACTIFLO + DMF	Alternative B ACTIFLO + NF	Alternative C ACTIFLO + DMF + NF	Alternative D ACTIFLO + DMF + RO
3 MGD	$2,043,828	$3,477,313	$3,374,634	$3,620,860
5 MGD	$2,196,024	$4,559,274	$4,245,114	$4,563,690
10 MGD	$2,517,201	$7,832,649	$7,058,730	$7,372,625
15 MGD	$3,282,017	$11,354,322	$10,063,666	$10,294,354

Table 8-19. Annualized Estimate of Probable Total Costs ($/1000 gallon) (No Blending)

CAPACITY	Alternative A ACTIFLO + DMF	Alternative B ACTIFLO + NF	Alternative C ACTIFLO + DMF + NF	Alternative D ACTIFLO + DMF + RO
3 MGD	$1.50	$3.18	$3.62	$4.57
5 MGD	$0.98	$2.50	$2.82	$3.43
10 MGD	$0.69	$2.15	$2.42	$2.98
15 MGD	$0.60	$2.07	$2.32	$2.82

Table 8-20. Annualized Estimate of Probable Total Costs ($/1000 gallon) (Blending)

CAPACITY	Alternative A ACTIFLO + DMF	Alternative B ACTIFLO + NF	Alternative C ACTIFLO + DMF + NF	Alternative D ACTIFLO + DMF + RO
3 MGD	$1.50	$3.18	$3.08	$3.31
5 MGD	$0.98	$2.50	$2.33	$2.50
10 MGD	$0.69	$2.15	$1.93	$2.02
15 MGD	$0.60	$2.07	$1.84	$1.88

9 Summary Conclusions and Recommendations

Summary

The purpose of this Regional Water Supply Facilities Plan was to identify and evaluate potential project sites, drinking water treatment processes, and facilities required to develop drainage water within the Hidalgo County Drainage District No.1 drainage systems as a potential alternative water source to supply treated water to areas within the Hidalgo County in the near future through 2060.

Facilities related to raw water diversion, storage, and conveyance were proposed. The proposed facilities include a weir structure located just downstream of the diversion intake structure on the drainage ditch to ensure a steady water level for diversion during normal base flow conditions, a diversion intake structure with screen to divert raw water from the drainage ditch to a wet well (concrete vault) via a pipeline by gravity, a pump station (Pump Station I) to lift the raw water from the wet well to a raw water storage basin which ensures reliable water supply to the treatment plant, a second pump station to provide feed water to the water treatment plant, a floodwater detention basin to store floodwater during wet season and supplement normal base flow drainage water during dry season, a side weir structure to divert floodwater to the floodwater detention basin via a open channel by gravity, and a pipeline between the floodwater detention basin and the raw water storage basin and a pipe between the floodwater detention basin and wet well to convey floodwater to the raw water storage basin by gravity.

Water quality samples were collected for the raw water from the drainage ditches and water quality parameters were determine by laboratory test analysis. Three potential project sites were identified and evaluated to divert and treat raw drainage water. Each site was evaluated with consideration of availability of dependable water, floodplain, topography, accessibility, land use and land cover, and environmental concerns. EPA and TCEQ current drinking water standards and rules were extensively reviewed and target finished water quality targets were developed.

Based on the raw water quality parameters and treated water quality requirements, four alternative water treatment processes were evaluated, including conventional and membrane treatment process units.

Conceptual designs with design data were developed for each of the four alternative treatment processes. Also, three alternative building arrangement layouts were developed. Based on the conceptual designs, conceptual capital costs and annual O&M costs were developed for each alternative treatment process and four treatment capacities were considered. Cost comparison analysis was performed based on annual costs. Annualized capital cost and annual O&M cost were summed to obtain the total annual cost for each alternative and treatment capacity. Life cycle present value analysis was not performed for the purpose of this study.

Conclusions

The following conclusions were obtained:

1. The untreated water has a high TDS of approximately 2000 mg/. It is considered very hard with a hardness of approximately 600 mg/L as $CaCO_3$ and brackish based on the high TDS and chloride in the water.
2. SITE III on the Main Floodwater Channel is the most promising site for water diversion and treatment site, which has the most reliable water supply source and has the potential for future expansion.
3. The preferred treatment process alternatives are the integrated membrane systems: (1) ACTIFLO followed DMF and NF, and (2) ACTIFLO followed DMF and RO with consideration of both performance and costs.
4. The proposed development strategy and treatment processes are technically and economically feasible to develop the drainage ditch water to meet some of the future water needs in the Hidalgo County.

Recommendations

1. Conduct a pilot study to determine the optimal blending ratio for Alternative C that ACTIFLO is followed by DMF and NF and alternative D that ACTIFLO is followed by DMF and RO.
2. Should be included in the TWDB's 2010 Region M Water Plan for the Rio Grande area as a viable water development strategy.

Texas Water Development Board
P.O. Box 13231, 1700 N. Congress Ave.
Austin, TX 78711-3231, www.twdb.state.tx.us
Phone (512) 463-7847, Fax (512) 475-2053
1-800-RELAYTX (for hearing impaired)

February 14, 2011

Mr. Godfrey Garza, Jr.
District Manager
Hidalgo County Drainage District #1
902 N. Doolittle
Edinburg, Texas 78541

RE: Regional Facility Planning Grant Contract between the Texas Water Development Board (TWDB) and Hidalgo County Drainage District #1 (HCDD#1), TWDB Contract No. 0804830848, Draft Report Comments

Dear Mr. Garza:

Staff members of the TWDB have completed a review of the draft report prepared under the above-referenced contract. ATTACHMENT I provides the comments resulting from this review. As stated in the TWDB contract, HCDD#1 will consider incorporating draft report comments from the EXECUTIVE ADMINISTRATOR as well as other reviewers into the final report. In addition, the HCDD#1 will include a copy of the EXECUTIVE ADMINISTRATOR'S draft report comments in the Final Report.

The TWDB looks forward to receiving one (1) electronic copy of the entire Final Report in Portable Document Format (PDF) and six (6) bound double-sided copies. The HCDD#1 shall also submit one (1) electronic copy of any computer programs or models, and, if applicable, an operations manual developed under the terms of this Contract.

If you have any questions concerning the contract, please contact Connie Townsend, the TWDB's designated Contract Manager for this project at (512) 463-8290.

Sincerely,

Dan Hardin
for Carolyn L. Brittin
Deputy Executive Administrator
Water Resources Planning and Information

Enclosures

c: Connie Townsend, TWDB

Attachment I
Hidalgo County Drainage District #1
Regional Water Supply Facilities Plan
TWDB Contract #0804830848 - Draft Report Review Comments

Level 1 Comments

1. Please provide documentation in the final report for contract Scope of Work Task 2 (Public Involvement).
2. In several instances, this draft report refers to data in the draft Region M water plan. Many of these numbers were incorrect in the draft plan or otherwise significantly revised in the final plan. Please revise the final report on the following pages so that references are to numbers contained in the final Adopted Region M plan, which can be located online at http://www.twdb.state.tx.us/wrpi/rwp/3rdRound/2011_RWP/RegionM/:
    a) Page 1-1, Column 1, paragraph 2; and Page 3-9, Table 3-1: The projected Hidalgo County municipal water surplus/needs volumes. Please see plan Section 4.2.1.2, page 4-9, Table 4.5: Hidalgo County projected gross sum of municipal WUG deficits is 3,276 ac-ft/yr in 2010; projected to increase to a deficit of 139,939 ac-ft/yr by 2060.
    b) Page 1-2, Column 1, paragraph 1: The City of Elsa projects no shortages in the Region M plan; please see plan Section 4.2.1.2., page 4-9, Table 4.5.
    c) Page 1-2, Column 1, paragraph 3: The year 2060 projected population stated for Hidalgo County does not appear to match this draft report's page 3-3, paragraph 1, as well as the Region M plan. Please see plan 2nd Errata Sheet, page 7 of 42, Replacement Table 2.2.
    d) Page 1-2, Column 1, paragraph 3: The stated 50-year increase in municipal water needs. Please see plan Section 4.2.1.2, page 4-9, Table 4.5: the 136,654 ac-ft/yr increase between 2010 and 2060 corresponds to a 41.7-fold increase.
    e) Page 1-2, Column 2, paragraph 2: The water management strategy status of the HCDD#1 project. Please see plan Section 4.9.1, page 4-104, which states the planning group <u>considered, but did not evaluate</u> the HCDD#1 project due to the preliminary status of the project and the lack of pertinent information.
    f) Page 3-3, Column 1, paragraph 2: Hidalgo County summary net water demands for municipal, manufacturing, steam-electric, mining, and livestock. Please see plan Section 2.3: 131,124 ac-ft/yr in 2010 and 313,577 ac-ft/yr in 2060 for a 139% increase.
    g) Page 3-3, Column 1, paragraph 2: Hidalgo County net water demands for irrigation. Please see plan Section 2.3: 560,291 ac-ft/yr in 2010 and 436,074 ac-ft/yr in 2060 for a 22% decrease.
    h) Page 3-3, Column 1, paragraph 2: Hidalgo County net municipal water demands. Please see plan Section 2.3: 115,410 ac-ft/yr in 2010 and 278,964 ac-ft/yr in 2060 for a 142% increase.
    i) Page 3-3, Column 1, paragraph 3: Surplus/Deficit volumes for McAllen, Mission, and total for Hidalgo County. Please see plan Section 4.2.1.2, page 4-9, Table 4.5: needs are 29,457 ac-ft/yr, 19,674 ac-ft/yr, and 139,930 ac-ft/yr, respectively.
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    k) Page 3-4, Column 2, paragraph 3: total water deficit for Hidalgo County. Please see plan Section 4.2.1.2, page 4-9, Table 4.5: 2030 needs = 38,126 ac-ft/yr.

3. Page 1-1, Column 1, paragraph 2: Please clarify in the final report how conversion of irrigation water rights to municipal water rights decreases water availability to the county.
4. Page 1-1, Column 2, paragraph 2; and Page 1-2, Column 2, paragraph 2: Water sources listed for water collected in the district's drainage canals appears to be missing discussion on contributions from Rio Grande agricultural irrigation runoff (tailwater) as well as potential overflow directly into the drainage canals from the Rio Grande during flood conditions. Please clarify in the final report where appropriate.
5. Page 1-4, Figure 1-1: It appears that delineation is missing between district-owned drainage canals and the floodway canals owned by the IBWC and others. In the final report, please identify these other drainage networks separately and add to the figure legend.
6. Page 2-1, column 1, paragraph 2; and page 2-1, column 2, paragraphs 2 and 3: It appears there is a conflict in these 2 paragraphs regarding the types of water that are considered waters of the state, specifically storm water. In the final report, please clarify this information and reconcile if appropriate. Also, please provide the missing specific references for the various State water regulations paraphrased in this chapter.
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8. Page 2-2, paragraph 2; Figure 2-1; and page 3-4, paragraph 2: Please provide the actual square mileage of the North Main Drain Watershed and the percentage of this area that would likely be able to contribute rainfall runoff for stormwater flows.
9. Task 3 (Water Rights and Permit Applications) of this study had not been performed at the time the draft report was submitted to the TWDB. Please revise all of Chapter 2 in the final report with the information required to document in detail the process of the thorough legal investigation and the coordination with the TCEQ on water rights for the project area as well as the permit process that appears will eventually be required by the TCEQ in order for the HCDD#1 to be granted authorization to utilize the waters in the specified district canals.
10. Page 3-8, Figure 3-4: The CCN service area boundaries for each water utility appear to be missing in Figure 3-4 and its legend (as referenced in text on page 3-4, column 2 of the draft report). Please include in the final report.
11. Chapter 4, Site II Analysis: The proposed Floodwater Detention Basin is in the 100-year flood plain and the development will take out a substantial amount of floodplain. In the final report, please include discussion of measures that may be taken to mitigate this impact.
12. Chapter 5: In the final report, please clarify whether or not the Floodwater Detention Basin will include a screen at the discharge to the Wet Well and Raw Water Storage Basin.
13. Chapter 6: In the final report, please document the analysis process for the treatment facility flocculation/sedimentation option.
14. Chapter 6: In the final report, please document the mineral and contaminant analysis process performed on the six treatment alternatives.
15. Chapter 6: In the final report, please document the calculations used for the water quality analysis of the six treatment alternatives.
16. Chapter 7: In the final report, please document the conceptual process trains proposed for the blending option for alternatives A, B, C, and D that are discussed in Chapter 8.
17. Chapter 8: In the final report, please document the blending requirements of the reverse osmosis treatment system for public water supplies.

Level 2 Comments

1. Please ensure that the final report is printed double-sided per Section II., Article3, Item 4 of the contract.
2. Please add a listing for the Executive Summary to the Table of Contents in the final report.
3. Page 1-1, Column 2 refers to "Figure 1". Please correct this to Figure 1-1 (page 1-4).
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Memorandum

To: Connie Townsend, P.E.

From: Deren Li, PhD, P.E., D.WRE, CFM

Date: April 4, 2011

Re: Responses to TWDB Review Comments on Draft Report of Regional Water Supply Facilities Plan (Feb 14, 2011)
TWDB Contract No. 0804830848

The following responses are provided for the TWDB review comments for the Regional Water Supply Facilities Plan Draft Report, dated July 2010. The comments were provided by a letter from the Texas Water Development Board to Hidalgo County Drainage District No. 1 on February 14, 2011. For ease of review we have provided verbatim the comments in italics followed by our responses in normal font.

All editorial and substantive technical comments are addressed here and incorporated in the final report.

Level 1 Comments

1. *Comment: Please provide documentation in the final report for contract Scope of Work Task 2 (Public Involvement)*

Response: Public Involvement aspects of this project has been documented in the Section - Public Involvement of Chapter 1

2. *Comment: In several instances, this draft report refers to data in the draft Region M water plan. Many of these numbers were incorrect in the draft plan or otherwise significantly revised in the final plan. Please revise the final report on the following pages so that references are to numbers contained in the final Adopted Region M plan, which can be* located online at http://www.twdb.state.tx.us/wrpi/rwp/3rdRound/2011_RWP/RegionM/

a) *Page 1-1, Column 1, paragraph 2; and Page 3-9, Table 3-1: The projected Hidalgo County municipal water surplus/needs volumes. Please see plan Section 4.2.1.2, page 4-9, Table 4.5: Hidalgo County projected gross sum of municipal WUG deficits is 3,276 ac-ft/yr in 2010; projected to increase to a deficit of 139,939 ac-ft/yr by 2060.*

Response: The report text on Page 1-1 and the Table 3-1 have been updated to reflect the values in the 2011 Region M Regional Water Plan.

b) *Page 1-2, Column 1, paragraph 1: The City of Elsa projects no shortages in the Region M plan; please see plan Section 4.2.1.2, page 4-9, Table 4.5.*

Response: The City of Elsa has been removed from the text in reference to projected water shortages.

c) *Page 1-2, Column 1, paragraph 3: The year 2060 projected population stated for Hidalgo County does not appear to match this draft report's page 3-3, paragraph 1, as well as the Region M plan. Please see plan 2nd Errata Sheet, page 7 of 42, Replacement Table 2.2.*

Response: The report text has been updated to match the 2011 Region M Regional Water Plan population projections.

d) *Page 1-2, Column 1, paragraph 3: The stated 50-year increase in municipal water needs. Please see plan Section 4.2.1.2, page 4-9, Table 4.5: the 136,654 ac-ft/yr increase between 2010 and 2060 corresponds to a 41.7-fold increase.*

Response: The report text has been updated to reflect the 2011 Region M Regional Water Plan projections.

e) *Page 1-2, Column 2, paragraph 2: The water management strategy status of the HCDD #1 project. Please see plan Section 4.9.1, page 4-104, which states the planning group <u>considered, but did not evaluate</u> the HCDD #1 project due to the preliminary status of the project and lack of pertinent information.*

Response: The report text has been amended to reflect the correct language used in the 2011 Region M Regional Water Plan.

f) *Page 3-3, Column 1, paragraph 2: Hidalgo County summary net water demands for municipal, manufacturing, steam-electric, mining, and livestock. Please see plan Section 2.3: 131,124 ac-ft/yr in 2010 and 313,577 ac-ft/yr in 2060 for a 139% increase.*

Response: The report text has been updated to reflect the 2011 Region M Regional Water Plan projections.

g) *Page 3-3, Column 1, paragraph 2: Hidalgo County net water demands for irrigation. Please see plan Section 2.3: 560,291 ac-ft/yr in 2010 and 436,074 ac-ft/yr in 2060 for a 22% decrease.*

Response: The report text has been updated to reflect 2011 Region M Regional Water Plan projections.

h) *Page 3-3, Column 1, paragraph 2: Hidalgo County net municipal water demands. Please see plan Section 2.3: 115,410 ac-ft/yr in 2010 and 278,964 ac-ft/yr in 2060 for a 142% increase.*

Response: The report text has been updated to match the 2011 Region M Regional Water Plan projections.

i) *Page 3-3, Column 1, paragraph 3: Surplus/Deficit volumes for McAllen, Mission, and total for Hidalgo County. Please see plan Section 4.2.1.2, page 4-9, Table 4.5: needs are 29,457 ac-ft/yr, 19,674 ac-ft/yr, and 139,930 ac-ft/yr, respectively.*

Response: The report text has been updated to match the 2011 Region M Regional Water Plan projections.

j) *Page 3-3, Column 2, last paragraph; Pages 8-2 and 8-3: The proposed project is not a recommended or alternative water management strategy. Please see plan Section 4.9.1, page 4-104. Please provide a notation in these two sections of the final report to state that for any funding to be available from the TWDB, the proposed project will need to be added as a viable water management strategy in the "2011 Adopted Region M Regional Water Plan" or will require support from the Region M Water Planning Group for a consistency waiver.*

Response: The report text has been updated to include the specified notations under the Section - Potential Funding Sources on Page 8-3.

k) *Page 3-4, Column 2, paragraph 3: total deficit for Hidalgo County. Please see plan Section 4.2.1.2, page 4-9, Table 4.5: 2030 needs = 38,126 ac-ft/yr.*

Response: The report text has been updated to match the 2011 Region M Regional Water Plan projections.

3. *Page 1-1, Column 1, paragraph 2: Please clarify in the final report how conversion of irrigation water rights to municipal water rights decreases water availability to the county.*

Response: The conversion of irrigation water rights to domestic, municipal and industrial rights also reduces total water availability to the county. The conversion could reduce return flows that could potentially be used by downstream water users. As mentioned in Section 5.2 of the 2011 Region M Regional Water Plan, it takes a minimum 2 acre-feet of irrigation water rights to convert to 1 acre-feet of municipal water rights in the region. The report has been updated to provide clarification. The report text has been updated to clarify the water conversion issue.

4. *Page 1-1, Column 2, paragraph 2; and Page 1-2, Column 2, paragraph 2: Water sources listed for water collected in the district's drainage canals appears to be missing discussion on contributions from Rio-Grande agricultural irrigation runoff (tailwater) as well as potential overflow directly into the drainage canals from the Rio-Grande during flood conditions. Please clarify in the final report where appropriate.*

Response: The report text reflects that stormwater runoff and shallow groundwater are the main water sources within the drainage system. The proposed project location within the North Main Drain watershed does not receive flood water from the Rio Grande River during normal flood events.

5. *Page 1-4, Figure 1-1: It appears that delineation is missing between district-owned drainage canals and the floodway canals owned by the IBWC and others. In the final report, please identify these other drainage networks separately and add to the figure legend.*

Response: The report Figure 1-1 has been updated accordingly to distinguish between HCDD No. 1 and non-HCDD No.1 streams.

6. *Page 2-1, Column 1, paragraph 2; and Page 2-1, Column 2, paragraphs 2 and 3: It appears there is a conflict in these 2 paragraphs regarding the types of water that are considered waters of the state, specifically stormwater. In the final report, please clarify this information and reconcile if appropriate. Also please provide the missing references for the various State water regulations paraphrased in this chapter.*

Response: The report text has been modified to clarify the difference between state water and non-state water with regards to concentrated flow and stormwater runoff (sheet flow). Reference to the appropriate section of The Texas Water Code regarding water rights was made in the report.

7. *Page 2-1, last paragraph; and Page 2-2, first paragraph: Please provide the specific reference from the "2011 Adopted Region M Regional Water Plan"*

Response: The report text has been updated to include the specific reference.

8. *Page 2-2, paragraph 2; Figure 2-1; and Page 3-4, paragraph 2: Please provide the actual square mileage of the North Main Drain Watershed and the percentage of this area that would likely be able to contribute rainfall runoff for stormwater flows.*

Response: The report text (see Section - Project Water Rights) has been updated to provide information on contributing watershed areas. The narrative now indicates that the North Main Drain Watershed is 444 square miles and the percentage of area contributing stormwater runoff ranges from 59 percent to 91 percent depending on the location of the project site.

9. *Task 3 (Water Rights and Permit Applications) of this study had not been performed at the time the draft report was submitted to the TWDB. Please revise all of Chapter 2 in the final report with the information required to document in detail the process of the thorough legal investigation and the coordination with the TCEQ on water rights for the project area as well as the permit process that appears will eventually be required by the TCEQ in order for the HCDD #1 to be granted authorization to utilize the waters in the specified district canals.*

Response: The report text in Chapter 2 has been revised accordingly.

10. *Page 3-8, Figure 3-4: The CCN service area boundaries for each water utility appear to be missing in Figure 3-4 and its legend (as referenced in text on page 3-4, column 2 of the draft report). Please include in final report.*

Response: Figure 3-4 of the report has been updated to reflect the missing CCN service areas.

11. *Chapter 4, Site II Analysis: The proposed Floodwater Detention Basin is in the 100-year floodplain and the development will take out a substantial amount of floodplain. In the final report, please include discussion of measures that may be taken to mitigate this impact.*

Response: The proposed floodwater detention basin will provide net benefit to floodplain storage with implementation of the project at Site II. Additional narrative has been provided in the text to address potential impacts being mitigated within the proposed floodwater detention basin volume.

12. *Chapter 5: In the final report, please clarify whether or not the Floodwater Detention Basin will include a screen at the discharge to the Wet Well and Raw Water Storage Basin.*

Response: Screening facilities are required at the Floodwater Detention Basin discharging to the Wet Well and Raw Water Storage Basin.

13. *Chapter 6: In the final report, please document the analysis process for the treatment facility flocculation/sedimentation option.*

Response: Analysis process for the flocculation/sedimentation processes are discussed in Section - Water Treatment Technologies.

The water supply source for this project is from the storm water drainage ditch. Even though the turbidity is measured between 11 and 60 NTU (Table 6-1), the nature of suspended solids during flood events, is expected much higher than 60 NTU. Particles in the raw water supply also include colloids, dissolved solids, bacteria, and other organisms. The chemical characteristics of the raw water supply required more efficient formations of larger particles in the coagulation and flocculation process.

The primary parameter used for conventional sedimentation basin design is the acceptable hydraulic overflow rate. The typical range of hydraulic over flow rates for sedimentation of solids produced through alum coagulation/flocculation are 800 to 1200 gallon per day (gpd) per square foot (ft^2).

The principal types of high-rate clarification processes considered are:

- Tube settlers
- Plate settlers
- Sludge blanket clarifier
- Ballasted flocculation (ACTIFLO)

High-rate Clarifier Unit	Definitions	Hydraulic Overflow Rate, gpd/ft^2
Tube settlers	The first tube settlers were introduced in the 1960s by Microfloc, which take advantage of the theory that surface overflow loading	2,880, or 4 times of conventional sedimentation basin
Plate settlers	Platte settlers date back to an English patent in 1886 (Purac) and were developed in the 1950s in drinking water	2,880 to 8,640, or 4 to 12 times of conventional sedimentation basin
Sludge blanket clarifier (Superpulsator)	The original Pulsator Clarifier was developed in the early 1950s, and designed to provide uniform upward flow	2,880 to 7,200, or 4 to 10 times of conventional basin
Ballasted flocculation (ACTIFLO)	Patented package unit developed by Kruger, and designed to combine the plate settlers and ballasted flocculation	21,600 to 28,800, or 30 to 40 times of conventional basin

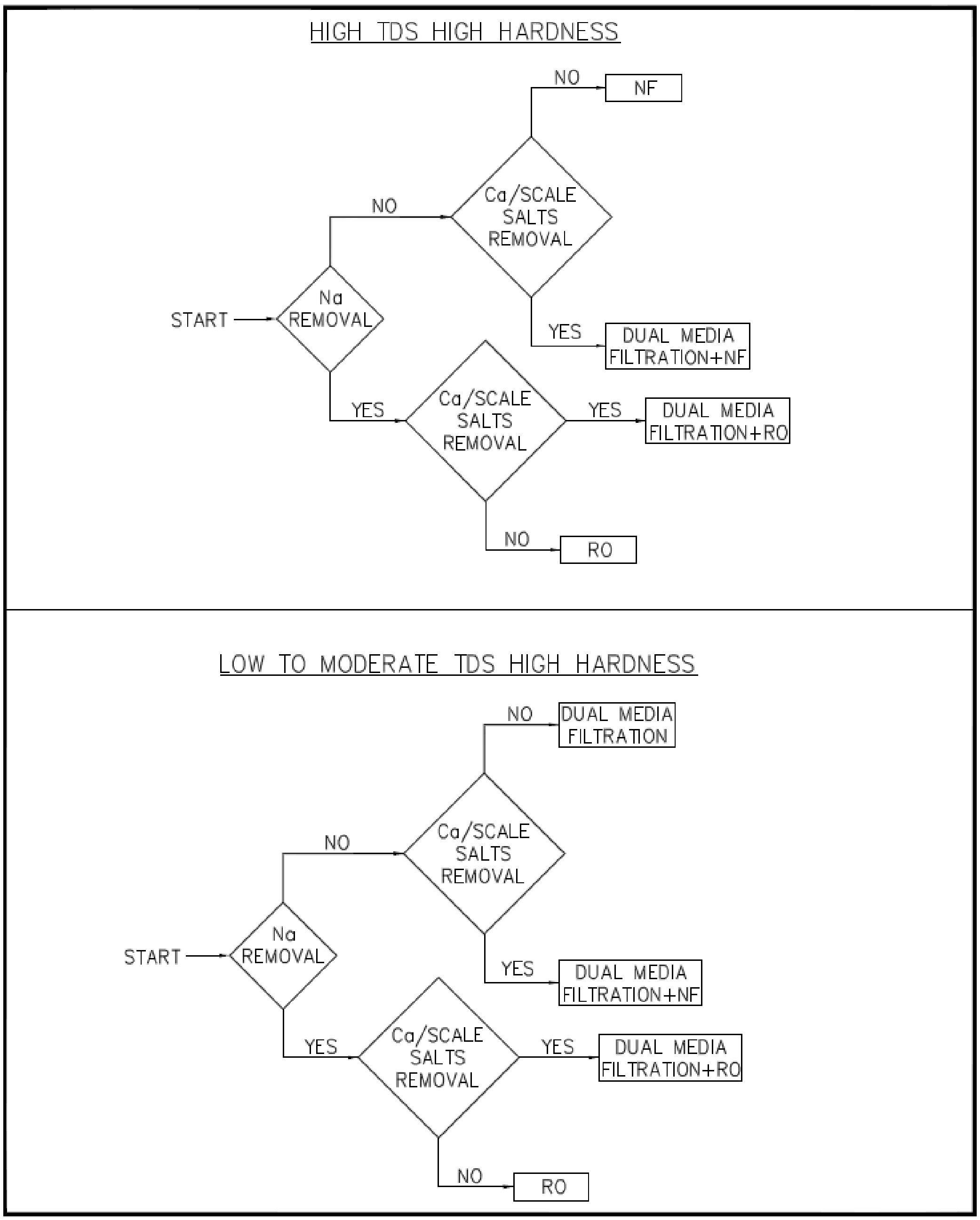
ACTIFLO has more than 30 times of the conventional sedimentation basins' hydraulic overflow rate. Using ACTIFLO will significantly reduce construction costs for the project.

14. *Chapter 6: In the final report, please document the mineral and contaminant analysis process performed on the six treatment alternatives*

Response: See response to Comment 15.

15. *Chapter 6: In the final report, please document the calculations used for the water quality analysis of the six treatment alternatives.*

Response: The removal of contaminants can be cost-effectively achieved by DMF process. ACTIFLO can effectively remove suspended solids. Membrane process (RO or NF) is very effective in removing dissolved solids. It seems that a combination of the above treatment processes is necessary to achieve the treated water targets. A flow diagram was developed in the treatment process selection for this project. The report text in Chapter 6 has been updated accordingly.



16. *Chapter 7: In the final report, please document the conceptual process trains proposed for the blending option for alternatives A, B, C, and D that are discussed in Chapter 8.*

Response: Discussion of blending for alternatives C and D is provided in Chapter 7. To minimize the initial capital expenditures and annual O & M costs, the blending of DMF discharge with NF treated water for Alternative C and blending of DMF discharge with RO treated water for Alternative D are recommended. The treated water blending ratio for alternatives C and D are generally governed by the amounts of salinity water concentrations at DMF discharge and either NF or RO treated water and the acceptable levels of TDS established for public water supplies. In general, the acceptable levels of TDS are ranged from 500 to 1,000 mg/L. Pilot testing is recommended to identify the cost-effective alternative. The report text in Chapter 7 has been updated accordingly.

17. *Chapter 8: In the final report, please document the blending requirements of the reverse osmosis treatment system for public water supplies.*

Response: Potential blending requirements of the RO treatment system is discussed in Chapter 8. To minimize the initial capital expenditures and annual O & M costs, the blending of DMF discharge with NF treated water for Alternative C and blending of DMF discharge with RO treated water for Alternative D are recommended. The treated water blending ratio for alternatives C and D are generally governed by the amounts of salinity water concentrations at DMF discharge and either NF or RO treated water and the acceptable levels of TDS established for public water supplies. In general, the acceptable levels of TDS are ranged from 500 to 1,000 mg/L. Pilot testing is recommended to identify the most cost-effective alternative. The report text in Chapter 8 has been updated accordingly.

Level 2 Comments

1. *Please ensure that the final report is printed double-sided per Section II., Article 3, Item 4 of the contract.*

Response: The final report has been printed accordingly.

2. *Please add a listing for the Executive Summary to the Table of Contents in the final report.*

Response: The report has been updated accordingly.

3. *Page 1-1, Column 2 refers to "Figure 1". Please correct this to Figure 1-1 (page 1-4).*

Response: The report has been updated accordingly.

4. *Throughout the final report, please revise references from the "TWDB" Regional Water Plans to the appropriate version of the "Rio Grande" or "Region M" Regional Water Plan. Regional water plans are developed by each of the 16 Regional Water Planning Groups, not TWDB. Examples include pages 2-1, 2-2, and 3-2.*

Response: Comment noted. The report has been updated accordingly.

5. *Page 2-1, Column 2, paragraph 2: The status of municipal water rights are in continual process of change as irrigation water rights are purchased and converted to municipal water rights over time. In the final report please revise the sentence "The total municipal water rights in the county <u>are currently</u>..."; to "The total municipal water rights in the county <u>at that time were</u>…".*

Response: Comment noted. The report has been updated accordingly.

APPENDIX A

BASELINE ENVIRONMENTAL STUDY REPORT

AMBIOTEC GROUP

AMBIOTEC ENVIRONMENTAL CONSULTANTS, INC.

1101 E. Harrison Avenue
Harlingen, TX 78550
(956) 423-7807
(956) 423-7905 Fax

Baseline Environmental Review

Proposed Water Treatment Facility

Hidalgo County, Texas

Prepared For:

Civil Systems Engineering, Inc.
9894 Bissonnet St., Suite 404
Houston, Texas 77036

May 2010

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TABLES

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APPENDICES

Environmental Baseline Review

I. Introduction

The Hidalgo County Drainage District No.1 (HCDD No.1) is conducting a Regional Water Supply Planning Investigation (RWSPI) in Hidalgo County. The purpose of the RWSPI is to identify, plan, evaluate, and optimize alternative water supply facilities to store, treat, and deliver captured rainfall runoff and shallow groundwater within the existing HCDD No.1 drainage/flood control systems for beneficial uses throughout the County. This environmental review provides a baseline assessment of environmental conditions for three alternative locations in Hidalgo County for the site selection of a proposed water treatment plant and reservoir facility.

The reservoirs described will be used for flood control purposes allowing only base flow releases and any extreme event overflows during flood events. However, detained water will be stored to feed a proposed 7-day supply 116 MG (356 ac-ft) storage tank at a proposed water treatment facility during drought conditions.

II. Description of the Locations

Three alternative site locations for the construction of a water treatment and storage facility have been identified. A map showing the three alternative locations is presented in **Figure 1**.

Location 1

The proposed project activities for Location 1 consist of constructing a 200-ft channel diversion from the North Main Drain to a 660 acre-feet reservoir during flood flows. The use of a channel diversion to the storage basin ensures flood control benefits to the North Main Drain downstream of this location. A 10 MGD water treatment facility at this location has the potential to address projected water shortages in the Cities of Edinburg and Pharr.

The proposed site for Location 1 is located adjacent to the north of Fm 1925 (Monte Christo Road) and Alamo Road is adjacent along the eastern boundary. The Evins Regional Juvenile Detention Center is adjacent to the west. North Main Drain is located approximately 200 feet to the north. The entire site currently consists of an active agricultural field. **Figure 2** presents a site map for Location 1. Photos of the site for Location 1 are presented in **Appendix A**.

Location 2

The proposed project activities for Location 2 consist of constructing a 770 acre-feet inline reservoir and a 797.5 acre-feet offline reservoir occupying approximately 285 acres for multiple uses including flood control and water supply storage areas. A 15 MGD facility at this location has the potential to address projected water shortages in the Cities of Donna, Edinburg, Elsa, La Villa, and San Juan.

The site for the proposed reservoir is located adjacent to the west of FM 493, is intersected by Mile 19, and is adjacent to the east of Mile 6 Road. The site for the water treatment facility is located adjacent to the east of FM 493 and adjacent to the south of Mile 19 within the same vicinity of the storage basin. This location is approximately 30,500 feet downstream of Location 1. The entire location consists of active agricultural fields. **Figure 3** presents a site map for Location 2. Photos of the site for Location 2 are presented in **Appendix A.**

Location 3

The proposed project activities for Location 3 consist of constructing a 625 acre-feet offline reservoir occupying approximately 124 acres for multiple uses including flood control and water supply storage areas. A 10 MGD facility at this location has the potential to address projected water shortages in the Cities of Donna, Elsa, La Villa, San Juan, and Weslaco.

The proposed site for Location 3 is located in the general vicinity of Mile 4, Mile 19 and Mile 3. One possible site location for the reservoir is located on the northeast corner of Mile 4 and north of Mile 19. The second location for the reservoir is located west of Mile 3, south of the North Main Drain and adjacent to the north of the Tres Palacios dirt, sand and gravel company which is located on the northwest corner of Mile 19 and Mile 3. The Anahuac Community Cemetery is located on the southwest corner of Mile 19 and Mile 3. The water treatment facility would be located south of the reservoir and adjacent to the north of FM 1925. The entire location consists of active and dormant agricultural fields. **Figure 4** presents a site map for Location 3. Photos of the site for Location 3 are presented in **Appendix A.**

III. Environmental Issues

A. Land Use and Socioeconomic Issues

The proposed locations consist of active and non-active agricultural fields. Non-active agricultural fields consisted of overgrown weeds with no trees. According to the Natural Resource Conservation Service (NRCS), 46.6% of the land within Hidalgo County is characterized as cropland and 28.0% as rangeland. Only 9% is considered urban land (NRCS, 1992). No visible structural improvements, aside from agricultural components (irrigation ditches, wells, equipment), were observed at any of the locations. Visual obstructions and access impediments during on-site field investigations included the presence of tall agricultural crops and/or overgrown fields and lack of access roads.

The project would not disrupt orderly, planned development or be inconsistent with plans or goals adopted by the community. The proposed water development plan is consistent with the regional and state water policy and plans and is consistent with the National Economic Development (NED) objective of Water Resources Council's Principles and Standards adopted by Presidential Order in 1973 and revised in 1979, by maximizing the outputs of the County's existing drainage/flood control systems. The use of the existing drainage facilities for multiple purposes will increase benefits without a proportional increase in costs and thus enhance the economic justification for the project. Hidalgo County is a political entity located in the most economically distressed areas of the State of Texas and the United States.

The proposed project lies entirely within Hidalgo County. The region has seen an increasing population in recent decades, which has expanded around twice as rapidly as the state's population in recent decades. Between 1980 and 1990 the county's population grew from 283,323 persons to 385,545 persons, an increase of 36% (USBOC 1981; 1991). This rate of growth has remained constant as the population increased by 37% to 527,726 persons between 1990 and 1999.

Population forecasts provided by the Texas Water Development Board indicate that Hidalgo County is expected to reach a population of just over one million by 2030. The projected average annual growth rates for Hidalgo County are at least 1% higher per year than the projected average annual growth rate for the state (TWDB, 1996). No changes in the life style of the neighborhood or other groups are anticipated as a direct result of this project.

No displacements of any residential or commercial facilities would be required and no impacts to public parks or recreational facilities will be impacted as the proposed improvements are located within undeveloped agricultural fields.

The actual construction process should affect some temporary economic activity by enhancing short-term employment and incomes. The employment of minority and low-income residents in the area should not be impacted.

B. Coastal Zone Management Act

Section 306 of the Federal Coastal Zone Management Act of 1972 allows coastal states to submit for approval state coastal management plans. Texas has an approved Coastal Management Plan (CMP), which was developed and adopted and is currently being implemented by the Texas Coastal Coordination Council (CCC).

Under the CMP, agency actions that are within the coastal boundaries and subject to the CMP must comply with the CMP's applicable goals policies. Issuance of certain state permits to store or dispose of oil and gas waste and issuance of state water quality certifications of certain federal permits are RRC actions that are subject to the CMP.

Hidalgo County is not located within the Texas Coastal Management Program (CMP) boundary; therefore, the proposed project would not require coordination under TCMP rules. A CMP boundary map for the Rio Grande Valley is presented in **Figure 5**.

C. Farmland Protection Policy Act

The purpose of the Farmland Protection Policy Act (FPPA) is to minimize the extent to which federal programs contribute to the necessary and irreversible conversion of farmland to nonagricultural uses. Prime farmland soils are defined as soils that are best suited to producing food, forage, fiber, and oilseed crops. The proposed improvements may convert prime or unique farmland to non-agricultural use. Coordination with the USDA Natural Resource Conservation Service (NRCS) may be necessary depending on the site selected for the proposed project improvements. In accordance with the FPPA, the land being acquired would need to be scored using Form AD-1006. A score of one hundred and sixty (160) points or more would require further coordination with the NRCS.

Soils

Soil erosion and sedimentation are not a problem within the generally flat project areas and the proposed improvements are not expected to precipitate adverse problems in regard to these elements. The NRCS soil survey for Hidalgo County identified one general soil association for the project areas. Hidalgo Association: These soils are deep, moderately permeable soils that typically have a dark grayish brown sandy clayloam surface layer. A soil report for each location is provided in **Appendix B**.

D. Floodplains

Hidalgo County is mapped and in the regular phase of the National Flood Insurance Program (NFIP). Location 3 is the only proposed project area not located within a floodway area. The proposed project would not increase the base flood elevation to a level that would violate applicable ordinances or regulations. The intent of the proposed project is to store, treat, and deliver captured rainfall runoff and shallow groundwater within the existing HCDD No.1 drainage/flood control systems for beneficial uses throughout the County. A FEMA Flood Insurance Rate Map for each location is provided in **Figures 6, 7** and **8**.

E. Air and Water Quality Issues

This project is located in Hidalgo County which is in an area in attainment of all National Ambient Air Quality Standards (NAAQS). The proposed improvements will have no effect on air quality. A minor potential for temporary air quality impacts may occur due to exhaust fumes from construction equipment, but are limited only to the duration and times of construction activity and equipment being used.

The Clean Water Act makes it unlawful to discharge storm water from construction sites to Waters of the U. S., unless authorized by the Environmental Protection Agency's National Pollutant Discharge Elimination System (NPDES) General Permit for Industrial Activity. The proposed project drainage ditches are not under the jurisdiction of the U.S. Army Corps of

Engineers (USACE). Wetland Maps for the three locations are presented in **Figures 9, 10** and **11.**

F. Wild and Scenic Rivers Act

The National Wild and Scenic Rivers System was created by Congress in 1968 (Public Law 90-542; 16 U.S.C. 1271 et seq.) to preserve certain rivers with outstanding natural, cultural, and recreational values. The project will not impact any wild and scenic rivers and/or natural streambeds.

G. Natural Resources Issues

The proposed project locations consist of active and non-active agricultural fields. There are no sensitive ecosystems or wetlands as defined by USACE within the proposed project areas. No designated scenic views, natural scenic areas or parks occur within the proposed project areas. Although a Lower Rio Grande Valley National Wildlife Refuge is located approximately *** miles northeast of Location 1, this area will not be impacted by the projects proposed improvements.

H. Endangered Species

Some populations of fauna and flora have been, or are, in the process of decline due to either natural forces or their inability to coexist with humans. The Endangered Species Act of 1973, as amended, authorized the U.S. Department of Interior and USFWS, to identify populations of flora and fauna that are in decline and endangered or threatened with extinction. The Act requires that any federal action likely to adversely affect a species classified as federally protected be subject to review by the USFWS. Other species may receive additional protection under separate state laws.

A visual survey did not reveal any endangered or threatened species or their habitat within the preferred site. The Federal and State protected species listed for Hidalgo County is shown in **Table 1**. The list consists of species that are Federally Listed Endangered, Threatened, or De-listed (LE, LT, DL), or State Endangered and Threatened (E, T). According to TPWD, some of the species listed are migrants or wintering residents only, or may be historic or considered extirpated; therefore, they do not share the same probability of occurrence.

Table 1 provides a brief review of the ecological requirements and known distributions of the federally threatened and endangered species of potential occurrence in Hidalgo County, along with their regulatory status, a brief description of their habitat requirements and a brief summary of results of investigation relative to the proposed project. The current information available for each species is discussed relative to the proposed project.

Table 1: Federal and State Threatened and Endangered Species List for Hidalgo County

Species	Federal Status	State Status	Description of Suitable Habitat	Potential Habitat Present	Species Impact	Pertinent Project Information
BIRDS						
Peregrine Falcon *Falco peregrinus*	DL	ET	subspecies (tundrius) potential migrant through most of state, winters along coast; subspecies (anatum) resident, nests in west Texas	No	No	The project areas do not support the suitable habitat for the falcons to exist; therefore, no impacts are anticipated.
Arctic Peregrine Falcon *Falco peregrinus tundrius*	DL	T	Potential migrant. Nests in tundra regions; winter inhabitant of coastlines and mountains from Florida to S. America. Open areas, near water.	No	No	The project areas do not support the suitable habitat for the falcons to exist; therefore, no impacts are anticipated.
Cactus Ferruginous Pygmy Owl *Glaucidium brasilianum cactorum*		T	riparian trees, brush, palm, and mesquite thickets; during day also roosts in small caves and recesses on slopes of low hills; breeding April to June	No	No	The project areas do not support the suitable habitat; therefore, no impacts to the pygmy-owl are anticipated.
Common Black Hawk *Buteogallus anthracinus*		T	cottonwood-lined rivers and streams; willow tree groves on the lower Rio Grande floodplain; formerly bred in south Texas	No	No	The project areas do not support the suitable habitat for this species to exist; therefore, no impacts to the hawk are anticipated.
White-tailed Hawk *Buteo albicaudatus*		T	near coast on prairies, cordgrass flats, and scrub-live oak; further inland on prairies, mesquite and oak savannas, and mixed savanna-chaparral; breeding March-May	No	No	The project areas do not support the suitable habitat for this species to exist; therefore, no impacts to the hawks are anticipated.
Zone-tailed Hawk *Buteo albonotatus*		T	arid open country, including open deciduous or pine-oak woodland, mesa or mountain county, often near watercourses, and wooded canyons and tree-lined rivers along middle-slopes of desert mountains; nests in various habitats and sites, ranging from small trees in lower desert, giant cottonwoods in riparian areas, to mature conifers in high mountain regions	No	No	The project areas do not support the suitable habitat for this species to exist; therefore, no impacts to the hawk are anticipated.
Gray Hawk *Asturina nitida*	—	T	Locally and irregularly along U.S.-Mexico border; mature riparian woodlands and nearby semiarid mesquite and scrub grasslands; breeding range formerly extended north to southernmost Rio Grande floodplain of Texas.	No	No	The project areas do not support the suitable habitat for this species to exist; therefore, no impacts to the hawk are anticipated.
Northern Beardless-Tyrannulet *Camptostoma imberbe*		T	mesquite woodlands; near Rio Grande frequents cottonwood, willow, elm, and lead tree; breeding April to July	No	No	The project areas do not support the suitable habitat for this species to exist; therefore, no impacts are anticipated.
Rose-throated Becard *Pachyramphus aglaiae*		T	riparian trees, woodlands, open forest, scrub, and mangroves; breeding April to July	No	No	The project areas do not support the suitable habitat for this species to exist; therefore, no impacts are anticipated.
Tropical Parula *Parula pitiayumi*		T	dense or open woods, undergrowth, brush, and trees along edges of rivers and resacas; breeding April to July	No	No	The project areas do not support the suitable habitat for this species to exist; therefore, no impacts are anticipated.

Species	Federal Status	State Status	Description of Suitable Habitat	Potential Habitat Present	Species Impact	Pertinent Project Information
Texas Botteri's Sparrow *Aimophila botterii texana*		T	grassland and short-grass plains with scattered bushes or shrubs, sagebrush, mesquite, or yucca; nests on ground of low clump of grasses	No	No	The project areas do not support the suitable habitat for this species to exist; therefore, no impacts are anticipated.
Interior Least Tern *Sterna antillarum athalassos*	LE	E	subspecies is listed only when inland (more than 50 miles from a coastline); nests along sand and gravel bars within braided streams, rivers; also know to nest on man-made structures (inland beaches, wastewater treatment plants, gravel mines, etc); eats small fish and crustaceans, when breeding forages within a few hundred feet of colony	No	No	The project area are within an upland setting with drainage ditches draining the area. No habitat for the interior least tern was identified in the project area; therefore, no impacts are anticipated.
White-Faced Ibis *Plegadis chihi*		T	prefers freshwater marshes, sloughs, and irrigated rice fields, but will attend brackish and saltwater habitats; nests in marshes, in low trees, on the ground in bulrushes or reeds, or on floating mats	No	No	The project areas do not support the suitable habitat for this species to exist; therefore, no impacts are anticipated. not support suitable habitat for this species; therefore, no impacts to the ibis are anticipated.
Reddish Egret *Egretta rufescens*		T	resident of the Texas Gulf Coast; brackish marshes and shallow salt ponds and tidal flats; nests on ground or in trees or bushes, on dry coastal islands in brushy thickets of yucca and prickly pear	No	No	The project areas do not support the suitable habitat for this species to exist; therefore, no impacts are anticipated. not support suitable habitat for this species; therefore, no impacts to the egret are anticipated.
Wood Stork *Mycteria americana*		T	forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds (i.e. active heronries); breeds in Mexico and birds move into Gulf States in search of mud flats and other wetlands, even those associated with forested areas; formerly nested in Texas, but no breeding records since 1960	No	No	The project areas do not support suitable habitat for this species; therefore, no impacts to the stork are anticipated.
MAMMALS						
Jaguar *Panthera onca*	LE	E	extirpated; dense chaparral; no reliable Texas sightings since 1952	No	No	The area surrounding the project consists of agricultural fields. The area is cleared of cat habitat and travel corridors; therefore, no impacts to the endangered feline is anticipated.

Species	Federal Status	State Status	Description of Suitable Habitat	Potential Habitat Present	Species Impact	Pertinent Project Information
Ocelot *Leopardus pardalis*	LE	E	dense chaparral thickets; mesquite-thorn scrub and live oak mottes; avoids open areas; breeds and raises young June-November; no reliable Texas sightings since 1984	No	No	The area surrounding the project consists of agricultural fields. The area is cleared of cat habitat and travel corridors; therefore, no impacts to the endangered feline is anticipated.
Jaguarundi *Herpailurus yaguarondi*	LE	E	thick brushlands, near water favored; six month gestation, young born twice per year in March and August	No	No	The area surrounding the project consists of agricultural field. The area is cleared of cat habitat and travel corridors; therefore, no impacts to the endangered feline is anticipated.
White-nosed Coati *Nasua narica*		T	woodlands, riparian corridors and canyons; most individuals in Texas probably transients from Mexico; diurnal and crepuscular; very sociable; forages on ground and in trees; omnivorous; may be susceptible to hunting, trapping, and pet trade	No	No	The project areas do not support the suitable habitat for this species to exist; therefore, no impacts to the coati are anticipated.
Coues' Rice Rat *Oryzomys couesi*		T	cattail-bulrush marsh with shallower zone of aquatic grasses near the shoreline; shade trees around the shoreline are important features; prefers salt and freshwater, as well as grassy areas near water; breeds April-Augu	No	No	The project area does not support the suitable habitat for this species to exist; therefore, no impacts to the coati are anticipated.
Southern Yellow Bat *Lasiurus ega*		T	Associated with trees, such as palm trees (Sabal mexicana), which provide them with daytime roosts; insectivorous; breeding in late winter	No	No	The project area does not support the suitable habitat for this species to exist; therefore, no impacts to the coati are anticipated.
FISH						
Rio Grande Silvery Minnow *Hybognathus amarus*	LE	E	extirpated; historically Rio Grande and Pecos River systems and canals; pools and backwaters of medium to large streams with low or moderate gradient in mud, sand, or gravel bottom; ingests mud and bottom ooze for algae and other organic matter; probably spawns on silt substrates of quiet coves	Yes	No	Because water features exist along this project, there is a potential for the species to exist and the potential that the species may be affected by the project; however, the drain ditches are routinely disturbed by maintenance activities to clear sediment and debris from them; therefore, no impacts to the Rio Grande Silvery Minnow are anticipated.
River Goby *Awaous banana*		T	Southern coastal waters; clear water with slow to moderate current, sandy or hard bottom, and little or no vegetation; also enters brackish and ocean waters	No	No	The project areas do not support the suitable habitat for this species to exist; therefore, no impacts to the coati are anticipated.
REPTILES						

Species	Federal Status	State Status	Description of Suitable Habitat	Potential Habitat Present	Species Impact	Pertinent Project Information
Black-striped Snake *Coniophanes imperialis*	—	T	extreme South Texas; semi-arid coastal plain, warm, moist micro-habitats and sandy soils; proficient burrower; eggs laid April- June	No	No	The project areas do not provide suitable habitat for this species to exist; therefore, no impacts to the snake are anticipated.
Northern Cat-eyed Snake *Leptodeira septentrionalis septentrionalis*	—	T	Gulf Coastal Plain south of the Nueces River; thorn brush woodland; dense thickets bordering ponds and streams; semi-arboreal; nocturnal	No	No	The project areas do not consist of the habitat for this species to exist; therefore, no impacts to the snake are anticipated.
Speckled Racer Snake *Drymobius margaritiferus*	—	T	extreme south Texas; dense thickets near water, Texas palm groves, riparian woodlands; often in areas with much vegetation litter on ground; breeds April-August	No	No	The project areas do not consist of the habitat for this species to exist; therefore, no impacts to the snake are anticipated.
Indigo Snake *Drymarchon corais*	—	T	Texas south of the Guadalupe River and Balcones Escarpment; thornbush-chaparral woodlands of south Texas, in particular dense riparian corridors; can do well in suburban and irrigated croplands if not molested or indirectly poisoned; requires moist microhabitats, such as rodent burrows, for shelter	No	No	The project areas do not consist of the habitat for this species to exist; therefore, no impacts to the snake are anticipated.
Reticulate Collared Lizard *Crotaphytus reticulatus*	—	T	requires open brush-grasslands; thorn-scrub vegetation, usually on well-drained rolling terrain of shallow gravel, caliche, or sandy soils; often on scattered flat rocks below escarpments or isolated rock outcrops among scattered clumps of prickly pear and mesquite	No	No	The project areas do not provide suitable habitat for this species to exist; therefore, no impacts to the lizard are anticipated.
Texas Horned Lizard *Phrynosoma cornutum*	—	T	Open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees; sandy to rocky soil.	No	No	The project areas do not provide suitable habitat for this species to exist; therefore, no impacts to the lizard are anticipated.
Texas Tortoise *Gopherus berlandieri*	—	T	open brush with a grass understory is preferred; open grass and bare ground are avoided; when inactive occupies shallow depressions at base of bush or cactus, sometimes in underground burrows or under objects; longevity greater than 50 years; active March-November; breeds April-November	No	No	The project areas do not provide suitable habitat for this species to exist; therefore, no impacts to the lizard are anticipated.
			AMPHIBIANS			
South Texas Siren (large form) *Siren sp.1*		T	wet or sometimes wet areas, such as arroyos, canals, ditches, or even shallow depressions; aestivates in the ground during dry periods, but does require some moisture to remain; southern Texas south of Balcones Escarpment; breeds February-June	Yes	No	The siren could inhabit the drain ditches. Because of these factors, the species may be affected by the proposed project; however, the drain ditches are routinely disturbed by maintenance activities to clear sediment and debris from them; thus preventing the formation of potential siren habitat substrate. Because of these factors, no impacts to the siren are anticipated.

Species	Federal Status	State Status	Description of Suitable Habitat	Potential Habitat Present	Species Impact	Pertinent Project Information
Black-spotted Newt *Notophthalmus meridionalis*		T	can be found in wet or sometimes wet areas, such as arroyos, canals, ditches, or even shallow depressions; aestivates in the ground during dry periods; Gulf Coastal Plain south of the San Antonio River	Yes	No	The siren could inhabit the drain ditches. Because of these factors, the species may be affected by the proposed project; however, the drain ditches are routinely disturbed by maintenance activities to clear sediment and debris from them; thus preventing the formation of potential siren habitat substrate. Because of these factors, no impacts to the siren are anticipated.
Mexican Treefrog *Smilisca baudinii*		T	subtropical region of extreme southern Texas; breeds May-October coinciding with rainfall, eggs laid in temporary rain pools	No	No	The project areas do not provide suitable habitat for this species to exist; therefore, no impacts to the treefrog are anticipated.
Sheep Frog *Hypopachus variolosus*		T	predominantly grassland and savanna; moist sites in arid areas	No	No	The project areas do not provide suitable habitat for this species to exist not provide suitable habitat for this species to exist; therefore, no impacts to the sheep frog are anticipated.
White-lipped Frog *Leptodactylus labialis*		T	grasslands, cultivated fields, roadside ditches, and a wide variety of other habitats; often hides under rocks or in burrows under clumps of grass; species requirements incompatible with widespread habitat alteration and pesticide use in south Texas	No	No	Habitat for the frog does not exist within the project areas; therefore, no impacts to the frog are anticipated.
			PLANTS			
Walker's Manioc *Manihot walkerae*	LE	E	periphery of native brush in sandy loam; also on caliche cuestas; flowering April-September (following rains)	No	No	The project areas do not support the suitable habitat for the plant to exist; therefore, no impacts to the Walker's manioc are anticipated.
Star Cactus *Astrophytum asterias*	LE	E	gravelly saline clays or loams over the Catahoula and Frio formations, on gentle slopes and flats in grasslands or shrublands; flowering in May	No	No	The project areas do not contain the preferred habitat for the star cactus to exist; therefore, no impacts to the star cactus are anticipated.
Texas Ayenia *Ayenia limitaris*	LE	E	woodlands on alluvial deposits on floodplains and terraces along the Rio Grande; flowering throughout the year with sufficient rainfall	No	No	The project areas do not contain the preferred habitat for the species to exist; therefore, no impacts to the Ayenia are anticipated.

LE, LT - Federally Listed Endangered/Threatened
PT, C - Federally Proposed Threatened, or Candidate Species
DL, PDL - Federally Delisted/Proposed Delisted
E, T - State Endangered/Threatened

" — " - Rare or Species of Concern, but no regulatory listing status
*Data Sources: U.S. Fish and Wildlife Service, Texas Parks and Wildlife Department and site visit/survey of project area. Updated 07-06-06.

In summary, numerous state-listed threatened and endangered species are of potential occurrence in Hidalgo County. Information on the ecological requirements of some of these species is limited. In addition, many of the state listed species are tropical animals that reach their northern limits in the Lower Rio Grande Valley.

I. Archaeological and Historical Resources

The National Register of Historic Places is the official list of the Nation's historic places worthy of preservation. Authorized by the National Historic Preservation Act of 1966, the National Park Service's National Register of Historic Places is part of a national program to coordinate and support public and private efforts to identify, evaluate, and protect America's historic and archeological resources. The National Register Information System (NRIS) is a computerized database that contains information on every property in the Register.

The process of listing a property in the National Register is coordinated between the applicant, the Texas Historical Commission (THC) and the National Park Service (NPS). Information and documentation required by NPS is very specific, and the obligation for preparing a fully documented nomination rests with the applicant. Eligible properties must be at least 50 years old, maintain their historic integrity and meet at least one of the following four criteria at the local, state, or national levels of significance:

A. The property is associated with significant historical trends or events.
B. The property is associated with the lives of significant persons.
C. The property represents distinctive design or construction.
D. The property has potential to reveal important archeological data.

A review of the National Register of Historic Places (NRHP), the list of State Archeological Landmarks (SAL), and the list of Recorded Texas Historic Landmarks (RTHL) indicated several historical sites on record that are located throughout Hidalgo County, Texas. Three-hundred and forty (340) registered historical properties throughout Hidalgo County were identified. The Anahuac Community Cemetery is located on the southwest corner of Mile 19 and Mile 3 within the vicinity of Location 3; however, no registered historical properties were identified within the proposed project areas. A survey for archeological resources should be performed prior to the construction of the proposed improvements. **Table 2** presents registered Historic Places for Hidalgo County, Texas. Appendix C presents the entire listing of Historic Places for Hidalgo County.

Table 2: National Registered Historic Places in Hidalgo County

County, State	Ref Number	Resource Name	Address	City	Year
Hidalgo, TX	2000402	Cine El Rey	311 S. 17th St.	McAllen	1947
Hidalgo, TX	2000907	Shary, John, Building	900 Doherty	Mission	1939
Hidalgo, TX	2000908	Teatro La Paz	514,516,518 Doherty	Mission	1915
Hidalgo, TX	2000909	Roosevelt School Auditorium and Classroom Addition	407 E. 3rd St.	Mission	1929
Hidalgo, TX	2000910	Mission Canal Company Second Lift Pumphouse	6th St. and Canal	Mission	1910
Hidalgo, TX	2000911	Mission Citrus Growers Union Packing Shed	824 W. Business TX 83	Mission	1944

County, State	Ref Number	Resource Name	Address	City	Year
Hidalgo, TX	98001184	Lomita Boulevard Commercial Historic District	400 to 700 Blocks S. Conway Blvd.	Mission	1925
Hidalgo, TX	79002977	El Sal Del Rey Archeological District	Address Restricted	Linn	1930
Hidalgo, TX	80004136	Old Hidalgo Courthouse and Buildings	Flora and 1st Sts.	Hidalgo	1890
Hidalgo, TX	83004513	Rancho Toluca	FM 1015	Progreso	1903
Hidalgo, TX	95001284	Louisiana--Rio Grande Canal Company Irrigation System	S. 2nd St. at River Levee	Hidalgo	1916
Hidalgo, TX	97000780	Miller, Sam and Marjorie, House	707 N. 15th St.	McAllen	1937
Hidalgo, TX	98001124	Border Theater	905 North Conway Blvd.	Mission	1942
Hidalgo, TX	3000276	Casa de Palmas	101 N. Main St.	McAllen	1918
Hidalgo, TX	4001397	Cortez Hotel	260 S. Texas Ave.	Weslaco	1928
Hidalgo, TX	5001459	Oblate Park Historic District	Roughly bounded by Doherty, Keralum, W. 16th St. and W 10th St.	Mission	1907
Hidalgo, TX	7000337	McAllen Ranch	FM 1017, 13 mi. W of TX 281	Linn	1790
Hidalgo, TX	75002165	La Lomita Historic District	5 mi. S of Mission on FM 1016	Mission	1912
Hidalgo, TX	79002976	Old Hidalgo School	Flora and 4th Sts.	Hidalgo	1915

http://www.nr.nps.gov/iwisapi/explorer.dll?IWS_SCHEMA=NRIS1&IWS_LOGIN=1&IWS_REPORT=100000066

J. Hazardous Material Issues

An initial site assessment to identify possible hazardous materials concerns, which might impact the project, was performed by consultant staff. This assessment included a visual survey of the project limits and surrounding area and a limited review of federal and state regulatory database.

No evidence of spills or surface contamination was noted during the visual survey. There were no sites that appeared on TCEQ Leaking Petroleum Storage Tanks (LPST) list. A review of TCEQ's LPST Internet Database and EPA's Envirofacts Database did not produce any LPST sites, Superfund sites or Large Quantity Generators for the proposed project areas.

Any unanticipated hazardous materials encountered during construction should be handled according to applicable federal and state regulations. Hazardous materials that require special handling should be removed only by certified abatement contractors having documentation of prior acceptable abatement work.

K. Environmental Justice

Executive Order (E.O.) 12898, entitled "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," mandates federal agencies to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of programs on minority populations and low income populations (59 Federal Register February, 1994). Minority means a person who is Black (having origins in any of the black racial groups of Africa); Hispanic (of Mexican, Puerto Rican, Cuban, Central or South American, or Spanish culture or origin, regardless of race), Asian (having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands) or American Indian and Alaskan Native (having origins in any of the original people of North America and who maintains cultural identification through tribal affiliation or community recognition). A low-income population means any readily identifiable group of low-income persons who live in geographic proximity, and, if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who would be similarly affected by a proposed HMGP program, policy, or activity. The average poverty level threshold for a family of four people in 2006 is a total annual household income of $20,000.

The data used to determine the potential for disproportionate impacts to low and/or minority populations in the corridor is based on 2000 United States Bureau of Census (USBOC) State and Hidalgo County data for ethnicity and income. County Census data was used to determine the population composition of the area and region and compared to state population composition.

According to the 2000 Census, the total population of Hidalgo County is 569,463. Texas has a high percentage of people of Hispanic origin. The 2000 Census indicates that the Hispanic population comprises 32% of the total population. According to the 2000 Census, Hidalgo County's Hispanic population is 88.3% of its total population. In 1999, the percent of persons below the poverty level in Hidalgo County was 35.9% and 12.4% for the US.

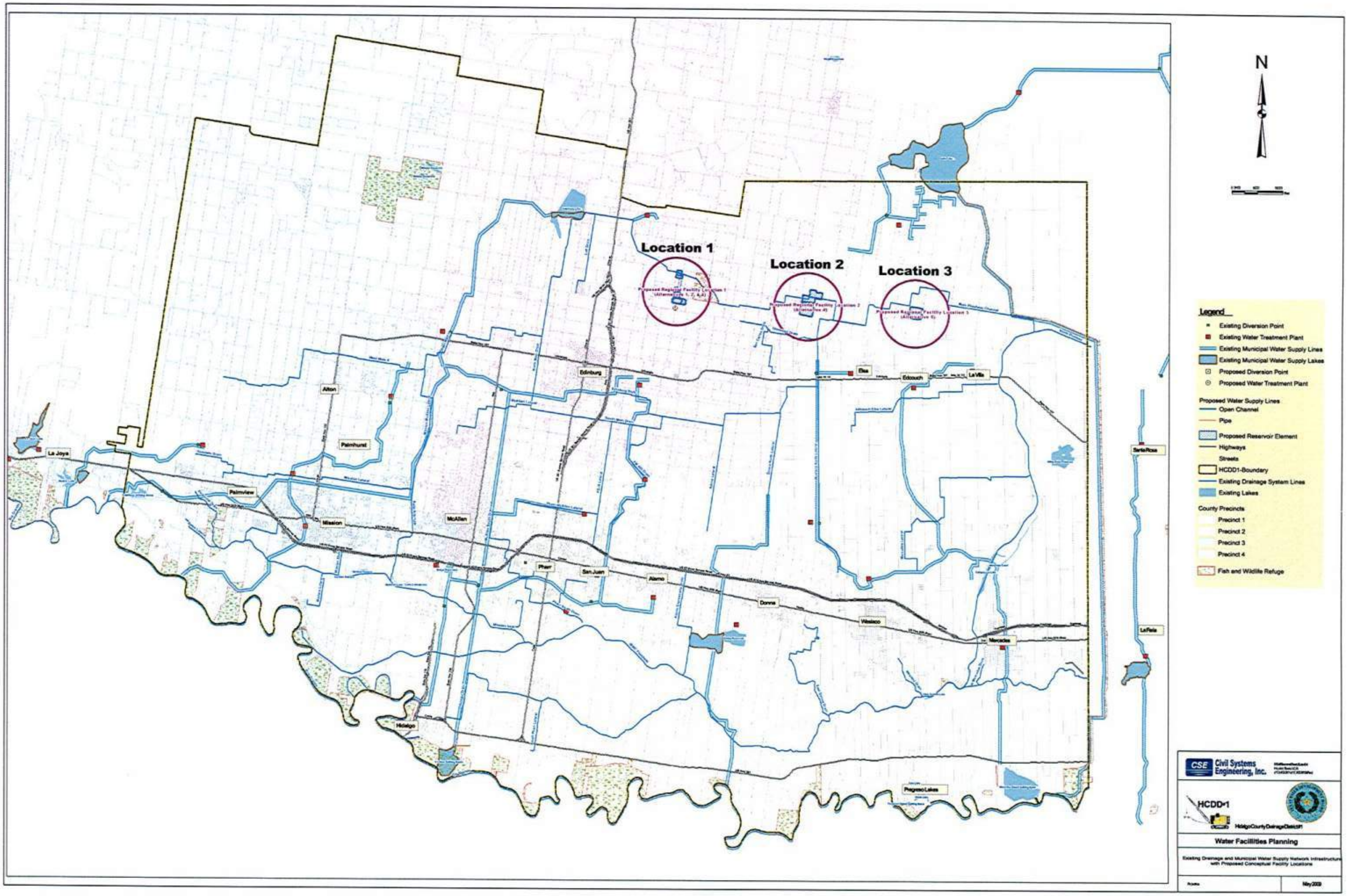
Despite the high minority and poverty rates of the population in the area, the proposed project improvements would not exhibit disproportionate impacts. Hidalgo County, the largest county of the Rio Grande Valley, is one of the fastest growing counties in Texas. According to the U.S. Census Bureau, the county's population increased 48 percent from approximately 383,545 in 1990 to 569,463 in 2000, and it is projected to have a population of 1,435,319 by year 2050. As projected by the TWDB, both municipal and agricultural water uses in Hidalgo County will face significant shortages through year 2050. I

In response to the future water shortages, many study efforts have been conducted by federal, state, and local agencies for Hidalgo County and the Rio Grande Valley as a whole. The most comprehensive and recent study is the 2001 Rio Grande Regional Water Plan and 2005 Initially Prepared Plan by TWDB. A range of water management strategies were evaluated. The recommended strategies include: conservation, acquisition of existing Rio Grande water rights, conversion of irrigation water to municipal water rights, reuse of wastewater, and improvements of irrigation practices and conveyance systems.

FIGURES

Figure 1

Project Areas Location Map



Location 1
Location 2
Location 3
N
Legend
Existing Diversion Point
Existing Water Treatment Plant
Existing Municipal Water Supply Lines
Existing Municipal Water Supply Lakes
Proposed Diversion Point
Proposed Water Treatment Plant
Proposed Water Supply Lines
Open Channel
Pipe
Proposed Reservoir Element
Highways
Streets
HCDD1-Boundary
Existing Drainage System Lines
Existing Lakes
County Precincts
Precinct 1
Precinct 2
Precinct 3
Precinct 4
Fish and Wildlife Refuge
La Joya
Palmview
Mission
Palmhurst
Alton
McAllen
Edinburg
Pharr
San Juan
Alamo
Donna
Weslaco
Mercedes
Elsa
Edcouch
La Villa
Santa Rosa
La Feria
Hidalgo
Progreso Lakes
CSE Civil Systems Engineering, Inc.
HCDD•1
Water Facilities Planning
Existing Drainage and Municipal Water Supply Network Infrastructure with Proposed Conceptual Facility Locations
May 2009

Figure 2

Location 1 Site Map

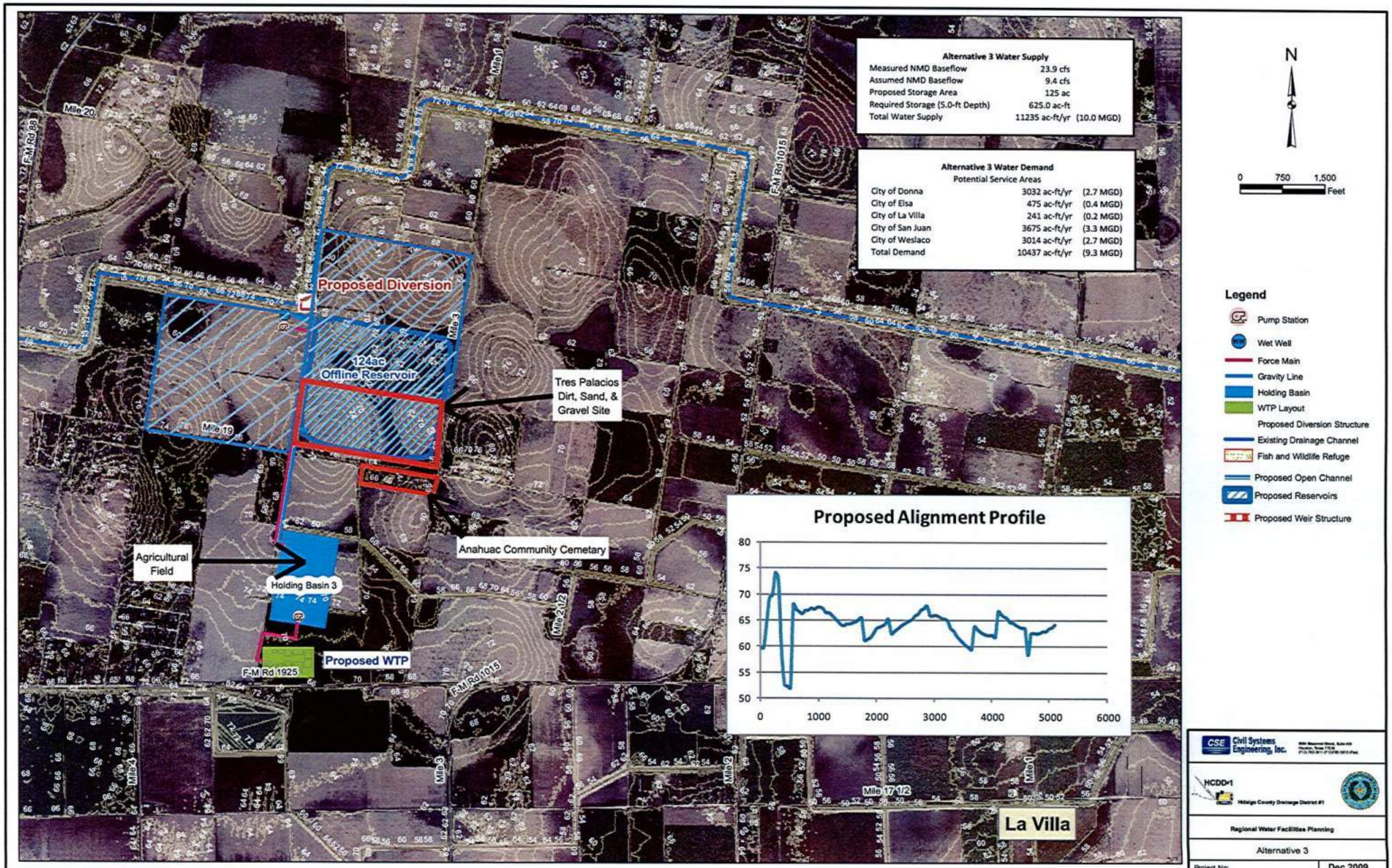

Alternative 3 Water Supply
Measured NMD Baseflow 23.9 cfs
Assumed NMD Baseflow 9.4 cfs
Proposed Storage Area 125 ac
Required Storage (5.0-ft Depth) 625.0 ac-ft
Total Water Supply 11235 ac-ft/yr (10.0 MGD)
Alternative 3 Water Demand
Potential Service Areas
City of Donna 3032 ac-ft/yr (2.7 MGD)
City of Elsa 475 ac-ft/yr (0.4 MGD)
City of La Villa 241 ac-ft/yr (0.2 MGD)
City of San Juan 3675 ac-ft/yr (3.3 MGD)
City of Weslaco 3014 ac-ft/yr (2.7 MGD)
Total Demand 10437 ac-ft/yr (9.3 MGD)
N
0 750 1,500 Feet
Legend
Pump Station
Wet Well
Force Main
Gravity Line
Holding Basin
WTP Layout
Proposed Diversion Structure
Existing Drainage Channel
Fish and Wildlife Refuge
Proposed Open Channel
Proposed Reservoirs
Proposed Weir Structure
Proposed Diversion
124ac Offline Reservoir
Tres Palacios Dirt, Sand, & Gravel Site
Anahuac Community Cemetary
Agricultural Field
Holding Basin 3
Proposed WTP
F-M Rd 1925
F-M Rd 1015
F-M Rd 88
Mile 20
Mile 19
Mile 3
Mile 2 1/2
Mile 2
Mile 1
Mile 4
Mile 17 1/2
La Villa
Proposed Alignment Profile
80
75
70
65
60
55
50
0 1000 2000 3000 4000 5000 6000
CSE Civil Systems Engineering, Inc.
HCDD#1
Hidalgo County Drainage District #1
Regional Water Facilities Planning
Alternative 3
Project No:
Dec 2009

Figure 3

Location 2 Site Map

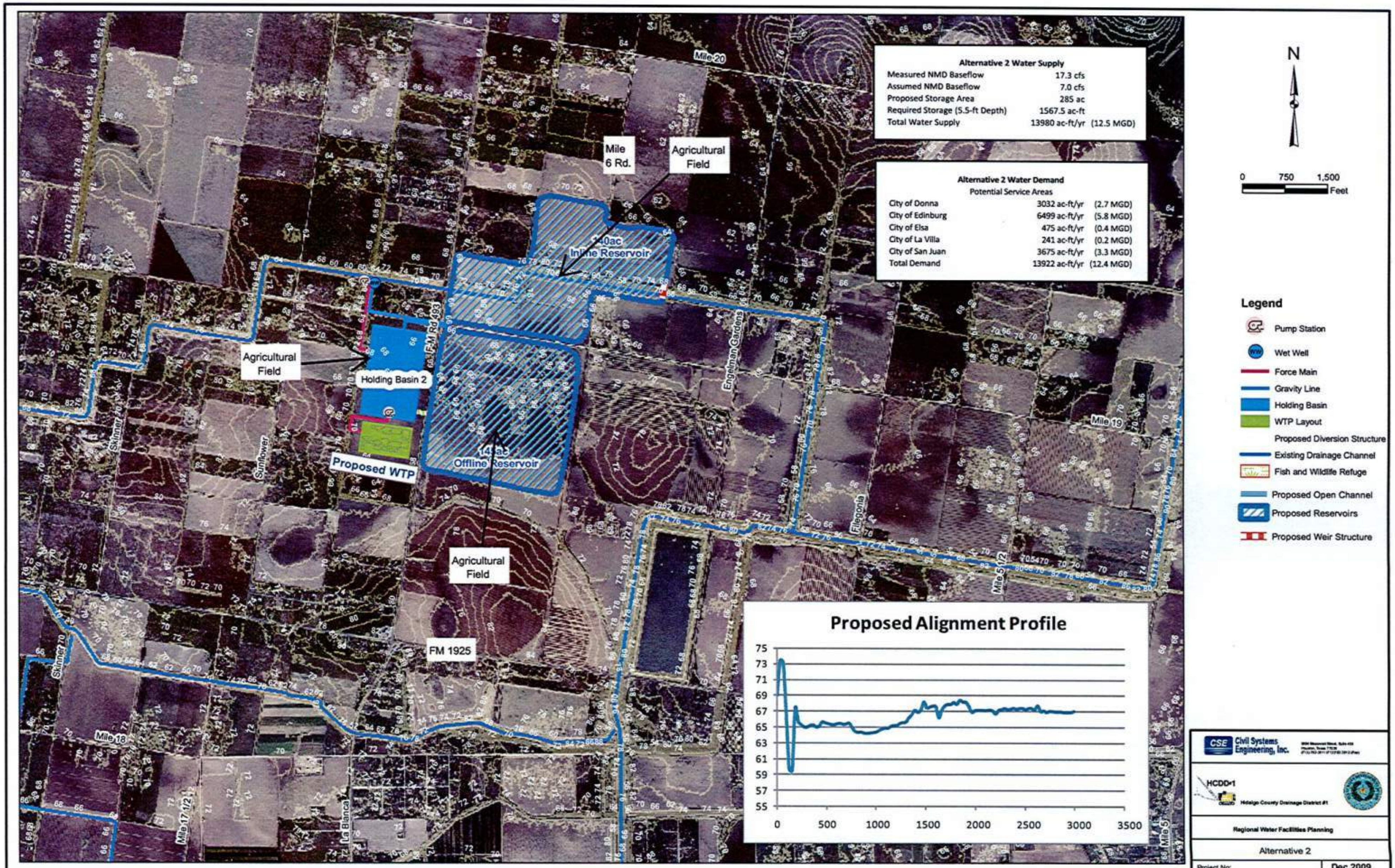
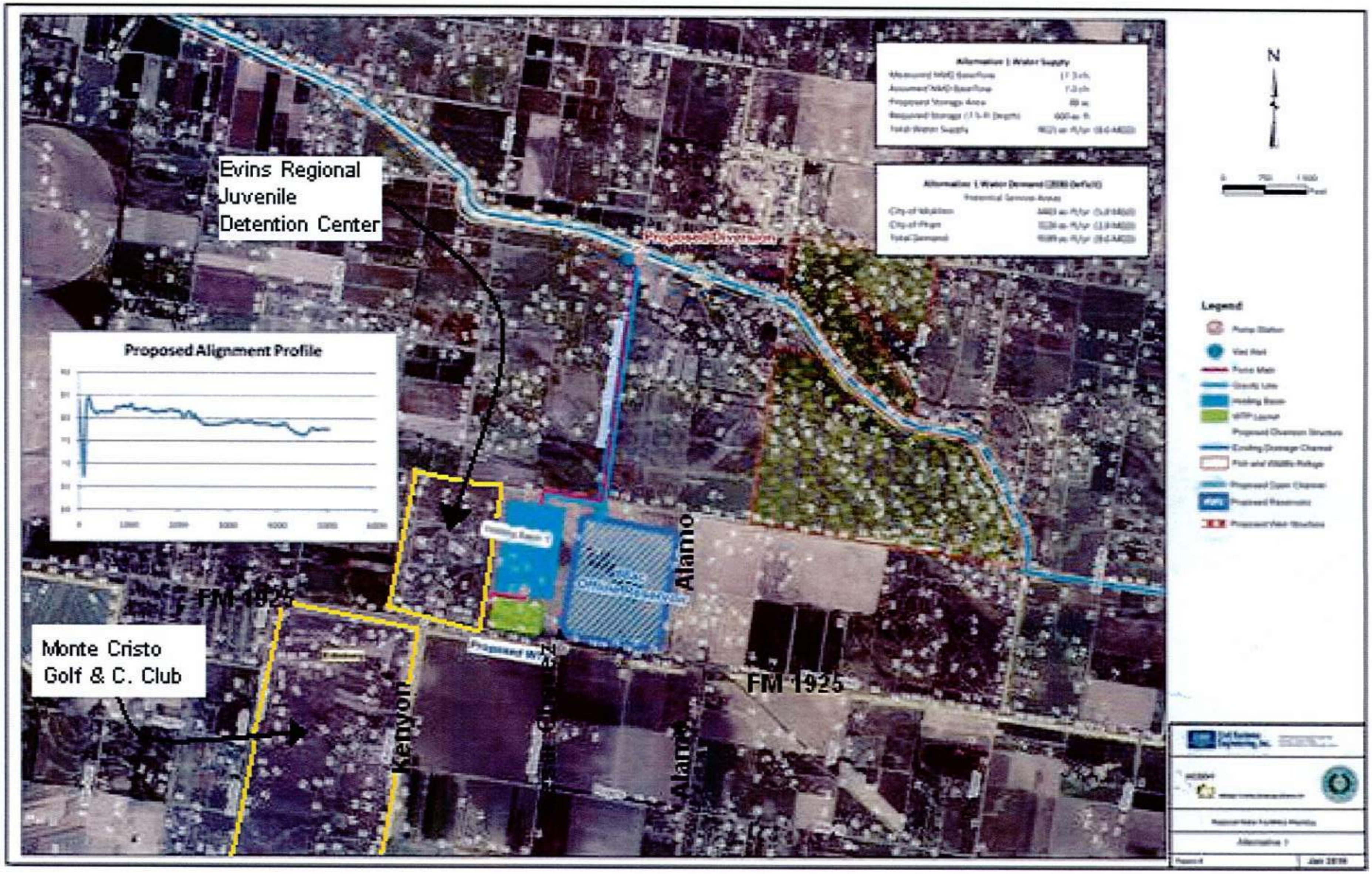

Alternative 2 Water Supply
Measured NMD Baseflow 17.3 cfs
Assumed NMD Baseflow 7.0 cfs
Proposed Storage Area 285 ac
Required Storage (5.5-ft Depth) 1567.5 ac-ft
Total Water Supply 13980 ac-ft/yr (12.5 MGD)
Alternative 2 Water Demand
Potential Service Areas
City of Donna 3032 ac-ft/yr (2.7 MGD)
City of Edinburg 6499 ac-ft/yr (5.8 MGD)
City of Elsa 475 ac-ft/yr (0.4 MGD)
City of La Villa 241 ac-ft/yr (0.2 MGD)
City of San Juan 3675 ac-ft/yr (3.3 MGD)
Total Demand 13922 ac-ft/yr (12.4 MGD)
Mile 20
Mile 6 Rd.
Agricultural Field
140ac Inline Reservoir
145ac Offline Reservoir
Agricultural Field
Holding Basin 2
Proposed WTP
Agricultural Field
FM 1925
F-M Rd 493
Engelman Gardens
Filegonia
Mile 19
Mile 5 1/2
Mile 18
Mile 17 1/2
Mile 5
Skinner
Sunflower
La Blanca
Proposed Alignment Profile
75
73
71
69
67
65
63
61
59
57
55
0
500
1000
1500
2000
2500
3000
3500
N
0 750 1,500 Feet
Legend
Pump Station
Wet Well
Force Main
Gravity Line
Holding Basin
WTP Layout
Proposed Diversion Structure
Existing Drainage Channel
Fish and Wildlife Refuge
Proposed Open Channel
Proposed Reservoirs
Proposed Weir Structure
CSE Civil Systems Engineering, Inc.
HCDD#1
Hidalgo County Drainage District #1
Regional Water Facilities Planning
Alternative 2
Project No:
Dec 2009

Figure 4

Location 3 Site Map



Evins Regional
Juvenile
Detention Center
Proposed Alignment Profile
Monte Cristo
Golf & C. Club
FM 1925
FM 1925
Kenyon
Alamo
Alamo
Proposed Diversion
N
Legend

Figure 5

Texas Coastal Zone Management Map

Brownsville - Harlingen Area

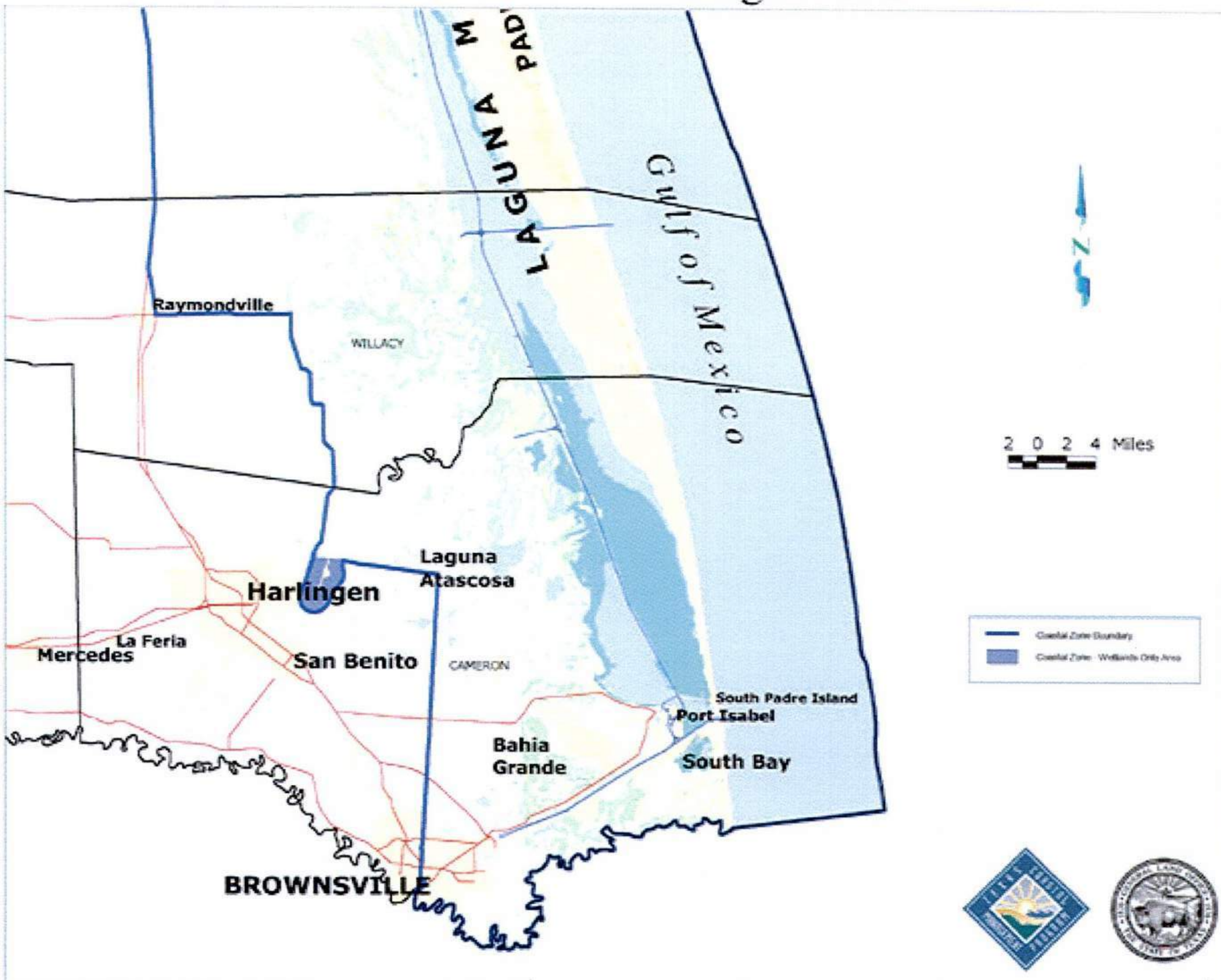


Figure 6

Location 1 FEMA Map

APPROXIMATE SCALE

2000 0 2000 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

HIDALGO COUNTY, TEXAS
(UNINCORPORATED AREAS)

(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
480334 0325 D

MAP REVISED:
JUNE 6, 2000

Federal Emergency Management Agency

Figure 7

Location 2 FEMA Map

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

HIDALGO COUNTY,
TEXAS
(UNINCORPORATED AREAS)

(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
480334 0350 C

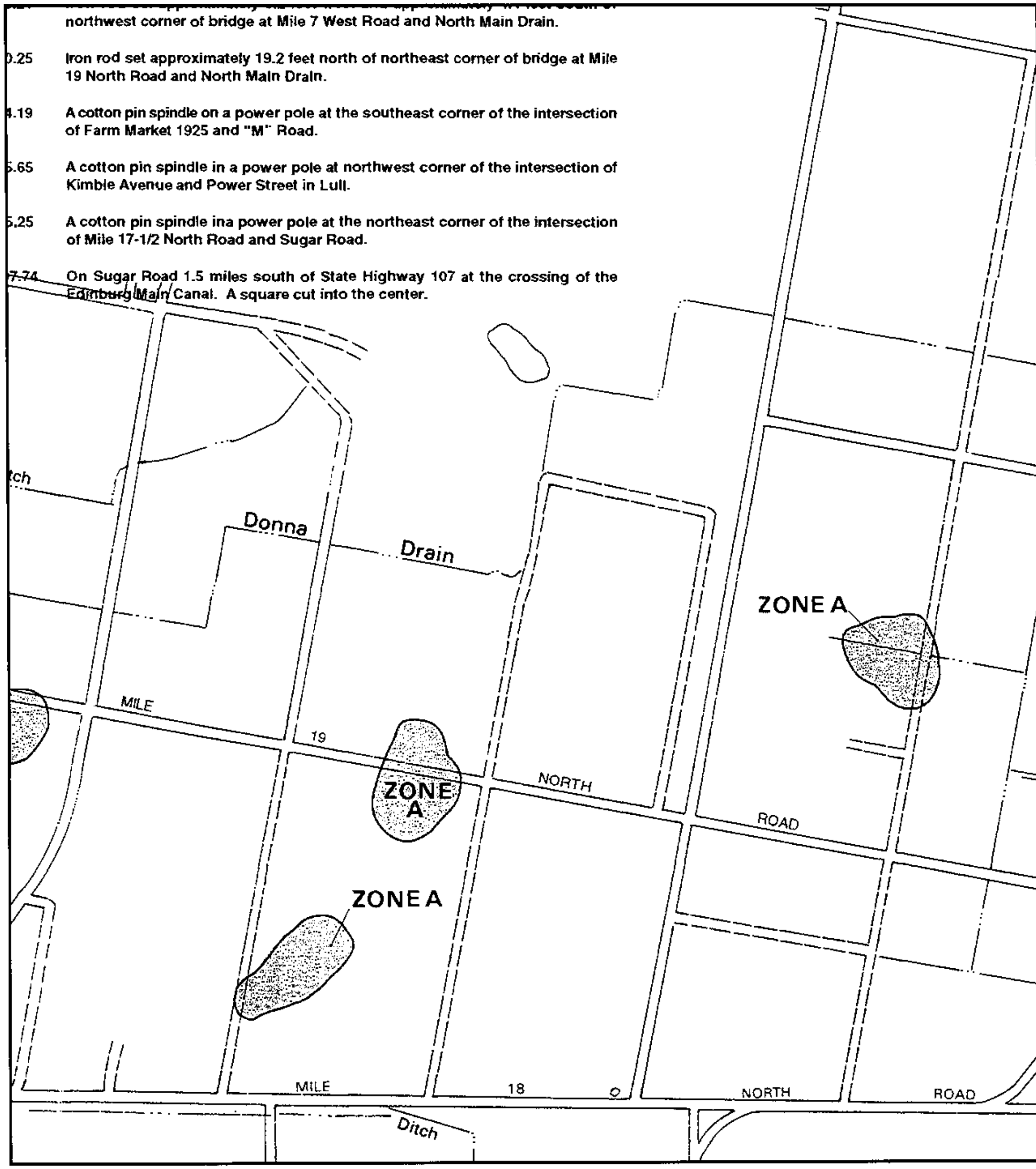
MAP REVISED:
JUNE 6, 2000

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

Figure 8

Location 3 FEMA Map



APPROXIMATE SCALE

2000 0 2000 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

HIDALGO COUNTY,
TEXAS
(UNINCORPORATED AREAS)

(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
480334 0350 C

MAP REVISED:
JUNE 6, 2000

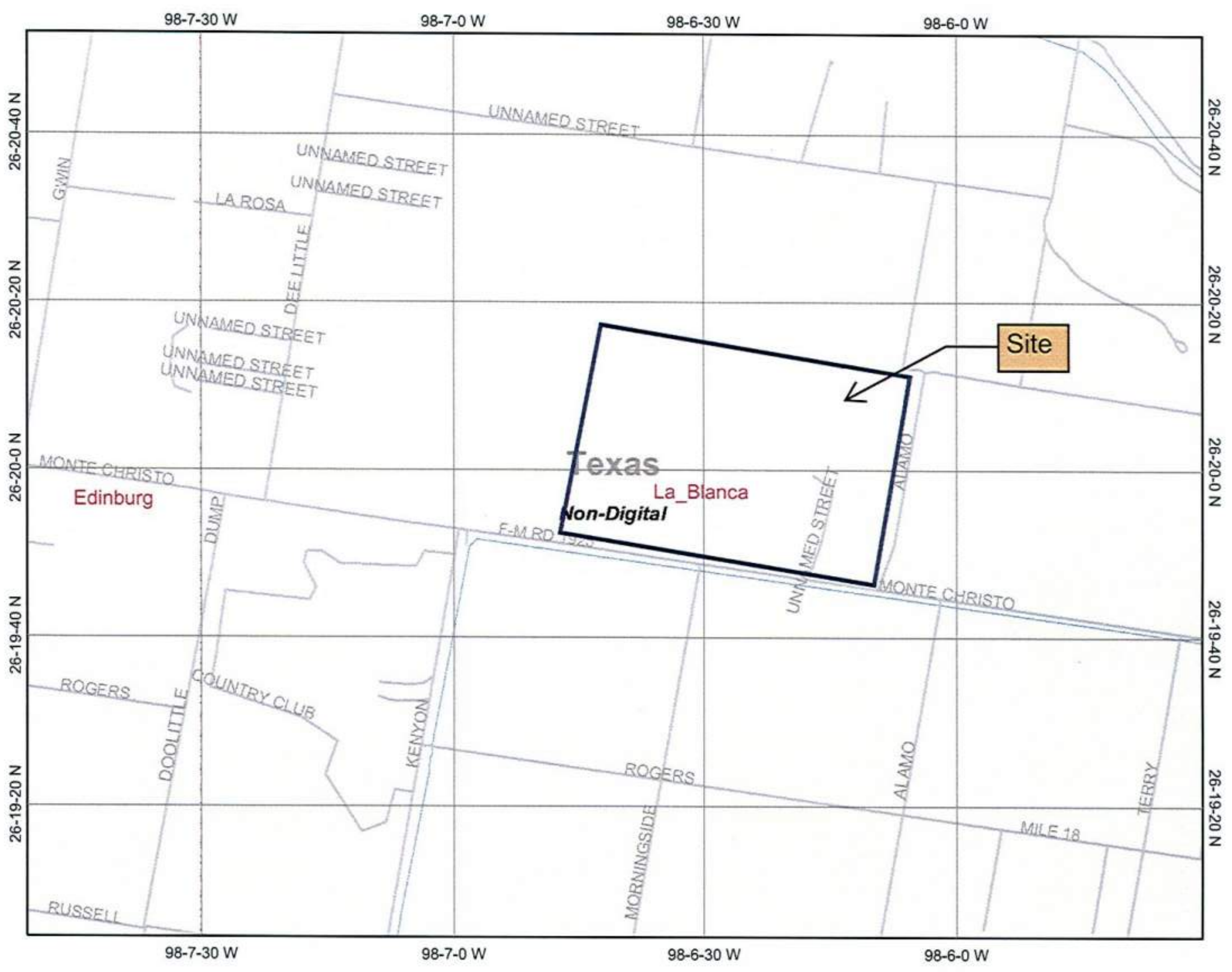
Federal Emergency Management Agency

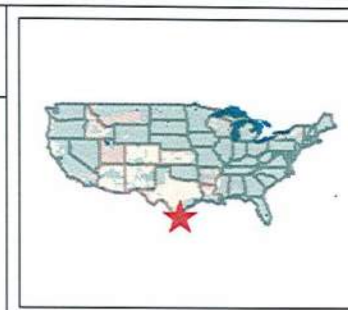
This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

Figure 9

Location 1 Wetland Map

Wetland Map - Alternative 1





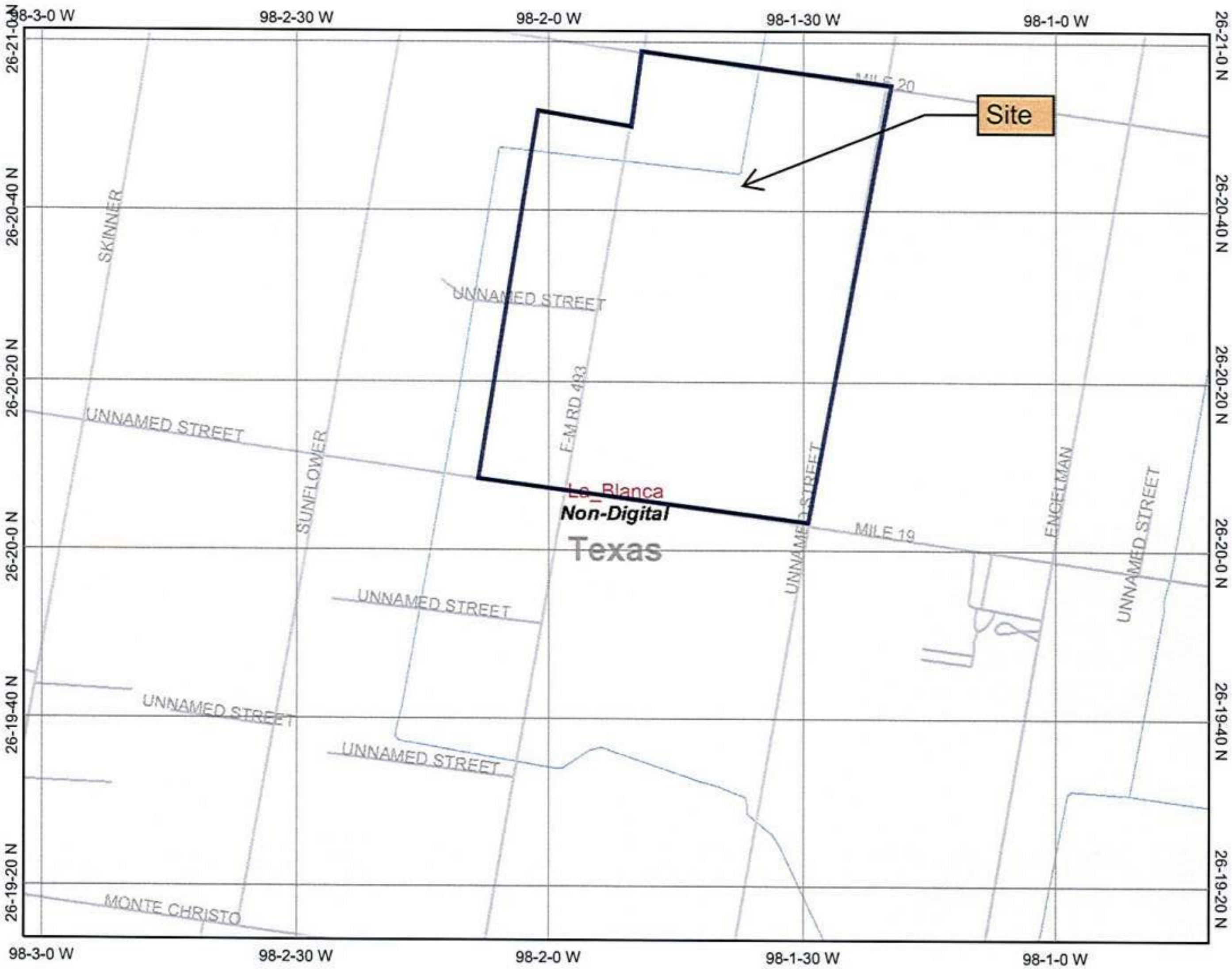
Map center: 26° 19' 58" N, 98° 6' 41" W

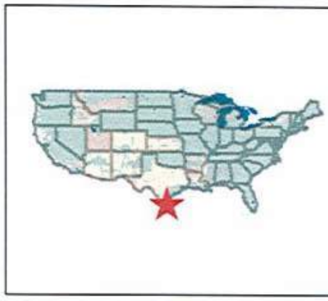
This map is a user generated static output from an Internet mapping site and is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. THIS MAP IS NOT TO BE USED FOR NAVIGATION.

Figure 10

Location 2 Wetland Map

Wetland Map - Alternative 2





Legend

Ohio_wet_scan
- 0
- 1
- Out of range

Interstate
Major Roads
- Other Road
- Interstate
- State highway
- US highway

Roads
Cities
USGS Quad Index 24K
Lower 48 Wetland Polygons
- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

Lower 48 Available Wetland Data
- Non-Digital
- Digital
- No Data
- Scan

NHD Streams
Counties 100K
States 100K
South America
North America

Scale: 1:23,323

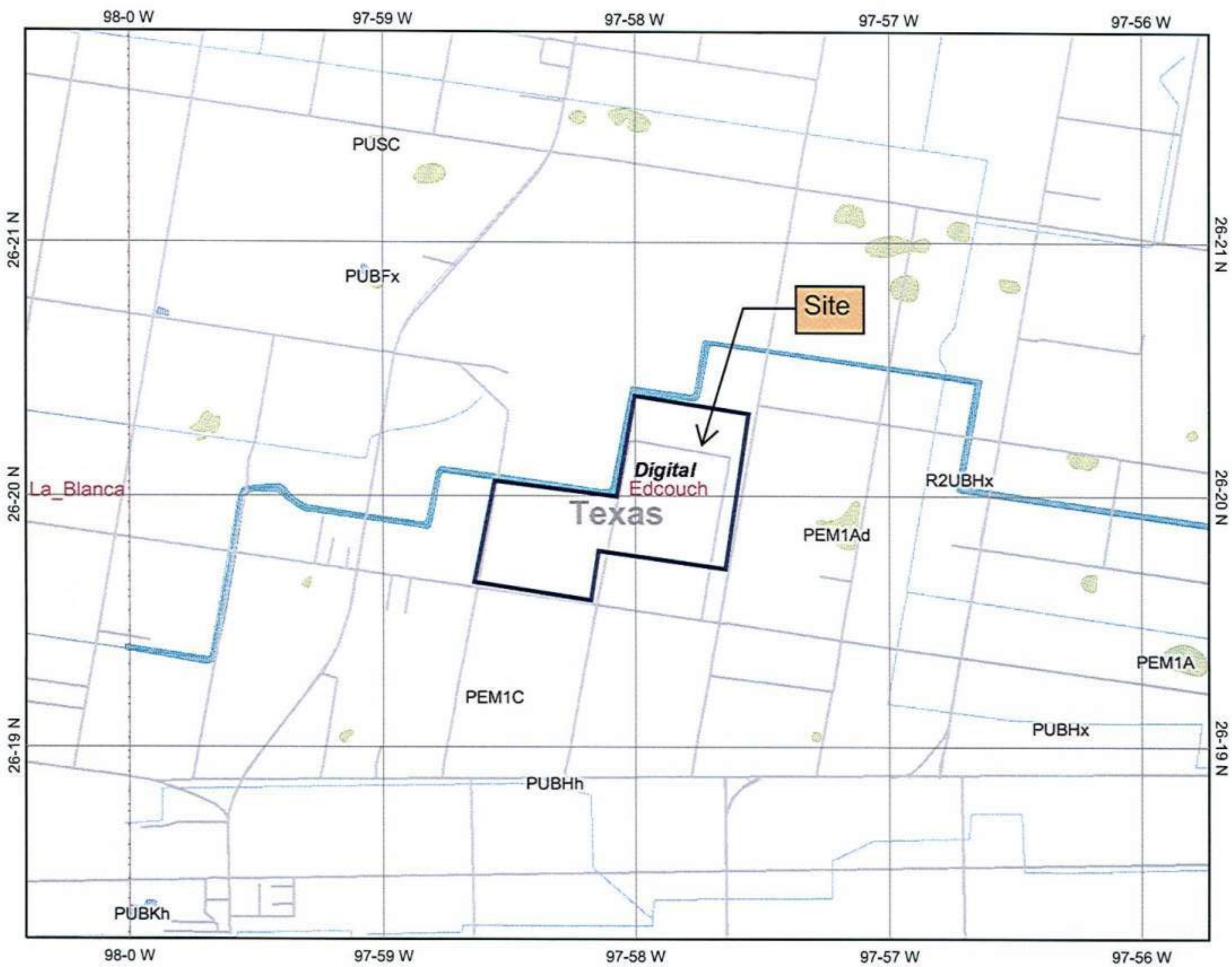
Map center: 26° 20' 8" N, 98° 1' 52" W

This map is a user generated static output from an Internet mapping site and is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. THIS MAP IS NOT TO BE USED FOR NAVIGATION.

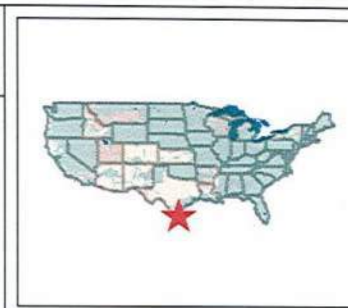
Figure 11

Location 3 Wetland Map

Wetland Map - Alternative 3



Map center: 26° 20' 2" N, 97° 58' 4" W



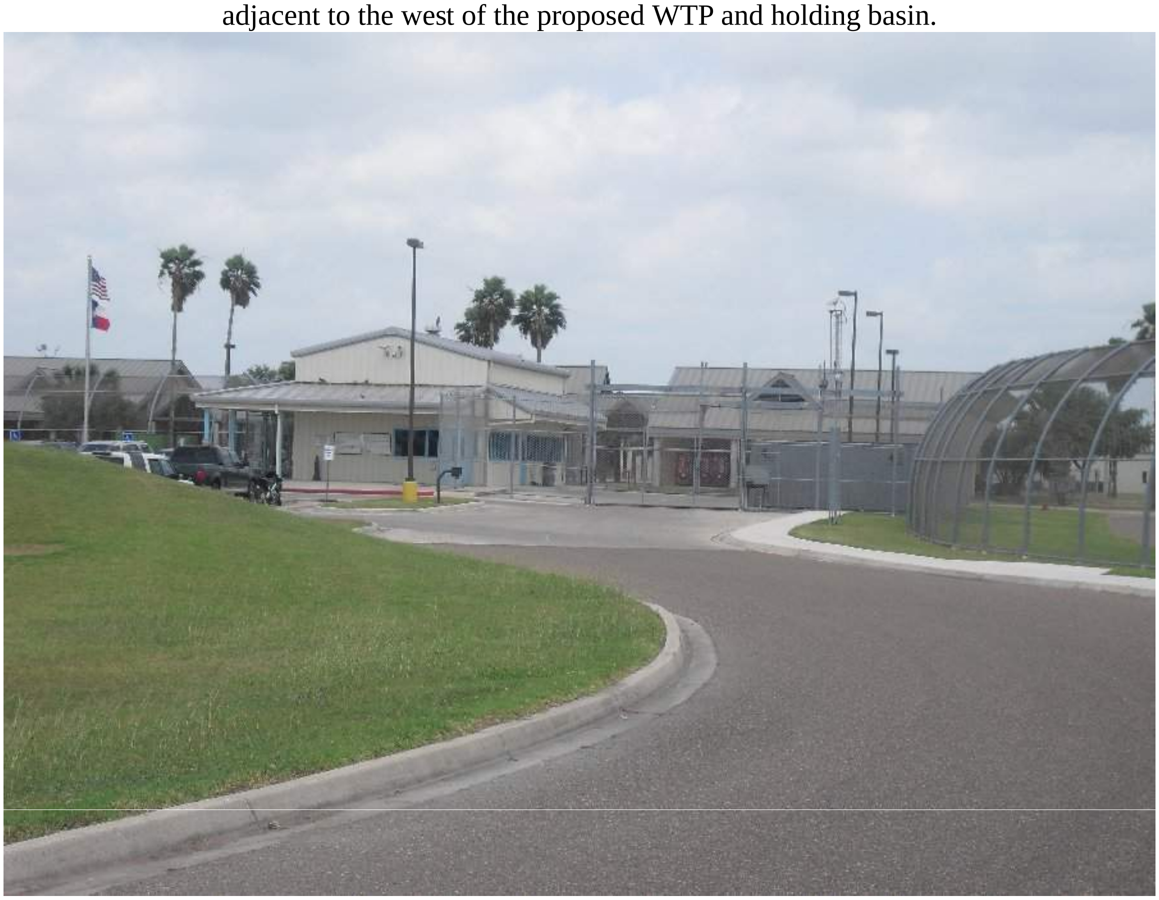
This map is a user generated static output from an Internet mapping site and is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. THIS MAP IS NOT TO BE USED FOR NAVIGATION.

Appendices

Appendix A

Site Photos

(Photo 1) Location 1 – View of the entrance to the Evins Regional Juvenial Center which is located adjacent to the west of the proposed WTP and holding basin.



(Photo 2) Location 1 – View of the facilities for the juvenile center.

(Photo 3) Location 1 – View to the northwest from FM 1925 showing the proposed location for the offline reservoir. The juvenile center is shown in the background to the left of photo.

(Photo 4) Location 1 – View to the north from FM 1925 showing an additional view of the proposed location for the offline reservoir.

(Photo 5) Location 1 – View to the northeast from the corner of FM 1925 and Alamo road showing the location for the offline reservoir. Notice change of crop.

(Photo 6) Location 1 – View to the north from the corner of FM 1925 and Alamo road showing the location for the offline reservoir.

(Photo 7) Location 2 – View to the northwest from FM 493 showing proposed location for the WTP and holding basin.

(Photo 8) Location 2 – View to the south from the corner of FM 493 and Mile 19 showing the proposed location for the offline reservoir.

(Photo 9) Location 2 – View to the southeast from corner of FM 493 and Mile 19 showing the proposed location for the Offline reservoir.

(Photo 10) Location 2 – View to the northeast from corner of FM 493 and Mile 19 showing the proposed location for the inline reservoir.

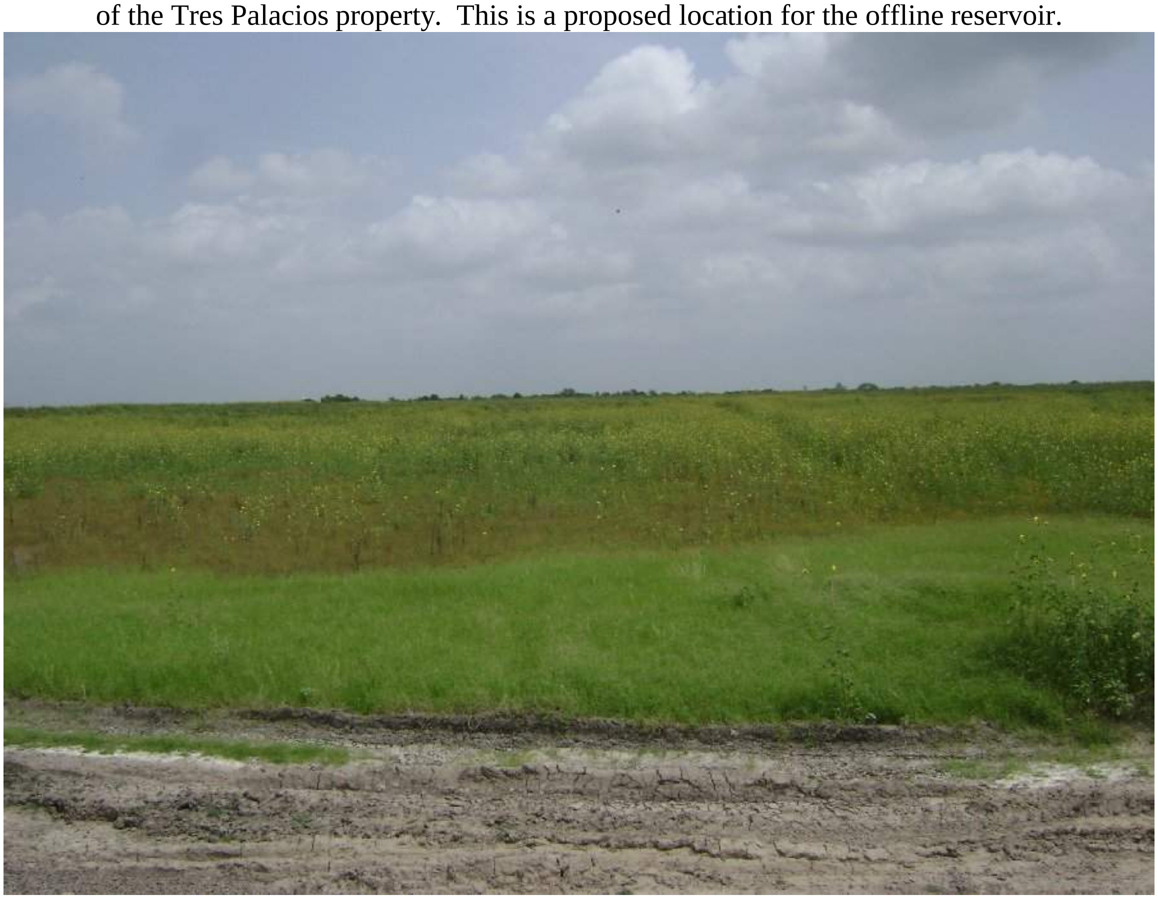
(Photo 11) Location 3 – View to the west of the Anahuac Community Cemetery located on the southwest corner of Mile 19 and Mile 3.

(Photo 12) Location 3 – View to the northwest showing the Tres Palacios dirt, gravel and sand company. The business is located on the northwest corner of Mile 3 and Mile 19.

(Photo 13) Location 3 – View to the northwest of the Tres Palacios property from the corner of Mile 3 and Mile 19.

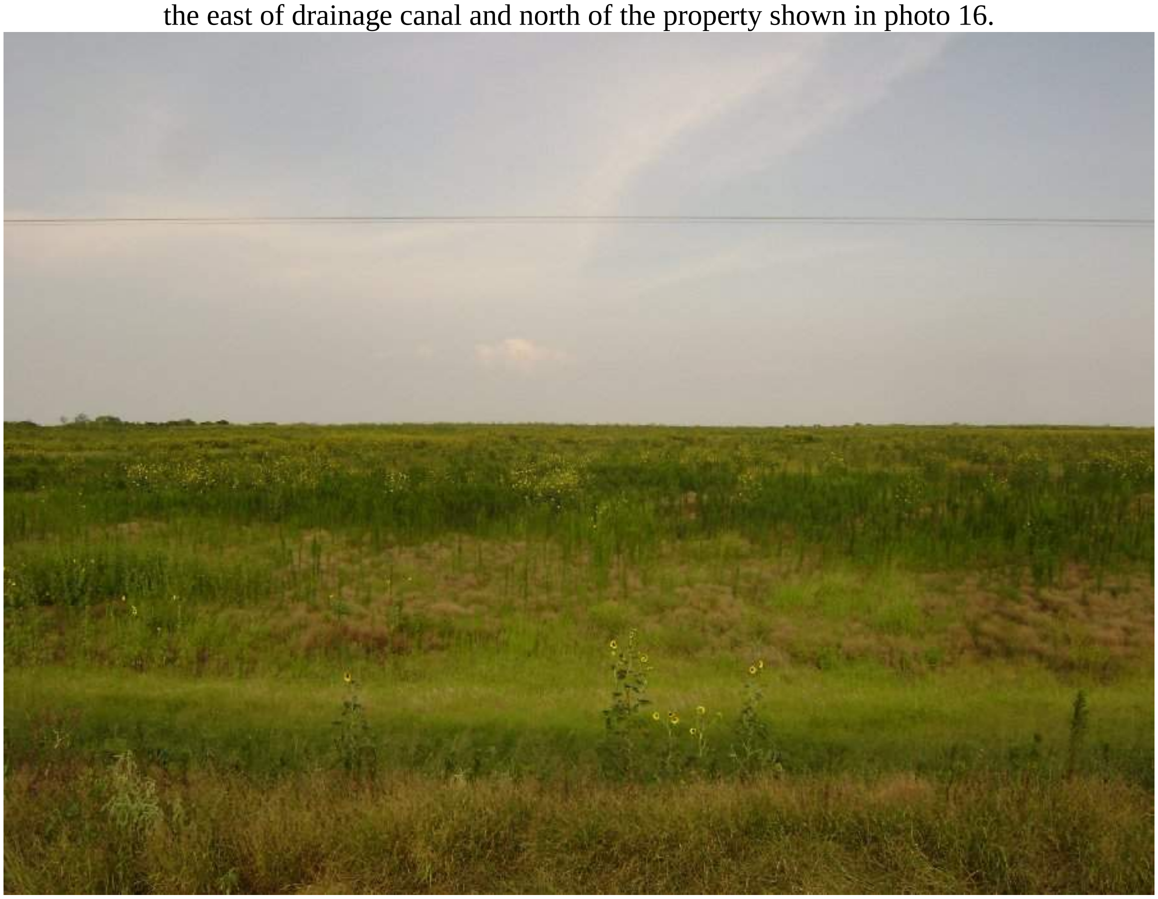
(Photo 14) Locaiton 3 – Additional view to the northwest from Mile 3 of the Tres Palacios property.

(Photo 15) Location 3 – View to the north of an overgrown agricultural field located adjacent to the north of the Tres Palacios property. This is a proposed location for the offline reservoir.



(Photo 16) Location 3 – Additional view of overgrown field adjacent to the north of the Tres Palacios property.

(Photo 17) Location 3 – View to the northeast showing an overgrown agricultural field located adjacent to the east of drainage canal and north of the property shown in photo 16.



(Photo 18) Location 3 – View to the east from drainage canal showing same agricultural property as photo 17.

(Photo 19) Location 3 – View to the northwest showing an agricultural field located adjacently to the north of the overgrown agricultural field shown in photo 18.

(Photo 20) Location 3 – View to the west showing an agricultural field located adjacently to the west of the Tres Palacios property and overgrown agricultural field.

(Photo 21) Location 3 – Additional view to the southwest of same agricultural field located adjacently to the west of the Tres Palacios property.

(Photo 22) Location 3 – View to the south from Mile 19 of agricultural property located adjacent to the north of a drainage ditch and proposed location for the holding basin.

(Photo 23) Location 3 – View to the east of a drainage ditch located adjacent to the north of the proposed location for the holding basin.

(Photo 24) Location 3 – View to the south of an agricultural field and the proposed location for the holding basin.

APPENDIX B

RAW WATER QUALITY SAMPLING AND LABORATORY ANALYSIS REPORT

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

Professional Analytical Services

Oct. 8, 2009
Civil Systems Engineering, INC
9894 Bissonnet St
Suite 404
Houston, TX 77036
Attention: Deren Li

Dear Deren Li:

Enclosed please find the analytical data for your project.

The following is a cross correlation of client and laboratory identifications for your convenience.

CLIENT ID	MATRIX	AMTEST ID	TEST
Site1	Drinking Water	09-A015959	Micro, CONV, MIN, DEM, NUT, MET
Site1 DM	Drinking Water	09-A015960	MET
Site2	Drinking Water	09-A015961	Micro, CONV, MIN, DEM, NUT, MET
Site2 DM	Drinking Water	09-A015962	MET
Site3	Drinking Water	09-A015963	Micro, CONV, MIN, DEM, NUT, MET
Site3 DM	Drinking Water	09-A015964	MET
Site4	Drinking Water	09-A015965	Micro, CONV, MIN, DEM, NUT, MET
Site4 DM	Drinking Water	09-A015966	MET

Your samples were received on Wednesday, September 30, 2009. At the time of receipt, the samples were logged in and properly maintained prior to the subsequent analysis.

The analytical procedures used at AmTest are well documented and are typically derived from the protocols of the EPA, USDA, FDA or the Army Corps of Engineers.

Following the analytical data you will find the Quality Control (QC) results.

Please note that the detection limits that are listed in the body of the report refer to the Method Detection Limits (MDL's), as opposed to Practical Quantitation Limits (PQL's).

If you should have any questions pertaining to the data package, please feel free to conact me.

Sincerely,

Aaron W Young

Aaron W. Young
Laboratory Manager

BACT = Bacteriological
CONV = Conventionals
MET = Metals
ORG = Organics
NUT=Nutrients
DEM=Demand
MIN=Minerals

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664
www.amtestlab.com

AMTEST LABORATORIES

Professional Analytical Services

ANALYSIS REPORT

Civil Systems Engineering, INC
9894 Bissonnet St
Houston, TX 77036
Attention: Deren Li
All results reported on an as received basis.

Date Received: 09/30/09
Date Reported: 10/8/09

AMTEST Identification Number **09-A015959**
Client Identification **Site1**
Sampling Date **09/29/09, 11:15**

Microbiological

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Heterotrophic Plate Count	55000	CFU/ml		1.	SM 9215D	NG	09/30/09 14:00

Conventionals

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
pH	7.62	unit	*		EPA 150.1	PT	09/30/09
Color	30.	unit		5.	EPA 110.2	PT	09/30/09
Total Dissolved Solids	2000	mg/l		1.0	SM 2540C	SW	10/05/09
Turbidity	13.	NTU		0.05	SM 2130B	PT	09/30/09

Demand

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Total Organic Carbon	40.	mg/l		1.0	EPA 415.1	SW	10/05/09

Minerals

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Alkalinity (as CaCO3)	120	mg/l		1.0	SM 2320B	SW	10/02/09
C-Alkalinity (as CaCO3)	< 1	mg/l		1.0	SM 2320B	SW	10/02/09
Bicarbonate	120	mg/l		1.0	SM 2320B	SW	10/02/09
Chloride	510	mg/l		0.10	EPA 300.0	MO	10/06/09
Hardness (CaCO3)	600	mg/l		1.0	EPA 200.7 calc	HL	10/02/09
Sulfate	510	mg/l		0.1	EPA 300.0	MO	10/06/09
Calcium	150	mg/l		0.05	EPA 200.7	HL	10/02/09
Potassium	13.	mg/l		0.10	EPA 200.7	HL	10/02/09
Magnesium	55.	mg/l		0.05	EPA 200.7	HL	10/02/09
Sodium	460	mg/l		0.05	EPA 200.7	HL	10/02/09

Nutrients

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Ammonia Nitrogen	0.160	mg/l		0.005	EPA 350.1	TS	10/05/09
Nitrite Nitrogen	0.10	mg/l		0.001	SM 4500NO2B	SW	09/01/09
Nitrite	0.270	mg/l		0.010	EPA 300.0	MO	10/01/09
Nitrate	5.93	mg/l		0.050	EPA 300.0	MO	10/01/09

ICP Metals by EPA Method 200.7

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Aluminum	1.98	mg/l		0.01	EPA 200.7	HL	10/02/09
Iron	0.662	mg/l		0.005	EPA 200.7	HL	10/02/09
Manganese	< 0.0005	mg/l		0.0005	EPA 200.7	HL	10/02/09
Silica as SiO2	32.	mg/l		0.01	SM 4500Si-E	SW	10/02/09

AMTEST Identification Number **09-A015960**
Client Identification **Site1 DM**
Sampling Date **09/29/09, 11:15**

Dissolved Metals

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Dissolved Iron	< 0.05	mg/l		0.005	EPA 200.7	HL	10/02/09
Dissolved Manganese	< 0.005	mg/l		0.0005	EPA 200.7	HL	10/02/09

AMTEST Identification Number **09-A015961**
Client Identification **Site2**
Sampling Date **09/29/09**

Microbiological

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Heterotrophic Plate Count	25000	CFU/ml		1.	SM 9215D	NG	09/30/09 14:00

Conventionals

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
pH	7.80	unit	*		EPA 150.1	PT	09/30/09
Color	30.	unit		5.	EPA 110.2	PT	09/30/09
Total Dissolved Solids	1700	mg/l		1.0	SM 2540C	SW	10/05/09
Turbidity	11.	NTU		0.05	SM 2130B	PT	09/30/09

Demand

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Total Organic Carbon	25.	mg/l		1.0	EPA 415.1	SW	10/05/09

Minerals

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Alkalinity (as CaCO3)	140	mg/l		1.0	SM 2320B	SW	10/02/09
C-Alkalinity (as CaCO3)	< 1	mg/l		1.0	SM 2320B	SW	10/02/09
Bicarbonate	140	mg/l		1.0	SM 2320B	SW	10/02/09
Chloride	450	mg/l		0.10	EPA 300.0	MO	10/06/09
Hardness (CaCO3)	520	mg/l		1.0	EPA 200.7 calc	HL	10/02/09
Sulfate	430	mg/l		0.1	EPA 300.0	MO	10/06/09
Calcium	130	mg/l		0.05	EPA 200.7	HL	10/02/09
Potassium	12.	mg/l		0.10	EPA 200.7	HL	10/02/09
Magnesium	48.	mg/l		0.05	EPA 200.7	HL	10/02/09
Sodium	410	mg/l		0.05	EPA 200.7	HL	10/02/09

Nutrients

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Ammonia Nitrogen	0.116	mg/l		0.005	EPA 350.1	TS	10/05/09
Nitrite Nitrogen	0.075	mg/l		0.001	SM 4500NO2B	SW	09/01/09
Nitrite	0.252	mg/l		0.010	EPA 300.0	MO	10/01/09
Nitrate	5.14	mg/l		0.050	EPA 300.0	MO	10/01/09

ICP Metals by EPA Method 200.7

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Aluminum	1.35	mg/l		0.01	EPA 200.7	HL	10/02/09
Iron	0.630	mg/l		0.005	EPA 200.7	HL	10/02/09
Manganese	< 0.005	mg/l		0.0005	EPA 200.7	HL	10/02/09
Silica as SiO2	27.	mg/l		0.01	SM 4500Si-E	SW	10/02/09

AMTEST Identification Number **09-A015962**
Client Identification **Site2 DM**
Sampling Date **09/29/09**

Dissolved Metals

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Dissolved Iron	< 0.05	mg/l		0.005	EPA 200.7	HL	10/02/09
Dissolved Manganese	< 0.005	mg/l		0.0005	EPA 200.7	HL	10/02/09

AMTEST Identification Number **09-A015963**
Client Identification **Site3**
Sampling Date **09/29/09, 12:05**

Microbiological

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Heterotrophic Plate Count	51000	CFU/ml		1.	SM 9215D	NG	09/30/09 14:00

Conventionals

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
pH	7.81	unit	*		EPA 150.1	PT	09/30/09
Color	40.	unit		5.	EPA 110.2	PT	09/30/09
Total Dissolved Solids	1600	mg/l		1.0	SM 2540C	SW	10/05/09
Turbidity	60.	NTU		0.05	SM 2130B	PT	09/30/09

Demand

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Total Organic Carbon	36.	mg/l		1.0	EPA 415.1	SW	10/05/09

Minerals

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Alkalinity (as CaCO3)	230	mg/l		1.0	SM 2320B	SW	10/02/09
C-Alkalinity (as CaCO3)	< 1	mg/l		1.0	SM 2320B	SW	10/02/09
Bicarbonate	230	mg/l		1.0	SM 2320B	SW	10/02/09
Chloride	410	mg/l		0.10	EPA 300.0	MO	10/06/09
Hardness (CaCO3)	610	mg/l		1.0	EPA 200.7 calc	HL	10/02/09
Sulfate	380	mg/l		0.1	EPA 300.0	MO	10/06/09
Calcium	160	mg/l		0.05	EPA 200.7	HL	10/02/09
Potassium	12.	mg/l		0.10	EPA 200.7	HL	10/02/09
Magnesium	50.	mg/l		0.05	EPA 200.7	HL	10/02/09
Sodium	420	mg/l		0.05	EPA 200.7	HL	10/02/09

Nutrients

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Ammonia Nitrogen	0.177	mg/l		0.005	EPA 350.1	TS	10/05/09
Nitrite Nitrogen	0.26	mg/l		0.001	SM 4500NO2B	SW	09/01/09
Nitrite	0.162	mg/l		0.010	EPA 300.0	MO	10/01/09
Nitrate	3.96	mg/l		0.050	EPA 300.0	MO	10/01/09

ICP Metals by EPA Method 200.7

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Aluminum	< 0.1	mg/l		0.01	EPA 200.7	HL	10/02/09
Iron	4.49	mg/l		0.005	EPA 200.7	HL	10/02/09
Manganese	0.354	mg/l		0.0005	EPA 200.7	HL	10/02/09
Silica as SiO2	25.	mg/l		0.01	SM 4500Si-E	SW	10/02/09

AMTEST Identification Number **09-A015964**
Client Identification **Site3 DM**
Sampling Date **09/29/09, 12:05**

Dissolved Metals

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Dissolved Iron	< 0.05	mg/l		0.005	EPA 200.7	HL	10/02/09
Dissolved Manganese	< 0.005	mg/l		0.0005	EPA 200.7	HL	10/02/09

AMTEST Identification Number **09-A015965**
Client Identification **Site4**
Sampling Date **09/29/09, 11:50**

Microbiological

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Heterotrophic Plate Count	40000	CFU/ml		1.	SM 9215D	NG	09/30/09 14:00

Conventionals

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
pH	7.73	unit	*		EPA 150.1	PT	09/30/09
Color	30.	unit		5.	EPA 110.2	PT	09/30/09
Total Dissolved Solids	1900	mg/l		1.0	SM 2540C	SW	10/05/09
Turbidity	17.	NTU		0.05	SM 2130B	PT	09/30/09

Demand

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Total Organic Carbon	78.	mg/l		1.0	EPA 415.1	SW	10/05/09

Minerals

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Alkalinity (as CaCO3)	180	mg/l		1.0	SM 2320B	SW	10/02/09
C-Alkalinity (as CaCO3)	< 1	mg/l		1.0	SM 2320B	SW	10/02/09
Bicarbonate	180	mg/l		1.0	SM 2320B	SW	10/02/09
Chloride	370	mg/l		0.10	EPA 300.0	MO	10/06/09
Hardness (CaCO3)	570	mg/l		1.0	EPA 200.7 calc	HL	10/02/09
Sulfate	360	mg/l		0.1	EPA 300.0	MO	10/06/09
Calcium	140	mg/l		0.05	EPA 200.7	HL	10/02/09
Potassium	15.	mg/l		0.10	EPA 200.7	HL	10/02/09
Magnesium	54.	mg/l		0.05	EPA 200.7	HL	10/02/09
Sodium	500	mg/l		0.05	EPA 200.7	HL	10/02/09

Nutrients

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Ammonia Nitrogen	0.151	mg/l		0.005	EPA 350.1	TS	10/05/09
Nitrite Nitrogen	0.10	mg/l		0.001	SM 4500NO2B	SW	09/01/09
Nitrite	< 0.05	mg/l		0.010	EPA 300.0	MO	10/01/09
Nitrate	6.30	mg/l		0.050	EPA 300.0	MO	10/01/09

ICP Metals by EPA Method 200.7

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Aluminum	1.68	mg/l		0.01	EPA 200.7	HL	10/02/09
Iron	0.952	mg/l		0.005	EPA 200.7	HL	10/02/09
Manganese	< 0.005	mg/l		0.0005	EPA 200.7	HL	10/02/09
Silica as SiO2	31.	mg/l		0.01	SM 4500Si-E	SW	10/02/09

AMTEST Identification Number **09-A015966**
Client Identification **Site4 DM**
Sampling Date **09/29/09, 11:50**

Dissolved Metals

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Dissolved Iron	< 0.05	mg/l		0.005	EPA 200.7	HL	10/02/09
Dissolved Manganese	< 0.005	mg/l		0.0005	EPA 200.7	HL	10/02/09

* = The method specifies the test is to be performed in the field; therefore the result is an estimate.

Aaron W. Young

Aaron W. Young
Laboratory Manager

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Professional Analytical Services

QC Summary for sample numbers: 09-A015959 to 09-A015966

DUPLICATES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	DUP VALUE	RPD
09-A015929	pH	unit	7.03	6.89	2.0
09-A015939	pH	unit	7.20	7.18	0.28
09-A015949	pH	unit	7.25	7.21	0.55
09-A015965	pH	unit	7.73	7.74	0.13
09-A015965	Alkalinity (as CaCO3)	mg/l	180	180	0.00
09-A015963	Total Organic Carbon	mg/l	36.	35.	2.8
09-A015929	Color	unit	< 5	< 5	
09-A015939	Color	unit	< 5	< 5	
09-A015949	Color	unit	< 5	< 5	
09-A015965	Color	unit	30.	30.	0.00
09-A016012	Ammonia Nitrogen	mg/l	0.167	0.180	7.5
09-A016112	Ammonia Nitrogen	mg/l	0.030	0.029	3.4
09-A015961	Nitrate	mg/l	5.14	4.20	20.
09-A015935	Nitrate	mg/l	< 0.3	< 0.3	
09-A015961	Nitrite	mg/l	0.252	0.306	19.
09-A015935	Nitrite	mg/l	< 0.05	< 0.05	
09-A016098	Total Dissolved Solids	mg/l	< 1	< 1	
09-A015929	Turbidity	NTU	0.15	0.14	6.9
09-A015939	Turbidity	NTU	0.13	0.14	7.4
09-A015949	Turbidity	NTU	0.08	0.08	0.00
09-A015965	Turbidity	NTU	17.	17.	0.00
09-A016048	Silica as SiO2	mg/l	< 0.01	< 0.01	
09-A016067	Silica as SiO2	mg/l	< 0.01	< 0.01	

MATRIX SPIKES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	SMPL+ SPK	SPK AMT	RECOVERY
09-A015886	Ammonia Nitrogen	mg/l	5.00	10.2	5.00	104.00 %
09-A016007	Ammonia Nitrogen	mg/l	0.388	0.790	0.500	80.40 %
09-A016012	Ammonia Nitrogen	mg/l	0.167	0.690	0.500	104.60 %
09-A016119	Ammonia Nitrogen	mg/l	0.047	0.579	0.500	106.40 %
09-A015961	Nitrate	mg/l	5.14	7.84	2.50	108.00 %
09-A015961	Nitrate	mg/l	5.14	8.30	2.50	126.40 %
09-A015929	Nitrate	mg/l	< 0.3	2.80	3.00	93.33 %
09-A015929	Nitrate	mg/l	< 0.3	2.70	3.00	90.00 %
09-A015935	Nitrate	mg/l	< 0.3	2.70	3.00	90.00 %
09-A015935	Nitrate	mg/l	< 0.3	2.60	3.00	86.67 %
09-A016056	Nitrite Nitrogen	mg/l	0.002	0.050	0.050	96.00 %
09-A015961	Nitrite	mg/l	0.252	2.85	2.50	103.92 %
09-A015961	Nitrite	mg/l	0.252	2.48	2.50	89.12 %
09-A015929	Nitrite	mg/l	< 0.05	2.67	3.00	89.00 %

MATRIX SPIKES continued....

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	SMPL+ SPK	SPK AMT	RECOVERY
09-A015929	Nitrite	mg/l	< 0.05	2.50	3.00	83.33 %
09-A015935	Nitrite	mg/l	< 0.05	2.60	3.00	86.67 %
09-A015935	Nitrite	mg/l	< 0.05	2.60	3.00	86.67 %
09-A015927	Aluminum	mg/l	0.02	1.25	1.30	94.62 %
09-A015927	Aluminum	mg/l	0.02	1.16	1.30	87.69 %
09-A015937	Aluminum	mg/l	0.01	1.21	1.30	92.31 %
09-A015937	Aluminum	mg/l	0.01	1.25	1.30	95.38 %
09-A015927	Calcium	mg/l	3.3	4.5	1.3	92.31 %
09-A015927	Calcium	mg/l	3.3	4.3	1.3	76.92 %
09-A015937	Calcium	mg/l	3.3	4.4	1.3	84.62 %
09-A015937	Calcium	mg/l	3.3	4.4	1.3	84.62 %
09-A015927	Iron	mg/l	0.007	1.23	1.30	94.08 %
09-A015927	Iron	mg/l	0.007	1.26	1.30	96.38 %
09-A015937	Iron	mg/l	< 0.005	1.20	1.30	92.31 %
09-A015937	Iron	mg/l	< 0.005	1.25	1.30	96.15 %
09-A016012	Potassium	mg/l	1.1	26.	20.	124.50 %
09-A016012	Potassium	mg/l	1.1	26.	20.	124.50 %
09-A015927	Magnesium	mg/l	0.55	1.8	1.3	96.15 %
09-A015927	Magnesium	mg/l	0.55	1.7	1.3	88.46 %
09-A015937	Magnesium	mg/l	0.54	1.7	1.3	89.23 %
09-A015937	Magnesium	mg/l	0.54	1.8	1.3	96.92 %
09-A015927	Manganese	mg/l	0.0337	1.31	1.30	98.18 %
09-A015927	Manganese	mg/l	0.0337	1.24	1.30	92.79 %
09-A015937	Manganese	mg/l	0.0132	1.28	1.30	97.45 %
09-A015937	Manganese	mg/l	0.0132	1.31	1.30	99.75 %
09-A015927	Sodium	mg/l	7.7	8.7	1.3	76.92 %
09-A015927	Sodium	mg/l	7.7	8.6	1.3	69.23 %
09-A015937	Sodium	mg/l	7.9	9.0	1.3	84.62 %
09-A015937	Sodium	mg/l	7.9	8.8	1.3	69.23 %

MATRIX SPIKE DUPLICATES

SAMPLE #	ANALYTE	UNITS	SAMPLE + SPK	MSD VALUE	RPD
Spike	Nitrate	mg/l	7.84	8.30	5.7
Spike	Nitrate	mg/l	2.80	2.70	3.6
Spike	Nitrate	mg/l	2.70	2.60	3.8
Spike	Nitrite	mg/l	2.85	2.48	14.
Spike	Nitrite	mg/l	2.67	2.50	6.6
Spike	Nitrite	mg/l	2.60	2.60	0.00
Spike	Aluminum	mg/l	1.25	1.16	7.5
Spike	Aluminum	mg/l	1.21	1.25	3.3
Spike	Calcium	mg/l	4.5	4.3	4.5
Spike	Calcium	mg/l	4.4	4.4	0.00
Spike	Iron	mg/l	1.23	1.26	2.4
Spike	Iron	mg/l	1.20	1.25	4.1
Spike	Potassium	mg/l	26.	26.	0.00
Spike	Magnesium	mg/l	1.8	1.7	5.7
Spike	Magnesium	mg/l	1.7	1.8	5.7
Spike	Manganese	mg/l	1.31	1.24	5.5
Spike	Manganese	mg/l	1.28	1.31	2.3
Spike	Sodium	mg/l	8.7	8.6	1.2
Spike	Sodium	mg/l	9.0	8.8	2.2

QC Summary for sample numbers: 09-A015959 to 09-A015966...

STANDARD REFERENCE MATERIALS

ANALYTE	UNITS	TRUE VALUE	MEASURED VALUE	RECOVERY
Alkalinity (as CaCO3)	mg/l	240	240	100. %
Total Organic Carbon	mg/l	100	95.	95.0 %
Ammonia Nitrogen	mg/l	0.250	0.259	104. %
Ammonia Nitrogen	mg/l	0.250	0.250	100. %
Ammonia Nitrogen	mg/l	0.250	0.263	105. %
Ammonia Nitrogen	mg/l	0.250	0.255	102. %
Nitrate	mg/l	1.00	1.07	107. %
Nitrate	mg/l	1.00	1.10	110. %
Nitrite Nitrogen	mg/l	0.057	0.054	94.7 %
Nitrite	mg/l	1.00	1.07	107. %
Nitrite	mg/l	1.00	1.06	106. %
Total Dissolved Solids	mg/l	350	360	103. %
Total Dissolved Solids	mg/l	350	360	103. %
Aluminum	mg/l	4.00	3.88	97.0 %
Aluminum	mg/l	4.00	3.79	94.8 %
Calcium	mg/l	4.0	3.8	95.0 %
Calcium	mg/l	4.0	4.0	100. %
Iron	mg/l	4.00	3.88	97.0 %
Iron	mg/l	4.00	4.06	102. %
Potassium	mg/l	4.0	4.1	102. %
Potassium	mg/l	4.0	3.7	92.5 %
Magnesium	mg/l	4.0	4.0	100. %
Magnesium	mg/l	4.0	3.9	97.5 %
Manganese	mg/l	0.800	0.789	98.6 %
Manganese	mg/l	0.800	0.824	103. %
Sodium	mg/l	4.0	4.0	100. %
Sodium	mg/l	4.0	3.9	97.5 %
Silica as SiO2	mg/l	7.4	6.8	91.9 %
Silica as SiO2	mg/l	7.4	6.6	89.2 %

BLANKS

ANALYTE	UNITS	RESULT
Alkalinity (as CaCO3)	mg/l	< 1
C-Alkalinity (as CaCO3)	mg/l	< 1
Total Organic Carbon	mg/l	< 1
Ammonia Nitrogen	mg/l	< 0.005
Ammonia Nitrogen	mg/l	< 0.005
Ammonia Nitrogen	mg/l	< 0.005
Ammonia Nitrogen	mg/l	< 0.005
Nitrate	mg/l	< 0.05
Nitrate	mg/l	< 0.05
Nitrite Nitrogen	mg/l	< 0.001
Nitrite	mg/l	< 0.01
Nitrite	mg/l	< 0.01

BLANKS continued....

ANALYTE	UNITS	RESULT
Total Dissolved Solids	mg/l	< 1
Total Dissolved Solids	mg/l	< 1
Aluminum	mg/l	< 0.01
Aluminum	mg/l	< 0.01
Calcium	mg/l	< 0.05
Calcium	mg/l	< 0.05
Iron	mg/l	< 0.005
Iron	mg/l	< 0.005
Potassium	mg/l	< 0.1
Potassium	mg/l	< 0.1
Potassium	mg/l	< 0.1
Magnesium	mg/l	< 0.05
Magnesium	mg/l	< 0.05
Manganese	mg/l	< 0.0005
Manganese	mg/l	< 0.0005
Sodium	mg/l	< 0.05
Sodium	mg/l	< 0.05
Silica as SiO2	mg/l	< 0.01
Silica as SiO2	mg/l	< 0.01

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Synthetic Organic Chemicals (SOC's) Analysis Report
EPA Test Method - EPA 505

System ID#:		System Name:	AMTEST WASHINGTON		
Lab/Sample Number:	125 34531	Collect Date:	9/29/2009	DOH Source #:	
Multiple Source Nos:		Sample Type:		Sample Purpose:	
Date Received:	10/1/2009	Date Reported:	10/8/2009	Supervisor:	JWC
Date Analyzed:	10/3/2009				
County:		Sample Location:	15959		
Report To:	Address:	13600 NE 126TH PL, SUITE C			
	City, State, ZIP	KIRKLAND, WA 98034			
	Phone Number:	425-885-1664			

EPA Regulated

DOH #	Analytes	Result	Units	SRL	Trigger	MCL	Method	Analyst
33	Endrin	ND	ug/L	0.02	0.02	2	EPA 505	SAT
34	Lindane (HCH gamma)	ND	ug/L	0.04	0.04	0.2	EPA 505	SAT
35	Methoxychlor	ND	ug/L	0.2	0.2	40	EPA 505	SAT
36	Toxaphene	ND	ug/L	2	2	3	EPA 505	SAT
122	Chlordane (Total)	ND	ug/L	0.4	0.4	2	EPA 505	SAT

EPA Unregulated

DOH #	Analytes	Result	Units	SRL	Trigger	MCL	Method	Analyst
118	Aldrin	ND	ug/L	0.2	0.2		EPA 505	SAT
123	Dieldrin	ND	ug/L	0.2	0.2		EPA 505	SAT
173	Aroclor 1221	ND	ug/L	0.5	0.5		EPA 505	SAT
174	Aroclor 1232	ND	ug/L	0.1	0.5		EPA 505	SAT
175	Aroclor 1242	ND	ug/L	0.1	0.3		EPA 505	SAT
176	Aroclor 1248	ND	ug/L	0.1	0.1		EPA 505	SAT
177	Aroclor 1254	ND	ug/L	0.1	0.1		EPA 505	SAT
178	Aroclor 1260	ND	ug/L	0.1	0.2		EPA 505	SAT
179	Aroclor 1016	ND	ug/L	0.2	0.2		EPA 505	SAT

State Unregulated

DOH #	Analytes	Result	Units	SRL	Trigger	MCL	Method	Analyst
233	4,4'-DDE	ND	ug/L	0.1	0.1		EPA 505	SAT
234	4,4'-DDT	ND	ug/L	0.1	0.1		EPA 505	SAT
234	4,4'-DDD	ND	ug/L	0.1	0.1		EPA 505	SAT

Notes: ND = Not Detected within the sensitivity of the instrument
Numerical Entry = Detection at level indicated
SRL - Minimum reporting level for Washington DOH

MCL - EPA maximum contaminant level
Trigger - Washington DOH response level. If results exceed this level, contact the DOH

Lab Supervisor: John W. Coddington

Date: 10/8/2009

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Synthetic Organic Chemicals (SOC's) Analysis Report
EPA Test Method - EPA 505

System ID#:		System Name:	AMTEST WASHINGTON		
Lab/Sample Number:	125 34532	Collect Date:	9/29/2009	DOH Source #:	
Multiple Source Nos:		Sample Type:		Sample Purpose:	
Date Received:	10/1/2009	Date Reported:	10/8/2009	Supervisor:	JWC
Date Analyzed:	10/3/2009				
County:		Sample Location:	15961		
Report To:	Address:	13600 NE 126TH PL, SUITE C			
	City, State, ZIP	KIRKLAND, WA 98034			
	Phone Number:	425-885-1664			

EPA Regulated

DOH #	Analytes	Result	Units	SRL	Trigger	MCL	Method	Analyst
33	Endrin	ND	ug/L	0.02	0.02	2	EPA 505	SAT
34	Lindane (HCH gamma)	ND	ug/L	0.04	0.04	0.2	EPA 505	SAT
35	Methoxychlor	ND	ug/L	0.2	0.2	40	EPA 505	SAT
36	Toxaphene	ND	ug/L	2	2	3	EPA 505	SAT
122	Chlordane (Total)	ND	ug/L	0.4	0.4	2	EPA 505	SAT

EPA Unregulated

DOH #	Analytes	Result	Units	SRL	Trigger	MCL	Method	Analyst
118	Aldrin	ND	ug/L	0.2	0.2		EPA 505	SAT
123	Dieldrin	ND	ug/L	0.2	0.2		EPA 505	SAT
173	Aroclor 1221	ND	ug/L	0.5	0.5		EPA 505	SAT
174	Aroclor 1232	ND	ug/L	0.1	0.5		EPA 505	SAT
175	Aroclor 1242	ND	ug/L	0.1	0.3		EPA 505	SAT
176	Aroclor 1248	ND	ug/L	0.1	0.1		EPA 505	SAT
177	Aroclor 1254	ND	ug/L	0.1	0.1		EPA 505	SAT
178	Aroclor 1260	ND	ug/L	0.1	0.2		EPA 505	SAT
179	Aroclor 1016	ND	ug/L	0.2	0.2		EPA 505	SAT

State Unregulated

DOH #	Analytes	Result	Units	SRL	Trigger	MCL	Method	Analyst
233	4,4'-DDE	ND	ug/L	0.1	0.1		EPA 505	SAT
234	4,4'-DDD	ND	ug/L	0.1	0.1		EPA 505	SAT
234	4,4'-DDT	ND	ug/L	0.1	0.1		EPA 505	SAT

Notes: ND = Not Detected within the sensitivity of the instrument
Numerical Entry = Detection at level indicated
SRL - Minimum reporting level for Washington DOH

MCL - EPA maximum contaminant level
Trigger - Washington DOH response level. If results exceed this level, contact the DOH

Lab Supervisor: John W. Coddington **Date:** 10/8/2009

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Synthetic Organic Chemicals (SOC's) Analysis Report
EPA Test Method - EPA 505

System ID#:		System Name:	AMTEST WASHINGTON		
Lab/Sample Number:	125 34533	Collect Date:	9/29/2009	DOH Source #:	
Multiple Source Nos:		Sample Type:		Sample Purpose:	
Date Received:	10/1/2009	Date Reported:	10/8/2009	Supervisor:	JWC
Date Analyzed:	10/3/2009				
County:		Sample Location:	15963		
Report To:	Address:	13600 NE 126TH PL, SUITE C			
	City, State, ZIP	KIRKLAND, WA 98034			
	Phone Number:	425-885-1664			

EPA Regulated

DOH #	Analytes	Result	Units	SRL	Trigger	MCL	Method	Analyst
33	Endrin	ND	ug/L	0.02	0.02	2	EPA 505	SAT
34	Lindane (HCH gamma)	ND	ug/L	0.04	0.04	0.2	EPA 505	SAT
35	Methoxychlor	ND	ug/L	0.2	0.2	40	EPA 505	SAT
36	Toxaphene	ND	ug/L	2	2	3	EPA 505	SAT
122	Chlordane (Total)	ND	ug/L	0.4	0.4	2	EPA 505	SAT

EPA Unregulated

DOH #	Analytes	Result	Units	SRL	Trigger	MCL	Method	Analyst
118	Aldrin	ND	ug/L	0.2	0.2		EPA 505	SAT
123	Dieldrin	ND	ug/L	0.2	0.2		EPA 505	SAT
173	Aroclor 1221	ND	ug/L	0.5	0.5		EPA 505	SAT
174	Aroclor 1232	ND	ug/L	0.1	0.5		EPA 505	SAT
175	Aroclor 1242	ND	ug/L	0.1	0.3		EPA 505	SAT
176	Aroclor 1248	ND	ug/L	0.1	0.1		EPA 505	SAT
177	Aroclor 1254	ND	ug/L	0.1	0.1		EPA 505	SAT
178	Aroclor 1260	ND	ug/L	0.1	0.2		EPA 505	SAT
179	Aroclor 1016	ND	ug/L	0.2	0.2		EPA 505	SAT

State Unregulated

DOH #	Analytes	Result	Units	SRL	Trigger	MCL	Method	Analyst
233	4,4'-DDE	ND	ug/L	0.1	0.1		EPA 505	SAT
234	4,4'-DDD	ND	ug/L	0.1	0.1		EPA 505	SAT
234	4,4'-DDT	ND	ug/L	0.1	0.1		EPA 505	SAT

Notes: ND = Not Detected within the sensitivity of the instrument
Numerical Entry = Detection at level indicated
SRL - Minimum reporting level for Washington DOH

MCL - EPA maximum contaminant level
Trigger - Washington DOH response level. If results exceed this level, contact the DOH

Lab Supervisor: John W. Coddington

Date: 10/8/2009

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Synthetic Organic Chemicals (SOC's) Analysis Report
EPA Test Method - EPA 505

System ID#:		System Name:	AMTEST WASHINGTON		
Lab/Sample Number:	125 34534	Collect Date:	9/29/2009	DOH Source #:	
Multiple Source Nos:		Sample Type:		Sample Purpose:	
Date Received:	10/1/2009	Date Reported:	10/8/2009	Supervisor:	JWC
Date Analyzed:	10/3/2009				
County:		Sample Location:	15965		
Report To:	Address:	13600 NE 126TH PL, SUITE C			
	City, State, ZIP	KIRKLAND, WA 98034			
	Phone Number:	425-885-1664			

EPA Regulated

DOH #	Analytes	Result	Units	SRL	Trigger	MCL	Method	Analyst
33	Endrin	ND	ug/L	0.02	0.02	2	EPA 505	SAT
34	Lindane (HCH gamma)	ND	ug/L	0.04	0.04	0.2	EPA 505	SAT
35	Methoxychlor	ND	ug/L	0.2	0.2	40	EPA 505	SAT
36	Toxaphene	ND	ug/L	2	2	3	EPA 505	SAT
122	Chlordane (Total)	ND	ug/L	0.4	0.4	2	EPA 505	SAT

EPA Unregulated

DOH #	Analytes	Result	Units	SRL	Trigger	MCL	Method	Analyst
118	Aldrin	ND	ug/L	0.2	0.2		EPA 505	SAT
123	Dieldrin	ND	ug/L	0.2	0.2		EPA 505	SAT
173	Aroclor 1221	ND	ug/L	0.5	0.5		EPA 505	SAT
174	Aroclor 1232	ND	ug/L	0.1	0.5		EPA 505	SAT
175	Aroclor 1242	ND	ug/L	0.1	0.3		EPA 505	SAT
176	Aroclor 1248	ND	ug/L	0.1	0.1		EPA 505	SAT
177	Aroclor 1254	ND	ug/L	0.1	0.1		EPA 505	SAT
178	Aroclor 1260	ND	ug/L	0.1	0.2		EPA 505	SAT
179	Aroclor 1016	ND	ug/L	0.2	0.2		EPA 505	SAT

State Unregulated

DOH #	Analytes	Result	Units	SRL	Trigger	MCL	Method	Analyst
233	4,4'-DDE	ND	ug/L	0.1	0.1		EPA 505	SAT
234	4,4'-DDT	ND	ug/L	0.1	0.1		EPA 505	SAT
234	4,4'-DDD	ND	ug/L	0.1	0.1		EPA 505	SAT

Notes: ND = Not Detected within the sensitivity of the instrument
Numerical Entry = Detection at level indicated
SRL - Minimum reporting level for Washington DOH

MCL - EPA maximum contaminant level
Trigger - Washington DOH response level. If results exceed this level, contact the DOH

Lab Supervisor: John W. Coddington (signature)

Date: 10/8/2009

APPENDIX C

NATIONAL AND STATE DRINKING WATER STANDARDS

The following tables list the primary USEPA's minimum contaminant levels, and the primary TCEQ's minimum contaminant levels:

Contaminants	National Standards	Texas Standards
Inorganic Chemicals	**MCL[2] or TT[3] (mg/L)[4]**	**MCL[2] or TT[3] (mg/L)[4]**
Antimony	0.006	0.006
Arsenic	0.01	0.01
Asbestos (fiber >10 micrometers)	7 MFL	7 MFL
Barium	2	2
Beryllium	0.004	0.004
Cadmium	0.005	0.005
Chromium (total)	0.1	0.1
Copper	Action Level=1.3; TT[6]	1.3
Cyanide (as free cyanide)	0.2	0.2
Fluoride	4.0	4.0
Lead	Action Level=0.015; TT[6]	0.015
Inorganic Mercury	0.002	0.002
Nitrate (measured as Nitrogen)	10	10
Nitrite (measured as Nitrogen)	1	1
Selenium	0.05	0.05
Thallium	0.002	0.002
Organic Chemicals	**MCL[2] or TT[3] (mg/L)[4]**	**MCL[2] or TT[3] (mg/L)[4]**
Acrylamide	TT[7]	
Alachlor	0.002	0.002
Atrazine	0.003	0.003
Benzene	0.005	0.005
Benzo(a)pyrene	0.0002	0.0002
Carbofuran	0.04	0.04
Carbon tetrachloride	0.005	0.005
Chlordane	0.002	0.002
Contaminants	**National Standards**	**Texas Standards**
Organic Chemicals (Continued)	**MCL[2] or TT[3] (mg/L)[4]**	**MCL[2] or TT[3] (mg/L)[4]**
Chlorobenzene	0.1	0.1
2,4-D	0.07	
Dalapon	0.2	0.2
1,2-Dibromo-3-chloropropane (DBCP)	0.0002	0.0002
o-Dichlorobenzene	0.6	0.6
p-Dichlorobenzene	0.075	0.075
1,2-Dichloroethane	0.005	0.005
1-1-Dichloroethylene	0.007	0.007
cis-1, 2-Dichloroethylene	0.07	0.07
trans-1,2-Dichloroethylene	0.1	0.1
Dichloromethane	0.005	0.005
1-2-Dichloropropane	0.005	0.005
Di(2-ethylhexyl)adipate	0.4	0.4
Di(2-ethylhexyl)phthalate	0.006	0.006
Dinoseb	0.007	0.007
Dioxin (2,3,7,8-TCDD)	0.00000003	0.00000003
Diquat	0.02	0.02
Endothall	0.1	0.1
Endrin	0.002	0.002

Epichlorohydrin	TT[7]	
Ethylbenzene	0.7	0.7
Ethelyne dibromide	0.00005	0.00005
Glyphosate	0.7	0.7
Heptachlor	0.0004	0.0004
Heptachlor epoxide	0.0002	0.0002
Hexachlorobenzene	0.001	0.001
Hexachlorocyclopentadiene	0.05	0.05
Lindane	0.0002	0.0002
Methoxychlor	0.04	0.04
Oxamyl (Vydate)	0.2	0.2
Polychlorinated biphenyls (PCBs)	0.0005	0.0005
Pentachlorophenol	0.001	0.001
Picloram	0.5	0.5
Simazine	0.004	0.004
Styrene	0.1	0.1
Tetrachloroethylene	0.005	0.005
Toluene	1	1
Total Trihalomethanes (TTHMs)	0.08	
Toxaphene	0.003	0.003
2,4,5-TP (Silvex)	0.05	0.05
1,2,4-Trichlorobenzene	0.07	0.07
1,1,1-Trichloroethane	0.2	0.2
1,1,2-Trichloroethane	0.005	0.005
Trichloroethylene	0.005	0.005
Vinyl chloride	0.002	0.002
Xylenes (total)	10	10
Radionuclides	**MCL[2] or TT[3] (mg/L)[4]**	**MCL[2] or TT[3] (mg/L)[4]**
Beta particles and photon emitters	4 millirems per year	
Gross alpha particle activity	15 picocuries per Liter (pCi/L)	
Radium 226 and Radium 228 (combined)	5 pCi/L	
Microorganisms	**MCL[2] or TT[3] (mg/L)[4]**	**MCL[2] or TT[3] (mg/L)[4]**
Giardia lamblia	TT[8]	
Heterotrophic plate count	TT[8]	
Legionella	TT[8]	
Total Coliforms (including fecal coliform and E. Coli)	5.0%[9]	
Turbidity	TT[8]	
Viruses (enteric)	TT[8]	

The following table lists the secondary USEPA's minimum contaminant levels, and the secondary TCEQ's minimum contaminant levels:

Contaminant	**National Secondary Standard**	**Texas Secondary Standard**
Aluminum	0.05 to 0.2 mg/L	0.05 to 0.2 mg/L
Chloride	250 mg/L	300 mg/L
Color	15 (color units)	15 (color units)

Copper	1.0 mg/L	1.0 mg/L
Corrosivity	Non-corrosive	Non-corrosive
Fluoride	2.0 mg/L	2.0 mg/L
Foaming Agents	0.5 mg/L	0.5 mg/L
Iron	0.3 mg/L	0.3 mg/L
Manganese	0.05 mg/L	0.05 mg/L
Odor	3 threshold odor number	3 threshold odor number
pH	6.5-8.5	>7.0
Silver	0.10 mg/L	0.10 mg/L
Sulfate	250 mg/L	300 mg/L
Total Dissolved Solids	500 mg/L	1,000 mg/L
Zinc	5 mg/L	5 mg/L

Notes

[1] Maximum Contaminant Level Goal (MCLG) - The maximum level of a contaminant in drinking water at which no known or anticipated adverse effect on the health effect of persons would occur, and which allows for an adequate margin of safety. MCLGs are non-enforceable public health goals.

[2] Maximum Contaminant Level (MCL) - The maximum permissible level of a contaminant in water which is delivered to any user of a public water system. MCLs are enforceable standards. The margins of safety in MCLGs ensure that exceeding the MCL slightly does not pose significant risk to public health.

[3] Treatment Technique - An enforceable procedure or level of technical performance which public water systems must follow to ensure control of a contaminant.

[4] Units are in milligrams per Liter (mg/L) unless otherwise noted.

[5] MCLGs were not established before the 1986 Amendments to the Safe Drinking Water Act. Therefore, there is no MCLG for this contaminant.

[6] Lead and copper are regulated in a Treatment Technique which requires systems to take tap water samples at sites with lead pipes or copper pipes that have lead solder and/or are served by lead service lines. The action level, which triggers water systems into taking treatment steps if exceeded in more than 10% of tap water samples, for copper is 1.3 mg/L, and for lead is 0.015mg/L.

[7] Each water system must certify, in writing, to the state (using third-party or manufacturer's certification) that when acrylamide and epichlorohydrin are used in drinking water systems, the combination (or product) of dose and monomer level does not exceed the levels specified, as follows:

- **Acrylamide** = 0.05% dosed at 1 mg/L (or equivalent)
- **Epichlorohydrin** = 0.01% dosed at 20 mg/L (or equivalent)

[8] The Surface Water Treatment Rule requires systems using surface water or ground water under the direct influence of surface water to (1) disinfect their water, and (2) filter their water or meet criteria for avoiding filtration so that the following contaminants are controlled at the following levels:

- ***Giardia lamblia**:* 99.9% killed/inactivated
  Viruses: 99.99% killed/inactivated
- ***Legionella**:* No limit, but EPA believes that if *Giardia* and viruses are inactivated, *Legionella* will also be controlled.
- **Turbidity**: At no time can turbidity (cloudiness of water) go above 5 nephelolometric turbidity units (NTU); systems that filter must ensure that the turbidity go no higher than 1 NTU (0.5 NTU for conventional or direct filtration) in at least 95% of the daily samples in any month.
- **HPC**: NO more than 500 bacterial colonies per milliliter.

[9] No more than 5.0% samples total coliform-positive in a month. (For water systems that collect fewer than 40 routine samples per month, no more than one sample can be total coliform-positive). Every sample that has total coliforms must be analyzed for fecal coliforms. There cannot be any fecal coliforms.

[10] Fecal coliform and *E. coli* are bacteria whose presence indicates that the water may be contaminated with human animal wastes. Microbes in these wastes can cause diarrhea, cramps, nausea, headaches, or other symptoms.

APPENDIX D

DETAILED COST ESTIMATES

Hildago County Draing District No. 1 - Water treatment Plant					7/13/2010
Plant Capcity of		3		MGD	
Project Cost Estimate				Factor =	0.30
Option A High Rate Actiflo + DMF + Drying Beds Configuration Option					
DIV	ITEM DESCRIPTION	Unit Quant	Unit	Unit Cost	Total Cost
GENERAL ITEMS including Shop+Admin.+Lab		Size = 40' x 100' x 15'			
1	General Requirements				
	Bonds & Insurance		LS	250000	250000
	Mobilization		LS	150000	150000
2	Sitework				
	Clearing & Grubbing / General Grading	1	LS	20000	20000
	Curb & Gutter	2600	LF	18	46800
	Asphalt Surfacing	3000	SY	20	60000
	Chain Link Fencing (6 ft)	2500	LF	10	25000
	Landscaping	1	LS	100000	100000
2	Yard Piping				
	Plant Influent - 36"	200	LF	125	25000
	Plant Sewer & Manholes (8" PVC)	2000	LF	40	80000
	Water Distribution & Valves (6" PVC)	1500	LF	30	45000
	Plant Effluent - 30 "	200	LF	120	24000
3	Concrete				
	Miscellaneous	100	CY	500	50000
5	Metals				
	Aluminum Railing	500	LF	25	12500
	Misc Metal Fabrications	1	LS	100000	100000
7	Thermal & Moisture Protection				
	Dampproofing	4000	SF	3	12000
	Downspouts & Scuppers	250	LF	30	7500
8	Doors & Windows				
	Doors-Operations Area				
	Exterior (Pedestrian)	4	EA	2000	8000
	Interior (Pedestrian)	8	EA	1500	12000
	Roll Up Door (8 x 10)	1	EA	5500	5500
	Windows- Operations Area	200	SF	15	3000
9	Finishes	0	0	0	0
	Misc. Painting (Piping)	1	LS	50000	50000
	General Office & Misc.	2500	SF	20	50000
	Restrooms	100	SF	25	2500
11	Equipment	0	0	0	0
	House Water System	1	LS	20000	20000
12	Furnishings				
	Laboratory	1	LS	30000	30000
	Miscellaneous	1	LS	50000	50000
13	Special Construction				
	Security System	1	LS	50000	50000
15	Mechanical				
	HVAC	4000	SF	30	120000
	Fire Protection	4000	SF	4	16000
	Plumbing	4000	SF	4	16000
16	Electrical				
	Standby Generator	1	LS	100000	100000
	Electrical Work (20% of Div 11)	1	LS	581800	581800
	Instrumentation & Control (35% of Div 11)	1	LS	1018150	1018150
	Subtotal for General Items for WTP				$ 3,140,750
Operations & Maintenance Facilities		Size = 40' x 100' x 15'			
2	Sitework				
	Excavation	400	CY	4	3200
	Backfill	200	CY	10	3000
3	Cast-in-Place Concrete				
	Slabs on Grade	100	CY	350	35000
	Walls	100	CY	450	45000
	Suspended Slabs & Beams	60	CY	600	36000
	Columns	25	CY	600	15000
	Precast Roofing	4000	SF	8	32000
	Garage / Shop				
	Slabs on Grade	75	CY	350	26250
	Walls	300	CY	450	135000
4	Masonry				
	Composite Wall (8" block, 4"brick)	4200	SF	15	63000
6	Wood And Plastics				
	Fiberglass Chemical Storage Tanks Alum (8000 gal)	1	EA	8000	8000
	Fiberglass Chemical Storage Tanks Permanganate (2500 g	2	EA	2500	5000
	Fiberglass Chemical Storage Tanks Caustic Soda (8000 ga	1	EA	8000	8000
	Polymer Day Tanks (250 gal)	6	EA	500	3000
	Fiberglass Chemical Storage Tanks NaOCL (whole system	1	EA	50000	50000
7	Thermal & Moisture Protection				
	Membrane Roofing (including ballast)	4000	SF	1.5	6000
	Rigid Insulation (Roof)	4000	SF	1.25	5000
	Roof Flashing	400	LF	12	4800
8	Doors & Windows				
	Doors-Operations Area				
	Exterior (Pedestrian)	2	EA	2000	4000
	Interior (Pedestrian)	4	EA	1500	6000
	Roll Up Door (8 x 10)	1	EA	5500	5500
	Windows- Operations Area	200	SF	15	3000
9	Finishes				
	Interior				
	Operations Complex				
	Chemical Area	150	SF	50	7500
	Restrooms / Lockers	250	SF	25	6250
	Carpeting	150	SY	30	4500
	Misc Trim & Finishes	1	LS	10000	10000
	Acoustical Suspended Ceiling (Operations Area)	400	SF	7	2800
	Vinyl Composition Flooring	1000	SF	3.7	3700
10	Specialties				
	Operations Bldg.				
	Lockers	1	LS	2500	2500
	Toilet Accessories	1	LS	2500	2500
11	Equipment				
	Chemical Transfer Pumps (25 gpm @ 50' TDH)	2	EA	20000	40000
	Alum Chemical Feed Metering Pumps (15-20 gph)	3	EA	4500	13500
	Polymer Feed System	1	EA		
	Garage / Shop		0	10000	10000
	Misc.	1	LS	20000	20000
	Subtotal for Operations & Maintenance Facilities				$ 625,000

DIV	ITEM DESCRIPTION	Unit Quant	Unit	Unit Cost	Total Cost
High Rate Clarification		Size =	80	70	25
2	**Sitework**				
	Excavation	240	CY	**$4**	$ 960
	Backfill	120	CY	**$10**	$ 1,200
3	**Cast-in-Place Concrete**				
	Concrete Basins	90	CY	$500	$ 45,000
	Slabs on Grade	45	CY	$350	$ 15,750
	Walls	18	CY	$450	$ 8,100
	Suspended Slabs & Beams	8	CY	$600	$ 4,500
	Columns	8	CY	$600	$ 4,500
	Precast Roofing	1,080	SF	$8	$ 8,640
	Wall Panels	930	SF	$8	$ 7,440
4	**Masonry**				
	Interior (8" Concrete Block)	450	SF	$5	$ 2,250
7	**Thermal & Moisture Protection**				
	Membrane Roofing (including ballast)	324	SF	$1.50	$ 486
	Rigid Insulation (Roof)	324	SF	$1.25	$ 405
	Rigid Insulation (Wall)	780	SF	$0.50	$ 390
	Roof Flashing	47	SF	$12.00	$ 558
8	**Doors & Windows**				
	Doors				
	Exterior (Pedestrian)	2	EA	$2,000	$ 4,000
	Interior (Pedestrian)		EA	$1,500	$ -
	Windows	70	SF	$10	$ 700
9	**Finishes**				
	Interior Finishes	300	SF	$4	$ 1,200
11	**Equipment**				
	10% Sand Attration per Year	1	LS	$3,000	$ 3,000
	High Rate Clarification Equipment	1	LS	**$1,000,000**	$ 1,000,000
15	**Mechanical**				
	Piping				
	36"	120	LF	$432	$ 51,840
	20"	20	LF	$48	$ 960
	Valves w/Actuator				
	36" BFV	4	EA	$20,000	$ 80,000
	20" BFV	2	EA	$12,000	$ 24,000
	Sluice Gates				
	36"		EA		$ -
		Subtotal for High Rate Clarification			**$ 1,265,879**
Filter Complex		Size =	80	110	25
2	**Sitework**				
	Excavation	450	CY	**$4**	$ 1,800
	Backfill	300	CY	**$10**	$ 3,000
2	**Yard Piping**				
	Filter Effluent - 30"	300	LF	$120	$ 36,000
	Backwash Supply - 20"	250	LF	$80	$ 20,000
3	**Cast-in-Place Concrete**				
	Slabs on Grade	45	CY	$350	$ 15,750
	Walls	68	CY	$450	$ 30,375
	Suspended Slabs & Beams	60	CY	$600	$ 36,000
	Columns	6	CY	$600	$ 3,600
	Precast Roofing	8,800	SF	$8	$ 70,400
4	**Masonry**				
	Composite Wall (8" block, 4"brick)	1,200	SF	$15	$ 18,000
7	**Thermal & Moisture Protection**				
	Membrane Roofing (including ballast)	8,800	SF	$1.50	$ 13,200
	Rigid Insulation (Roof)	8,800	SF	$1.25	$ 11,000
	Rigid Insulation (Wall)	360	SF	$0.50	$ 180
	Roof Flashing	38	SF	$12.00	$ 450
8	**Doors & Windows**				
	Doors				
	Exterior (Pedestrian)	2	EA	$2,000	$ 4,000
	Windows	150	SF	$10	$ 1,500
9	**Interior Finishes**	1,155	SF	$4	$ 4,620
11	**Equipment**				
	Filter Media	1	LS	**$30,000**	$ 30,000
	Underdrain	1	LS	**$150,000**	$ 150,000
	Wash Troughs + Agitator	1	LS	**$400,000**	$ 400,000
	Instrumentation & Controls	1	LS	**$350,000**	$ 350,000
	Backwash Water Pumps				
	2,500 gpm @ 30'TDH	**6**	EA	$50,000	$ 300,000
	Compressed Air Package	1	LS	**$200,000**	$ 200,000
	Surface Water Pumps				
	300gpm @ 100' TDH	2	EA	$14,000	$ 28,000
15	**Mechanical**				
	Piping				
	30" Drain	100	LF	$72	$ 7,200
	20" Filter Influent	40	LF	$48	$ 1,920
	20" Back Wash Supply	100	LF	$48	$ 4,800
	20" Back Wash Supply (Suction & Discharge)	40	LF	$48	$ 1,920
	12" Filter Drain	80	LF	$29	$ 2,304
	Valves w/Actuator				
	20" BFV	12	EA	$12,000	$ 144,000
	12" BFV	4	EA	$6,000	$ 24,000
	Piping				
	8" Suction & Discharge	100	LF	$48	$ 4,800
	Valves w/Actuator				
	8" BFV	4	EA	$2,000	$ 8,000
			Subtotal Filter Complex		**$ 1,914,019**

DIV	ITEM DESCRIPTION	Unit Quant	Unit	Unit Cost	Total Cost
Clearwell & Effluent Pumping Facilities					
2	**Sitework**	Size =	80	120	10
	Excavation	1,500	CY	**$4**	$ 6,000
	Backfill	750	CY	**$10**	$ 7,500
2	**Yard Piping**				
	Reservoir Overflow/Drain - 18"	250	LF	$72	$ 18,000
3	**Cast-in-Place Concrete**				
	Slabs on Grade	105	CY	$350	$ 36,750
	Walls	240	CY	$450	$ 108,000
	Suspended Slabs & Beams	75	CY	$600	$ 45,000
	Columns	15	CY	$600	$ 9,000
	Precast Roofing	330	SF	$8	$ 2,640
4	**Masonry**				
	Composite Wall (8" block, 4" brick)	600	SF	$15	$ 9,000
	Interior (8" Concrete Block)	1,500	SF	$5	$ 7,500
7	**Thermal & Moisture Protection**				
	Membrane Roofing (including ballast)	300	SF	$1.50	$ 450
	Reservoir Membrane	1,500	SF	$2.00	$ 3,000
	Rigid Insulation (Roof)	300	SF	$1.25	$ 375
	Rigid Insulation (Wall)	1,531	SF	$0.50	$ 766
	Roof Flashing	42	SF	$12.00	$ 504
8	**Doors & Windows**				
	Doors				
	Exterior (Pedestrian)	1	EA	$2,000	$ 2,000
	Roll Up Door (8 x 10)	1	EA	$5,500	$ 5,500
	Windows	50	SF	$10	$ 500
9	**Interior Finishes**	1,000	SF	$4	$ 4,000
11	**Equipment**				
	Effluent Pumping Station				
	Effluent Pumps				
	3500 gpm @ 200'TDH	**2**	EA	$80,000	$ 160,000
15	**Mechanical**				
	Effluent Pumping Station				
	Piping				
	30" Effluent	50	LF	$72	$ 3,600
	24" Suction & Discharge	50	LF	$58	$ 2,880
	Valves w/Actuator				
	24" BFV	6	EA	$15,000	$ 90,000
	18" BFV (Drain)	1	EA	$9,000	$ 9,000
				Subtotal Clearwell	**$ 531,965**
Plant Waste-Handling incd. Backwash holding + Sludge Holding/Recycling Basin					
2	**Sitework**				
	Excavation	**1,800**	CY	**$4**	$ 7,200
	Backfill	750	CY	**$10**	$ 7,500
2	**Yard Piping**				
	Wash Water Recovery - 30"	250	LF	$120	$ 30,000
	Wash Water Return - 12"	300	LF	$48	$ 14,400
	Sediment Transmission Line - 12"	650	LF	$48	$ 31,200
	Decant Return Line - 8"	1,000	LF	$32	$ 32,000
	Wash Water By-pass - 24"	200	LF	$96	$ 19,200
3	**Cast-in-Place Concrete**				
	Slabs on Grade	23	CY	$350	$ 7,875
	Walls	15	CY	$450	$ 6,750
	Suspended Slabs	8	CY	$600	$ 4,500
	Columns	0	CY	$600	$ -
	Precast Roofing	0	SF	$8	$ -
4	**Mebbrane Lining**				
	5-mil lining	**10,500**	SF	$2	$ 21,000
7	**Backwash Holding Tank - Concrete**				
	Slab on Grade	140	CY	$350.00	$ 49,000
	Walls	100	CY	$450.00	$ 45,000
	Suspended Slab	50	CY	$600.00	$ 30,000
	Column	0	CY	$600.00	$ -
8	**Doors & Windows**				
	Exterior (Pedestrian)	0	EA	$2,000	$ -
	Roll Up Door (8 x 10)	0	EA	$5,500	$ -
	Windows	0	SF	$10	$ -
9	**Interior Finishes**	0	SF	$4	$ -
11	**Equipment**				
	Filter Backwah Transfer Pumps 2000 gpm at 50'	2	EA	$30,000	$ 60,000
	Sludge Recycle Return Pumps				
	7000 gpm @ 100' TDH	2	LS	$45,000	$ 90,000
15	**Mechanical**				
	Piping				
	8" Suction & Discharge	60	LF	$19	$ 1,152
	12" Combined Return (2 Pumps)	60	LF	$29	$ 1,728
	Valves w/Actuator				
	8" BFV	4	EA	$2,000	$ 8,000
	8" Check	2	EA	$1,000	$ 2,000
	12" BFV	1	EA	$6,000	$ 6,000
	Subtotal WW Recovery Basin Complex				**$ 474,505**

DIV	ITEM DESCRIPTION	Unit Quant	Unit	Unit Cost	Total Cost
Chlorine Feed System Building		Size =	20	20	25
2	**Sitework**				
	Excavation	100	CY	**$4**	$ 400
	Backfill	100	CY	**$10**	$ 1,000
2	**Piping**				
	Chlorine Solution Piping	2,000	LF	$10	$ 20,000
3	**Cast-in-Place Concrete**				
	Slabs on Grade	15	CY	$350	$ 5,250
	Walls	30	CY	$450	$ 13,500
	Suspended Slabs & Beams	0	CY	$600	$ -
	Columns	0	CY	$600	$ -
	Precast Roofing	400	SF	$8	$ 3,200
4	**Salt Storage Tank**				
	RFP Storge Tank Mounted Outside of Building	1	LF	$5,000	$ 5,000
7	**Thermal & Moisture Protection**				
	Membrane Roofing (including ballast)	400	SF	$1.50	$ 600
	Rigid Insulation (Roof)	400	SF	$1.25	$ 500
	Rigid Insulation (Wall)	1,000	SF	$0.50	$ 500
	Roof Flashing	140	SF	$12.00	$ 1,680
8	**Doors & Windows**				
	Doors				
	Exterior (Pedestrian)	1	EA	$2,000	$ 2,000
	Roll Up Door (8 x 10)	1	EA	$5,500	$ 5,500
	Windows	12	SF	$10	$ 120
9	**Interior Finishes**	1,125	SF	$4	$ 4,500
11	**Equipment**				
	Regulators, Switchovers, Feeders, Analyzer,	**1**	**LS**	**$100,000**	**$ 100,000**

DIV	ITEM DESCRIPTION	Unit Quant	Unit	Unit Cost	Total Cost
	Leak Detector, Dual Ton Scale				
		Subtotal Chlorine Building			**$ 163,750**

DIV	ITEM DESCRIPTION	Unit Quant	Unit	Unit Cost		Total Cost
Sludge Drying Beds						
2	**Sitework**					
	Excavation	150	CY	**$4**	$	600
	Backfill	30	CY	**$10**	$	300
3	**Cast-in-Place Concrete**					
	Slabs on Grade	210	CY	$350	$	73,500
	Walls	45	CY	$450	$	20,250
	Suspended Slabs & Beams	0	CY	$600	$	-
	Columns	0	CY	$600	$	-
	Precast Roofing	0	SF	$8	$	-
4	**Masonry**					
	Composite Wall (8" block, 4" brick)	0	SF	$15	$	-
7	**Thermal & Moisture Protection**					
	Membrane Roofing (including ballast)	0	SF	$1.50	$	-
	Rigid Insulation (Roof)	0	SF	$1.25	$	-
	Rigid Insulation (Wall)	0	SF	$0.50	$	-
	Roof Flashing	0	SF	$12.00	$	-
8	**Doors & Windows**					
	Doors					
	Exterior (Pedestrian)	0	EA	$2,000	$	-
	Windows	0	SF	$10	$	-
9	**Interior Finishes**	0	SF	$4	$	-
11	**Equipment**					
	Pumps					
	3500 gpm @ 100' TDH	2	EA	$35,000	$	70,000
15	**Mechanical**					
	Piping					
	6" Suction & Discharge	60	LF	$48	$	2,880
	8" Combined Return (2 Pumps)	60	LF	$64	$	3,840
	Valves w/Actuator					
	6" BFV	4	EA	$1,000	$	4,000
	6" Check	2	EA	$750	$	1,500
	8" BFV	1	EA	$2,000	$	2,000
		Subtotal Decant Pump Station			**$**	**178,870**

Other						
2	**Sitework**					
	Manhole	10	EA	$2,000	$	20,000
		Subtotal Sendimentation Ponds			**$**	**20,000**

SUBTOTAL	**$**	**8,314,738**
Construction Contingency (30%)	**$**	**2,494,421**
Engineering, Survey & Const Mngmnt (20%)	**$**	**2,161,832**
PROJECT TOTAL	**$**	**12,970,991**

Cost ($/MG) ***$4.32***

Hildago County Draing District No. 1 - Water treatment Plant					7/13/2010
Plant Capcity of		5		MGD	
Project Cost Estimate				Factor =	0.50
Option A High Rate Actiflo + DMF + Drying Beds Configuration Option					
DIV	ITEM DESCRIPTION	Unit Quant	Unit	Unit Cost	Total Cost
GENERAL ITEMS including Shop+Admin.+Lab		Size = 40' x 100' x 15'			
1	General Requirements				
	Bonds & Insurance		LS	250000	250000
	Mobilization		LS	150000	150000
2	Sitework				
	Clearing & Grubbing / General Grading	1	LS	20000	20000
	Curb & Gutter	2600	LF	18	46800
	Asphalt Surfacing	3000	SY	20	60000
	Chain Link Fencing (6 ft)	2500	LF	10	25000
	Landscaping	1	LS	100000	100000
2	Yard Piping				
	Plant Influent - 36"	200	LF	125	25000
	Plant Sewer & Manholes (8" PVC)	2000	LF	40	80000
	Water Distribution & Valves (6" PVC)	1500	LF	30	45000
	Plant Effluent - 30 "	200	LF	120	24000
3	Concrete				
	Miscellaneous	100	CY	500	50000
5	Metals				
	Aluminum Railing	500	LF	25	12500
	Misc Metal Fabrications	1	LS	100000	100000
7	Thermal & Moisture Protection				
	Dampproofing	4000	SF	3	12000
	Downspouts & Scuppers	250	LF	30	7500
8	Doors & Windows				
	Doors-Operations Area				
	Exterior (Pedestrian)	4	EA	2000	8000
	Interior (Pedestrian)	8	EA	1500	12000
	Roll Up Door (8 x 10)	1	EA	5500	5500
	Windows- Operations Area	200	SF	15	3000
9	Finishes	0	0	0	0
	Misc. Painting (Piping)	1	LS	50000	50000
	General Office & Misc.	2500	SF	20	50000
	Restrooms	100	SF	25	2500
11	Equipment	0	0	0	0
	House Water System	1	LS	20000	20000
12	Furnishings				
	Laboratory	1	LS	30000	30000
	Miscellaneous	1	LS	50000	50000
13	Special Construction				
	Security System	1	LS	50000	50000
15	Mechanical				
	HVAC	4000	SF	30	120000
	Fire Protection	4000	SF	4	16000
	Plumbing	4000	SF	4	16000
16	Electrical				
	Standby Generator	1	LS	100000	100000
	Electrical Work (20% of Div 11)	1	LS	581800	581800
	Instrumentation & Control (35% of Div 11)	1	LS	1018150	1018150
	Subtotal for General Items for WTP				$ 3,140,750
Operations & Maintenance Facilities		Size = 40' x 100' x 15'			
2	Sitework				
	Excavation	400	CY	4	3200
	Backfill	200	CY	10	3000
3	Cast-in-Place Concrete				
	Slabs on Grade	100	CY	350	35000
	Walls	100	CY	450	45000
	Suspended Slabs & Beams	60	CY	600	36000
	Columns	25	CY	600	15000
	Precast Roofing	4000	SF	8	32000
	Garage / Shop				
	Slabs on Grade	75	CY	350	26250
	Walls	300	CY	450	135000
4	Masonry				
	Composite Wall (8" block, 4"brick)	4200	SF	15	63000
6	Wood And Plastics				
	Fiberglass Chemical Storage Tanks Alum (8000 gal)	1	EA	8000	8000
	Fiberglass Chemical Storage Tanks Permanganate (2500 g	2	EA	2500	5000
	Fiberglass Chemical Storage Tanks Caustic Soda (8000 ga	1	EA	8000	8000
	Polymer Day Tanks (250 gal)	6	EA	500	3000
	Fiberglass Chemical Storage Tanks NaOCL (whole system	1	EA	50000	50000
7	Thermal & Moisture Protection				
	Membrane Roofing (including ballast)	4000	SF	1.5	6000
	Rigid Insulation (Roof)	4000	SF	1.25	5000
	Roof Flashing	400	LF	12	4800
8	Doors & Windows				
	Doors-Operations Area				
	Exterior (Pedestrian)	2	EA	2000	4000
	Interior (Pedestrian)	4	EA	1500	6000
	Roll Up Door (8 x 10)	1	EA	5500	5500
	Windows- Operations Area	200	SF	15	3000
9	Finishes				
	Interior				
	Operations Complex				
	Chemical Area	150	SF	50	7500
	Restrooms / Lockers	250	SF	25	6250
	Carpeting	150	SY	30	4500
	Misc Trim & Finishes	1	LS	10000	10000
	Acoustical Suspended Ceiling (Operations Area)	400	SF	7	2800
	Vinyl Composition Flooring	1000	SF	3.7	3700
10	Specialties				
	Operations Bldg.				
	Lockers	1	LS	2500	2500
	Toilet Accessories	1	LS	2500	2500
11	Equipment				
	Chemical Transfer Pumps (25 gpm @ 50' TDH)	2	EA	20000	40000
	Alum Chemical Feed Metering Pumps (15-20 gph)	3	EA	4500	13500
	Polymer Feed System	1	EA		
	Garage / Shop		0	10000	10000
	Misc.	1	LS	20000	20000
	Subtotal for Operations & Maintenance Facilities				$ 625,000

DIV	ITEM DESCRIPTION	Unit Quant	Unit	Unit Cost		Total Cost
High Rate Clarification		Size =	80	70		25
2	**Sitework**					
	Excavation	400	CY	**$4**	$	1,600
	Backfill	200	CY	**$10**	$	2,000
3	**Cast-in-Place Concrete**					
	Concrete Basins	150	CY	$500	$	75,000
	Slabs on Grade	75	CY	$350	$	26,250
	Walls	30	CY	$450	$	13,500
	Suspended Slabs & Beams	13	CY	$600	$	7,500
	Columns	13	CY	$600	$	7,500
	Precast Roofing	1,800	SF	$8	$	14,400
	Wall Panels	1,550	SF	$8	$	12,400
4	**Masonry**					
	Interior (8" Concrete Block)	750	SF	$5	$	3,750
7	**Thermal & Moisture Protection**					
	Membrane Roofing (including ballast)	900	SF	$1.50	$	1,350
	Rigid Insulation (Roof)	900	SF	$1.25	$	1,125
	Rigid Insulation (Wall)	1,300	SF	$0.50	$	650
	Roof Flashing	78	SF	$12.00	$	930
8	**Doors & Windows**					
	Doors					
	Exterior (Pedestrian)	2	EA	$2,000	$	4,000
	Interior (Pedestrian)		EA	$1,500	$	-
	Windows	70	SF	$10	$	700
9	**Finishes**					
	Interior Finishes	500	SF	$4	$	2,000
11	**Equipment**					
	10% Sand Attration per Year	1	LS	$5,000	$	5,000
	High Rate Clarification Equipment	1	LS	**$1,200,000**	$	1,200,000
15	**Mechanical**					
	Piping					
	36"	120	LF	$432	$	51,840
	20"	20	LF	$80	$	1,600
	Valves w/Actuator					
	36" BFV	4	EA	$20,000	$	80,000
	20" BFV	2	EA	$12,000	$	24,000
	Sluice Gates					
	36"		EA		$	-
	Subtotal for High Rate Clarification				**$**	**1,537,095**
Filter Complex		Size =	80	110		25
2	**Sitework**					
	Excavation	750	CY	**$4**	$	3,000
	Backfill	500	CY	**$10**	$	5,000
2	**Yard Piping**					
	Filter Effluent - 30"	300	LF	$120	$	36,000
	Backwash Supply - 20"	250	LF	$80	$	20,000
3	**Cast-in-Place Concrete**					
	Slabs on Grade	75	CY	$350	$	26,250
	Walls	113	CY	$450	$	50,625
	Suspended Slabs & Beams	100	CY	$600	$	60,000
	Columns	10	CY	$600	$	6,000
	Precast Roofing	8,800	SF	$8	$	70,400
4	**Masonry**					
	Composite Wall (8" block, 4"brick)	2,000	SF	$15	$	30,000
7	**Thermal & Moisture Protection**					
	Membrane Roofing (including ballast)	8,800	SF	$1.50	$	13,200
	Rigid Insulation (Roof)	8,800	SF	$1.25	$	11,000
	Rigid Insulation (Wall)	1,000	SF	$0.50	$	500
	Roof Flashing	63	SF	$12.00	$	750
8	**Doors & Windows**					
	Doors					
	Exterior (Pedestrian)	2	EA	$2,000	$	4,000
	Windows	150	SF	$10	$	1,500
9	**Interior Finishes**	1,925	SF	$4	$	7,700
11	**Equipment**					
	Filter Media	1	LS	**$50,000**	$	50,000
	Underdrain	1	LS	**$300,000**	$	300,000
	Wash Troughs + Agitator	1	LS	**$500,000**	$	500,000
	Instrumentation & Controls	1	LS	**$350,000**	$	350,000
	Backwash Water Pumps					
	2,500 gpm @ 30'TDH	**6**	EA	$50,000	$	300,000
	Compressed Air Package	1	LS	**$200,000**	$	200,000
	Surface Water Pumps					
	300gpm @ 100' TDH	2	EA	$14,000	$	28,000
15	**Mechanical**					
	Piping					
	30" Drain	100	LF	$120	$	12,000
	20" Filter Influent	40	LF	$80	$	3,200
	20" Back Wash Supply	100	LF	$80	$	8,000
	20" Back Wash Supply (Suction & Discharge)	40	LF	$80	$	3,200
	12" Filter Drain	80	LF	$48	$	3,840
	Valves w/Actuator					
	20" BFV	12	EA	$12,000	$	144,000
	12" BFV	4	EA	$6,000	$	24,000
	Piping					
	8" Suction & Discharge	100	LF	$80	$	8,000
	Valves w/Actuator					
	8" BFV	4	EA	$2,000	$	8,000
	Subtotal Filter Complex				**$**	**2,272,165**

DIV	ITEM DESCRIPTION	Unit Quant	Unit	Unit Cost		Total Cost
Clearwell & Effluent Pumping Facilities						
2	**Sitework**	Size =	80	120		10
	Excavation	2,500	CY	**$4**	$	10,000
	Backfill	1,250	CY	**$10**	$	12,500
2	**Yard Piping**					
	Reservoir Overflow/Drain - 18"	250	LF	$72	$	18,000
3	**Cast-in-Place Concrete**					
	Slabs on Grade	175	CY	$350	$	61,250
	Walls	400	CY	$450	$	180,000
	Suspended Slabs & Beams	125	CY	$600	$	75,000
	Columns	25	CY	$600	$	15,000
	Precast Roofing	550	SF	$8	$	4,400
4	**Masonry**					
	Composite Wall (8" block, 4" brick)	1,000	SF	$15	$	15,000
	Interior (8" Concrete Block)	2,500	SF	$5	$	12,500
7	**Thermal & Moisture Protection**					
	Membrane Roofing (including ballast)	500	SF	$1.50	$	750
	Reservoir Membrane	2,500	SF	$2.00	$	5,000
	Rigid Insulation (Roof)	500	SF	$1.25	$	625
	Rigid Insulation (Wall)	2,552	SF	$0.50	$	1,276
	Roof Flashing	70	SF	$12.00	$	840
8	**Doors & Windows**					
	Doors					
	Exterior (Pedestrian)	1	EA	$2,000	$	2,000
	Roll Up Door (8 x 10)	1	EA	$5,500	$	5,500
	Windows	50	SF	$10	$	500
9	**Interior Finishes**	1,000	SF	$4	$	4,000
11	**Equipment**					
	Effluent Pumping Station					
	Effluent Pumps					
	3500 gpm @ 200'TDH	2	EA	$80,000	$	160,000
15	**Mechanical**					
	Effluent Pumping Station					
	Piping					
	30" Effluent	50	LF	$120	$	6,000
	24" Suction & Discharge	50	LF	$96	$	4,800
	Valves w/Actuator					
	24" BFV	6	EA	$15,000	$	90,000
	18" BFV (Drain)	1	EA	$9,000	$	9,000
			Subtotal Clearwell		**$**	**693,941**
Plant Waste-Handling incd. Backwash holding + Sludge Holding/Recycling Basin						
2	**Sitework**					
	Excavation	3,000	CY	**$4**	$	12,000
	Backfill	1,250	CY	**$10**	$	12,500
2	**Yard Piping**					
	Wash Water Recovery - 30"	250	LF	$120	$	30,000
	Wash Water Return - 12"	300	LF	$48	$	14,400
	Sediment Transmission Line - 12"	650	LF	$48	$	31,200
	Decant Return Line - 8"	1,000	LF	$32	$	32,000
	Wash Water By-pass - 24"	200	LF	$96	$	19,200
3	**Cast-in-Place Concrete**					
	Slabs on Grade	38	CY	$350	$	13,125
	Walls	25	CY	$450	$	11,250
	Suspended Slabs	13	CY	$600	$	7,500
	Columns	0	CY	$600	$	-
	Precast Roofing	0	SF	$8	$	-
4	**Mebbrane Lining**					
	5-mil lining	17,500	SF	$2	$	35,000
7	**Backwash Holding Tank - Concrete**					
	Slab on Grade	140	CY	$350.00	$	49,000
	Walls	100	CY	$450.00	$	45,000
	Suspended Slab	50	CY	$600.00	$	30,000
	Column	0	CY	$600.00	$	-
8	**Doors & Windows**					
	Exterior (Pedestrian)	0	EA	$2,000	$	-
	Roll Up Door (8 x 10)	0	EA	$5,500	$	-
	Windows	0	SF	$10	$	-
9	**Interior Finishes**	0	SF	$4	$	-
11	**Equipment**					
	Filter Backwah Transfer Pumps 2000 gpm at 50'	2	EA	$30,000	$	60,000
	Sludge Recycle Return Pumps					
	7000 gpm @ 100' TDH	2	LS	$45,000	$	90,000
15	**Mechanical**					
	Piping					
	8" Suction & Discharge	60	LF	$32	$	1,920
	12" Combined Return (2 Pumps)	60	LF	$48	$	2,880
	Valves w/Actuator					
	8" BFV	4	EA	$2,000	$	8,000
	8" Check	2	EA	$1,000	$	2,000
	12" BFV	1	EA	$6,000	$	6,000
	Subtotal WW Recovery Basin Complex				**$**	**512,975**

Chlorine Feed System Building		Size =	20	20		25
2	**Sitework**					
	Excavation	100	CY	**$4**	$	400
	Backfill	100	CY	**$10**	$	1,000
2	**Piping**					
	Chlorine Solution Piping	2,000	LF	$10	$	20,000
3	**Cast-in-Place Concrete**					
	Slabs on Grade	15	CY	$350	$	5,250
	Walls	30	CY	$450	$	13,500
	Suspended Slabs & Beams	0	CY	$600	$	-
	Columns	0	CY	$600	$	-
	Precast Roofing	400	SF	$8	$	3,200
4	**Salt Storage Tank**					
	RFP Storge Tank Mounted Outside of Building	1	LF	$5,000	$	5,000
7	**Thermal & Moisture Protection**					
	Membrane Roofing (including ballast)	400	SF	$1.50	$	600
	Rigid Insulation (Roof)	400	SF	$1.25	$	500
	Rigid Insulation (Wall)	1,000	SF	$0.50	$	500
	Roof Flashing	140	SF	$12.00	$	1,680
8	**Doors & Windows**					
	Doors					
	Exterior (Pedestrian)	1	EA	$2,000	$	2,000
	Roll Up Door (8 x 10)	1	EA	$5,500	$	5,500
	Windows	12	SF	$10	$	120
9	**Interior Finishes**	1,125	SF	$4	$	4,500
11	**Equipment**					
	Regulators, Switchovers, Feeders, Analyzer,	**1**	**LS**	**$100,000**	**$**	**100,000**

DIV	ITEM DESCRIPTION	Unit Quant	Unit	Unit Cost	Total Cost
	Leak Detector, Dual Ton Scale				
		Subtotal Chlorine Building			$ 163,750

DIV	ITEM DESCRIPTION	Unit Quant	Unit	Unit Cost		Total Cost
Sludge Drying Beds						
2	**Sitework**					
	Excavation	250	CY	**$4**	$	1,000
	Backfill	50	CY	**$10**	$	500
3	**Cast-in-Place Concrete**					
	Slabs on Grade	350	CY	$350	$	122,500
	Walls	75	CY	$450	$	33,750
	Suspended Slabs & Beams	0	CY	$600	$	-
	Columns	0	CY	$600	$	-
	Precast Roofing	0	SF	$8	$	-
4	**Masonry**					
	Composite Wall (8" block, 4" brick)	0	SF	$15	$	-
7	**Thermal & Moisture Protection**					
	Membrane Roofing (including ballast)	0	SF	$1.50	$	-
	Rigid Insulation (Roof)	0	SF	$1.25	$	-
	Rigid Insulation (Wall)	0	SF	$0.50	$	-
	Roof Flashing	0	SF	$12.00	$	-
8	**Doors & Windows**					
	Doors					
	Exterior (Pedestrian)	0	EA	$2,000	$	-
	Windows	0	SF	$10	$	-
9	**Interior Finishes**	0	SF	$4	$	-
11	**Equipment**					
	Pumps					
	3500 gpm @ 100' TDH	2	EA	$35,000	$	70,000
15	**Mechanical**					
	Piping					
	6" Suction & Discharge	60	LF	$48	$	2,880
	8" Combined Return (2 Pumps)	60	LF	$64	$	3,840
	Valves w/Actuator					
	6" BFV	4	EA	$1,000	$	4,000
	6" Check	2	EA	$750	$	1,500
	8" BFV	1	EA	$2,000	$	2,000
		Subtotal Decant Pump Station			**$**	**241,970**

Other						
2	**Sitework**					
	Manhole	10	EA	$2,000	$	20,000
		Subtotal Sendimentation Ponds			**$**	**20,000**

SUBTOTAL	**$**	**9,207,646**
Construction Contingency (30%)	**$**	**2,762,294**
Engineering, Survey & Const Mngmnt (20%)	**$**	**2,393,988**
PROJECT TOTAL	**$**	**14,363,928**

Cost ($/MG) ***$2.87***

Hildago County Draing District No. 1 - Water treatment Plant					7/13/2010
Plant Capcity of		10		MGD	
Project Cost Estimate					
Option A High Rate Actiflo + DMF + Drying Beds Configuration Option					
DIV	ITEM DESCRIPTION	Unit Quant	Unit	Unit Cost	Total Cost
GENERAL ITEMS including Shop+Admin.+Lab		Size = 40' x 100' x 15'			
1	General Requirements				
	Bonds & Insurance		LS	250000	250000
	Mobilization		LS	150000	150000
2	Sitework				
	Clearing & Grubbing / General Grading	1	LS	20000	20000
	Curb & Gutter	2600	LF	18	46800
	Asphalt Surfacing	3000	SY	20	60000
	Chain Link Fencing (6 ft)	2500	LF	10	25000
	Landscaping	1	LS	100000	100000
2	Yard Piping				
	Plant Influent - 36"	200	LF	125	25000
	Plant Sewer & Manholes (8" PVC)	2000	LF	40	80000
	Water Distribution & Valves (6" PVC)	1500	LF	30	45000
	Plant Effluent - 30 "	200	LF	120	24000
3	Concrete				
	Miscellaneous	100	CY	500	50000
5	Metals				
	Aluminum Railing	500	LF	25	12500
	Misc Metal Fabrications	1	LS	100000	100000
7	Thermal & Moisture Protection				
	Dampproofing	4000	SF	3	12000
	Downspouts & Scuppers	250	LF	30	7500
8	Doors & Windows				
	Doors-Operations Area				
	Exterior (Pedestrian)	4	EA	2000	8000
	Interior (Pedestrian)	8	EA	1500	12000
	Roll Up Door (8 x 10)	1	EA	5500	5500
	Windows- Operations Area	200	SF	15	3000
9	Finishes	0	0	0	0
	Misc. Painting (Piping)	1	LS	50000	50000
	General Office & Misc.	2500	SF	20	50000
	Restrooms	100	SF	25	2500
11	Equipment	0	0	0	0
	House Water System	1	LS	20000	20000
12	Furnishings				
	Laboratory	1	LS	30000	30000
	Miscellaneous	1	LS	50000	50000
13	Special Construction				
	Security System	1	LS	50000	50000
15	Mechanical				
	HVAC	4000	SF	30	120000
	Fire Protection	4000	SF	4	16000
	Plumbing	4000	SF	4	16000
16	Electrical				
	Standby Generator	1	LS	100000	100000
	Electrical Work (20% of Div 11)	1	LS	581800	581800
	Instrumentation & Control (35% of Div 11)	1	LS	1018150	1018150
	Subtotal for General Items for WTP				$ 3,140,750
Operations & Maintenance Facilities		Size = 40' x 100' x 15'			
2	Sitework				
	Excavation	400	CY	4	3200
	Backfill	200	CY	10	3000
3	Cast-in-Place Concrete				
	Slabs on Grade	100	CY	350	35000
	Walls	100	CY	450	45000
	Suspended Slabs & Beams	60	CY	600	36000
	Columns	25	CY	600	15000
	Precast Roofing	4000	SF	8	32000
	Garage / Shop				
	Slabs on Grade	75	CY	350	26250
	Walls	300	CY	450	135000
4	Masonry				
	Composite Wall (8" block, 4"brick)	4200	SF	15	63000
6	Wood And Plastics				
	Fiberglass Chemical Storage Tanks Alum (8000 gal)	1	EA	8000	8000
	Fiberglass Chemical Storage Tanks Permanganate (2500 g	2	EA	2500	5000
	Fiberglass Chemical Storage Tanks Caustic Soda (8000 ga	1	EA	8000	8000
	Polymer Day Tanks (250 gal)	6	EA	500	3000
	Fiberglass Chemical Storage Tanks NaOCL (whole system	1	EA	50000	50000
7	Thermal & Moisture Protection				
	Membrane Roofing (including ballast)	4000	SF	1.5	6000
	Rigid Insulation (Roof)	4000	SF	1.25	5000
	Roof Flashing	400	LF	12	4800
8	Doors & Windows				
	Doors-Operations Area				
	Exterior (Pedestrian)	2	EA	2000	4000
	Interior (Pedestrian)	4	EA	1500	6000
	Roll Up Door (8 x 10)	1	EA	5500	5500
	Windows- Operations Area	200	SF	15	3000
9	Finishes				
	Interior				
	Operations Complex				
	Chemical Area	150	SF	50	7500
	Restrooms / Lockers	250	SF	25	6250
	Carpeting	150	SY	30	4500
	Misc Trim & Finishes	1	LS	10000	10000
	Acoustical Suspended Ceiling (Operations Area)	400	SF	7	2800
	Vinyl Composition Flooring	1000	SF	3.7	3700
10	Specialties				
	Operations Bldg.				
	Lockers	1	LS	2500	2500
	Toilet Accessories	1	LS	2500	2500
11	Equipment				
	Chemical Transfer Pumps (25 gpm @ 50' TDH)	2	EA	20000	40000
	Alum Chemical Feed Metering Pumps (15-20 gph)	3	EA	4500	13500
	Polymer Feed System	1	EA		
	Garage / Shop		0	10000	10000
	Misc.	1	LS	20000	20000
	Subtotal for Operations & Maintenance Facilities				$ 625,000

DIV	ITEM DESCRIPTION	Unit Quant	Unit	Unit Cost	Total Cost
High Rate Clarification		Size =	60	70	25
2	**Sitework**				
	Excavation	800	CY	**$4**	$ 3,200
	Backfill	400	CY	**$10**	$ 4,000
3	**Cast-in-Place Concrete**				
	Concrete Basins	300	CY	$500	$ 150,000
	Slabs on Grade	150	CY	$350	$ 52,500
	Walls	60	CY	$450	$ 27,000
	Suspended Slabs & Beams	25	CY	$600	$ 15,000
	Columns	25	CY	$600	$ 15,000
	Precast Roofing	3,600	SF	$8	$ 28,800
	Wall Panels	3,100	SF	$8	$ 24,800
4	**Masonry**				
	Interior (8" Concrete Block)	1,500	SF	$5	$ 7,500
7	**Thermal & Moisture Protection**				
	Membrane Roofing (including ballast)	3,600	SF	$1.50	$ 5,400
	Rigid Insulation (Roof)	3,600	SF	$1.25	$ 4,500
	Rigid Insulation (Wall)	2,600	SF	$0.50	$ 1,300
	Roof Flashing	155	SF	$12.00	$ 1,860
8	**Doors & Windows**				
	Doors				
	Exterior (Pedestrian)	2	EA	$2,000	$ 4,000
	Interior (Pedestrian)		EA	$1,500	$ -
	Windows	70	SF	$10	$ 700
9	**Finishes**				
	Interior Finishes	1,000	SF	$4	$ 4,000
11	**Equipment**				
	10% Sand Attration per Year	1	LS	$10,000	$ 10,000
	High Rate Clarification Equipment	1	LS	**$2,500,000**	$ 2,500,000
15	**Mechanical**				
	Piping				
	36"	120	LF	$288	$ 34,560
	20"	20	LF	$160	$ 3,200
	Valves w/Actuator				
	36" BFV	4	EA	$20,000	$ 80,000
	20" BFV	2	EA	$12,000	$ 24,000
	Sluice Gates				
	36"		EA		$ -
		Subtotal for High Rate Clarification			**$ 3,001,320**
Filter Complex		Size =	80	80	25
2	**Sitework**				
	Excavation	1,500	CY	**$4**	$ 6,000
	Backfill	1,000	CY	**$10**	$ 10,000
2	**Yard Piping**				
	Filter Effluent - 30"	300	LF	$120	$ 36,000
	Backwash Supply - 20"	250	LF	$80	$ 20,000
3	**Cast-in-Place Concrete**				
	Slabs on Grade	150	CY	$350	$ 52,500
	Walls	225	CY	$450	$ 101,250
	Suspended Slabs & Beams	200	CY	$600	$ 120,000
	Columns	20	CY	$600	$ 12,000
	Precast Roofing	6,400	SF	$8	$ 51,200
4	**Masonry**				
	Composite Wall (8" block, 4"brick)	4,000	SF	$15	$ 60,000
7	**Thermal & Moisture Protection**				
	Membrane Roofing (including ballast)	6,400	SF	$1.50	$ 9,600
	Rigid Insulation (Roof)	6,400	SF	$1.25	$ 8,000
	Rigid Insulation (Wall)	4,000	SF	$0.50	$ 2,000
	Roof Flashing	125	SF	$12.00	$ 1,500
8	**Doors & Windows**				
	Doors				
	Exterior (Pedestrian)	2	EA	$2,000	$ 4,000
	Windows	150	SF	$10	$ 1,500
9	**Interior Finishes**	3,850	SF	$4	$ 15,400
11	**Equipment**				
	Filter Media	1	LS	**$100,000**	$ 100,000
	Underdrain	1	LS	**$600,000**	$ 600,000
	Wash Troughs + Agitator	1	LS	**$600,000**	$ 600,000
	Instrumentation & Controls	1	LS	**$350,000**	$ 350,000
	Backwash Water Pumps				
	2,500 gpm @ 30'TDH	4	EA	$50,000	$ 200,000
	Compressed Air Package	1	LS	**$200,000**	$ 200,000
	Surface Water Pumps				
	300gpm @ 100' TDH	2	EA	$14,000	$ 28,000
15	**Mechanical**				
	Piping				
	30" Drain	100	LF	$240	$ 24,000
	20" Filter Influent	40	LF	$160	$ 6,400
	20" Back Wash Supply	100	LF	$160	$ 16,000
	20" Back Wash Supply (Suction & Discharge)	40	LF	$160	$ 6,400
	12" Filter Drain	80	LF	$96	$ 7,680
	Valves w/Actuator				
	20" BFV	12	EA	$12,000	$ 144,000
	12" BFV	4	EA	$6,000	$ 24,000
	Piping				
	8" Suction & Discharge	100	LF	$160	$ 16,000
	Valves w/Actuator				
	8" BFV	4	EA	$2,000	$ 8,000
				Subtotal Filter Complex	**$ 2,817,430**

DIV	ITEM DESCRIPTION	Unit Quant	Unit	Unit Cost	Total Cost
Clearwell & Effluent Pumping Facilities					
2	**Sitework**	Size =	60	104	10
	Excavation	5,000	CY	**$4**	$ 20,000
	Backfill	2,500	CY	**$10**	$ 25,000
2	**Yard Piping**				
	Reservoir Overflow/Drain - 18"	250	LF	$72	$ 18,000
3	**Cast-in-Place Concrete**				
	Slabs on Grade	350	CY	$350	$ 122,500
	Walls	800	CY	$450	$ 360,000
	Suspended Slabs & Beams	250	CY	$600	$ 150,000
	Columns	50	CY	$600	$ 30,000
	Precast Roofing	1,100	SF	$8	$ 8,800
4	**Masonry**				
	Composite Wall (8" block, 4" brick)	2,000	SF	$15	$ 30,000
	Interior (8" Concrete Block)	5,000	SF	$5	$ 25,000
7	**Thermal & Moisture Protection**				
	Membrane Roofing (including ballast)	1,000	SF	$1.50	$ 1,500
	Reservoir Membrane	5,000	SF	$2.00	$ 10,000
	Rigid Insulation (Roof)	1,000	SF	$1.25	$ 1,250
	Rigid Insulation (Wall)	5,104	SF	$0.50	$ 2,552
	Roof Flashing	140	SF	$12.00	$ 1,680
8	**Doors & Windows**				
	Doors				
	Exterior (Pedestrian)	1	EA	$2,000	$ 2,000
	Roll Up Door (8 x 10)	1	EA	$5,500	$ 5,500
	Windows	50	SF	$10	$ 500
9	**Interior Finishes**	1,000	SF	$4	$ 4,000
11	**Equipment**				
	Effluent Pumping Station				
	Effluent Pumps				
	3500 gpm @ 200'TDH	4	EA	$80,000	$ 320,000
15	**Mechanical**				
	Effluent Pumping Station				
	Piping				
	30" Effluent	50	LF	$240	$ 12,000
	24" Suction & Discharge	50	LF	$192	$ 9,600
	Valves w/Actuator				
	24" BFV	6	EA	$15,000	$ 90,000
	18" BFV (Drain)	1	EA	$9,000	$ 9,000
				Subtotal Clearwell	**$ 1,258,882**
Plant Waste-Handling incd. Backwash holding + Sludge Holding/Recycling Basin					
2	**Sitework**				
	Excavation	6,000	CY	**$4**	$ 24,000
	Backfill	2,500	CY	**$10**	$ 25,000
2	**Yard Piping**				
	Wash Water Recovery - 30"	250	LF	$120	$ 30,000
	Wash Water Return - 12"	300	LF	$48	$ 14,400
	Sediment Transmission Line - 12"	650	LF	$48	$ 31,200
	Decant Return Line - 8"	1,000	LF	$32	$ 32,000
	Wash Water By-pass - 24"	200	LF	$96	$ 19,200
3	**Cast-in-Place Concrete**				
	Slabs on Grade	75	CY	$350	$ 26,250
	Walls	50	CY	$450	$ 22,500
	Suspended Slabs	25	CY	$600	$ 15,000
	Columns	0	CY	$600	$ -
	Precast Roofing	0	SF	$8	$ -
4	**Mebbrane Lining**				
	5-mil lining	35,000	SF	$2	$ 70,000
7	**Backwash Holding Tank - Concrete**				
	Slab on Grade	140	CY	$350.00	$ 49,000
	Walls	100	CY	$450.00	$ 45,000
	Suspended Slab	50	CY	$600.00	$ 30,000
	Column	0	CY	$600.00	$ -
8	**Doors & Windows**				
	Exterior (Pedestrian)	0	EA	$2,000	$ -
	Roll Up Door (8 x 10)	0	EA	$5,500	$ -
	Windows	0	SF	$10	$ -
9	**Interior Finishes**	0	SF	$4	$ -
11	**Equipment**				
	Filter Backwah Transfer Pumps 2000 gpm at 50'	2	EA	$30,000	$ 60,000
	Sludge Recycle Return Pumps				
	7000 gpm @ 100' TDH	2	LS	$45,000	$ 90,000
15	**Mechanical**				
	Piping				
	8" Suction & Discharge	60	LF	$64	$ 3,840
	12" Combined Return (2 Pumps)	60	LF	$96	$ 5,760
	Valves w/Actuator				
	8" BFV	4	EA	$2,000	$ 8,000
	8" Check	2	EA	$1,000	$ 2,000
	12" BFV	1	EA	$6,000	$ 6,000
	Subtotal WW Recovery Basin Complex				**$ 609,150**

Chlorine Feed System Building		Size =	20	20	25
2	**Sitework**				
	Excavation	100	CY	**$4**	$ 400
	Backfill	100	CY	**$10**	$ 1,000
2	**Piping**				
	Chlorine Solution Piping	2,000	LF	$10	$ 20,000
3	**Cast-in-Place Concrete**				
	Slabs on Grade	15	CY	$350	$ 5,250
	Walls	30	CY	$450	$ 13,500
	Suspended Slabs & Beams	0	CY	$600	$ -
	Columns	0	CY	$600	$ -
	Precast Roofing	400	SF	$8	$ 3,200
4	**Salt Storage Tank**				
	RFP Storge Tank Mounted Outside of Building	1	LF	$5,000	$ 5,000
7	**Thermal & Moisture Protection**				
	Membrane Roofing (including ballast)	400	SF	$1.50	$ 600
	Rigid Insulation (Roof)	400	SF	$1.25	$ 500
	Rigid Insulation (Wall)	1,000	SF	$0.50	$ 500
	Roof Flashing	140	SF	$12.00	$ 1,680
8	**Doors & Windows**				
	Doors				
	Exterior (Pedestrian)	1	EA	$2,000	$ 2,000
	Roll Up Door (8 x 10)	1	EA	$5,500	$ 5,500
	Windows	12	SF	$10	$ 120
9	**Interior Finishes**	1,125	SF	$4	$ 4,500
11	**Equipment**				
	Regulators, Switchovers, Feeders, Analyzer,	1	LS	$150,000	$ 150,000

DIV	ITEM DESCRIPTION	Unit Quant	Unit	Unit Cost	Total Cost
	Leak Detector, Dual Ton Scale				
		Subtotal Chlorine Building			$ 213,750

DIV	ITEM DESCRIPTION	Unit Quant	Unit	Unit Cost	Total Cost
Sludge Drying Beds					
2	**Sitework**				
	Excavation	500	CY	**$4**	$ 2,000
	Backfill	100	CY	**$10**	$ 1,000
3	**Cast-in-Place Concrete**				
	Slabs on Grade	700	CY	$350	$ 245,000
	Walls	150	CY	$450	$ 67,500
	Suspended Slabs & Beams	0	CY	$600	$ -
	Columns	0	CY	$600	$ -
	Precast Roofing	0	SF	$8	$ -
4	**Masonry**				
	Composite Wall (8" block, 4" brick)	0	SF	$15	$ -
7	**Thermal & Moisture Protection**				
	Membrane Roofing (including ballast)	0	SF	$1.50	$ -
	Rigid Insulation (Roof)	0	SF	$1.25	$ -
	Rigid Insulation (Wall)	0	SF	$0.50	$ -
	Roof Flashing	0	SF	$12.00	$ -
8	**Doors & Windows**				
	Doors				
	Exterior (Pedestrian)	0	EA	$2,000	$ -
	Windows	0	SF	$10	$ -
9	**Interior Finishes**	0	SF	$4	$ -
11	**Equipment**				
	Pumps				
	3500 gpm @ 100' TDH	3	EA	$35,000	$ 105,000
15	**Mechanical**				
	Piping				
	6" Suction & Discharge	60	LF	$48	$ 2,880
	8" Combined Return (2 Pumps)	60	LF	$64	$ 3,840
	Valves w/Actuator				
	6" BFV	4	EA	$1,000	$ 4,000
	6" Check	2	EA	$750	$ 1,500
	8" BFV	1	EA	$2,000	$ 2,000
		Subtotal Decant Pump Station			**$ 434,720**

DIV	ITEM DESCRIPTION	Unit Quant	Unit	Unit Cost	Total Cost
Other					
2	**Sitework**				
	Manhole	10	EA	$2,000	$ 20,000
		Subtotal Sendimentation Ponds			**$ 20,000**

SUBTOTAL $ 12,121,002
Construction Contingency (30%) $ 3,636,301
Engineering, Survey & Const Mngmnt (20%) $ 3,151,461

PROJECT TOTAL $ 18,908,763

Cost ($/MG) ***$1.89***

Hildago County Draing District No. 1 - Water treatment Plant					7/13/2010
Plant Capcity of		15		MGD	
Project Cost Estimate				Factor =	1.50
Option A High Rate Actiflo + DMF + Drying Beds Configuration Option					
DIV	ITEM DESCRIPTION	Unit Quant	Unit	Unit Cost	Total Cost
GENERAL ITEMS including Shop+Admin.+Lab		Size = 40' x 100' x 15'			
1	General Requirements				
	Bonds & Insurance		LS	250000	250000
	Mobilization		LS	150000	150000
2	Sitework				
	Clearing & Grubbing / General Grading	1	LS	20000	20000
	Curb & Gutter	2600	LF	18	46800
	Asphalt Surfacing	3000	SY	20	60000
	Chain Link Fencing (6 ft)	2500	LF	10	25000
	Landscaping	1	LS	100000	100000
2	Yard Piping				
	Plant Influent - 36"	200	LF	125	25000
	Plant Sewer & Manholes (8" PVC)	2000	LF	40	80000
	Water Distribution & Valves (6" PVC)	1500	LF	30	45000
	Plant Effluent - 30 "	200	LF	120	24000
3	Concrete				
	Miscellaneous	100	CY	500	50000
5	Metals				
	Aluminum Railing	500	LF	25	12500
	Misc Metal Fabrications	1	LS	100000	100000
7	Thermal & Moisture Protection				
	Dampproofing	4000	SF	3	12000
	Downspouts & Scuppers	250	LF	30	7500
8	Doors & Windows				
	Doors-Operations Area				
	Exterior (Pedestrian)	4	EA	2000	8000
	Interior (Pedestrian)	8	EA	1500	12000
	Roll Up Door (8 x 10)	1	EA	5500	5500
	Windows- Operations Area	200	SF	15	3000
9	Finishes	0	0	0	0
	Misc. Painting (Piping)	1	LS	50000	50000
	General Office & Misc.	2500	SF	20	50000
	Restrooms	100	SF	25	2500
11	Equipment	0	0	0	0
	House Water System	1	LS	20000	20000
12	Furnishings				
	Laboratory	1	LS	30000	30000
	Miscellaneous	1	LS	50000	50000
13	Special Construction				
	Security System	1	LS	50000	50000
15	Mechanical				
	HVAC	4000	SF	30	120000
	Fire Protection	4000	SF	4	16000
	Plumbing	4000	SF	4	16000
16	Electrical				
	Standby Generator	1	LS	100000	100000
	Electrical Work (20% of Div 11)	1	LS	581800	581800
	Instrumentation & Control (35% of Div 11)	1	LS	1018150	1018150
	Subtotal for General Items for WTP				$ 3,140,750
Operations & Maintenance Facilities		Size = 40' x 100' x 15'			
2	Sitework				
	Excavation	400	CY	4	3200
	Backfill	200	CY	10	3000
3	Cast-in-Place Concrete				
	Slabs on Grade	100	CY	350	35000
	Walls	100	CY	450	45000
	Suspended Slabs & Beams	60	CY	600	36000
	Columns	25	CY	600	15000
	Precast Roofing	4000	SF	8	32000
	Garage / Shop				
	Slabs on Grade	75	CY	350	26250
	Walls	300	CY	450	135000
4	Masonry				
	Composite Wall (8" block, 4"brick)	4200	SF	15	63000
6	Wood And Plastics				
	Fiberglass Chemical Storage Tanks Alum (8000 gal)	1	EA	8000	8000
	Fiberglass Chemical Storage Tanks Permanganate (2500 g	2	EA	2500	5000
	Fiberglass Chemical Storage Tanks Caustic Soda (8000 ga	1	EA	8000	8000
	Polymer Day Tanks (250 gal)	6	EA	500	3000
	Fiberglass Chemical Storage Tanks NaOCL (whole system	1	EA	50000	50000
7	Thermal & Moisture Protection				
	Membrane Roofing (including ballast)	4000	SF	1.5	6000
	Rigid Insulation (Roof)	4000	SF	1.25	5000
	Roof Flashing	400	LF	12	4800
8	Doors & Windows				
	Doors-Operations Area				
	Exterior (Pedestrian)	2	EA	2000	4000
	Interior (Pedestrian)	4	EA	1500	6000
	Roll Up Door (8 x 10)	1	EA	5500	5500
	Windows- Operations Area	200	SF	15	3000
9	Finishes				
	Interior				
	Operations Complex				
	Chemical Area	150	SF	50	7500
	Restrooms / Lockers	250	SF	25	6250
	Carpeting	150	SY	30	4500
	Misc Trim & Finishes	1	LS	10000	10000
	Acoustical Suspended Ceiling (Operations Area)	400	SF	7	2800
	Vinyl Composition Flooring	1000	SF	3.7	3700
10	Specialties				
	Operations Bldg.				
	Lockers	1	LS	2500	2500
	Toilet Accessories	1	LS	2500	2500
11	Equipment				
	Chemical Transfer Pumps (25 gpm @ 50' TDH)	2	EA	20000	40000
	Alum Chemical Feed Metering Pumps (15-20 gph)	3	EA	4500	13500
	Polymer Feed System	1	EA		
	Garage / Shop		0	10000	10000
	Misc.	1	LS	20000	20000
	Subtotal for Operations & Maintenance Facilities				$ 625,000

DIV	ITEM DESCRIPTION	Unit Quant	Unit	Unit Cost	Total Cost
High Rate Clarification		Size =	80	70	25
2	**Sitework**				
	Excavation	1,200	CY	**$4**	$ 4,800
	Backfill	600	CY	**$10**	$ 6,000
3	**Cast-in-Place Concrete**				
	Concrete Basins	450	CY	$500	$ 225,000
	Slabs on Grade	225	CY	$350	$ 78,750
	Walls	90	CY	$450	$ 40,500
	Suspended Slabs & Beams	38	CY	$600	$ 22,500
	Columns	38	CY	$600	$ 22,500
	Precast Roofing	5,400	SF	$8	$ 43,200
	Wall Panels	4,650	SF	$8	$ 37,200
4	**Masonry**				
	Interior (8" Concrete Block)	2,250	SF	$5	$ 11,250
7	**Thermal & Moisture Protection**				
	Membrane Roofing (including ballast)	8,100	SF	$1.50	$ 12,150
	Rigid Insulation (Roof)	8,100	SF	$1.25	$ 10,125
	Rigid Insulation (Wall)	3,900	SF	$0.50	$ 1,950
	Roof Flashing	233	SF	$12.00	$ 2,790
8	**Doors & Windows**				
	Doors				
	Exterior (Pedestrian)	2	EA	$2,000	$ 4,000
	Interior (Pedestrian)		EA	$1,500	$ -
	Windows	70	SF	$10	$ 700
9	**Finishes**				
	Interior Finishes	1,500	SF	$4	$ 6,000
11	**Equipment**				
	10% Sand Attration per Year	1	LS	$15,000	$ 15,000
	High Rate Clarification Equipment	1	LS	**$3,700,000**	$ 3,700,000
15	**Mechanical**				
	Piping				
	36"	120	LF	$432	$ 51,840
	20"	20	LF	$240	$ 4,800
	Valves w/Actuator				
	36" BFV	4	EA	$20,000	$ 80,000
	20" BFV	2	EA	$12,000	$ 24,000
	Sluice Gates				
	36"		EA		$ -
		Subtotal for High Rate Clarification			**$ 4,405,055**
Filter Complex		Size =	80	110	25
2	**Sitework**				
	Excavation	2,250	CY	**$4**	$ 9,000
	Backfill	1,500	CY	**$10**	$ 15,000
2	**Yard Piping**				
	Filter Effluent - 30"	300	LF	$120	$ 36,000
	Backwash Supply - 20"	250	LF	$80	$ 20,000
3	**Cast-in-Place Concrete**				
	Slabs on Grade	225	CY	$350	$ 78,750
	Walls	338	CY	$450	$ 151,875
	Suspended Slabs & Beams	300	CY	$600	$ 180,000
	Columns	30	CY	$600	$ 18,000
	Precast Roofing	8,800	SF	$8	$ 70,400
4	**Masonry**				
	Composite Wall (8" block, 4"brick)	6,000	SF	$15	$ 90,000
7	**Thermal & Moisture Protection**				
	Membrane Roofing (including ballast)	8,800	SF	$1.50	$ 13,200
	Rigid Insulation (Roof)	8,800	SF	$1.25	$ 11,000
	Rigid Insulation (Wall)	9,000	SF	$0.50	$ 4,500
	Roof Flashing	188	SF	$12.00	$ 2,250
8	**Doors & Windows**				
	Doors				
	Exterior (Pedestrian)	2	EA	$2,000	$ 4,000
	Windows	150	SF	$10	$ 1,500
9	**Interior Finishes**	5,775	SF	$4	$ 23,100
11	**Equipment**				
	Filter Media	1	LS	**$150,000**	$ 150,000
	Underdrain	1	LS	**$800,000**	$ 800,000
	Wash Troughs + Agitator	1	LS	**$700,000**	$ 700,000
	Instrumentation & Controls	1	LS	**$400,000**	$ 400,000
	Backwash Water Pumps				
	2,500 gpm @ 30'TDH	**6**	EA	$50,000	$ 300,000
	Compressed Air Package	1	LS	**$200,000**	$ 200,000
	Surface Water Pumps				
	300gpm @ 100' TDH	2	EA	$14,000	$ 28,000
15	**Mechanical**				
	Piping				
	30" Drain	100	LF	$360	$ 36,000
	20" Filter Influent	40	LF	$240	$ 9,600
	20" Back Wash Supply	100	LF	$240	$ 24,000
	20" Back Wash Supply (Suction & Discharge)	40	LF	$240	$ 9,600
	12" Filter Drain	80	LF	$144	$ 11,520
	Valves w/Actuator				
	20" BFV	12	EA	$12,000	$ 144,000
	12" BFV	4	EA	$6,000	$ 24,000
	Piping				
	8" Suction & Discharge	100	LF	$240	$ 24,000
	Valves w/Actuator				
	8" BFV	4	EA	$2,000	$ 8,000
		Subtotal Filter Complex			**$ 3,565,295**

DIV	ITEM DESCRIPTION	Unit Quant	Unit	Unit Cost	Total Cost
Clearwell & Effluent Pumping Facilities					
2	**Sitework**	Size =	80	120	10
	Excavation	7,500	CY	**$4**	$ 30,000
	Backfill	3,750	CY	**$10**	$ 37,500
2	**Yard Piping**				
	Reservoir Overflow/Drain - 18"	250	LF	$72	$ 18,000
3	**Cast-in-Place Concrete**				
	Slabs on Grade	525	CY	$350	$ 183,750
	Walls	1,200	CY	$450	$ 540,000
	Suspended Slabs & Beams	375	CY	$600	$ 225,000
	Columns	75	CY	$600	$ 45,000
	Precast Roofing	1,650	SF	$8	$ 13,200
4	**Masonry**				
	Composite Wall (8" block, 4" brick)	3,000	SF	$15	$ 45,000
	Interior (8" Concrete Block)	7,500	SF	$5	$ 37,500
7	**Thermal & Moisture Protection**				
	Membrane Roofing (including ballast)	1,500	SF	$1.50	$ 2,250
	Reservoir Membrane	7,500	SF	$2.00	$ 15,000
	Rigid Insulation (Roof)	1,500	SF	$1.25	$ 1,875
	Rigid Insulation (Wall)	7,656	SF	$0.50	$ 3,828
	Roof Flashing	210	SF	$12.00	$ 2,520
8	**Doors & Windows**				
	Doors				
	Exterior (Pedestrian)	1	EA	$2,000	$ 2,000
	Roll Up Door (8 x 10)	1	EA	$5,500	$ 5,500
	Windows	50	SF	$10	$ 500
9	**Interior Finishes**	1,000	SF	$4	$ 4,000
11	**Equipment**				
	Effluent Pumping Station				
	Effluent Pumps				
	3500 gpm @ 200'TDH	6	EA	$80,000	$ 480,000
15	**Mechanical**				
	Effluent Pumping Station				
	Piping				
	30" Effluent	50	LF	$360	$ 18,000
	24" Suction & Discharge	50	LF	$288	$ 14,400
	Valves w/Actuator				
	24" BFV	6	EA	$15,000	$ 90,000
	18" BFV (Drain)	1	EA	$9,000	$ 9,000
				Subtotal Clearwell	**$ 1,823,823**
Plant Waste-Handling incd. Backwash holding + Sludge Holding/Recycling Basin					
2	**Sitework**				
	Excavation	9,000	CY	**$4**	$ 36,000
	Backfill	3,750	CY	**$10**	$ 37,500
2	**Yard Piping**				
	Wash Water Recovery - 30"	250	LF	$120	$ 30,000
	Wash Water Return - 12"	300	LF	$48	$ 14,400
	Sediment Transmission Line - 12"	650	LF	$48	$ 31,200
	Decant Return Line - 8"	1,000	LF	$32	$ 32,000
	Wash Water By-pass - 24"	200	LF	$96	$ 19,200
3	**Cast-in-Place Concrete**				
	Slabs on Grade	113	CY	$350	$ 39,375
	Walls	75	CY	$450	$ 33,750
	Suspended Slabs	38	CY	$600	$ 22,500
	Columns	0	CY	$600	$ -
	Precast Roofing	0	SF	$8	$ -
4	**Mebbrane Lining**				
	5-mil lining	52,500	SF	$2	$ 105,000
7	**Backwash Holding Tank - Concrete**				
	Slab on Grade	140	CY	$350.00	$ 49,000
	Walls	100	CY	$450.00	$ 45,000
	Suspended Slab	50	CY	$600.00	$ 30,000
	Column	0	CY	$600.00	$ -
8	**Doors & Windows**				
	Exterior (Pedestrian)	0	EA	$2,000	$ -
	Roll Up Door (8 x 10)	0	EA	$5,500	$ -
	Windows	0	SF	$10	$ -
9	**Interior Finishes**	0	SF	$4	$ -
11	**Equipment**				
	Filter Backwah Transfer Pumps 2000 gpm at 50'	2	EA	$30,000	$ 60,000
	Sludge Recycle Return Pumps				
	7000 gpm @ 100' TDH	2	LS	$45,000	$ 90,000
15	**Mechanical**				
	Piping				
	8" Suction & Discharge	60	LF	$96	$ 5,760
	12" Combined Return (2 Pumps)	60	LF	$144	$ 8,640
	Valves w/Actuator				
	8" BFV	4	EA	$2,000	$ 8,000
	8" Check	2	EA	$1,000	$ 2,000
	12" BFV	1	EA	$6,000	$ 6,000
	Subtotal WW Recovery Basin Complex				**$ 705,325**

Chlorine Feed System Building		Size =	20	20	25
2	**Sitework**				
	Excavation	100	CY	**$4**	$ 400
	Backfill	100	CY	**$10**	$ 1,000
2	**Piping**				
	Chlorine Solution Piping	2,000	LF	$10	$ 20,000
3	**Cast-in-Place Concrete**				
	Slabs on Grade	15	CY	$350	$ 5,250
	Walls	30	CY	$450	$ 13,500
	Suspended Slabs & Beams	0	CY	$600	$ -
	Columns	0	CY	$600	$ -
	Precast Roofing	400	SF	$8	$ 3,200
4	**Salt Storage Tank**				
	RFP Storge Tank Mounted Outside of Building	1	LF	$5,000	$ 5,000
7	**Thermal & Moisture Protection**				
	Membrane Roofing (including ballast)	400	SF	$1.50	$ 600
	Rigid Insulation (Roof)	400	SF	$1.25	$ 500
	Rigid Insulation (Wall)	1,000	SF	$0.50	$ 500
	Roof Flashing	140	SF	$12.00	$ 1,680
8	**Doors & Windows**				
	Doors				
	Exterior (Pedestrian)	1	EA	$2,000	$ 2,000
	Roll Up Door (8 x 10)	1	EA	$5,500	$ 5,500
	Windows	12	SF	$10	$ 120
9	**Interior Finishes**	1,125	SF	$4	$ 4,500
11	**Equipment**				
	Regulators, Switchovers, Feeders, Analyzer,	1	LS	$200,000	$ 200,000

DIV	ITEM DESCRIPTION	Unit Quant	Unit	Unit Cost	Total Cost
	Leak Detector, Dual Ton Scale				
		Subtotal Chlorine Building			**$ 263,750**

DIV	ITEM DESCRIPTION	Unit Quant	Unit	Unit Cost	Total Cost
Sludge Drying Beds					
2	**Sitework**				
	Excavation	750	CY	**$4**	$ 3,000
	Backfill	150	CY	**$10**	$ 1,500
3	**Cast-in-Place Concrete**				
	Slabs on Grade	1,050	CY	$350	$ 367,500
	Walls	225	CY	$450	$ 101,250
	Suspended Slabs & Beams	0	CY	$600	$ -
	Columns	0	CY	$600	$ -
	Precast Roofing	0	SF	$8	$ -
4	**Masonry**				
	Composite Wall (8" block, 4" brick)	0	SF	$15	$ -
7	**Thermal & Moisture Protection**				
	Membrane Roofing (including ballast)	0	SF	$1.50	$ -
	Rigid Insulation (Roof)	0	SF	$1.25	$ -
	Rigid Insulation (Wall)	0	SF	$0.50	$ -
	Roof Flashing	0	SF	$12.00	$ -
8	**Doors & Windows**				
	Doors				
	Exterior (Pedestrian)	0	EA	$2,000	$ -
	Windows	0	SF	$10	$ -
9	**Interior Finishes**	0	SF	$4	$ -
11	**Equipment**				
	Pumps				
	3500 gpm @ 100' TDH	3	EA	$35,000	$ 105,000
15	**Mechanical**				
	Piping				
	6" Suction & Discharge	60	LF	$48	$ 2,880
	8" Combined Return (2 Pumps)	60	LF	$64	$ 3,840
	Valves w/Actuator				
	6" BFV	4	EA	$1,000	$ 4,000
	6" Check	2	EA	$750	$ 1,500
	8" BFV	1	EA	$2,000	$ 2,000
		Subtotal Decant Pump Station			**$ 592,470**

Other					
2	**Sitework**				
	Manhole	10	EA	$2,000	$ 20,000
		Subtotal Sendimentation Ponds			**$ 20,000**

SUBTOTAL $ 15,141,468
Construction Contingency (30%) $ 4,542,440
Engineering, Survey & Const Mngmnt (20%) $ 3,936,782

PROJECT TOTAL $ 23,620,690

Cost ($/MG) ***$1.57***

Estimated Operation and Maintenance Costs
Option A_ ACTIFLO + DMF
Hildago County Drainage District No. 1
Regional Water Supply Facilities Planning

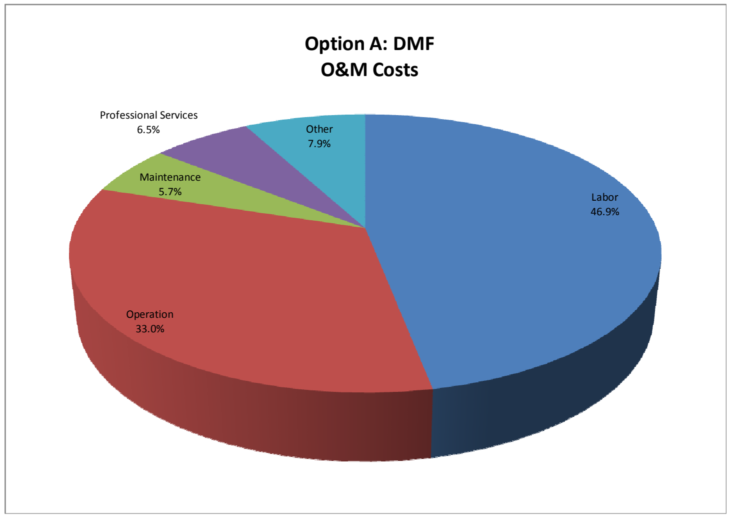
Assumptions:
Design Flow (Peak), mgd: **3.0**
Average Day Flow, mgd: 3
Labor Burden (%) 40
Power Costs, $/kW-h 0.06
Water supply costs not included
Estimated effluent pumping costs included
(total pumping head estimated at 200')

Total			
$696,500	Labor	$ 327,000	46.9%
	Operation	$ 229,500	33.0%
	Maintenance	$ 40,000	5.7%
	Professional Services	$ 45,000	6.5%
	Other	$ 55,000	7.9%
		$ 696,500	1

Description	Unit	Quantity	Unit Cost ($)	Total Cost ($)
Labor				
Plant Manager	EA	1	75,000	75,000
Operators	EA	2	50,000	100,000
Mechanics	EA	1	45,000	45,000
Electrical/Instrumentation	EA	1	65,000	65,000
General Maintenance	EA	1	42,000	42,000
			Subtotal	**327,000**
Operation				
Chemicals	LS	1	15,000	15,000
Sludge Disposal	LS	1	1,500	1,500
Electric Costs				
On-site	LS	1	160,000	160,000
Effluent Pumping	LS	1	45,000	45,000
Other Utilities (Gas & Phone)	LS	1	1,500	1,500
Office Supplies	LS	1	3,000	3,000
Custodial Supplies	LS	1	1,500	1,500
Lab Fees & Supplies	LS	1	2,000	2,000
			Subtotal	**229,500**
Maintenance				
Parts & Replacement	LS	1	40,000	40,000
			Subtotal	**40,000**
Professional Services				
Engineering, Legal & Acctng.	LS	1	45,000	45,000
			Subtotal	**45,000**
Other				
Travel, Training, Dues, etc.	LS	1	15,000	15,000
Insurance	LS	1	40,000	40,000
			Subtotal	**55,000**

TOTAL **$696,500**

Chemical Costs ($/1000G) **$0.01**
Total O&M Costs ($/1000G) **$0.64**



Estimated Operation and Maintenance Costs
Option A_ ACTIFLO + DMF
Hildago County Drainage District No. 1
Regional Water Supply Facilities Planning

Assumptions:

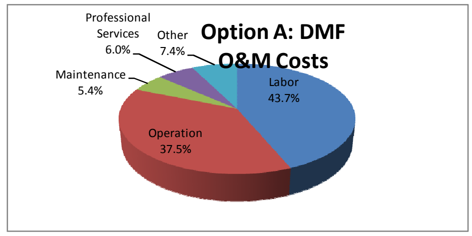
Design Flow (Peak), mgd:	**5.0**
Average Day Flow, mgd:	5
Labor Burden (%)	40
Power Costs, $/kW-h	0.06
Water supply costs not included	
Estimated effluent pumping costs included	
(total pumping head estimated at 200')	

Total				
$747,500	Labor	$	327,000	43.7%
	Operation	$	280,500	37.5%
	Maintenance	$	40,000	5.4%
	Professional Services	$	45,000	6.0%
	Other	$	55,000	7.4%
		$	747,500	100.0%

Description	Unit	Quantity	Unit Cost ($)	Total Cost ($)
Labor				
Plant Manager	EA	1	75,000	75,000
Operators	EA	2	50,000	100,000
Mechanics	EA	1	45,000	45,000
Electrical/Instrumentation	EA	1	65,000	65,000
General Maintenance	EA	1	42,000	42,000
			Subtotal	**327,000**
Operation				
Chemicals	LS	1	25,000	25,000
Sludge Disposal	LS	1	2,500	2,500
Electric Costs				
On-site	LS	1	200,000	200,000
Effluent Pumping	LS	1	45,000	45,000
Other Utilities (Gas & Phone)	LS	1	1,500	1,500
Office Supplies	LS	1	3,000	3,000
Custodial Supplies	LS	1	1,500	1,500
Lab Fees & Supplies	LS	1	2,000	2,000
			Subtotal	**280,500**
Maintenance				
Parts & Replacement	LS	1	40,000	40,000
			Subtotal	**40,000**
Professional Services				
Engineering, Legal & Acctng.	LS	1	45,000	45,000
			Subtotal	**45,000**
Other				
Travel, Training, Dues, etc.	LS	1	15,000	15,000
Insurance	LS	1	40,000	40,000
			Subtotal	**55,000**

TOTAL **$747,500**

Chemical Costs ($/1000G)	**$0.01**
Total O&M Costs ($/1000G)	**$0.41**



Estimated Operation and Maintenance Costs
Option A_ ACTIFLO + DMF
Hildago County Drainage District No. 1
Regional Water Supply Facilities Planning

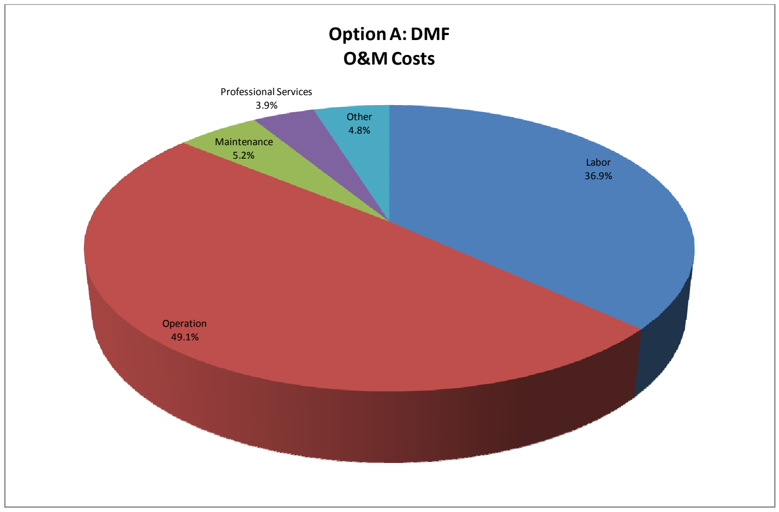
Total	Labor	$ 422,000	36.9%
$1,143,500	Operation	$ 561,500	49.1%
	Maintenance	$ 60,000	5.2%
	Professional Services	$ 45,000	3.9%
	Other	$ 55,000	4.8%
		$1,143,500	100.0%

Assumptions:

Design Flow (Peak), mgd:	**10.0**
Average Day Flow, mgd:	10
Labor Burden (%)	40
Power Costs, $/kW-h	0.06

Water supply costs not included
Estimated effluent pumping costs included
(total pumping head estimated at 200')

Description	Unit	Quantity	Unit Cost ($)	Total Cost ($)
Labor				
Plant Manager	EA	1	75,000	75,000
Operators	EA	3	50,000	150,000
Mechanics	EA	2	45,000	90,000
Electrical/Instrumentation	EA	1	65,000	65,000
General Maintenance	EA	1	42,000	42,000
			Subtotal	**422,000**
Operation				
Chemicals	LS	1	50,000	50,000
Sludge Disposal	LS	1	5,000	5,000
Electric Costs				
On-site	LS	1	400,000	400,000
Effluent Pumping	LS	1	85,000	85,000
Other Utilities (Gas & Phone)	LS	1	15,000	15,000
Office Supplies	LS	1	3,000	3,000
Custodial Supplies	LS	1	1,500	1,500
Lab Fees & Supplies	LS	1	2,000	2,000
			Subtotal	**561,500**
Maintenance				
Parts & Replacement	LS	1	60,000	60,000
			Subtotal	**60,000**
Professional Services				
Engineering, Legal & Acctng.	LS	1	45,000	45,000
			Subtotal	**45,000**
Other				
Travel, Training, Dues, etc.	LS	1	15,000	15,000
Insurance	LS	1	40,000	40,000
			Subtotal	**55,000**
TOTAL				**$1,143,500**



Chemical Costs ($/1000G) **$0.01**
Total O&M Costs ($/1000G) **$0.31**

Estimated Operation and Maintenance Costs
Option A_ ACTIFLO + DMF
Hildago County Drainage District No. 1
Regional Water Supply Facilities Planning

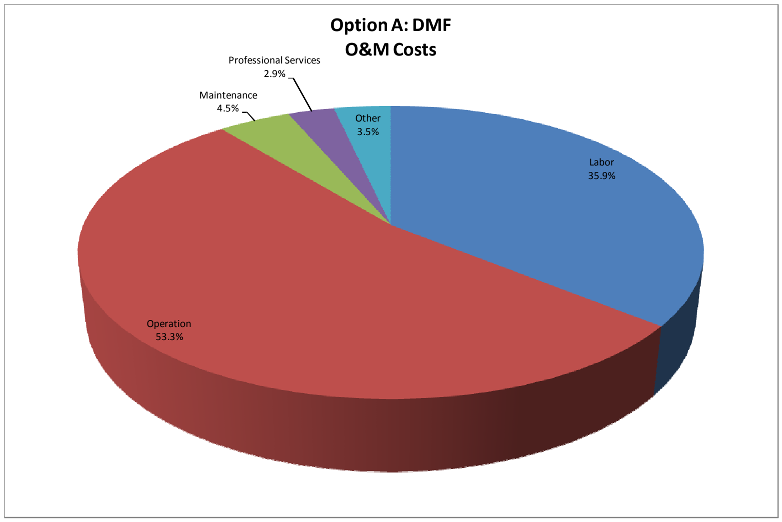
Assumptions:
Design Flow (Peak), mgd: 15.0
Average Day Flow, mgd: 10
Labor Burden (%) 40
Power Costs, $/kW-h 0.06
Water supply costs not included
Estimated effluent pumping costs included
(total pumping head estimated at 200')

Total			
$1,566,000	Labor	$ 562,000	35.9%
	Operation	$ 834,000	53.3%
	Maintenance	$ 70,000	4.5%
	Professional Services	$ 45,000	2.9%
	Other	$ 55,000	3.5%
		$1,566,000	100.0%

Description	Unit	Quantity	Unit Cost ($)	Total Cost ($)
Labor				
Plant Manager	EA	1	75,000	75,000
Operators	EA	4	50,000	200,000
Mechanics	EA	4	45,000	180,000
Electrical/Instrumentation	EA	1	65,000	65,000
General Maintenance	EA	1	42,000	42,000
			Subtotal	**562,000**
Operation				
Chemicals	LS	1	75,000	75,000
Sludge Disposal	LS	1	7,500	7,500
Electric Costs				
On-site	LS	1	600,000	600,000
Effluent Pumping	LS	1	130,000	130,000
Other Utilities (Gas & Phone)	LS	1	15,000	15,000
Office Supplies	LS	1	3,000	3,000
Custodial Supplies	LS	1	1,500	1,500
Lab Fees & Supplies	LS	1	2,000	2,000
			Subtotal	**834,000**
Maintenance				
Parts & Replacement	LS	1	70,000	70,000
			Subtotal	**70,000**
Professional Services				
Engineering, Legal & Acctng.	LS	1	45,000	45,000
			Subtotal	**45,000**
Other				
Travel, Training, Dues, etc.	LS	1	15,000	15,000
Insurance	LS	1	40,000	40,000
			Subtotal	**55,000**

TOTAL **$1,566,000**

Chemical Costs ($/1000G) **$0.02**
Total O&M Costs ($/1000G) **$0.43**



Hildago County Draing District No. 1 - Water treatment Plant					7/13/2010
Plant Capcity of		3		MGD	
Project Cost Estimate				Factor =	0.30
Option B High Rate Actiflo + NF + Drying Beds Configuration Option					
DIV	ITEM DESCRIPTION	Unit Quant	Unit	Unit Cost	Total Cost
GENERAL ITEMS including Shop+Admin.+Lab		Size = 40' x 100' x 15'			
1	General Requirements				
	Bonds & Insurance		LS	250000	250000
	Mobilization		LS	150000	150000
2	Sitework				
	Clearing & Grubbing / General Grading	1	LS	20000	20000
	Curb & Gutter	2600	LF	18	46800
	Asphalt Surfacing	3000	SY	20	60000
	Chain Link Fencing (6 ft)	2500	LF	10	25000
	Landscaping	1	LS	100000	100000
2	Yard Piping				
	Plant Influent - 36"	200	LF	125	25000
	Plant Sewer & Manholes (8" PVC)	2000	LF	40	80000
	Water Distribution & Valves (6" PVC)	1500	LF	30	45000
	Plant Effluent - 30 "	200	LF	120	24000
3	Concrete				
	Miscellaneous	100	CY	500	50000
5	Metals				
	Aluminum Railing	500	LF	25	12500
	Misc Metal Fabrications	1	LS	100000	100000
7	Thermal & Moisture Protection				
	Dampproofing	4000	SF	3	12000
	Downspouts & Scuppers	250	LF	30	7500
8	Doors & Windows				
	Doors-Operations Area				
	Exterior (Pedestrian)	4	EA	2000	8000
	Interior (Pedestrian)	8	EA	1500	12000
	Roll Up Door (8 x 10)	1	EA	5500	5500
	Windows- Operations Area	200	SF	15	3000
9	Finishes	0	0	0	0
	Misc. Painting (Piping)	1	LS	50000	50000
	General Office & Misc.	2500	SF	20	50000
	Restrooms	100	SF	25	2500
11	Equipment	0	0	0	0
	House Water System	1	LS	20000	20000
12	Furnishings				
	Laboratory	1	LS	30000	30000
	Miscellaneous	1	LS	50000	50000
13	Special Construction				
	Security System	1	LS	50000	50000
15	Mechanical				
	HVAC	4000	SF	30	120000
	Fire Protection	4000	SF	4	16000
	Plumbing	4000	SF	4	16000
16	Electrical				
	Standby Generator	1	LS	100000	100000

	Electrical Work (20% of Div 11)	1	LS	581800	581800
	Instrumentation & Control (35% of Div 11)	1	LS	1018150	1018150
				Subtotal for General Items for WTP	**$ 3,140,750**
Operations & Maintenance Facilities		Size = 40' x 100' x 15'			
2	Sitework				
	Excavation	400	CY	4	3200
	Backfill	200	CY	10	3000
3	Cast-in-Place Concrete				
	Slabs on Grade	100	CY	350	35000
	Walls	100	CY	450	45000
	Suspended Slabs & Beams	60	CY	600	36000
	Columns	25	CY	600	15000
	Precast Roofing	4000	SF	8	32000
	Garage / Shop				
	Slabs on Grade	75	CY	350	26250
	Walls	300	CY	450	135000
4	Masonry				
	Composite Wall (8" block, 4"brick)	4200	SF	15	63000
6	Wood And Plastics				
	Fiberglass Chemical Storage Tanks Alum (8000 g	1	EA	8000	8000
	Fiberglass Chemical Storage Tanks Permangana	2	EA	2500	5000
	Fiberglass Chemical Storage Tanks Caustic Soda	1	EA	8000	8000
	Polymer Day Tanks (250 gal)	6	EA	500	3000
	Fiberglass Chemical Storage Tanks NaOCL (who	1	EA	50000	50000
7	Thermal & Moisture Protection				
	Membrane Roofing (including ballast)	4000	SF	1.5	6000
	Rigid Insulation (Roof)	4000	SF	1.25	5000
	Roof Flashing	400	LF	12	4800
8	Doors & Windows				
	Doors-Operations Area				
	Exterior (Pedestrian)	2	EA	2000	4000
	Interior (Pedestrian)	4	EA	1500	6000
	Roll Up Door (8 x 10)	1	EA	5500	5500
	Windows- Operations Area	200	SF	15	3000
9	Finishes				
	Interior				
	Operations Complex				
	Chemical Area	150	SF	50	7500
	Restrooms / Lockers	250	SF	25	6250
	Carpeting	150	SY	30	4500
	Misc Trim & Finishes	1	LS	10000	10000
	Acoustical Suspended Ceiling (Operations Area)	400	SF	7	2800
	Vinyl Composition Flooring	1000	SF	3.7	3700
10	Specialties				
	Operations Bldg.				
	Lockers	1	LS	2500	2500
	Toilet Accessories	1	LS	2500	2500
11	Equipment				
	Chemical Transfer Pumps (25 gpm @ 50' TDH)	2	EA	20000	40000
	Alum Chemical Feed Metering Pumps (15-20 gph	3	EA	4500	13500

	Polymer Feed System	**1**	**EA**		
	Garage / Shop		**0**	**10000**	**10000**
	Misc.	**1**	**LS**	**20000**	**20000**
	Subtotal for Operations & Maintenance Facilities			**$**	**625,000**
High Rate Clarification					
	Subtotal for High Rate Clarification			**$**	**1,265,879**
NF Membrane Complex		Size =	120	36	50
2	**Sitework**				
	Excavation	6,000	CY	**$4**	$ 24,000
	Backfill	3,000	CY	**$10**	$ 30,000
2	**Yard Piping**				
	Filter Effluent - 30"	300	LF	$36	$ 10,800
	Backwash Supply - 20"	250	LF	$24	$ 6,000
3	**Cast-in-Place Concrete**				
	Slabs on Grade	165	CY	$350	$ 57,750
	Walls	135	CY	$450	$ 60,750
	Suspended Slabs & Beams	30	CY	$600	$ 18,000

	Columns	15	CY	$600	$ 9,000
	Precast Roofing	4,320	SF	$8	$ 34,560
4	**Masonry**				
	Composite Wall (8" block, 4"brick)	2,700	SF	$15	$ 40,500
7	**Thermal & Moisture Protection**				
	Membrane Roofing (including ballast)	4,320	SF	$1.50	$ 6,480
	Rigid Insulation (Roof)	4,320	SF	$1.25	$ 5,400
	Rigid Insulation (Wall)	2,700	SF	$0.50	$ 1,350
	Roof Flashing	38	SF	$12.00	$ 450
8	**Doors & Windows**				
	Doors				
	Exterior (Pedestrian)	2	EA	$2,000	$ 4,000
	Windows		SF	$10	$ -
9	**Interior Finishes**	600	SF	$4	$ 2,400
11	**Equipment**				
	Membrane Module	1	LS	**$2,500,000**	$ 2,500,000
	Pressure Booster Pump Station	1	LS	**$100,000**	$ 100,000
	Backwash Equipment	1	LS	**$250,000**	$ 250,000
	Instrumentation & Controls	1	LS	**$250,000**	$ 250,000
	Backwash Water Pumps				
	2,500 gpm @ 30'TDH	4	EA	**$50,000**	$ 200,000
	Compressed Air Package	1	LS	**$100,000**	$ 100,000
15	**Mechanical**				
	Piping				
	30" Drain	100	LF	$72	$ 7,200
	20" Filter Influent	40	LF	$48	$ 1,920
	20" Back Wash Supply	100	LF	$48	$ 4,800
	20" Back Wash Supply (Suction & Discharge)	40	LF	$48	$ 1,920
	12" Filter Drain	80	LF	$29	$ 2,304
	Valves w/Actuator				
	20" BFV	12	EA	$12,000	$ 144,000
	12" BFV	4	EA	$6,000	$ 24,000
	Piping				
	8" Suction & Discharge	100	LF	$160	$ 16,000
	Valves w/Actuator				
	8" BFV	4	EA	$2,000	$ 8,000
				Subtotal Filter Complex	**$ 3,897,584**
Clearwell & Effluent Pumping Facilities					
2	**Sitework**	Size =	60	31	10
	Excavation	1,500	CY	**$4**	$ 6,000
	Backfill	750	CY	**$10**	$ 7,500
2	**Yard Piping**				
	Reservoir Overflow/Drain - 18"	250	LF	$72	$ 18,000
3	**Cast-in-Place Concrete**				
	Slabs on Grade	105	CY	$350	$ 36,750
	Walls	240	CY	$450	$ 108,000
	Suspended Slabs & Beams	75	CY	$600	$ 45,000
	Columns	15	CY	$600	$ 9,000
	Precast Roofing	330	SF	$8	$ 2,640
4	**Masonry**				
	Composite Wall (8" block, 4" brick)	600	SF	$15	$ 9,000

	Interior (8" Concrete Block)	1,500	SF	$5	$	7,500
7	**Thermal & Moisture Protection**					
	Membrane Roofing (including ballast)	300	SF	$1.50	$	450
	Reservoir Membrane	1,500	SF	$2.00	$	3,000
	Rigid Insulation (Roof)	300	SF	$1.25	$	375
	Rigid Insulation (Wall)	1,531	SF	$0.50	$	766
	Roof Flashing	42	SF	$12.00	$	504
8	**Doors & Windows**					
	Doors					
	Exterior (Pedestrian)	1	EA	$2,000	$	2,000
	Roll Up Door (8 x 10)	1	EA	$5,500	$	5,500
	Windows	50	SF	$10	$	500
9	**Interior Finishes**	300	SF	$4	$	1,200
11	**Equipment**					
	Effluent Pumping Station					
	Effluent Pumps					
	3500 gpm @ 200'TDH	2	EA	$80,000	$	160,000
15	**Mechanical**					
	Effluent Pumping Station					
	Piping					
	30" Effluent	50	LF	$72	$	3,600
	24" Suction & Discharge	50	LF	$58	$	2,880
	Valves w/Actuator					
	24" BFV	6	EA	$15,000	$	90,000
	18" BFV (Drain)	1	EA	$9,000	$	9,000
				Subtotal Clearwell	**$**	**529,165**
Plant Waste-Handling incd. Backwash holding + Sludge Holding/Recycling Basin						

	Subtotal WW Recovery Basin Complex			$	474,505

Chlorine Feed System Building	Size =	20	20	25
	Subtotal Chlorine Building			**$ 163,750**
Sludge Drying Beds				

				Subtotal Decant Pump Station	$ 178,870
Other					
2	**Sitework**				
	Manhole	10	EA	$2,000	$ 20,000
				Subtotal Sendimentation Ponds	**$ 20,000**

SUBTOTAL	**$ 10,295,503**
Construction Contingency (30%)	**$ 3,088,651**
Engineering, Survey & Const Mngmnt (20%)	**$ 2,676,831**
PROJECT TOTAL	**$ 16,060,984**

Cost ($/MG) ***$5.35***

Hildago County Draing District No. 1 - Water treatment Plant					7/13/2010
Plant Capcity of		5		MGD	
Project Cost Estimate				Factor =	0.50
Option B High Rate Actiflo + NF + Drying Beds Configuration Option					
DIV	**ITEM DESCRIPTION**	**Unit Quant**	**Unit**	**Unit Cost**	**Total Cost**
GENERAL ITEMS including Shop+Admin.+Lab		Size = 40' x 100' x 15'			
1	General Requirements				
	Bonds & Insurance		LS	250000	250000
	Mobilization		LS	150000	150000
2	Sitework				
	Clearing & Grubbing / General Grading	1	LS	20000	20000
	Curb & Gutter	2600	LF	18	46800
	Asphalt Surfacing	3000	SY	20	60000
	Chain Link Fencing (6 ft)	2500	LF	10	25000
	Landscaping	1	LS	100000	100000
2	Yard Piping				
	Plant Influent - 36"	200	LF	125	25000
	Plant Sewer & Manholes (8" PVC)	2000	LF	40	80000
	Water Distribution & Valves (6" PVC)	1500	LF	30	45000
	Plant Effluent - 30 "	200	LF	120	24000
3	Concrete				
	Miscellaneous	100	CY	500	50000
5	Metals				
	Aluminum Railing	500	LF	25	12500
	Misc Metal Fabrications	1	LS	100000	100000
7	Thermal & Moisture Protection				
	Dampproofing	4000	SF	3	12000
	Downspouts & Scuppers	250	LF	30	7500
8	Doors & Windows				
	Doors-Operations Area				
	Exterior (Pedestrian)	4	EA	2000	8000
	Interior (Pedestrian)	8	EA	1500	12000
	Roll Up Door (8 x 10)	1	EA	5500	5500
	Windows- Operations Area	200	SF	15	3000
9	Finishes	0	0	0	0
	Misc. Painting (Piping)	1	LS	50000	50000
	General Office & Misc.	2500	SF	20	50000
	Restrooms	100	SF	25	2500
11	Equipment	0	0	0	0
	House Water System	1	LS	20000	20000
12	Furnishings				
	Laboratory	1	LS	30000	30000
	Miscellaneous	1	LS	50000	50000
13	Special Construction				
	Security System	1	LS	50000	50000
15	Mechanical				
	HVAC	4000	SF	30	120000
	Fire Protection	4000	SF	4	16000
	Plumbing	4000	SF	4	16000
16	Electrical				
	Standby Generator	1	LS	100000	100000

	Electrical Work (20% of Div 11)	1	LS	581800	581800
	Instrumentation & Control (35% of Div 11)	1	LS	1018150	1018150
				Subtotal for General Items for WTP $	3,140,750
Operations & Maintenance Facilities		Size = 40' x 100' x 15'			
2	Sitework				
	Excavation	400	CY	4	3200
	Backfill	200	CY	10	3000
3	Cast-in-Place Concrete				
	Slabs on Grade	100	CY	350	35000
	Walls	100	CY	450	45000
	Suspended Slabs & Beams	60	CY	600	36000
	Columns	25	CY	600	15000
	Precast Roofing	4000	SF	8	32000
	Garage / Shop				
	Slabs on Grade	75	CY	350	26250
	Walls	300	CY	450	135000
4	Masonry				
	Composite Wall (8" block, 4"brick)	4200	SF	15	63000
6	Wood And Plastics				
	Fiberglass Chemical Storage Tanks Alum (8000 g	1	EA	8000	8000
	Fiberglass Chemical Storage Tanks Permangana	2	EA	2500	5000
	Fiberglass Chemical Storage Tanks Caustic Soda	1	EA	8000	8000
	Polymer Day Tanks (250 gal)	6	EA	500	3000
	Fiberglass Chemical Storage Tanks NaOCL (who	1	EA	50000	50000
7	Thermal & Moisture Protection				
	Membrane Roofing (including ballast)	4000	SF	1.5	6000
	Rigid Insulation (Roof)	4000	SF	1.25	5000
	Roof Flashing	400	LF	12	4800
8	Doors & Windows				
	Doors-Operations Area				
	Exterior (Pedestrian)	2	EA	2000	4000
	Interior (Pedestrian)	4	EA	1500	6000
	Roll Up Door (8 x 10)	1	EA	5500	5500
	Windows- Operations Area	200	SF	15	3000
9	Finishes				
	Interior				
	Operations Complex				
	Chemical Area	150	SF	50	7500
	Restrooms / Lockers	250	SF	25	6250
	Carpeting	150	SY	30	4500
	Misc Trim & Finishes	1	LS	10000	10000
	Acoustical Suspended Ceiling (Operations Area)	400	SF	7	2800
	Vinyl Composition Flooring	1000	SF	3.7	3700
10	Specialties				
	Operations Bldg.				
	Lockers	1	LS	2500	2500
	Toilet Accessories	1	LS	2500	2500
11	Equipment				
	Chemical Transfer Pumps (25 gpm @ 50' TDH)	2	EA	20000	40000
	Alum Chemical Feed Metering Pumps (15-20 gph	3	EA	4500	13500

	Polymer Feed System	**1**	**EA**		
	Garage / Shop		**0**	**10000**	**10000**
	Misc.	**1**	**LS**	**20000**	**20000**
	Subtotal for Operations & Maintenance Facilities			**$**	**625,000**
High Rate Clarification					
	Subtotal for High Rate Clarification			**$**	**1,537,095**
NF Membrane Complex		Size =	120	**60**	50
2	**Sitework**				
	Excavation	10,000	CY	**$4**	$ 40,000
	Backfill	5,000	CY	**$10**	$ 50,000
2	**Yard Piping**				
	Filter Effluent - 30"	300	LF	$60	$ 18,000
	Backwash Supply - 20"	250	LF	$40	$ 10,000
3	**Cast-in-Place Concrete**				
	Slabs on Grade	275	CY	$350	$ 96,250
	Walls	225	CY	$450	$ 101,250
	Suspended Slabs & Beams	50	CY	$600	$ 30,000

	Columns	25	CY	$600	$ 15,000
	Precast Roofing	7,200	SF	$8	$ 57,600
4	**Masonry**				
	Composite Wall (8" block, 4"brick)	4,500	SF	$15	$ 67,500
7	**Thermal & Moisture Protection**				
	Membrane Roofing (including ballast)	7,200	SF	$1.50	$ 10,800
	Rigid Insulation (Roof)	7,200	SF	$1.25	$ 9,000
	Rigid Insulation (Wall)	4,500	SF	$0.50	$ 2,250
	Roof Flashing	63	SF	$12.00	$ 750
8	**Doors & Windows**				
	Doors				
	Exterior (Pedestrian)	2	EA	$2,000	$ 4,000
	Windows		SF	$10	$ -
9	**Interior Finishes**	1,000	SF	$4	$ 4,000
11	**Equipment**				
	Membrane Module	1	LS	**$4,500,000**	$ 4,500,000
	Pressure Booster Pump Station	1	LS	**$100,000**	$ 100,000
	Backwash Equipment	1	LS	**$250,000**	$ 250,000
	Instrumentation & Controls	1	LS	**$250,000**	$ 250,000
	Backwash Water Pumps				
	2,500 gpm @ 30'TDH	4	EA	**$50,000**	$ 200,000
	Compressed Air Package	1	LS	**$100,000**	$ 100,000
15	**Mechanical**				
	Piping				
	30" Drain	100	LF	$120	$ 12,000
	20" Filter Influent	40	LF	$80	$ 3,200
	20" Back Wash Supply	100	LF	$80	$ 8,000
	20" Back Wash Supply (Suction & Discharge)	40	LF	$80	$ 3,200
	12" Filter Drain	80	LF	$48	$ 3,840
	Valves w/Actuator				
	20" BFV	12	EA	$12,000	$ 144,000
	12" BFV	4	EA	$6,000	$ 24,000
	Piping				
	8" Suction & Discharge	100	LF	$160	$ 16,000
	Valves w/Actuator				
	8" BFV	4	EA	$2,000	$ 8,000
		Subtotal Filter Complex			**$ 6,114,640**
Clearwell & Effluent Pumping Facilities					
2	**Sitework**	Size =	60	52	10
	Excavation	2,500	CY	**$4**	$ 10,000
	Backfill	1,250	CY	**$10**	$ 12,500
2	**Yard Piping**				
	Reservoir Overflow/Drain - 18"	250	LF	$72	$ 18,000
3	**Cast-in-Place Concrete**				
	Slabs on Grade	175	CY	$350	$ 61,250
	Walls	400	CY	$450	$ 180,000
	Suspended Slabs & Beams	125	CY	$600	$ 75,000
	Columns	25	CY	$600	$ 15,000
	Precast Roofing	550	SF	$8	$ 4,400
4	**Masonry**				
	Composite Wall (8" block, 4" brick)	1,000	SF	$15	$ 15,000

	Interior (8" Concrete Block)	2,500	SF	$5	$	12,500
7	**Thermal & Moisture Protection**					
	Membrane Roofing (including ballast)	500	SF	$1.50	$	750
	Reservoir Membrane	2,500	SF	$2.00	$	5,000
	Rigid Insulation (Roof)	500	SF	$1.25	$	625
	Rigid Insulation (Wall)	2,552	SF	$0.50	$	1,276
	Roof Flashing	70	SF	$12.00	$	840
8	**Doors & Windows**					
	Doors					
	Exterior (Pedestrian)	1	EA	$2,000	$	2,000
	Roll Up Door (8 x 10)	1	EA	$5,500	$	5,500
	Windows	50	SF	$10	$	500
9	**Interior Finishes**	500	SF	$4	$	2,000
11	**Equipment**					
	Effluent Pumping Station					
	Effluent Pumps					
	3500 gpm @ 200'TDH	**2**	EA	$80,000	$	160,000
15	**Mechanical**					
	Effluent Pumping Station					
	Piping					
	30" Effluent	50	LF	$120	$	6,000
	24" Suction & Discharge	50	LF	$96	$	4,800
	Valves w/Actuator					
	24" BFV	6	EA	$15,000	$	90,000
	18" BFV (Drain)	1	EA	$9,000	$	9,000
				Subtotal Clearwell	**$**	**691,941**

Plant Waste-Handling incd. Backwash holding + Sludge Holding/Recycling Basin

	Subtotal WW Recovery Basin Complex				$ 512,975

Chlorine Feed System Building	Size =	20	20	25
	Subtotal Chlorine Building			$ 163,750
Sludge Drying Beds				

		Subtotal Decant Pump Station			$	241,970

Other						
2	**Sitework**					
	Manhole	10	EA	$2,000	$	20,000
		Subtotal Sendimentation Ponds			**$**	**20,000**

SUBTOTAL	**$**	**13,048,121**
Construction Contingency (30%)	**$**	**3,914,436**
Engineering, Survey & Const Mngmnt (20%)	**$**	**3,392,511**
PROJECT TOTAL	**$**	**20,355,069**

Cost ($/MG) ***$4.07***

Hildago County Draing District No. 1 - Water treatment Plant 7/13/2010
Plant Capcity of 10 MGD
Project Cost Estimate
Option B High Rate Actiflo + NF + Drying Beds Configuration Option

DIV	ITEM DESCRIPTION	Unit Quant	Unit	Unit Cost	Total Cost
GENERAL ITEMS including Shop+Admin.+Lab		Size = 40' x 100' x 15'			
1	General Requirements				
	Bonds & Insurance		LS	250000	250000
	Mobilization		LS	150000	150000
2	Sitework				
	Clearing & Grubbing / General Grading	1	LS	20000	20000
	Curb & Gutter	2600	LF	18	46800
	Asphalt Surfacing	3000	SY	20	60000
	Chain Link Fencing (6 ft)	2500	LF	10	25000
	Landscaping	1	LS	100000	100000
2	Yard Piping				
	Plant Influent - 36"	200	LF	125	25000
	Plant Sewer & Manholes (8" PVC)	2000	LF	40	80000
	Water Distribution & Valves (6" PVC)	1500	LF	30	45000
	Plant Effluent - 30 "	200	LF	120	24000
3	Concrete				
	Miscellaneous	100	CY	500	50000
5	Metals				
	Aluminum Railing	500	LF	25	12500
	Misc Metal Fabrications	1	LS	100000	100000
7	Thermal & Moisture Protection				
	Dampproofing	4000	SF	3	12000
	Downspouts & Scuppers	250	LF	30	7500
8	Doors & Windows				
	Doors-Operations Area				
	Exterior (Pedestrian)	4	EA	2000	8000
	Interior (Pedestrian)	8	EA	1500	12000
	Roll Up Door (8 x 10)	1	EA	5500	5500
	Windows- Operations Area	200	SF	15	3000
9	Finishes	0	0	0	0
	Misc. Painting (Piping)	1	LS	50000	50000
	General Office & Misc.	2500	SF	20	50000
	Restrooms	100	SF	25	2500
11	Equipment	0	0	0	0
	House Water System	1	LS	20000	20000
12	Furnishings				
	Laboratory	1	LS	30000	30000
	Miscellaneous	1	LS	50000	50000
13	Special Construction				
	Security System	1	LS	50000	50000
15	Mechanical				
	HVAC	4000	SF	30	120000
	Fire Protection	4000	SF	4	16000
	Plumbing	4000	SF	4	16000
16	Electrical				
	Standby Generator	1	LS	100000	100000

	Electrical Work (20% of Div 11)	1	LS	581800	581800
	Instrumentation & Control (35% of Div 11)	1	LS	1018150	1018150
				Subtotal for General Items for WTP	$ 3,140,750
Operations & Maintenance Facilities		Size = 40' x 100' x 15'			
2	Sitework				
	Excavation	400	CY	4	3200
	Backfill	200	CY	10	3000
3	Cast-in-Place Concrete				
	Slabs on Grade	100	CY	350	35000
	Walls	100	CY	450	45000
	Suspended Slabs & Beams	60	CY	600	36000
	Columns	25	CY	600	15000
	Precast Roofing	4000	SF	8	32000
	Garage / Shop				
	Slabs on Grade	75	CY	350	26250
	Walls	300	CY	450	135000
4	Masonry				
	Composite Wall (8" block, 4"brick)	4200	SF	15	63000
6	Wood And Plastics				
	Fiberglass Chemical Storage Tanks Alum (8000 g	1	EA	8000	8000
	Fiberglass Chemical Storage Tanks Permangana	2	EA	2500	5000
	Fiberglass Chemical Storage Tanks Caustic Soda	1	EA	8000	8000
	Polymer Day Tanks (250 gal)	6	EA	500	3000
	Fiberglass Chemical Storage Tanks NaOCL (who	1	EA	50000	50000
7	Thermal & Moisture Protection				
	Membrane Roofing (including ballast)	4000	SF	1.5	6000
	Rigid Insulation (Roof)	4000	SF	1.25	5000
	Roof Flashing	400	LF	12	4800
8	Doors & Windows				
	Doors-Operations Area				
	Exterior (Pedestrian)	2	EA	2000	4000
	Interior (Pedestrian)	4	EA	1500	6000
	Roll Up Door (8 x 10)	1	EA	5500	5500
	Windows- Operations Area	200	SF	15	3000
9	Finishes				
	Interior				
	Operations Complex				
	Chemical Area	150	SF	50	7500
	Restrooms / Lockers	250	SF	25	6250
	Carpeting	150	SY	30	4500
	Misc Trim & Finishes	1	LS	10000	10000
	Acoustical Suspended Ceiling (Operations Area)	400	SF	7	2800
	Vinyl Composition Flooring	1000	SF	3.7	3700
10	Specialties				
	Operations Bldg.				
	Lockers	1	LS	2500	2500
	Toilet Accessories	1	LS	2500	2500
11	Equipment				
	Chemical Transfer Pumps (25 gpm @ 50' TDH)	2	EA	20000	40000
	Alum Chemical Feed Metering Pumps (15-20 gph	3	EA	4500	13500

	Polymer Feed System	**1**	**EA**		
	Garage / Shop		**0**	**10000**	**10000**
	Misc.	**1**	**LS**	**20000**	**20000**
	Subtotal for Operations & Maintenance Facilities				**$ 625,000**
High Rate Clarification		Size =	60	70	25
	Subtotal for High Rate Clarification				**$ 3,001,320**
NF Membrane Complex		Size =	120	120	50
2	**Sitework**				
	Excavation	20,000	CY	**$0**	$ -
	Backfill	10,000	CY	**$0**	$ -
2	**Yard Piping**				
	Filter Effluent - 30"	300	LF	$120	$ 36,000
	Backwash Supply - 20"	250	LF	$80	$ 20,000
3	**Cast-in-Place Concrete**				
	Slabs on Grade	550	CY	$350	$ 192,500
	Walls	450	CY	$450	$ 202,500
	Suspended Slabs & Beams	100	CY	$600	$ 60,000

	Columns	50	CY	$600	$	30,000
	Precast Roofing	14,400	SF	$8	$	115,200
4	**Masonry**					
	Composite Wall (8" block, 4"brick)	9,000	SF	$15	$	135,000
7	**Thermal & Moisture Protection**					
	Membrane Roofing (including ballast)	14,400	SF	$1.50	$	21,600
	Rigid Insulation (Roof)	14,400	SF	$1.25	$	18,000
	Rigid Insulation (Wall)	9,000	SF	$0.50	$	4,500
	Roof Flashing	125	SF	$12.00	$	1,500
8	**Doors & Windows**					
	Doors					
	Exterior (Pedestrian)	2	EA	$2,000	$	4,000
	Windows		SF	$10	$	-
9	**Interior Finishes**	2,000	SF	$4	$	8,000
11	**Equipment**					
	Membrane Module	1	LS	**$9,500,000**	$	9,500,000
	Pressure Booster Pump Station	1	LS	**$100,000**	$	100,000
	Backwash Equipment	1	LS	**$250,000**	$	250,000
	Instrumentation & Controls	1	LS	**$250,000**	$	250,000
	Backwash Water Pumps					
	2,500 gpm @ 30'TDH	4	EA	**$50,000**	$	200,000
	Compressed Air Package	1	LS	**$100,000**	$	100,000
15	**Mechanical**					
	Piping					
	30" Drain	100	LF	$240	$	24,000
	20" Filter Influent	40	LF	$160	$	6,400
	20" Back Wash Supply	100	LF	$160	$	16,000
	20" Back Wash Supply (Suction & Discharge)	40	LF	$160	$	6,400
	12" Filter Drain	80	LF	$96	$	7,680
	Valves w/Actuator					
	20" BFV	12	EA	$12,000	$	144,000
	12" BFV	4	EA	$6,000	$	24,000
	Piping					
	8" Suction & Discharge	100	LF	$160	$	16,000
	Valves w/Actuator					
	8" BFV	4	EA	$2,000	$	8,000
				Subtotal Filter Complex	**$**	**11,477,280**
Clearwell & Effluent Pumping Facilities						
2	**Sitework**	Size =	60	104		10
	Excavation	5,000	CY	**$0**	$	-
	Backfill	2,500	CY	**$0**	$	-
2	**Yard Piping**					
	Reservoir Overflow/Drain - 18"	250	LF	$72	$	18,000
3	**Cast-in-Place Concrete**					
	Slabs on Grade	350	CY	$350	$	122,500
	Walls	800	CY	$450	$	360,000
	Suspended Slabs & Beams	250	CY	$600	$	150,000
	Columns	50	CY	$600	$	30,000
	Precast Roofing	1,100	SF	$8	$	8,800
4	**Masonry**					
	Composite Wall (8" block, 4" brick)	2,000	SF	$15	$	30,000

	Interior (8" Concrete Block)	5,000	SF	$5	$	25,000
7	**Thermal & Moisture Protection**					
	Membrane Roofing (including ballast)	1,000	SF	$1.50	$	1,500
	Reservoir Membrane	5,000	SF	$2.00	$	10,000
	Rigid Insulation (Roof)	1,000	SF	$1.25	$	1,250
	Rigid Insulation (Wall)	5,104	SF	$0.50	$	2,552
	Roof Flashing	140	SF	$12.00	$	1,680
8	**Doors & Windows**					
	Doors					
	Exterior (Pedestrian)	1	EA	$2,000	$	2,000
	Roll Up Door (8 x 10)	1	EA	$5,500	$	5,500
	Windows	50	SF	$10	$	500
9	**Interior Finishes**	1,000	SF	$4	$	4,000
11	**Equipment**					
	Effluent Pumping Station					
	Effluent Pumps					
	3500 gpm @ 200'TDH	4	EA	$80,000	$	320,000
15	**Mechanical**					
	Effluent Pumping Station					
	Piping					
	30" Effluent	50	LF	$240	$	12,000
	24" Suction & Discharge	50	LF	$192	$	9,600
	Valves w/Actuator					
	24" BFV	6	EA	$15,000	$	90,000
	18" BFV (Drain)	1	EA	$9,000	$	9,000
				Subtotal Clearwell	**$**	**1,213,882**
Plant Waste-Handling incd. Backwash holding + Sludge Holding/Recycling Basin						
2	**Sitework**					
	Excavation	**6,000**	CY	**$0**	$	-
	Backfill	2,500	CY	**$0**	$	-
2	**Yard Piping**					
	Wash Water Recovery - 30"	250	LF	$120	$	30,000
	Wash Water Return - 12"	300	LF	$48	$	14,400
	Sediment Transmission Line - 12"	650	LF	$48	$	31,200
	Decant Return Line - 8"	1,000	LF	$32	$	32,000
	Wash Water By-pass - 24"	200	LF	$96	$	19,200
3	**Cast-in-Place Concrete**					
	Slabs on Grade	75	CY	$350	$	26,250
	Walls	50	CY	$450	$	22,500
	Suspended Slabs	25	CY	$600	$	15,000
	Columns	0	CY	$600	$	-
	Precast Roofing	0	SF	$8	$	-
4	**Mebbrane Lining**					
	5-mil lining	**35,000**	SF	$2	$	70,000
7	**Backwash Holding Tank - Concrete**					
	Slab on Grade	140	CY	$350.00	$	49,000
	Walls	100	CY	$450.00	$	45,000
	Suspended Slab	50	CY	$600.00	$	30,000
	Column	0	CY	$600.00	$	-
8	**Doors & Windows**					
	Exterior (Pedestrian)	0	EA	$2,000	$	-
	Roll Up Door (8 x 10)	0	EA	$5,500	$	-
	Windows	0	SF	$10	$	-
9	**Interior Finishes**	0	SF	$4	$	-

11	**Equipment**					
	Filter Backwah Transfer Pumps 2000 gpm at 50'	2	EA	$30,000	$	60,000
	Sludge Recycle Return Pumps					
	7000 gpm @ 100' TDH	2	LS	$45,000	$	90,000
15	**Mechanical**					
	Piping					
	8" Suction & Discharge	60	LF	$64	$	3,840
	12" Combined Return (2 Pumps)	60	LF	$96	$	5,760
	Valves w/Actuator					
	8" BFV	4	EA	$2,000	$	8,000
	8" Check	2	EA	$1,000	$	2,000
	12" BFV	1	EA	$6,000	$	6,000
	Subtotal WW Recovery Basin Complex				**$**	**560,150**

Chlorine Feed System Building		Size =	20	20	25
				Subtotal Chlorine Building	**$** **213,750**
Sludge Drying Beds					
2	**Sitework**				
	Excavation	500	CY	**$0**	$ -
	Backfill	100	CY	**$0**	$ -
3	**Cast-in-Place Concrete**				
	Slabs on Grade	700	CY	$350	$ 245,000
	Walls	150	CY	$450	$ 67,500
	Suspended Slabs & Beams	0	CY	$600	$ -
	Columns	0	CY	$600	$ -
	Precast Roofing	0	SF	$8	$ -

4	**Masonry**					
	Composite Wall (8" block, 4" brick)	0	SF	$15	$	-
7	**Thermal & Moisture Protection**					
	Membrane Roofing (including ballast)	0	SF	$1.50	$	-
	Rigid Insulation (Roof)	0	SF	$1.25	$	-
	Rigid Insulation (Wall)	0	SF	$0.50	$	-
	Roof Flashing	0	SF	$12.00	$	-
8	**Doors & Windows**					
	Doors					
	Exterior (Pedestrian)	0	EA	$2,000	$	-
	Windows	0	SF	$10	$	-
9	**Interior Finishes**	0	SF	$4	$	-
11	**Equipment**					
	Pumps					
	3500 gpm @ 100' TDH	3	EA	$35,000	$	105,000
15	**Mechanical**					
	Piping					
	6" Suction & Discharge	60	LF	$48	$	2,880
	8" Combined Return (2 Pumps)	60	LF	$64	$	3,840
	Valves w/Actuator					
	6" BFV	4	EA	$1,000	$	4,000
	6" Check	2	EA	$750	$	1,500
	8" BFV	1	EA	$2,000	$	2,000
		Subtotal Decant Pump Station			**$**	**431,720**

Other						
2	**Sitework**					
	Manhole	10	EA	$2,000	$	20,000
		Subtotal Sendimentation Ponds			**$**	**20,000**

SUBTOTAL	**$**	**20,683,852**
Construction Contingency (30%)	**$**	**6,205,156**
Engineering, Survey & Const Mngmnt (20%)	**$**	**5,377,802**
PROJECT TOTAL	**$**	**32,266,809**

Cost ($/MG) ***$3.23***

Hildago County Draing District No. 1 - Water treatment Plant					7/13/2010
Plant Capcity of		15		MGD	
Project Cost Estimate				Factor =	1.50
Option B High Rate Actiflo + NF + Drying Beds Configuration Option					
DIV	ITEM DESCRIPTION	Unit Quant	Unit	Unit Cost	Total Cost
GENERAL ITEMS including Shop+Admin.+Lab		Size = 40' x 100' x 15'			
1	General Requirements				
	Bonds & Insurance		LS	250000	250000
	Mobilization		LS	150000	150000
2	Sitework				
	Clearing & Grubbing / General Grading	1	LS	20000	20000
	Curb & Gutter	2600	LF	18	46800
	Asphalt Surfacing	3000	SY	20	60000
	Chain Link Fencing (6 ft)	2500	LF	10	25000
	Landscaping	1	LS	100000	100000
2	Yard Piping				
	Plant Influent - 36"	200	LF	125	25000
	Plant Sewer & Manholes (8" PVC)	2000	LF	40	80000
	Water Distribution & Valves (6" PVC)	1500	LF	30	45000
	Plant Effluent - 30 "	200	LF	120	24000
3	Concrete				
	Miscellaneous	100	CY	500	50000
5	Metals				
	Aluminum Railing	500	LF	25	12500
	Misc Metal Fabrications	1	LS	100000	100000
7	Thermal & Moisture Protection				
	Damproofing	4000	SF	3	12000
	Downspouts & Scuppers	250	LF	30	7500
8	Doors & Windows				
	Doors-Operations Area				
	Exterior (Pedestrian)	4	EA	2000	8000
	Interior (Pedestrian)	8	EA	1500	12000
	Roll Up Door (8 x 10)	1	EA	5500	5500
	Windows- Operations Area	200	SF	15	3000
9	Finishes	0	0	0	0
	Misc. Painting (Piping)	1	LS	50000	50000
	General Office & Misc.	2500	SF	20	50000
	Restrooms	100	SF	25	2500
11	Equipment	0	0	0	0
	House Water System	1	LS	20000	20000
12	Furnishings				
	Laboratory	1	LS	30000	30000
	Miscellaneous	1	LS	50000	50000
13	Special Construction				
	Security System	1	LS	50000	50000
15	Mechanical				
	HVAC	4000	SF	30	120000
	Fire Protection	4000	SF	4	16000
	Plumbing	4000	SF	4	16000
16	Electrical				
	Standby Generator	1	LS	100000	100000

	Electrical Work (20% of Div 11)	1	LS	581800	581800
	Instrumentation & Control (35% of Div 11)	1	LS	1018150	1018150
				Subtotal for General Items for WTP $	3,140,750
Operations & Maintenance Facilities		Size = 40' x 100' x 15'			
2	Sitework				
	Excavation	400	CY	4	3200
	Backfill	200	CY	10	3000
3	Cast-in-Place Concrete				
	Slabs on Grade	100	CY	350	35000
	Walls	100	CY	450	45000
	Suspended Slabs & Beams	60	CY	600	36000
	Columns	25	CY	600	15000
	Precast Roofing	4000	SF	8	32000
	Garage / Shop				
	Slabs on Grade	75	CY	350	26250
	Walls	300	CY	450	135000
4	Masonry				
	Composite Wall (8" block, 4"brick)	4200	SF	15	63000
6	Wood And Plastics				
	Fiberglass Chemical Storage Tanks Alum (8000 g	1	EA	8000	8000
	Fiberglass Chemical Storage Tanks Permangana	2	EA	2500	5000
	Fiberglass Chemical Storage Tanks Caustic Soda	1	EA	8000	8000
	Polymer Day Tanks (250 gal)	6	EA	500	3000
	Fiberglass Chemical Storage Tanks NaOCL (who	1	EA	50000	50000
7	Thermal & Moisture Protection				
	Membrane Roofing (including ballast)	4000	SF	1.5	6000
	Rigid Insulation (Roof)	4000	SF	1.25	5000
	Roof Flashing	400	LF	12	4800
8	Doors & Windows				
	Doors-Operations Area				
	Exterior (Pedestrian)	2	EA	2000	4000
	Interior (Pedestrian)	4	EA	1500	6000
	Roll Up Door (8 x 10)	1	EA	5500	5500
	Windows- Operations Area	200	SF	15	3000
9	Finishes				
	Interior				
	Operations Complex				
	Chemical Area	150	SF	50	7500
	Restrooms / Lockers	250	SF	25	6250
	Carpeting	150	SY	30	4500
	Misc Trim & Finishes	1	LS	10000	10000
	Acoustical Suspended Ceiling (Operations Area)	400	SF	7	2800
	Vinyl Composition Flooring	1000	SF	3.7	3700
10	Specialties				
	Operations Bldg.				
	Lockers	1	LS	2500	2500
	Toilet Accessories	1	LS	2500	2500
11	Equipment				
	Chemical Transfer Pumps (25 gpm @ 50' TDH)	2	EA	20000	40000
	Alum Chemical Feed Metering Pumps (15-20 gph	3	EA	4500	13500

	Polymer Feed System	**1**	**EA**		
	Garage / Shop		**0**	**10000**	**10000**
	Misc.	**1**	**LS**	**20000**	**20000**
	Subtotal for Operations & Maintenance Facilities				**$ 625,000**
High Rate Clarification					
	Subtotal for High Rate Clarification				**$ 4,405,055**
NF Membrane Complex		Size =	120	**180**	50
2	**Sitework**				
	Excavation	30,000	CY	**$4**	$ 120,000
	Backfill	15,000	CY	**$10**	$ 150,000
2	**Yard Piping**				
	Filter Effluent - 30"	300	LF	$180	$ 54,000
	Backwash Supply - 20"	250	LF	$120	$ 30,000
3	**Cast-in-Place Concrete**				
	Slabs on Grade	825	CY	$350	$ 288,750
	Walls	675	CY	$450	$ 303,750
	Suspended Slabs & Beams	150	CY	$600	$ 90,000

	Columns	75	CY	$600	$	45,000
	Precast Roofing	21,600	SF	$8	$	172,800
4	**Masonry**					
	Composite Wall (8" block, 4"brick)	13,500	SF	$15	$	202,500
7	**Thermal & Moisture Protection**					
	Membrane Roofing (including ballast)	21,600	SF	$1.50	$	32,400
	Rigid Insulation (Roof)	21,600	SF	$1.25	$	27,000
	Rigid Insulation (Wall)	13,500	SF	$0.50	$	6,750
	Roof Flashing	188	SF	$12.00	$	2,250
8	**Doors & Windows**					
	Doors					
	Exterior (Pedestrian)	2	EA	$2,000	$	4,000
	Windows		SF	$10	$	-
9	**Interior Finishes**	3,000	SF	$4	$	12,000
11	**Equipment**					
	Membrane Module	1	LS	**$13,500,000**	$	13,500,000
	Pressure Booster Pump Station	1	LS	**$150,000**	$	150,000
	Backwash Equipment	1	LS	**$250,000**	$	250,000
	Instrumentation & Controls	1	LS	**$250,000**	$	250,000
	Backwash Water Pumps					
	2,500 gpm @ 30'TDH	4	EA	**$50,000**	$	200,000
	Compressed Air Package	1	LS	**$100,000**	$	100,000
15	**Mechanical**					
	Piping					
	30" Drain	100	LF	$360	$	36,000
	20" Filter Influent	40	LF	$240	$	9,600
	20" Back Wash Supply	100	LF	$240	$	24,000
	20" Back Wash Supply (Suction & Discharge)	40	LF	$240	$	9,600
	12" Filter Drain	80	LF	$144	$	11,520
	Valves w/Actuator					
	20" BFV	12	EA	$12,000	$	144,000
	12" BFV	4	EA	$6,000	$	24,000
	Piping					
	8" Suction & Discharge	100	LF	$160	$	16,000
	Valves w/Actuator					
	8" BFV	4	EA	$2,000	$	8,000
				Subtotal Filter Complex	**$**	**16,249,920**
Clearwell & Effluent Pumping Facilities						
2	**Sitework**	Size =	60	156		10
	Excavation	7,500	CY	**$4**	$	30,000
	Backfill	3,750	CY	**$10**	$	37,500
2	**Yard Piping**					
	Reservoir Overflow/Drain - 18"	250	LF	$72	$	18,000
3	**Cast-in-Place Concrete**					
	Slabs on Grade	525	CY	$350	$	183,750
	Walls	1,200	CY	$450	$	540,000
	Suspended Slabs & Beams	375	CY	$600	$	225,000
	Columns	75	CY	$600	$	45,000
	Precast Roofing	1,650	SF	$8	$	13,200
4	**Masonry**					
	Composite Wall (8" block, 4" brick)	3,000	SF	$15	$	45,000

	Interior (8" Concrete Block)	7,500	SF	$5	$	37,500
7	**Thermal & Moisture Protection**					
	Membrane Roofing (including ballast)	1,500	SF	$1.50	$	2,250
	Reservoir Membrane	7,500	SF	$2.00	$	15,000
	Rigid Insulation (Roof)	1,500	SF	$1.25	$	1,875
	Rigid Insulation (Wall)	7,656	SF	$0.50	$	3,828
	Roof Flashing	210	SF	$12.00	$	2,520
8	**Doors & Windows**					
	Doors					
	Exterior (Pedestrian)	1	EA	$2,000	$	2,000
	Roll Up Door (8 x 10)	1	EA	$5,500	$	5,500
	Windows	50	SF	$10	$	500
9	**Interior Finishes**	1,500	SF	$4	$	6,000
11	**Equipment**					
	Effluent Pumping Station					
	Effluent Pumps					
	3500 gpm @ 200'TDH	**6**	EA	$80,000	$	480,000
15	**Mechanical**					
	Effluent Pumping Station					
	Piping					
	30" Effluent	50	LF	$360	$	18,000
	24" Suction & Discharge	50	LF	$288	$	14,400
	Valves w/Actuator					
	24" BFV	6	EA	$15,000	$	90,000
	18" BFV (Drain)	1	EA	$9,000	$	9,000
				Subtotal Clearwell	**$**	**1,825,823**
Plant Waste-Handling incd. Backwash holding + Sludge Holding/Recycling Basin						

	Subtotal WW Recovery Basin Complex				$	705,325

Chlorine Feed System Building	Size =	20	20	25
	Subtotal Chlorine Building			**$ 263,750**
Sludge Drying Beds				

		Subtotal Decant Pump Station			**$ 592,470**
Other					
2	**Sitework** Manhole	10	EA	$2,000	$ 20,000
		Subtotal Sendimentation Ponds			**$ 20,000**

SUBTOTAL	**$ 27,828,093**
Construction Contingency (30%)	**$ 8,348,428**
Engineering, Survey & Const Mngmnt (20%)	**$ 7,235,304**
PROJECT TOTAL	**$ 43,411,825**
Cost ($/MG)	***$2.89***

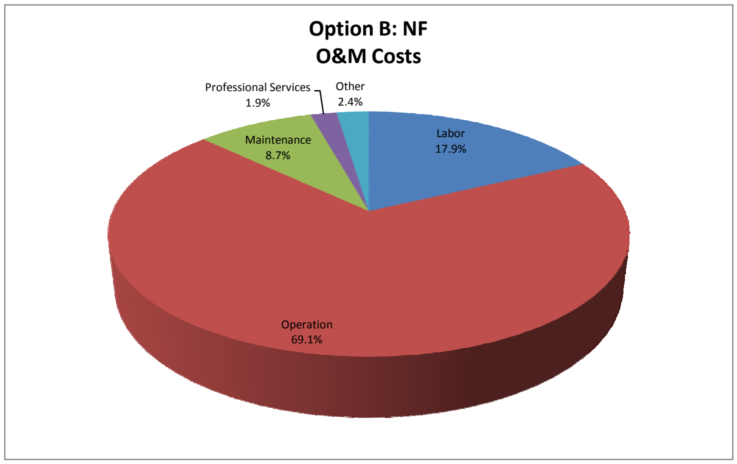
Estimated Operation and Maintenance Costs
Estimated Operation and Maintenance Costs
Option B_ ACTIFLO + NF
Hildago County Drainage District No. 1
Regional Water Supply Facilities Planning

Total	Labor	$ 414,000	17.9%	
$2,310,500	Operation	$ 1,596,500	69.1%	
	Maintenanc	$ 200,000	8.7%	
	Profession	$ 45,000	1.9%	
	Other	$ 55,000	2.4%	
		$ 2,310,500		1

Assumptions:

Design Flow (Peak), mgd:	**3.0**
Average Day Flow, mgd:	3.0
Labor Burden (%)	40
Power Costs, $/kW-h	0.06
Water supply costs not included	
Estimated effluent pumping costs included	
(total pumping head estimated at 200')	

Description	Unit	Quantity	Unit Cost ($)	Total Cost ($)
Labor				
Plant Manager	EA	1	75,000	$ 75,000
Operators	EA	2	50,000	$ 100,000
Mechanics	EA	2	45,000	$ 90,000
Electrical/Instrumentation	EA	1	65,000	$ 65,000
General Maintenance	EA	2	42,000	$ 84,000
			Subtotal	**$ 414,000**
Operation				
Chemicals	LS	1	900,000	$ 900,000
Sludge Disposal	LS	1	30,000	$ 30,000
Electric Costs				
On-site	LS	1	600,000	$ 600,000
Effluent Pumping	LS	1	45,000	$ 45,000
Other Utilities (Gas & Phone)	LS	1	15,000	$ 15,000
Office Supplies	LS	1	3,000	$ 3,000
Custodial Supplies	LS	1	1,500	$ 1,500
Lab Fees & Supplies	LS	1	2,000	$ 2,000
			Subtotal	**$ 1,596,500**
Maintenance				
Parts & Replacement	LS	1	200,000	$ 200,000
			Subtotal	**$ 200,000**
Professional Services				
Engineering, Legal & Acctng.	LS	1	45,000	$ 45,000
			Subtotal	**$ 45,000**
Other				
Travel, Training, Dues, etc.	LS	1	15,000	$ 15,000
Insurance	LS	1	40,000	$ 40,000
			Subtotal	**$ 55,000**
TOTAL				**$2,310,500**



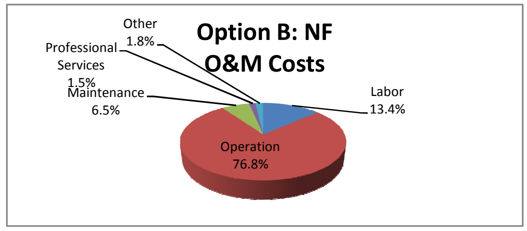
Chemical Costs ($/1000G)	**$0.82**
Total O&M Costs ($/1000G)	**$2.11**

Estimated Operation and Maintenance Costs
Estimated Operation and Maintenance Costs
Option B_ ACTIFLO + NF
Hildago County Drainage District No. 1
Regional Water Supply Facilities Planning

Total				
$3,080,500	Labor	$ 414,000	13.4%
	Operation	$ 2,366,500	76.8%
	Maintenanc	$ 200,000	6.5%
	Professiona	$ 45,000	1.5%
	Other	$ 55,000	1.8%
		$ 3,080,500	100.0%

Assumptions:

Design Flow (Peak), mgd:	**5.0**
Average Day Flow, mgd:	5.0
Labor Burden (%)	40
Power Costs, $/kW-h	0.06
Water supply costs not included	
Estimated effluent pumping costs included	
(total pumping head estimated at 200')	



Description	Unit	Quantity	Unit Cost ($)	Total Cost ($)
Labor				
Plant Manager	EA	1	75,000	$ 75,000
Operators	EA	2	50,000	$ 100,000
Mechanics	EA	2	45,000	$ 90,000
Electrical/Instrumentation	EA	1	65,000	$ 65,000
General Maintenance	EA	2	42,000	$ 84,000
			Subtotal	**$ 414,000**
Operation				
Chemicals	LS	1	1,500,000	$ 1,500,000
Sludge Disposal	LS	1	50,000	$ 50,000
Electric Costs				
On-site	LS	1	750,000	$ 750,000
Effluent Pumping	LS	1	45,000	$ 45,000
Other Utilities (Gas & Phone)	LS	1	15,000	$ 15,000
Office Supplies	LS	1	3,000	$ 3,000
Custodial Supplies	LS	1	1,500	$ 1,500
Lab Fees & Supplies	LS	1	2,000	$ 2,000
			Subtotal	**$ 2,366,500**
Maintenance				
Parts & Replacement	LS	1	200,000	$ 200,000
			Subtotal	**$ 200,000**
Professional Services				
Engineering, Legal & Acctng.	LS	1	45,000	$ 45,000
			Subtotal	**$ 45,000**
Other				
Travel, Training, Dues, etc.	LS	1	15,000	$ 15,000
Insurance	LS	1	40,000	$ 40,000
			Subtotal	**$ 55,000**
TOTAL				**$3,080,500**

Chemical Costs ($/1000G)	**$0.82**
Total O&M Costs ($/1000G)	**$1.69**

Estimated Operation and Maintenance Costs
Estimated Operation and Maintenance Costs
Option B_ ACTIFLO + NF
Hildago County Drainage District No. 1
Regional Water Supply Facilities Planning

Total	Labor	$ 422,000	7.7%
$5,488,500	Operation	$ 4,706,500	85.8%
	Maintenanc	$ 260,000	4.7%
	Professiona	$ 45,000	0.8%
	Other	$ 55,000	1.0%
		$ 5,488,500	100.0%

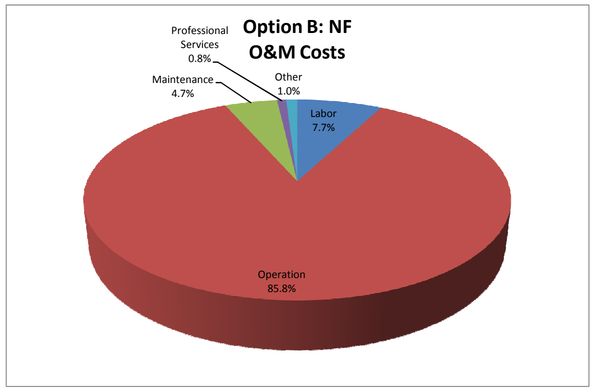
Assumptions:

Design Flow (Peak), mgd:	**10.0**
Average Day Flow, mgd:	10.0
Labor Burden (%)	40
Power Costs, $/kW-h	0.06

Water supply costs not included
Estimated effluent pumping costs included
(total pumping head estimated at 200')

Description	Unit	Quantity	Unit Cost ($)	Total Cost ($)
Labor				
Plant Manager	EA	1	75,000	$ 75,000
Operators	EA	3	50,000	$ 150,000
Mechanics	EA	2	45,000	$ 90,000
Electrical/Instrumentation	EA	1	65,000	$ 65,000
General Maintenance	EA	1	42,000	$ 42,000
			Subtotal	**$ 422,000**
Operation				
Chemicals	LS	1	3,000,000	$ 3,000,000
Sludge Disposal	LS	1	100,000	$ 100,000
Electric Costs				
On-site	LS	1	1,500,000	$ 1,500,000
Effluent Pumping	LS	1	85,000	$ 85,000
Other Utilities (Gas & Phone)	LS	1	15,000	$ 15,000
Office Supplies	LS	1	3,000	$ 3,000
Custodial Supplies	LS	1	1,500	$ 1,500
Lab Fees & Supplies	LS	1	2,000	$ 2,000
			Subtotal	**$ 4,706,500**
Maintenance				
Parts & Replacement	LS	1	260,000	$ 260,000
			Subtotal	**$ 260,000**
Professional Services				
Engineering, Legal & Acctng.	LS	1	45,000	$ 45,000
			Subtotal	**$ 45,000**
Other				
Travel, Training, Dues, etc.	LS	1	15,000	$ 15,000
Insurance	LS	1	40,000	$ 40,000
			Subtotal	**$ 55,000**
TOTAL				**$5,488,500**

Chemical Costs ($/1000G)	**$0.82**
Total O&M Costs ($/1000G)	**$1.50**

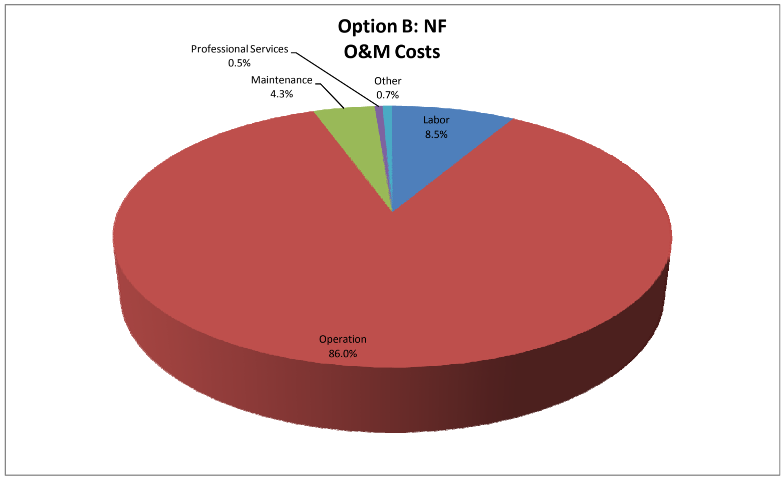


Estimated Operation and Maintenance Costs
Estimated Operation and Maintenance Costs
Option B_ ACTIFLO + NF
Hildago County Drainage District No. 1
Regional Water Supply Facilities Planning

Total	Labor	$ 699,000	8.5%
$8,200,500	Operation	$ 7,051,500	86.0%
	Maintenanc	$ 350,000	4.3%
	Profession	$ 45,000	0.5%
	Other	$ 55,000	0.7%
		$ 8,200,500	100.0%

Assumptions:

Design Flow (Peak), mgd:	15.0
Average Day Flow, mgd:	15.0
Labor Burden (%)	40
Power Costs, $/kW-h	0.06
Water supply costs not included	
Estimated effluent pumping costs included	
(total pumping head estimated at 200')	



Description	Unit	Quantity	Unit Cost ($)	Total Cost ($)
Labor				
Plant Manager	EA	1	75,000	$ 75,000
Operators	EA	5	50,000	$ 250,000
Mechanics	EA	5	45,000	$ 225,000
Electrical/Instrumentation	EA	1	65,000	$ 65,000
General Maintenance	EA	2	42,000	$ 84,000
			Subtotal	**$ 699,000**
Operation				
Chemicals	LS	1	4,500,000	$ 4,500,000
Sludge Disposal	LS	1	150,000	$ 150,000
Electric Costs				
On-site	LS	1	2,250,000	$ 2,250,000
Effluent Pumping	LS	1	130,000	$ 130,000
Other Utilities (Gas & Phone)	LS	1	15,000	$ 15,000
Office Supplies	LS	1	3,000	$ 3,000
Custodial Supplies	LS	1	1,500	$ 1,500
Lab Fees & Supplies	LS	1	2,000	$ 2,000
			Subtotal	**$ 7,051,500**
Maintenance				
Parts & Replacement	LS	1	350,000	$ 350,000
			Subtotal	**$ 350,000**
Professional Services				
Engineering, Legal & Acctng.	LS	1	45,000	$ 45,000
			Subtotal	**$ 45,000**
Other				
Travel, Training, Dues, etc.	LS	1	15,000	$ 15,000
Insurance	LS	1	40,000	$ 40,000
			Subtotal	**$ 55,000**
TOTAL				**$8,200,500**

Chemical Costs ($/1000G)	**$0.82**
Total O&M Costs ($/1000G)	**$1.50**

Hildago County Draing District No. 1 - Water treatment Plant					7/13/2010
Plant Capcity of		3		MGD	
Project Cost Estimate				Factor =	0.30
Option C High Rate Actiflo + DMF+NF + Drying Beds Configuration Option					
DIV	ITEM DESCRIPTION	Unit Quant	Unit	Unit Cost	Total Cost
GENERAL ITEMS including Shop+Admin.+Lab		Size = 40' x 100' x 15'			
1	General Requirements				
	Bonds & Insurance		LS	250000	250000
	Mobilization		LS	150000	150000
2	Sitework				
	Clearing & Grubbing / General Grading	1	LS	20000	20000
	Curb & Gutter	2600	LF	18	46800
	Asphalt Surfacing	3000	SY	20	60000
	Chain Link Fencing (6 ft)	2500	LF	10	25000
	Landscaping	1	LS	100000	100000
2	Yard Piping				
	Plant Influent - 36"	200	LF	125	25000
	Plant Sewer & Manholes (8" PVC)	2000	LF	40	80000
	Water Distribution & Valves (6" PVC)	1500	LF	30	45000
	Plant Effluent - 30 "	200	LF	120	24000
3	Concrete				
	Miscellaneous	100	CY	500	50000
5	Metals				
	Aluminum Railing	500	LF	25	12500
	Misc Metal Fabrications	1	LS	100000	100000
7	Thermal & Moisture Protection				
	Dampproofing	4000	SF	3	12000
	Downspouts & Scuppers	250	LF	30	7500
8	Doors & Windows				
	Doors-Operations Area				
	Exterior (Pedestrian)	4	EA	2000	8000
	Interior (Pedestrian)	8	EA	1500	12000
	Roll Up Door (8 x 10)	1	EA	5500	5500
	Windows- Operations Area	200	SF	15	3000
9	Finishes	0	0	0	0
	Misc. Painting (Piping)	1	LS	50000	50000
	General Office & Misc.	2500	SF	20	50000
	Restrooms	100	SF	25	2500
11	Equipment	0	0	0	0
	House Water System	1	LS	20000	20000
12	Furnishings				
	Laboratory	1	LS	30000	30000
	Miscellaneous	1	LS	50000	50000
13	Special Construction				
	Security System	1	LS	50000	50000
15	Mechanical				
	HVAC	4000	SF	30	120000
	Fire Protection	4000	SF	4	16000
	Plumbing	4000	SF	4	16000
16	Electrical				
	Standby Generator	1	LS	100000	100000
	Electrical Work (20% of Div 11)	1	LS	581800	581800
	Instrumentation & Control (35% of Div 11)	1	LS	1018150	1018150
		Subtotal for General Items for WTP		$	3,140,750
Operations & Maintenance Facilities		Size = 40' x 100' x 15'			

2	Sitework				
	Excavation	400	CY	4	3200
	Backfill	200	CY	10	3000
3	Cast-in-Place Concrete				
	Slabs on Grade	100	CY	350	35000
	Walls	100	CY	450	45000
	Suspended Slabs & Beams	60	CY	600	36000
	Columns	25	CY	600	15000
	Precast Roofing	4000	SF	8	32000
	Garage / Shop				
	Slabs on Grade	75	CY	350	26250
	Walls	300	CY	450	135000
4	Masonry				
	Composite Wall (8" block, 4"brick)	4200	SF	15	63000
6	Wood And Plastics				
	Fiberglass Chemical Storage Tanks Alum (8000 gal)	1	EA	8000	8000
	Fiberglass Chemical Storage Tanks Permanganate (2500 gal)	2	EA	2500	5000
	Fiberglass Chemical Storage Tanks Caustic Soda (8000 gal) (Alkalinity adjustment)	1	EA	8000	8000
	Polymer Day Tanks (250 gal)	6	EA	500	3000
	Fiberglass Chemical Storage Tanks NaOCL (whole systeml)	1	EA	50000	50000
7	Thermal & Moisture Protection				
	Membrane Roofing (including ballast)	4000	SF	1.5	6000
	Rigid Insulation (Roof)	4000	SF	1.25	5000
	Roof Flashing	400	LF	12	4800
8	Doors & Windows				
	Doors-Operations Area				
	Exterior (Pedestrian)	2	EA	2000	4000
	Interior (Pedestrian)	4	EA	1500	6000
	Roll Up Door (8 x 10)	1	EA	5500	5500
	Windows- Operations Area	200	SF	15	3000
9	Finishes				
	Interior				
	Operations Complex				
	Chemical Area	150	SF	50	7500
	Restrooms / Lockers	250	SF	25	6250
	Carpeting	150	SY	30	4500
	Misc Trim & Finishes	1	LS	10000	10000
	Acoustical Suspended Ceiling (Operations Area)	400	SF	7	2800
	Vinyl Composition Flooring	1000	SF	3.7	3700
10	Specialties				
	Operations Bldg.				
	Lockers	1	LS	2500	2500
	Toilet Accessories	1	LS	2500	2500
11	Equipment				
	Chemical Transfer Pumps (25 gpm @ 50' TDH)	2	EA	20000	40000
	Alum Chemical Feed Metering Pumps (15-20 gph)	3	EA	4500	13500
	Polymer Feed System	1	EA		
	Garage / Shop		0	10000	10000
	Misc.	1	LS	20000	20000
	Subtotal for Operations & Maintenance Facilities			$	625,000
High Rate Clarification		Size =	60	70	25

	Subtotal for High Rate Clarification			**$**	**1,265,879**
NF Filter Complex + DMF As Shown in Others		Size =	120	120	50

			Subtotal Filter Complex	$	3,897,584
Clearwell & Effluent Pumping Facilities					

			Subtotal Clearwell	$	531,965
Plant Waste-Handling incd. Backwash holding + Sludge Holding/Recycling Basin					
	Subtotal WW Recovery Basin Complex			$	474,505

Chlorine Feed System Building	Size =	20	20	25

				Subtotal Chlorine Building	$	163,750
Sludge Drying Beds						
				Subtotal Decant Pump Station	$	178,870

OTHERS					
2	**Sitework** Manhole	10	EA	$2,000	$ 20,000
11	**DMF System** Dual-Media Equipment + Building	1	LS	**$1,914,019**	**$ 1,914,019**
2	**DMF and NF Effluent Mixing Flow Vault** Valve, Pipe, and Concrete Structure	1	LS	$45,000	$ 45,000
				Subtotal Sendimentation Ponds	**$ 1,979,019**

SUBTOTAL	**$ 12,257,322**
Construction Contingency (30%)	**$ 3,677,196**
Engineering, Survey & Const Mngmnt (20%)	**$ 3,186,904**
PROJECT TOTAL	**$ 19,121,422**

Cost ($/MG) ***$6.37***

Hildago County Draing District No. 1 - Water treatment Plant					7/13/2010
Plant Capcity of		5		MGD	
Project Cost Estimate				Factor =	0.50
Option C High Rate Actiflo + DMF+NF + Drying Beds Configuration Option					
DIV	ITEM DESCRIPTION	Unit Quant	Unit	Unit Cost	Total Cost
GENERAL ITEMS including Shop+Admin.+Lab		Size = 40' x 100' x 15'			
1	General Requirements				
	Bonds & Insurance		LS	250000	250000
	Mobilization		LS	150000	150000
2	Sitework				
	Clearing & Grubbing / General Grading	1	LS	20000	20000
	Curb & Gutter	2600	LF	18	46800
	Asphalt Surfacing	3000	SY	20	60000
	Chain Link Fencing (6 ft)	2500	LF	10	25000
	Landscaping	1	LS	100000	100000
2	Yard Piping				
	Plant Influent - 36"	200	LF	125	25000
	Plant Sewer & Manholes (8" PVC)	2000	LF	40	80000
	Water Distribution & Valves (6" PVC)	1500	LF	30	45000
	Plant Effluent - 30 "	200	LF	120	24000
3	Concrete				
	Miscellaneous	100	CY	500	50000
5	Metals				
	Aluminum Railing	500	LF	25	12500
	Misc Metal Fabrications	1	LS	100000	100000
7	Thermal & Moisture Protection				
	Dampproofing	4000	SF	3	12000
	Downspouts & Scuppers	250	LF	30	7500
8	Doors & Windows				
	Doors-Operations Area				
	Exterior (Pedestrian)	4	EA	2000	8000
	Interior (Pedestrian)	8	EA	1500	12000
	Roll Up Door (8 x 10)	1	EA	5500	5500
	Windows- Operations Area	200	SF	15	3000
9	Finishes	0	0	0	0
	Misc. Painting (Piping)	1	LS	50000	50000
	General Office & Misc.	2500	SF	20	50000
	Restrooms	100	SF	25	2500
11	Equipment	0	0	0	0
	House Water System	1	LS	20000	20000
12	Furnishings				
	Laboratory	1	LS	30000	30000
	Miscellaneous	1	LS	50000	50000
13	Special Construction				
	Security System	1	LS	50000	50000
15	Mechanical				
	HVAC	4000	SF	30	120000
	Fire Protection	4000	SF	4	16000
	Plumbing	4000	SF	4	16000
16	Electrical				
	Standby Generator	1	LS	100000	100000
	Electrical Work (20% of Div 11)	1	LS	581800	581800
	Instrumentation & Control (35% of Div 11)	1	LS	1018150	1018150
		Subtotal for General Items for WTP			$ 3,140,750

Operations & Maintenance Facilities		Size = 40' x 100' x 15'			
2	Sitework				
	Excavation	400	CY	4	3200
	Backfill	200	CY	10	3000
3	Cast-in-Place Concrete				
	Slabs on Grade	100	CY	350	35000
	Walls	100	CY	450	45000
	Suspended Slabs & Beams	60	CY	600	36000
	Columns	25	CY	600	15000
	Precast Roofing	4000	SF	8	32000
	Garage / Shop				
	Slabs on Grade	75	CY	350	26250
	Walls	300	CY	450	135000
4	Masonry				
	Composite Wall (8" block, 4"brick)	4200	SF	15	63000
6	Wood And Plastics				
	Fiberglass Chemical Storage Tanks Alum (8000 gal)	1	EA	8000	8000
	Fiberglass Chemical Storage Tanks Permanganate (2500 gal)	2	EA	2500	5000
	Fiberglass Chemical Storage Tanks Caustic Soda (8000 gal) (Alkalinity adjustment)	1	EA	8000	8000
	Polymer Day Tanks (250 gal)	6	EA	500	3000
	Fiberglass Chemical Storage Tanks NaOCL (whole systeml)	1	EA	50000	50000
7	Thermal & Moisture Protection				
	Membrane Roofing (including ballast)	4000	SF	1.5	6000
	Rigid Insulation (Roof)	4000	SF	1.25	5000
	Roof Flashing	400	LF	12	4800
8	Doors & Windows				
	Doors-Operations Area				
	Exterior (Pedestrian)	2	EA	2000	4000
	Interior (Pedestrian)	4	EA	1500	6000
	Roll Up Door (8 x 10)	1	EA	5500	5500
	Windows- Operations Area	200	SF	15	3000
9	Finishes				
	Interior				
	Operations Complex				
	Chemical Area	150	SF	50	7500
	Restrooms / Lockers	250	SF	25	6250
	Carpeting	150	SY	30	4500
	Misc Trim & Finishes	1	LS	10000	10000
	Acoustical Suspended Ceiling (Operations Area)	400	SF	7	2800
	Vinyl Composition Flooring	1000	SF	3.7	3700
10	Specialties				
	Operations Bldg.				
	Lockers	1	LS	2500	2500
	Toilet Accessories	1	LS	2500	2500
11	Equipment				
	Chemical Transfer Pumps (25 gpm @ 50' TDH)	2	EA	20000	40000
	Alum Chemical Feed Metering Pumps (15-20 gph)	3	EA	4500	13500
	Polymer Feed System	1	EA		
	Garage / Shop		0	10000	10000
	Misc.	1	LS	20000	20000
	Subtotal for Operations & Maintenance Facilities			$	625,000

High Rate Clarification		Size =	60	70	25

	Subtotal for High Rate Clarification			**$**	**1,537,095**
NF Filter Complex + DMF As Shown in Others		Size =	120	120	50

			Subtotal Filter Complex		$	6,114,640
Clearwell & Effluent Pumping Facilities						

			Subtotal Clearwell		$ 693,941
Plant Waste-Handling incd. Backwash holding + Sludge Holding/Recycling Basin					
	Subtotal WW Recovery Basin Complex				$ 512,975

Chlorine Feed System Building	Size =	20	20	25

			Subtotal Chlorine Building		$	163,750
Sludge Drying Beds						

		Subtotal Decant Pump Station			$	241,970

OTHERS						
2	**Sitework** Manhole	10	EA	$2,000	$	20,000
11	**DMF System** Dual-Media Equipment + Building	1	LS	**$2,272,165**	**$**	**2,272,165**
2	**DMF and NF Effluent Mixing Flow Vault** Valve, Pipe, and Concrete Structure	1	LS	$75,000	$	75,000
		Subtotal Sendimentation Ponds			**$**	**2,367,165**

SUBTOTAL	**$**	**15,397,286**
Construction Contingency (30%)	**$**	**4,619,186**
Engineering, Survey & Const Mngmnt (20%)	**$**	**4,003,294**
PROJECT TOTAL	**$**	**24,019,766**

Cost ($/MG) ***$4.80***

Hildago County Draing District No. 1 - Water treatment Plant 7/13/2010

Plant Capcity of 10 MGD

Project Cost Estimate

Option C High Rate Actiflo + DMF+NF + Drying Beds Configuration Option

DIV	ITEM DESCRIPTION	Unit Quant	Unit	Unit Cost	Total Cost
GENERAL ITEMS including Shop+Admin.+Lab		Size = 40' x 100' x 15'			
1	General Requirements				
	Bonds & Insurance		LS	250000	250000
	Mobilization		LS	150000	150000
2	Sitework				
	Clearing & Grubbing / General Grading	1	LS	20000	20000
	Curb & Gutter	2600	LF	18	46800
	Asphalt Surfacing	3000	SY	20	60000
	Chain Link Fencing (6 ft)	2500	LF	10	25000
	Landscaping	1	LS	100000	100000
2	Yard Piping				
	Plant Influent - 36"	200	LF	125	25000
	Plant Sewer & Manholes (8" PVC)	2000	LF	40	80000
	Water Distribution & Valves (6" PVC)	1500	LF	30	45000
	Plant Effluent - 30 "	200	LF	120	24000
3	Concrete				
	Miscellaneous	100	CY	500	50000
5	Metals				
	Aluminum Railing	500	LF	25	12500
	Misc Metal Fabrications	1	LS	100000	100000
7	Thermal & Moisture Protection				
	Damproofing	4000	SF	3	12000
	Downspouts & Scuppers	250	LF	30	7500
8	Doors & Windows				
	Doors-Operations Area				
	Exterior (Pedestrian)	4	EA	2000	8000
	Interior (Pedestrian)	8	EA	1500	12000
	Roll Up Door (8 x 10)	1	EA	5500	5500
	Windows- Operations Area	200	SF	15	3000
9	Finishes	0	0	0	0
	Misc. Painting (Piping)	1	LS	50000	50000
	General Office & Misc.	2500	SF	20	50000
	Restrooms	100	SF	25	2500
11	Equipment	0	0	0	0
	House Water System	1	LS	20000	20000
12	Furnishings				
	Laboratory	1	LS	30000	30000
	Miscellaneous	1	LS	50000	50000
13	Special Construction				
	Security System	1	LS	50000	50000
15	Mechanical				
	HVAC	4000	SF	30	120000
	Fire Protection	4000	SF	4	16000
	Plumbing	4000	SF	4	16000
16	Electrical				
	Standby Generator	1	LS	100000	100000
	Electrical Work (20% of Div 11)	1	LS	581800	581800
	Instrumentation & Control (35% of Div 11)	1	LS	1018150	1018150
	Subtotal for General Items for WTP				$ 3,140,750
Operations & Maintenance Facilities		Size = 40' x 100' x 15'			

2	**Sitework**				
	Excavation	400	CY	4	3200
	Backfill	200	CY	10	3000
3	**Cast-in-Place Concrete**				
	Slabs on Grade	100	CY	350	35000
	Walls	100	CY	450	45000
	Suspended Slabs & Beams	60	CY	600	36000
	Columns	25	CY	600	15000
	Precast Roofing	4000	SF	8	32000
	Garage / Shop				
	Slabs on Grade	75	CY	350	26250
	Walls	300	CY	450	135000
4	**Masonry**				
	Composite Wall (8" block, 4"brick)	4200	SF	15	63000
6	**Wood And Plastics**				
	Fiberglass Chemical Storage Tanks Alum (8000 gal)	1	EA	8000	8000
	Fiberglass Chemical Storage Tanks Permanganate (2500 gal)	2	EA	2500	5000
	Fiberglass Chemical Storage Tanks Caustic Soda (8000 gal) (Alkalinity adjustment)	1	EA	8000	8000
	Polymer Day Tanks (250 gal)	6	EA	500	3000
	Fiberglass Chemical Storage Tanks NaOCL (whole systeml)	1	EA	50000	50000
7	**Thermal & Moisture Protection**				
	Membrane Roofing (including ballast)	4000	SF	1.5	6000
	Rigid Insulation (Roof)	4000	SF	1.25	5000
	Roof Flashing	400	LF	12	4800
8	**Doors & Windows**				
	Doors-Operations Area				
	Exterior (Pedestrian)	2	EA	2000	4000
	Interior (Pedestrian)	4	EA	1500	6000
	Roll Up Door (8 x 10)	1	EA	5500	5500
	Windows- Operations Area	200	SF	15	3000
9	**Finishes**				
	Interior				
	Operations Complex				
	Chemical Area	150	SF	50	7500
	Restrooms / Lockers	250	SF	25	6250
	Carpeting	150	SY	30	4500
	Misc Trim & Finishes	1	LS	10000	10000
	Acoustical Suspended Ceiling (Operations Area)	400	SF	7	2800
	Vinyl Composition Flooring	1000	SF	3.7	3700
10	**Specialties**				
	Operations Bldg.				
	Lockers	1	LS	2500	2500
	Toilet Accessories	1	LS	2500	2500
11	**Equipment**				
	Chemical Transfer Pumps (25 gpm @ 50' TDH)	2	EA	20000	40000
	Alum Chemical Feed Metering Pumps (15-20 gph)	3	EA	4500	13500
	Polymer Feed System	1	EA		
	Garage / Shop		0	10000	10000
	Misc.	1	LS	20000	20000
	Subtotal for Operations & Maintenance Facilities			**$**	**625,000**
	High Rate Clarification	Size =	60	70	25

	Subtotal for High Rate Clarification			$	3,001,320
NF Filter Complex + DMF As Shown in Others		Size =	120	120	50

				Subtotal Filter Complex	$	11,477,280
Clearwell & Effluent Pumping Facilities						
2	**Sitework**	Size =	60	104		10
	Excavation	5,000	CY	**$0**	$	-
	Backfill	2,500	CY	**$0**	$	-
2	**Yard Piping**					
	Reservoir Overflow/Drain - 18"	250	LF	$72	$	18,000
3	**Cast-in-Place Concrete**					
	Slabs on Grade	350	CY	$350	$	122,500
	Walls	800	CY	$450	$	360,000
	Suspended Slabs & Beams	250	CY	$600	$	150,000
	Columns	50	CY	$600	$	30,000
	Precast Roofing	1,100	SF	$8	$	8,800
4	**Masonry**					
	Composite Wall (8" block, 4" brick)	2,000	SF	$15	$	30,000
	Interior (8" Concrete Block)	5,000	SF	$5	$	25,000
7	**Thermal & Moisture Protection**					
	Membrane Roofing (including ballast)	1,000	SF	$1.50	$	1,500
	Reservoir Membrane	5,000	SF	$2.00	$	10,000
	Rigid Insulation (Roof)	1,000	SF	$1.25	$	1,250
	Rigid Insulation (Wall)	5,104	SF	$0.50	$	2,552
	Roof Flashing	140	SF	$12.00	$	1,680
8	**Doors & Windows**					
	Doors					
	Exterior (Pedestrian)	1	EA	$2,000	$	2,000
	Roll Up Door (8 x 10)	1	EA	$5,500	$	5,500
	Windows	50	SF	$10	$	500
9	**Interior Finishes**	1,000	SF	$4	$	4,000
11	**Equipment**					
	Effluent Pumping Station					
	Effluent Pumps					

	3500 gpm @ 200'TDH	4	EA	$80,000	$	320,000
15	**Mechanical**					
	Effluent Pumping Station					
	Piping					
	30" Effluent	50	LF	$240	$	12,000
	24" Suction & Discharge	50	LF	$192	$	9,600
	Valves w/Actuator					
	24" BFV	6	EA	$15,000	$	90,000
	18" BFV (Drain)	1	EA	$9,000	$	9,000
			Subtotal Clearwell		**$**	**1,213,882**
Plant Waste-Handling incd. Backwash holding + Sludge Holding/Recycling Basin						
2	**Sitework**					
	Excavation	**6,000**	CY	**$0**	$	-
	Backfill	**2,500**	CY	**$0**	$	-
2	**Yard Piping**					
	Wash Water Recovery - 30"	250	LF	$120	$	30,000
	Wash Water Return - 12"	300	LF	$48	$	14,400
	Sediment Transmission Line - 12"	650	LF	$48	$	31,200
	Decant Return Line - 8"	1,000	LF	$32	$	32,000
	Wash Water By-pass - 24"	200	LF	$96	$	19,200
3	**Cast-in-Place Concrete**					
	Slabs on Grade	75	CY	$350	$	26,250
	Walls	50	CY	$450	$	22,500
	Suspended Slabs	25	CY	$600	$	15,000
	Columns	0	CY	$600	$	-
	Precast Roofing	0	SF	$8	$	-
4	**Mebbrane Lining**					
	5-mil lining	**35,000**	SF	$2	$	70,000
7	**Backwash Holding Tank - Concrete**					
	Slab on Grade	140	CY	$350.00	$	49,000
	Walls	100	CY	$450.00	$	45,000
	Suspended Slab	50	CY	$600.00	$	30,000
	Column	0	CY	$600.00	$	-
8	**Doors & Windows**					
	Exterior (Pedestrian)	0	EA	$2,000	$	-
	Roll Up Door (8 x 10)	0	EA	$5,500	$	-
	Windows	0	SF	$10	$	-
9	**Interior Finishes**	0	SF	$4	$	-
11	**Equipment**					
	Filter Backwah Transfer Pumps 2000 gpm at 50'	2	EA	$30,000	$	60,000
	Sludge Recycle Return Pumps					
	7000 gpm @ 100' TDH	2	LS	$45,000	$	90,000
15	**Mechanical**					
	Piping					
	8" Suction & Discharge	60	LF	$64	$	3,840
	12" Combined Return (2 Pumps)	60	LF	$96	$	5,760
	Valves w/Actuator					
	8" BFV	4	EA	$2,000	$	8,000
	8" Check	2	EA	$1,000	$	2,000
	12" BFV	1	EA	$6,000	$	6,000
	Subtotal WW Recovery Basin Complex				**$**	**560,150**

Chlorine Feed System Building	Size =	20	20	25

		Subtotal Chlorine Building			$	213,750
Sludge Drying Beds						
2	**Sitework**					
	Excavation	500	CY	**$0**	$	-
	Backfill	100	CY	**$0**	$	-
3	**Cast-in-Place Concrete**					
	Slabs on Grade	700	CY	$350	$	245,000
	Walls	150	CY	$450	$	67,500
	Suspended Slabs & Beams	0	CY	$600	$	-
	Columns	0	CY	$600	$	-
	Precast Roofing	0	SF	$8	$	-
4	**Masonry**					
	Composite Wall (8" block, 4" brick)	0	SF	$15	$	-
7	**Thermal & Moisture Protection**					
	Membrane Roofing (including ballast)	0	SF	$1.50	$	-
	Rigid Insulation (Roof)	0	SF	$1.25	$	-
	Rigid Insulation (Wall)	0	SF	$0.50	$	-
	Roof Flashing	0	SF	$12.00	$	-
8	**Doors & Windows**					
	Doors					
	Exterior (Pedestrian)	0	EA	$2,000	$	-
	Windows	0	SF	$10	$	-
9	**Interior Finishes**	0	SF	$4	$	-
11	**Equipment**					
	Pumps					
	3500 gpm @ 100' TDH	3	EA	$35,000	$	105,000
15	**Mechanical**					
	Piping					
	6" Suction & Discharge	60	LF	$48	$	2,880
	8" Combined Return (2 Pumps)	60	LF	$64	$	3,840
	Valves w/Actuator					
	6" BFV	4	EA	$1,000	$	4,000
	6" Check	2	EA	$750	$	1,500
	8" BFV	1	EA	$2,000	$	2,000
		Subtotal Decant Pump Station			**$**	**431,720**

OTHERS					
2	**Sitework** Manhole	10	EA	$2,000	$ 20,000
11	**DMF System** Dual-Media Equipment + Building	1	LS	**$2,817,430**	**$ 2,817,430**
2	**DMF and NF Effluent Mixing Flow Vault** Valve, Pipe, and Concrete Structure	1	LS	$150,000	$ 150,000
		Subtotal Sendimentation Ponds			**$ 2,987,430**

SUBTOTAL	**$ 23,651,282**
Construction Contingency (30%)	**$ 7,095,385**
Engineering, Survey & Const Mngmnt (20%)	**$ 6,149,333**
PROJECT TOTAL	**$ 36,896,000**

Cost ($/MG) ***$3.69***

Hildago County Draing District No. 1 - Water treatment Plant 7/13/2010

Plant Capcity of 15 MGD

Project Cost Estimate Factor = 1.50

Option C High Rate Actiflo + DMF+NF + Drying Beds Configuration Option

DIV	ITEM DESCRIPTION	Unit Quant	Unit	Unit Cost	Total Cost
GENERAL ITEMS including Shop+Admin.+Lab		Size = 40' x 100' x 15'			
1	General Requirements				
	Bonds & Insurance		LS	250000	250000
	Mobilization		LS	150000	150000
2	Sitework				
	Clearing & Grubbing / General Grading	1	LS	20000	20000
	Curb & Gutter	2600	LF	18	46800
	Asphalt Surfacing	3000	SY	20	60000
	Chain Link Fencing (6 ft)	2500	LF	10	25000
	Landscaping	1	LS	100000	100000
2	Yard Piping				
	Plant Influent - 36"	200	LF	125	25000
	Plant Sewer & Manholes (8" PVC)	2000	LF	40	80000
	Water Distribution & Valves (6" PVC)	1500	LF	30	45000
	Plant Effluent - 30 "	200	LF	120	24000
3	Concrete				
	Miscellaneous	100	CY	500	50000
5	Metals				
	Aluminum Railing	500	LF	25	12500
	Misc Metal Fabrications	1	LS	100000	100000
7	Thermal & Moisture Protection				
	Dampproofing	4000	SF	3	12000
	Downspouts & Scuppers	250	LF	30	7500
8	Doors & Windows				
	Doors-Operations Area				
	Exterior (Pedestrian)	4	EA	2000	8000
	Interior (Pedestrian)	8	EA	1500	12000
	Roll Up Door (8 x 10)	1	EA	5500	5500
	Windows- Operations Area	200	SF	15	3000
9	Finishes	0	0	0	0
	Misc. Painting (Piping)	1	LS	50000	50000
	General Office & Misc.	2500	SF	20	50000
	Restrooms	100	SF	25	2500
11	Equipment	0	0	0	0
	House Water System	1	LS	20000	20000
12	Furnishings				
	Laboratory	1	LS	30000	30000
	Miscellaneous	1	LS	50000	50000
13	Special Construction				
	Security System	1	LS	50000	50000
15	Mechanical				
	HVAC	4000	SF	30	120000
	Fire Protection	4000	SF	4	16000
	Plumbing	4000	SF	4	16000
16	Electrical				
	Standby Generator	1	LS	100000	100000
	Electrical Work (20% of Div 11)	1	LS	581800	581800
	Instrumentation & Control (35% of Div 11)	1	LS	1018150	1018150
				Subtotal for General Items for WTP $	3,140,750

Operations & Maintenance Facilities		Size = 40' x 100' x 15'			
2	Sitework				
	Excavation	400	CY	4	3200
	Backfill	200	CY	10	3000
3	Cast-in-Place Concrete				
	Slabs on Grade	100	CY	350	35000
	Walls	100	CY	450	45000
	Suspended Slabs & Beams	60	CY	600	36000
	Columns	25	CY	600	15000
	Precast Roofing	4000	SF	8	32000
	Garage / Shop				
	Slabs on Grade	75	CY	350	26250
	Walls	300	CY	450	135000
4	Masonry				
	Composite Wall (8" block, 4"brick)	4200	SF	15	63000
6	Wood And Plastics				
	Fiberglass Chemical Storage Tanks Alum (8000 gal)	1	EA	8000	8000
	Fiberglass Chemical Storage Tanks Permanganate (2500 gal)	2	EA	2500	5000
	Fiberglass Chemical Storage Tanks Caustic Soda (8000 gal) (Alkalinity adjustment)	1	EA	8000	8000
	Polymer Day Tanks (250 gal)	6	EA	500	3000
	Fiberglass Chemical Storage Tanks NaOCL (whole systeml)	1	EA	50000	50000
7	Thermal & Moisture Protection				
	Membrane Roofing (including ballast)	4000	SF	1.5	6000
	Rigid Insulation (Roof)	4000	SF	1.25	5000
	Roof Flashing	400	LF	12	4800
8	Doors & Windows				
	Doors-Operations Area				
	Exterior (Pedestrian)	2	EA	2000	4000
	Interior (Pedestrian)	4	EA	1500	6000
	Roll Up Door (8 x 10)	1	EA	5500	5500
	Windows- Operations Area	200	SF	15	3000
9	Finishes				
	Interior				
	Operations Complex				
	Chemical Area	150	SF	50	7500
	Restrooms / Lockers	250	SF	25	6250
	Carpeting	150	SY	30	4500
	Misc Trim & Finishes	1	LS	10000	10000
	Acoustical Suspended Ceiling (Operations Area)	400	SF	7	2800
	Vinyl Composition Flooring	1000	SF	3.7	3700
10	Specialties				
	Operations Bldg.				
	Lockers	1	LS	2500	2500
	Toilet Accessories	1	LS	2500	2500
11	Equipment				
	Chemical Transfer Pumps (25 gpm @ 50' TDH)	2	EA	20000	40000
	Alum Chemical Feed Metering Pumps (15-20 gph)	3	EA	4500	13500
	Polymer Feed System	1	EA		
	Garage / Shop		0	10000	10000
	Misc.	1	LS	20000	20000
	Subtotal for Operations & Maintenance Facilities			$	625,000

High Rate Clarification		Size =	60	70	25

		Subtotal for High Rate Clarification			$	4,405,055
NF Filter Complex + DMF As Shown in Others		Size =	120	120		50

				Subtotal Filter Complex		$ 16,249,920
Clearwell & Effluent Pumping Facilities						

			Subtotal Clearwell		$	1,823,823
Plant Waste-Handling incd. Backwash holding + Sludge Holding/Recycling Basin						
	Subtotal WW Recovery Basin Complex				$	705,325

Chlorine Feed System Building	Size =	20	20	25

		Subtotal Chlorine Building			$	263,750
Sludge Drying Beds						

		Subtotal Decant Pump Station			**$ 592,470**

OTHERS					
2	**Sitework** Manhole	10	EA	$2,000	$ 20,000
11	**DMF System** Dual-Media Equipment + Building	1	LS	**$3,565,295**	**$ 3,565,295**
2	**DMF and NF Effluent Mixing Flow Vault** Valve, Pipe, and Concrete Structure	1	LS	$225,000	$ 225,000
	Subtotal Sendimentation Ponds				**$ 3,810,295**

SUBTOTAL	**$ 31,616,388**
Construction Contingency (30%)	**$ 9,484,916**
Engineering, Survey & Const Mngmnt (20%)	**$ 8,220,261**
PROJECT TOTAL	**$ 49,321,565**

Cost ($/MG) ***$3.29***

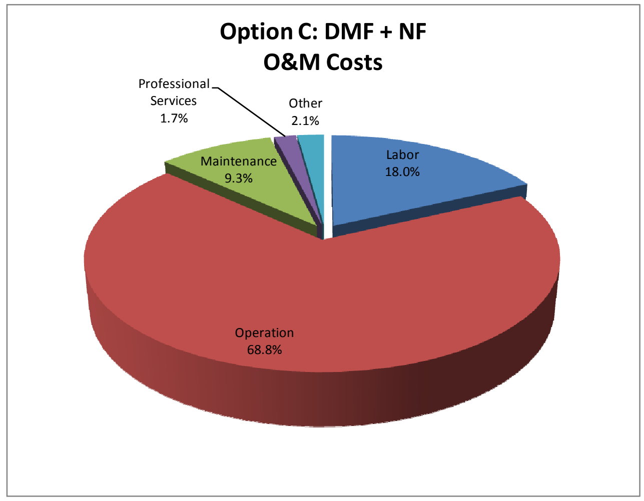
Estimated Operation and Maintenance Costs
Estimated Operation and Maintenance Costs
Option C_ ACTIFLO + DMF + NF
Hildago County Drainage District No. 1
Regional Water Supply Facilities Planning

Total	Labor	$ 464,000	18.0%	
$2,577,000	Operation	$ 1,773,000	68.8%	
	Maintenanc	$ 240,000	9.3%	
	Profession	$ 45,000	1.7%	
	Other	$ 55,000	2.1%	
		$ 2,577,000		1

Assumptions:

Design Flow (Peak), mgd:	**3.0**
Average Day Flow, mgd:	3.0
Labor Burden (%)	40
Power Costs, $/kW-h	0.06
Water supply costs not included	
Estimated effluent pumping costs included	
(total pumping head estimated at 200')	

Description	Unit	Quantity	Unit Cost ($)	Total Cost ($)
Labor				
Plant Manager	EA	1	75,000	$ 75,000
Operators	EA	3	50,000	$ 150,000
Mechanics	EA	2	45,000	$ 90,000
Electrical/Instrumentation	EA	1	65,000	$ 65,000
General Maintenance	EA	2	42,000	$ 84,000
			Subtotal	**$ 464,000**
Operation				
Chemicals	LS	1	915,000	$ 915,000
Sludge Disposal	LS	1	31,500	$ 31,500
Electric Costs				
On-site	LS	1	760,000	$ 760,000
Effluent Pumping	LS	1	45,000	$ 45,000
Other Utilities (Gas & Phone)	LS	1	15,000	$ 15,000
Office Supplies	LS	1	3,000	$ 3,000
Custodial Supplies	LS	1	1,500	$ 1,500
Lab Fees & Supplies	LS	1	2,000	$ 2,000
			Subtotal	**$ 1,773,000**
Maintenance				
Parts & Replacement	LS	1	240,000	$ 240,000
			Subtotal	**$ 240,000**
Professional Services				
Engineering, Legal & Acctng.	LS	1	45,000	$ 45,000
			Subtotal	**$ 45,000**
Other				
Travel, Training, Dues, etc.	LS	1	15,000	$ 15,000
Insurance	LS	1	40,000	$ 40,000
			Subtotal	**$ 55,000**
TOTAL				**$2,577,000**



Chemical Costs ($/1000G)	**$0.84**
Total O&M Costs ($/1000G)	**$2.35**

Estimated Operation and Maintenance Costs
Estimated Operation and Maintenance Costs
Option C_ ACTIFLO + DMF + NF
Hildago County Drainage District No. 1
Regional Water Supply Facilities Planning

Assumptions:

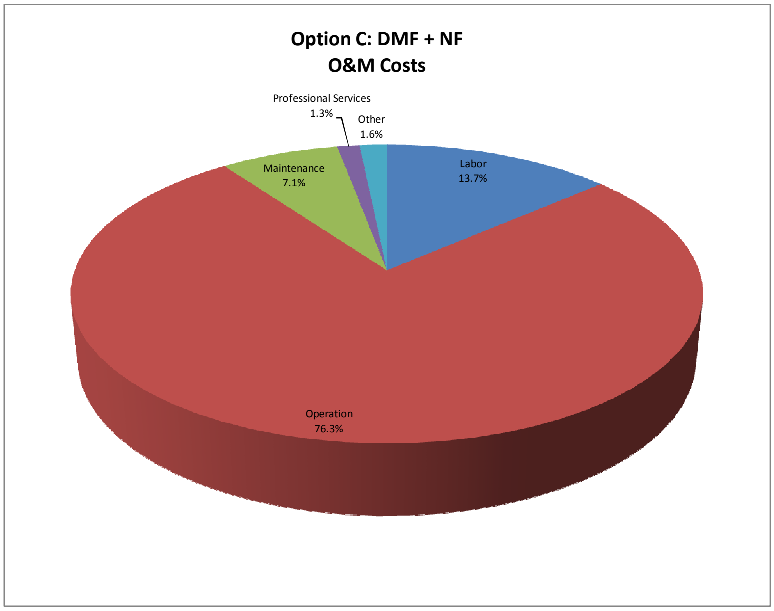
Design Flow (Peak), mgd:	**5.0**
Average Day Flow, mgd:	5.0
Labor Burden (%)	40
Power Costs, $/kW-h	0.06

Water supply costs not included
Estimated effluent pumping costs included
(total pumping head estimated at 200')

Description	Unit	Quantity	Unit Cost ($)	Total Cost ($)
Labor				
Plant Manager	EA	1	75,000	$ 75,000
Operators	EA	3	50,000	$ 150,000
Mechanics	EA	2	45,000	$ 90,000
Electrical/Instrumentation	EA	1	65,000	$ 65,000
General Maintenance	EA	2	42,000	$ 84,000
			Subtotal	**$ 464,000**
Operation				
Chemicals	LS	1	1,525,000	$ 1,525,000
Sludge Disposal	LS	1	52,500	$ 52,500
Electric Costs				
On-site	LS	1	950,000	$ 950,000
Effluent Pumping	LS	1	45,000	$ 45,000
Other Utilities (Gas & Phone)	LS	1	15,000	$ 15,000
Office Supplies	LS	1	3,000	$ 3,000
Custodial Supplies	LS	1	1,500	$ 1,500
Lab Fees & Supplies	LS	1	2,000	$ 2,000
			Subtotal	**$ 2,594,000**
Maintenance				
Parts & Replacement	LS	1	240,000	$ 240,000
			Subtotal	**$ 240,000**
Professional Services				
Engineering, Legal & Acctng.	LS	1	45,000	$ 45,000
			Subtotal	**$ 45,000**
Other				
Travel, Training, Dues, etc.	LS	1	15,000	$ 15,000
Insurance	LS	1	40,000	$ 40,000
			Subtotal	**$ 55,000**
TOTAL				**$3,398,000**

Chemical Costs ($/1000G)	**$0.84**
Total O&M Costs ($/1000G)	**$1.86**

Total			
$3,398,000	Labor	$ 464,000	13.7%
	Operation	$ 2,594,000	76.3%
	Maintenanc	$ 240,000	7.1%
	Profession	$ 45,000	1.3%
	Other	$ 55,000	1.6%
		$ 3,398,000	100.0%



Estimated Operation and Maintenance Costs
Estimated Operation and Maintenance Costs
Option C_ ACTIFLO + DMF + NF
Hildago County Drainage District No. 1
Regional Water Supply Facilities Planning

Assumptions:

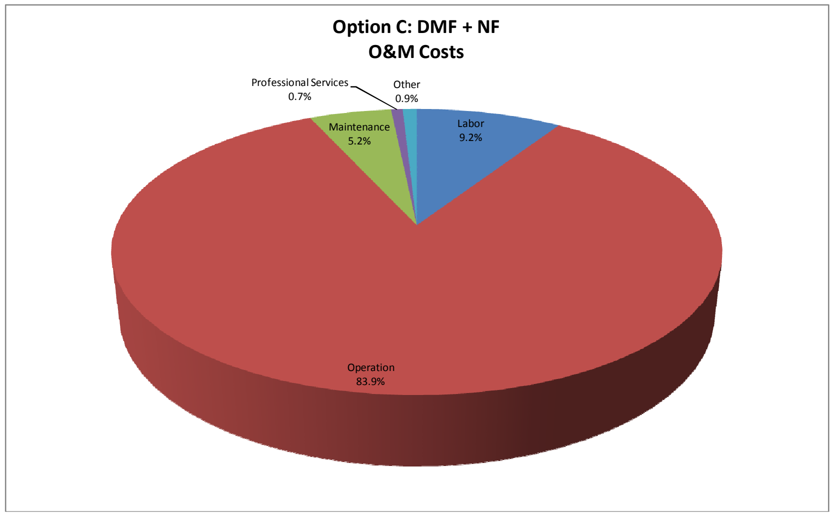
Design Flow (Peak), mgd:	**10.0**
Average Day Flow, mgd:	10.0
Labor Burden (%)	40
Power Costs, $/kW-h	0.06

Water supply costs not included
Estimated effluent pumping costs included
(total pumping head estimated at 200')

Description	Unit	Quantity	Unit Cost ($)	Total Cost ($)
Labor				
Plant Manager	EA	1	75,000	$ 75,000
Operators	EA	5	50,000	$ 250,000
Mechanics	EA	3	45,000	$ 135,000
Electrical/Instrumentation	EA	1	65,000	$ 65,000
General Maintenance	EA	1	42,000	$ 42,000
			Subtotal	**$ 567,000**
Operation				
Chemicals	LS	1	3,050,000	$ 3,050,000
Sludge Disposal	LS	1	105,000	$ 105,000
Electric Costs				
On-site	LS	1	1,900,000	$ 1,900,000
Effluent Pumping	LS	1	85,000	$ 85,000
Other Utilities (Gas & Phone)	LS	1	15,000	$ 15,000
Office Supplies	LS	1	3,000	$ 3,000
Custodial Supplies	LS	1	1,500	$ 1,500
Lab Fees & Supplies	LS	1	2,000	$ 2,000
			Subtotal	**$ 5,161,500**
Maintenance				
Parts & Replacement	LS	1	320,000	$ 320,000
			Subtotal	**$ 320,000**
Professional Services				
Engineering, Legal & Acctng.	LS	1	45,000	$ 45,000
			Subtotal	**$ 45,000**
Other				
Travel, Training, Dues, etc.	LS	1	15,000	$ 15,000
Insurance	LS	1	40,000	$ 40,000
			Subtotal	**$ 55,000**
TOTAL				**$6,148,500**

Chemical Costs ($/1000G)	**$0.84**
Total O&M Costs ($/1000G)	**$1.68**

Total			
$6,148,500	Labor	$ 567,000	9.2%
	Operation	$ 5,161,500	83.9%
	Maintenanc	$ 320,000	5.2%
	Profession:	$ 45,000	0.7%
	Other	$ 55,000	0.9%
		$ 6,148,500	100.0%



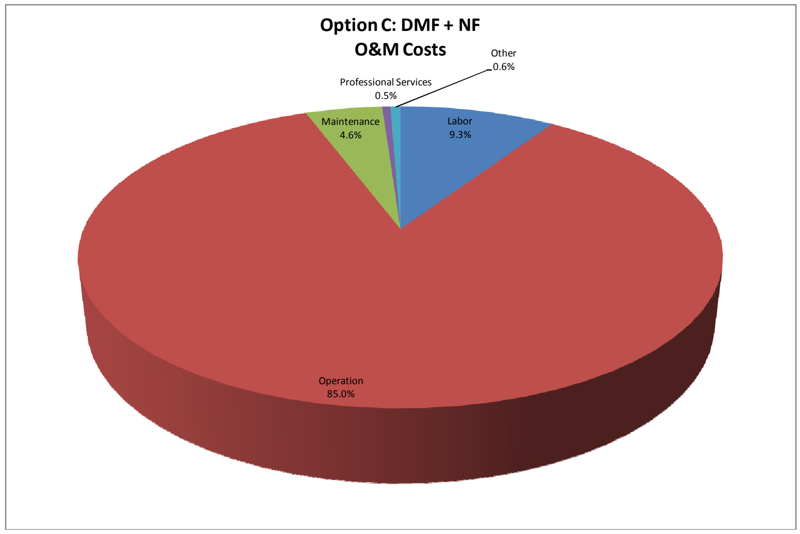
Estimated Operation and Maintenance Costs
Estimated Operation and Maintenance Costs
Option C_ ACTIFLO + DMF + NF
Hildago County Drainage District No. 1
Regional Water Supply Facilities Planning

Total	Labor	$ 849,000	9.3%
$9,103,000	Operation	$7,734,000	85.0%
	Maintenanc	$ 420,000	4.6%
	Profession	$ 45,000	0.5%
	Other	$ 55,000	0.6%
		$9,103,000	100.0%

Assumptions:
- Design Flow (Peak), mgd: **15.0**
- Average Day Flow, mgd: 15.0
- Labor Burden (%) 40
- Power Costs, $/kW-h 0.06
- Water supply costs not included
- Estimated effluent pumping costs included (total pumping head estimated at 200')

Description	Unit	Quantity	Unit Cost ($)	Total Cost ($)
Labor				
Plant Manager	EA	1	75,000	$ 75,000
Operators	EA	8	50,000	$ 400,000
Mechanics	EA	5	45,000	$ 225,000
Electrical/Instrumentation	EA	1	65,000	$ 65,000
General Maintenance	EA	2	42,000	$ 84,000
			Subtotal	**$ 849,000**
Operation				
Chemicals	LS	1	4,575,000	$ 4,575,000
Sludge Disposal	LS	1	157,500	$ 157,500
Electric Costs				
On-site	LS	1	2,850,000	$ 2,850,000
Effluent Pumping	LS	1	130,000	$ 130,000
Other Utilities (Gas & Phone)	LS	1	15,000	$ 15,000
Office Supplies	LS	1	3,000	$ 3,000
Custodial Supplies	LS	1	1,500	$ 1,500
Lab Fees & Supplies	LS	1	2,000	$ 2,000
			Subtotal	**$ 7,734,000**
Maintenance				
Parts & Replacement	LS	1	420,000	$ 420,000
			Subtotal	**$ 420,000**
Professional Services				
Engineering, Legal & Acctng.	LS	1	45,000	$ 45,000
			Subtotal	**$ 45,000**
Other				
Travel, Training, Dues, etc.	LS	1	15,000	$ 15,000
Insurance	LS	1	40,000	$ 40,000
			Subtotal	**$ 55,000**
TOTAL				**$9,103,000**

Chemical Costs ($/1000G) **$0.84**
Total O&M Costs ($/1000G) **$1.66**



Hildago County Draing District No. 1 - Water treatment Plant					7/13/2010
Plant Capcity of		3		MGD	
Project Cost Estimate				Factor =	0.30
Option D High Rate Actiflo + DMF+RO + Drying Beds Configuration Option					
DIV	ITEM DESCRIPTION	Unit Quant	Unit	Unit Cost	Total Cost
GENERAL ITEMS including Shop+Admin.+Lab		Size = 40' x 100' x 15'			
1	General Requirements				
	Bonds & Insurance		LS	250000	250000
	Mobilization		LS	150000	150000
2	Sitework				
	Clearing & Grubbing / General Grading	1	LS	20000	20000
	Curb & Gutter	2600	LF	18	46800
	Asphalt Surfacing	3000	SY	20	60000
	Chain Link Fencing (6 ft)	2500	LF	10	25000
	Landscaping	1	LS	100000	100000
2	Yard Piping				
	Plant Influent - 36"	200	LF	125	25000
	Plant Sewer & Manholes (8" PVC)	2000	LF	40	80000
	Water Distribution & Valves (6" PVC)	1500	LF	30	45000
	Plant Effluent - 30 "	200	LF	120	24000
3	Concrete				
	Miscellaneous	100	CY	500	50000
5	Metals				
	Aluminum Railing	500	LF	25	12500
	Misc Metal Fabrications	1	LS	100000	100000
7	Thermal & Moisture Protection				
	Dampproofing	4000	SF	3	12000
	Downspouts & Scuppers	250	LF	30	7500
8	Doors & Windows				
	Doors-Operations Area				
	Exterior (Pedestrian)	4	EA	2000	8000
	Interior (Pedestrian)	8	EA	1500	12000
	Roll Up Door (8 x 10)	1	EA	5500	5500
	Windows- Operations Area	200	SF	15	3000
9	Finishes	0	0	0	0
	Misc. Painting (Piping)	1	LS	50000	50000
	General Office & Misc.	2500	SF	20	50000
	Restrooms	100	SF	25	2500
11	Equipment	0	0	0	0
	House Water System	1	LS	20000	20000
12	Furnishings				
	Laboratory	1	LS	30000	30000
	Miscellaneous	1	LS	50000	50000
13	Special Construction				
	Security System	1	LS	50000	50000
15	Mechanical				
	HVAC	4000	SF	30	120000
	Fire Protection	4000	SF	4	16000
	Plumbing	4000	SF	4	16000
16	Electrical				
	Standby Generator	1	LS	100000	100000
	Electrical Work (20% of Div 11)	1	LS	581800	581800
	Instrumentation & Control (35% of Div 11)	1	LS	1018150	1018150
		Subtotal for General Items for WTP			$ 3,140,750
Operations & Maintenance Facilities		Size = 40' x 100' x 15'			

2	**Sitework**				
	Excavation	400	CY	4	3200
	Backfill	200	CY	10	3000
3	**Cast-in-Place Concrete**				
	Slabs on Grade	100	CY	350	35000
	Walls	100	CY	450	45000
	Suspended Slabs & Beams	60	CY	600	36000
	Columns	25	CY	600	15000
	Precast Roofing	4000	SF	8	32000
	Garage / Shop				
	Slabs on Grade	75	CY	350	26250
	Walls	300	CY	450	135000
4	**Masonry**				
	Composite Wall (8" block, 4"brick)	4200	SF	15	63000
6	**Wood And Plastics**				
	Fiberglass Chemical Storage Tanks Alum (8000 gal)	1	EA	8000	8000
	Fiberglass Chemical Storage Tanks Permanganate (2500 gal)	2	EA	2500	5000
	Fiberglass Chemical Storage Tanks Caustic Soda (8000 gal) (Alkalinity adjustment)	1	EA	8000	8000
	Polymer Day Tanks (250 gal)	6	EA	500	3000
	Fiberglass Chemical Storage Tanks NaOCL (whole systeml)	1	EA	50000	50000
7	**Thermal & Moisture Protection**				
	Membrane Roofing (including ballast)	4000	SF	1.5	6000
	Rigid Insulation (Roof)	4000	SF	1.25	5000
	Roof Flashing	400	LF	12	4800
8	**Doors & Windows**				
	Doors-Operations Area				
	Exterior (Pedestrian)	2	EA	2000	4000
	Interior (Pedestrian)	4	EA	1500	6000
	Roll Up Door (8 x 10)	1	EA	5500	5500
	Windows- Operations Area	200	SF	15	3000
9	**Finishes**				
	Interior				
	Operations Complex				
	Chemical Area	150	SF	50	7500
	Restrooms / Lockers	250	SF	25	6250
	Carpeting	150	SY	30	4500
	Misc Trim & Finishes	1	LS	10000	10000
	Acoustical Suspended Ceiling (Operations Area)	400	SF	7	2800
	Vinyl Composition Flooring	1000	SF	3.7	3700
10	**Specialties**				
	Operations Bldg.				
	Lockers	1	LS	2500	2500
	Toilet Accessories	1	LS	2500	2500
11	**Equipment**				
	Chemical Transfer Pumps (25 gpm @ 50' TDH)	2	EA	20000	40000
	Alum Chemical Feed Metering Pumps (15-20 gph)	3	EA	4500	13500
	Polymer Feed System	1	EA		
	Garage / Shop		0	10000	10000
	Misc.	1	LS	20000	20000

Subtotal for Operations & Maintenance Facilities $ 625,000

High Rate Clarification		Size =	60	70	25

	Subtotal for High Rate Clarification				**$ 1,265,879**
RO Filter Complex Plus DMF as Shown in Others		Size =	120	36	50
2	**Sitework**				
	Excavation	6,000	CY	**$0**	$ -
	Backfill	3,000	CY	**$0**	$ -
2	**Yard Piping**				
	Filter Effluent - 30"	300	LF	$120	$ 36,000
	Backwash Supply - 20"	250	LF	$80	$ 20,000
3	**Cast-in-Place Concrete**				
	Slabs on Grade	165	CY	$350	$ 57,750
	Walls	135	CY	$450	$ 60,750
	Suspended Slabs & Beams	30	CY	$600	$ 18,000
	Columns	15	CY	$600	$ 9,000
	Precast Roofing	4,320	SF	$8	$ 34,560
4	**Masonry**				
	Composite Wall (8" block, 4"brick)	2,700	SF	$15	$ 40,500
7	**Thermal & Moisture Protection**				
	Membrane Roofing (including ballast)	4,320	SF	$1.50	$ 6,480
	Rigid Insulation (Roof)	4,320	SF	$1.25	$ 5,400
	Rigid Insulation (Wall)	2,700	SF	$0.50	$ 1,350
	Roof Flashing	38	SF	$12.00	$ 450
8	**Doors & Windows**				
	Doors				
	Exterior (Pedestrian)	2	EA	$2,000	$ 4,000

	Windows		SF	$10	$	-
9	**Interior Finishes**	600	SF	$4	$	2,400
11	**Equipment**					
	Membrane Module	1	LS	**$3,500,000**	$	3,500,000
	Pressure Booster Pump Station	1	LS	**$350,000**	$	350,000
	Backwash Equipment	1	LS	**$300,000**	$	300,000
	Instrumentation & Controls	1	LS	**$300,000**	$	300,000
	Backwash Water Pumps					
	2,500 gpm @ 30'TDH	4	EA	**$75,000**	$	300,000
	Compressed Air Package	1	LS	**$100,000**	$	100,000
15	**Mechanical**					
	Piping					
	30" Drain	100	LF	$72	$	7,200
	20" Filter Influent	40	LF	$48	$	1,920
	20" Back Wash Supply	100	LF	$160	$	16,000
	20" Back Wash Supply (Suction & Discharge)	40	LF	$160	$	6,400
	12" Filter Drain	80	LF	$96	$	7,680
	Valves w/Actuator					
	20" BFV	12	EA	$12,000	$	144,000
	12" BFV	4	EA	$6,000	$	24,000
	Piping					
	8" Suction & Discharge	100	LF	$48	$	4,800
	Valves w/Actuator					
	8" BFV	4	EA	$2,000	$	8,000
			Subtotal Filter Complex		**$**	**5,353,840**
Clearwell & Effluent Pumping Facilities						

			Subtotal Clearwell	$	531,965
Plant Waste-Handling incd. Backwash holding + Sludge Holding/Recycling Basin					
	Subtotal WW Recovery Basin Complex			$	474,505

Chlorine Feed System Building	Size =	20	20	25

				Subtotal Chlorine Building	$	163,750
Sludge Drying Beds						
				Subtotal Decant Pump Station	$	178,870

Other					
2	**Sitework** Manhole	10	EA	$2,000	$ 20,000
11	**DMF System** Dual-Media Equipment + Building	1	LS	**$1,914,019**	**$ 1,914,019**
2	**DMF and NF Effluent Mixing Flow Vault** Valve, Pipe, and Concrete Structure	1	LS	$45,000	$ 45,000
				Subtotal Sendimentation Ponds	**$ 1,979,019**

SUBTOTAL	**$ 13,713,578**
Construction Contingency (30%)	**$ 4,114,073**
Engineering, Survey & Const Mngmnt (20%)	**$ 3,565,530**
PROJECT TOTAL	**$ 21,393,181**

Cost ($/MG) ***$7.13***

Hildago County Draing District No. 1 - Water treatment Plant					7/13/2010
Plant Capcity of		5		MGD	
Project Cost Estimate				Factor =	0.50
Option D High Rate Actiflo + DMF+RO + Drying Beds Configuration Option					
DIV	ITEM DESCRIPTION	Unit Quant	Unit	Unit Cost	Total Cost
GENERAL ITEMS including Shop+Admin.+Lab		Size = 40' x 100' x 15'			
1	General Requirements				
	Bonds & Insurance		LS	250000	250000
	Mobilization		LS	150000	150000
2	Sitework				
	Clearing & Grubbing / General Grading	1	LS	20000	20000
	Curb & Gutter	2600	LF	18	46800
	Asphalt Surfacing	3000	SY	20	60000
	Chain Link Fencing (6 ft)	2500	LF	10	25000
	Landscaping	1	LS	100000	100000
2	Yard Piping				
	Plant Influent - 36"	200	LF	125	25000
	Plant Sewer & Manholes (8" PVC)	2000	LF	40	80000
	Water Distribution & Valves (6" PVC)	1500	LF	30	45000
	Plant Effluent - 30 "	200	LF	120	24000
3	Concrete				
	Miscellaneous	100	CY	500	50000
5	Metals				
	Aluminum Railing	500	LF	25	12500
	Misc Metal Fabrications	1	LS	100000	100000
7	Thermal & Moisture Protection				
	Damproofing	4000	SF	3	12000
	Downspouts & Scuppers	250	LF	30	7500
8	Doors & Windows				
	Doors-Operations Area				
	Exterior (Pedestrian)	4	EA	2000	8000
	Interior (Pedestrian)	8	EA	1500	12000
	Roll Up Door (8 x 10)	1	EA	5500	5500
	Windows- Operations Area	200	SF	15	3000
9	Finishes	0	0	0	0
	Misc. Painting (Piping)	1	LS	50000	50000
	General Office & Misc.	2500	SF	20	50000
	Restrooms	100	SF	25	2500
11	Equipment	0	0	0	0
	House Water System	1	LS	20000	20000
12	Furnishings				
	Laboratory	1	LS	30000	30000
	Miscellaneous	1	LS	50000	50000
13	Special Construction				
	Security System	1	LS	50000	50000
15	Mechanical				
	HVAC	4000	SF	30	120000
	Fire Protection	4000	SF	4	16000
	Plumbing	4000	SF	4	16000
16	Electrical				
	Standby Generator	1	LS	100000	100000
	Electrical Work (20% of Div 11)	1	LS	581800	581800
	Instrumentation & Control (35% of Div 11)	1	LS	1018150	1018150
			Subtotal for General Items for WTP		$ 3,140,750

Operations & Maintenance Facilities		Size = 40' x 100' x 15'			
2	Sitework				
	Excavation	400	CY	4	3200
	Backfill	200	CY	10	3000
3	Cast-in-Place Concrete				
	Slabs on Grade	100	CY	350	35000
	Walls	100	CY	450	45000
	Suspended Slabs & Beams	60	CY	600	36000
	Columns	25	CY	600	15000
	Precast Roofing	4000	SF	8	32000
	Garage / Shop				
	Slabs on Grade	75	CY	350	26250
	Walls	300	CY	450	135000
4	Masonry				
	Composite Wall (8" block, 4"brick)	4200	SF	15	63000
6	Wood And Plastics				
	Fiberglass Chemical Storage Tanks Alum (8000 gal)	1	EA	8000	8000
	Fiberglass Chemical Storage Tanks Permanganate (2500 gal)	2	EA	2500	5000
	Fiberglass Chemical Storage Tanks Caustic Soda (8000 gal) (Alkalinity adjustment)	1	EA	8000	8000
	Polymer Day Tanks (250 gal)	6	EA	500	3000
	Fiberglass Chemical Storage Tanks NaOCL (whole systeml)	1	EA	50000	50000
7	Thermal & Moisture Protection				
	Membrane Roofing (including ballast)	4000	SF	1.5	6000
	Rigid Insulation (Roof)	4000	SF	1.25	5000
	Roof Flashing	400	LF	12	4800
8	Doors & Windows				
	Doors-Operations Area				
	Exterior (Pedestrian)	2	EA	2000	4000
	Interior (Pedestrian)	4	EA	1500	6000
	Roll Up Door (8 x 10)	1	EA	5500	5500
	Windows- Operations Area	200	SF	15	3000
9	Finishes				
	Interior				
	Operations Complex				
	Chemical Area	150	SF	50	7500
	Restrooms / Lockers	250	SF	25	6250
	Carpeting	150	SY	30	4500
	Misc Trim & Finishes	1	LS	10000	10000
	Acoustical Suspended Ceiling (Operations Area)	400	SF	7	2800
	Vinyl Composition Flooring	1000	SF	3.7	3700
10	Specialties				
	Operations Bldg.				
	Lockers	1	LS	2500	2500
	Toilet Accessories	1	LS	2500	2500
11	Equipment				
	Chemical Transfer Pumps (25 gpm @ 50' TDH)	2	EA	20000	40000
	Alum Chemical Feed Metering Pumps (15-20 gph)	3	EA	4500	13500
	Polymer Feed System	1	EA		
	Garage / Shop		0	10000	10000
	Misc.	1	LS	20000	20000
	Subtotal for Operations & Maintenance Facilities			$	625,000

High Rate Clarification		Size =	60	70	25

				Subtotal for High Rate Clarification	**$**	**1,537,095**
RO Filter Complex Plus DMF as Shown in Others		Size =	120	60		50
2	**Sitework**					
	Excavation	10,000	CY	**$0**	$	-
	Backfill	5,000	CY	**$0**	$	-
2	**Yard Piping**					
	Filter Effluent - 30"	300	LF	$120	$	36,000
	Backwash Supply - 20"	250	LF	$80	$	20,000
3	**Cast-in-Place Concrete**					
	Slabs on Grade	275	CY	$350	$	96,250
	Walls	225	CY	$450	$	101,250
	Suspended Slabs & Beams	50	CY	$600	$	30,000
	Columns	25	CY	$600	$	15,000
	Precast Roofing	7,200	SF	$8	$	57,600
4	**Masonry**					
	Composite Wall (8" block, 4"brick)	4,500	SF	$15	$	67,500
7	**Thermal & Moisture Protection**					
	Membrane Roofing (including ballast)	7,200	SF	$1.50	$	10,800
	Rigid Insulation (Roof)	7,200	SF	$1.25	$	9,000
	Rigid Insulation (Wall)	4,500	SF	$0.50	$	2,250
	Roof Flashing	63	SF	$12.00	$	750
8	**Doors & Windows**					
	Doors					

	Exterior (Pedestrian)	2	EA	$2,000	$	4,000
	Windows		SF	$10	$	-
9	**Interior Finishes**	1,000	SF	$4	$	4,000
11	**Equipment**					
	Membrane Module	1	LS	**$4,500,000**	$	4,500,000
	Pressure Booster Pump Station	1	LS	**$350,000**	$	350,000
	Backwash Equipment	1	LS	**$300,000**	$	300,000
	Instrumentation & Controls	1	LS	**$300,000**	$	300,000
	Backwash Water Pumps					
	2,500 gpm @ 30'TDH	4	EA	**$75,000**	$	300,000
	Compressed Air Package	1	LS	**$100,000**	$	100,000
15	**Mechanical**					
	Piping					
	30" Drain	100	LF	$120	$	12,000
	20" Filter Influent	40	LF	$80	$	3,200
	20" Back Wash Supply	100	LF	$160	$	16,000
	20" Back Wash Supply (Suction & Discharge)	40	LF	$160	$	6,400
	12" Filter Drain	80	LF	$96	$	7,680
	Valves w/Actuator					
	20" BFV	12	EA	$12,000	$	144,000
	12" BFV	4	EA	$6,000	$	24,000
	Piping					
	8" Suction & Discharge	100	LF	$80	$	8,000
	Valves w/Actuator					
	8" BFV	4	EA	$2,000	$	8,000
				Subtotal Filter Complex	**$**	**6,517,680**
Clearwell & Effluent Pumping Facilities						

		Subtotal Clearwell		$	693,941
Plant Waste-Handling incd. Backwash holding + Sludge Holding/Recycling Basin					
	Subtotal WW Recovery Basin Complex			$	512,975

Chlorine Feed System Building	Size =	20	20	25

				Subtotal Chlorine Building	$	163,750
Sludge Drying Beds						

		Subtotal Decant Pump Station			**$**	**241,970**

Other						
2	**Sitework** Manhole	10	EA	$2,000	$	20,000
11	**DMF System** Dual-Media Equipment + Building	1	LS	**$2,272,165**	**$**	**2,272,165**
2	**DMF and NF Effluent Mixing Flow Vault** Valve, Pipe, and Concrete Structure	1	LS	$75,000	$	75,000
	Subtotal Sendimentation Ponds				**$**	**2,367,165**

SUBTOTAL	**$**	**15,800,326**
Construction Contingency (30%)	**$**	**4,740,098**
Engineering, Survey & Const Mngmnt (20%)	**$**	**4,108,085**
PROJECT TOTAL	**$**	**24,648,509**

Cost ($/MG) ***$4.93***

Hildago County Draing District No. 1 - Water treatment Plant					7/13/2010
Plant Capcity of		10		MGD	
Project Cost Estimate					
Option D High Rate Actiflo + DMF+RO + Drying Beds Configuration Option					
DIV	ITEM DESCRIPTION	Unit Quant	Unit	Unit Cost	Total Cost
GENERAL ITEMS including Shop+Admin.+Lab		Size = 40' x 100' x 15'			
1	General Requirements				
	Bonds & Insurance		LS	250000	250000
	Mobilization		LS	150000	150000
2	Sitework				
	Clearing & Grubbing / General Grading	1	LS	20000	20000
	Curb & Gutter	2600	LF	18	46800
	Asphalt Surfacing	3000	SY	20	60000
	Chain Link Fencing (6 ft)	2500	LF	10	25000
	Landscaping	1	LS	100000	100000
2	Yard Piping				
	Plant Influent - 36"	200	LF	125	25000
	Plant Sewer & Manholes (8" PVC)	2000	LF	40	80000
	Water Distribution & Valves (6" PVC)	1500	LF	30	45000
	Plant Effluent - 30 "	200	LF	120	24000
3	Concrete				
	Miscellaneous	100	CY	500	50000
5	Metals				
	Aluminum Railing	500	LF	25	12500
	Misc Metal Fabrications	1	LS	100000	100000
7	Thermal & Moisture Protection				
	Dampproofing	4000	SF	3	12000
	Downspouts & Scuppers	250	LF	30	7500
8	Doors & Windows				
	Doors-Operations Area				
	Exterior (Pedestrian)	4	EA	2000	8000
	Interior (Pedestrian)	8	EA	1500	12000
	Roll Up Door (8 x 10)	1	EA	5500	5500
	Windows- Operations Area	200	SF	15	3000
9	Finishes	0	0	0	0
	Misc. Painting (Piping)	1	LS	50000	50000
	General Office & Misc.	2500	SF	20	50000
	Restrooms	100	SF	25	2500
11	Equipment	0	0	0	0
	House Water System	1	LS	20000	20000
12	Furnishings				
	Laboratory	1	LS	30000	30000
	Miscellaneous	1	LS	50000	50000
13	Special Construction				
	Security System	1	LS	50000	50000
15	Mechanical				
	HVAC	4000	SF	30	120000
	Fire Protection	4000	SF	4	16000
	Plumbing	4000	SF	4	16000
16	Electrical				
	Standby Generator	1	LS	100000	100000
	Electrical Work (20% of Div 11)	1	LS	581800	581800
	Instrumentation & Control (35% of Div 11)	1	LS	1018150	1018150
				Subtotal for General Items for WTP	$ 3,140,750
Operations & Maintenance Facilities		Size = 40' x 100' x 15'			

2	**Sitework**				
	Excavation	**400**	**CY**	**4**	**3200**
	Backfill	**200**	**CY**	**10**	**3000**
3	**Cast-in-Place Concrete**				
	Slabs on Grade	**100**	**CY**	**350**	**35000**
	Walls	**100**	**CY**	**450**	**45000**
	Suspended Slabs & Beams	**60**	**CY**	**600**	**36000**
	Columns	**25**	**CY**	**600**	**15000**
	Precast Roofing	**4000**	**SF**	**8**	**32000**
	Garage / Shop				
	Slabs on Grade	**75**	**CY**	**350**	**26250**
	Walls	**300**	**CY**	**450**	**135000**
4	**Masonry**				
	Composite Wall (8" block, 4"brick)	**4200**	**SF**	**15**	**63000**
6	**Wood And Plastics**				
	Fiberglass Chemical Storage Tanks Alum (8000 gal)	**1**	**EA**	**8000**	**8000**
	Fiberglass Chemical Storage Tanks Permanganate (2500 gal)	**2**	**EA**	**2500**	**5000**
	Fiberglass Chemical Storage Tanks Caustic Soda (8000 gal) (Alkalinity adjustment)	**1**	**EA**	**8000**	**8000**
	Polymer Day Tanks (250 gal)	**6**	**EA**	**500**	**3000**
	Fiberglass Chemical Storage Tanks NaOCL (whole systeml)	**1**	**EA**	**50000**	**50000**
7	**Thermal & Moisture Protection**				
	Membrane Roofing (including ballast)	**4000**	**SF**	**1.5**	**6000**
	Rigid Insulation (Roof)	**4000**	**SF**	**1.25**	**5000**
	Roof Flashing	**400**	**LF**	**12**	**4800**
8	**Doors & Windows**				
	Doors-Operations Area				
	Exterior (Pedestrian)	**2**	**EA**	**2000**	**4000**
	Interior (Pedestrian)	**4**	**EA**	**1500**	**6000**
	Roll Up Door (8 x 10)	**1**	**EA**	**5500**	**5500**
	Windows- Operations Area	**200**	**SF**	**15**	**3000**
9	**Finishes**				
	Interior				
	Operations Complex				
	Chemical Area	**150**	**SF**	**50**	**7500**
	Restrooms / Lockers	**250**	**SF**	**25**	**6250**
	Carpeting	**150**	**SY**	**30**	**4500**
	Misc Trim & Finishes	**1**	**LS**	**10000**	**10000**
	Acoustical Suspended Ceiling (Operations Area)	**400**	**SF**	**7**	**2800**
	Vinyl Composition Flooring	**1000**	**SF**	**3.7**	**3700**
10	**Specialties**				
	Operations Bldg.				
	Lockers	**1**	**LS**	**2500**	**2500**
	Toilet Accessories	**1**	**LS**	**2500**	**2500**
11	**Equipment**				
	Chemical Transfer Pumps (25 gpm @ 50' TDH)	**2**	**EA**	**20000**	**40000**
	Alum Chemical Feed Metering Pumps (15-20 gph)	**3**	**EA**	**4500**	**13500**
	Polymer Feed System	**1**	**EA**		
	Garage / Shop		**0**	**10000**	**10000**
	Misc.	**1**	**LS**	**20000**	**20000**
	Subtotal for Operations & Maintenance Facilities			**$**	**625,000**
	High Rate Clarification	Size =	60	70	25

				Subtotal for High Rate Clarification	$ 3,001,320
RO Filter Complex Plus DMF as Shown in Others		Size =	120	120	50
2	**Sitework**				
	Excavation	20,000	CY	**$0**	$ -
	Backfill	10,000	CY	**$0**	$ -
2	**Yard Piping**				
	Filter Effluent - 30"	300	LF	$120	$ 36,000
	Backwash Supply - 20"	250	LF	$80	$ 20,000
3	**Cast-in-Place Concrete**				
	Slabs on Grade	550	CY	$350	$ 192,500
	Walls	450	CY	$450	$ 202,500
	Suspended Slabs & Beams	100	CY	$600	$ 60,000
	Columns	50	CY	$600	$ 30,000
	Precast Roofing	14,400	SF	$8	$ 115,200
4	**Masonry**				
	Composite Wall (8" block, 4"brick)	9,000	SF	$15	$ 135,000
7	**Thermal & Moisture Protection**				
	Membrane Roofing (including ballast)	14,400	SF	$1.50	$ 21,600
	Rigid Insulation (Roof)	14,400	SF	$1.25	$ 18,000
	Rigid Insulation (Wall)	9,000	SF	$0.50	$ 4,500
	Roof Flashing	125	SF	$12.00	$ 1,500
8	**Doors & Windows**				
	Doors				
	Exterior (Pedestrian)	2	EA	$2,000	$ 4,000

	Windows		SF	$10	$	-
9	**Interior Finishes**	2,000	SF	$4	$	8,000
11	**Equipment**					
	Membrane Module	1	LS	**$11,000,000**	$	11,000,000
	Pressure Booster Pump Station	1	LS	$150,000	$	150,000
	Backwash Equipment	1	LS	$250,000	$	250,000
	Instrumentation & Controls	1	LS	$350,000	$	350,000
	Backwash Water Pumps					
	2,500 gpm @ 30'TDH	4	EA	$50,000	$	200,000
	Compressed Air Package	1	LS	$100,000	$	100,000
15	**Mechanical**					
	Piping					
	30" Drain	100	LF	$240	$	24,000
	20" Filter Influent	40	LF	$160	$	6,400
	20" Back Wash Supply	100	LF	$160	$	16,000
	20" Back Wash Supply (Suction & Discharge)	40	LF	$160	$	6,400
	12" Filter Drain	80	LF	$96	$	7,680
	Valves w/Actuator					
	20" BFV	12	EA	$12,000	$	144,000
	12" BFV	4	EA	$6,000	$	24,000
	Piping					
	8" Suction & Discharge	100	LF	$160	$	16,000
	Valves w/Actuator					
	8" BFV	4	EA	$2,000	$	8,000
				Subtotal Filter Complex	**$**	**13,127,280**
Clearwell & Effluent Pumping Facilities						
2	**Sitework**	Size =	60	104		10
	Excavation	5,000	CY	**$0**	$	-
	Backfill	2,500	CY	**$0**	$	-
2	**Yard Piping**					
	Reservoir Overflow/Drain - 18"	250	LF	$72	$	18,000
3	**Cast-in-Place Concrete**					
	Slabs on Grade	350	CY	$350	$	122,500
	Walls	800	CY	$450	$	360,000
	Suspended Slabs & Beams	250	CY	$600	$	150,000
	Columns	50	CY	$600	$	30,000
	Precast Roofing	1,100	SF	$8	$	8,800
4	**Masonry**					
	Composite Wall (8" block, 4" brick)	2,000	SF	$15	$	30,000
	Interior (8" Concrete Block)	5,000	SF	$5	$	25,000
7	**Thermal & Moisture Protection**					
	Membrane Roofing (including ballast)	1,000	SF	$1.50	$	1,500
	Reservoir Membrane	5,000	SF	$2.00	$	10,000
	Rigid Insulation (Roof)	1,000	SF	$1.25	$	1,250
	Rigid Insulation (Wall)	5,104	SF	$0.50	$	2,552
	Roof Flashing	140	SF	$12.00	$	1,680
8	**Doors & Windows**					
	Doors					
	Exterior (Pedestrian)	1	EA	$2,000	$	2,000
	Roll Up Door (8 x 10)	1	EA	$5,500	$	5,500
	Windows	50	SF	$10	$	500
9	**Interior Finishes**	1,000	SF	$4	$	4,000
11	**Equipment**					
	Effluent Pumping Station					
	Effluent Pumps					

	3500 gpm @ 200'TDH	4	EA	$80,000	$	320,000
15	**Mechanical**					
	Effluent Pumping Station					
	Piping					
	30" Effluent	50	LF	$240	$	12,000
	24" Suction & Discharge	50	LF	$192	$	9,600
	Valves w/Actuator					
	24" BFV	6	EA	$15,000	$	90,000
	18" BFV (Drain)	1	EA	$9,000	$	9,000
				Subtotal Clearwell	**$**	**1,213,882**
Plant Waste-Handling incd. Backwash holding + Sludge Holding/Recycling Basin						
2	**Sitework**					
	Excavation	**6,000**	CY	**$0**	$	-
	Backfill	2,500	CY	**$0**	$	-
2	**Yard Piping**					
	Wash Water Recovery - 30"	250	LF	$120	$	30,000
	Wash Water Return - 12"	300	LF	$48	$	14,400
	Sediment Transmission Line - 12"	650	LF	$48	$	31,200
	Decant Return Line - 8"	1,000	LF	$32	$	32,000
	Wash Water By-pass - 24"	200	LF	$96	$	19,200
3	**Cast-in-Place Concrete**					
	Slabs on Grade	75	CY	$350	$	26,250
	Walls	50	CY	$450	$	22,500
	Suspended Slabs	25	CY	$600	$	15,000
	Columns	0	CY	$600	$	-
	Precast Roofing	0	SF	$8	$	-
4	**Mebbrane Lining**					
	5-mil lining	**35,000**	SF	$2	$	70,000
7	**Backwash Holding Tank - Concrete**					
	Slab on Grade	140	CY	$350.00	$	49,000
	Walls	100	CY	$450.00	$	45,000
	Suspended Slab	50	CY	$600.00	$	30,000
	Column	0	CY	$600.00	$	-
8	**Doors & Windows**					
	Exterior (Pedestrian)	0	EA	$2,000	$	-
	Roll Up Door (8 x 10)	0	EA	$5,500	$	-
	Windows	0	SF	$10	$	-
9	**Interior Finishes**	0	SF	$4	$	-
11	**Equipment**					
	Filter Backwah Transfer Pumps 2000 gpm at 50'	2	EA	$30,000	$	60,000
	Sludge Recycle Return Pumps					
	7000 gpm @ 100' TDH	2	LS	$45,000	$	90,000
15	**Mechanical**					
	Piping					
	8" Suction & Discharge	60	LF	$64	$	3,840
	12" Combined Return (2 Pumps)	60	LF	$96	$	5,760
	Valves w/Actuator					
	8" BFV	4	EA	$2,000	$	8,000
	8" Check	2	EA	$1,000	$	2,000
	12" BFV	1	EA	$6,000	$	6,000
	Subtotal WW Recovery Basin Complex				**$**	**560,150**

Chlorine Feed System Building	Size =	20	20	25

				Subtotal Chlorine Building	**$**	**213,750**
Sludge Drying Beds						
2	**Sitework**					
	Excavation	500	CY	**$0**	$	-
	Backfill	100	CY	**$0**	$	-
3	**Cast-in-Place Concrete**					
	Slabs on Grade	700	CY	$350	$	245,000
	Walls	150	CY	$450	$	67,500
	Suspended Slabs & Beams	0	CY	$600	$	-
	Columns	0	CY	$600	$	-
	Precast Roofing	0	SF	$8	$	-
4	**Masonry**					
	Composite Wall (8" block, 4" brick)	0	SF	$15	$	-
7	**Thermal & Moisture Protection**					
	Membrane Roofing (including ballast)	0	SF	$1.50	$	-
	Rigid Insulation (Roof)	0	SF	$1.25	$	-
	Rigid Insulation (Wall)	0	SF	$0.50	$	-
	Roof Flashing	0	SF	$12.00	$	-
8	**Doors & Windows**					
	Doors					
	Exterior (Pedestrian)	0	EA	$2,000	$	-
	Windows	0	SF	$10	$	-
9	**Interior Finishes**	0	SF	$4	$	-
11	**Equipment**					
	Pumps					
	3500 gpm @ 100' TDH	3	EA	$35,000	$	105,000
15	**Mechanical**					
	Piping					
	6" Suction & Discharge	60	LF	$48	$	2,880
	8" Combined Return (2 Pumps)	60	LF	$64	$	3,840
	Valves w/Actuator					
	6" BFV	4	EA	$1,000	$	4,000
	6" Check	2	EA	$750	$	1,500
	8" BFV	1	EA	$2,000	$	2,000
				Subtotal Decant Pump Station	**$**	**431,720**

Other					
2	**Sitework** Manhole	10	EA	$2,000	$ 20,000
11	**DMF System** Dual-Media Equipment + Building	1	LS	**$2,817,430**	**$ 2,817,430**
2	**DMF and NF Effluent Mixing Flow Vault** Valve, Pipe, and Concrete Structure	1	LS	$150,000	$ 150,000
		Subtotal Sendimentation Ponds			**$ 2,987,430**

SUBTOTAL	**$ 25,301,282**
Construction Contingency (30%)	**$ 7,590,385**
Engineering, Survey & Const Mngmnt (20%)	**$ 6,578,333**
PROJECT TOTAL	**$ 39,470,000**

Cost ($/MG) ***$3.95***

Hildago County Draing District No. 1 - Water treatment Plant					7/14/2010
Plant Capcity of		15		MGD	
Project Cost Estimate				Factor =	1.50
Option D High Rate Actiflo + DMF+RO + Drying Beds Configuration Option					
DIV	ITEM DESCRIPTION	Unit Quant	Unit	Unit Cost	Total Cost
GENERAL ITEMS including Shop+Admin.+Lab		Size = 40' x 100' x 15'			
1	General Requirements				
	Bonds & Insurance		LS	250000	250000
	Mobilization		LS	150000	150000
2	Sitework				
	Clearing & Grubbing / General Grading	1	LS	20000	20000
	Curb & Gutter	2600	LF	18	46800
	Asphalt Surfacing	3000	SY	20	60000
	Chain Link Fencing (6 ft)	2500	LF	10	25000
	Landscaping	1	LS	100000	100000
2	Yard Piping				
	Plant Influent - 36"	200	LF	125	25000
	Plant Sewer & Manholes (8" PVC)	2000	LF	40	80000
	Water Distribution & Valves (6" PVC)	1500	LF	30	45000
	Plant Effluent - 30 "	200	LF	120	24000
3	Concrete				
	Miscellaneous	100	CY	500	50000
5	Metals				
	Aluminum Railing	500	LF	25	12500
	Misc Metal Fabrications	1	LS	100000	100000
7	Thermal & Moisture Protection				
	Dampproofing	4000	SF	3	12000
	Downspouts & Scuppers	250	LF	30	7500
8	Doors & Windows				
	Doors-Operations Area				
	Exterior (Pedestrian)	4	EA	2000	8000
	Interior (Pedestrian)	8	EA	1500	12000
	Roll Up Door (8 x 10)	1	EA	5500	5500
	Windows- Operations Area	200	SF	15	3000
9	Finishes	0	0	0	0
	Misc. Painting (Piping)	1	LS	50000	50000
	General Office & Misc.	2500	SF	20	50000
	Restrooms	100	SF	25	2500
11	Equipment	0	0	0	0
	House Water System	1	LS	20000	20000
12	Furnishings				
	Laboratory	1	LS	30000	30000
	Miscellaneous	1	LS	50000	50000
13	Special Construction				
	Security System	1	LS	50000	50000
15	Mechanical				
	HVAC	4000	SF	30	120000
	Fire Protection	4000	SF	4	16000
	Plumbing	4000	SF	4	16000
16	Electrical				
	Standby Generator	1	LS	100000	100000
	Electrical Work (20% of Div 11)	1	LS	581800	581800
	Instrumentation & Control (35% of Div 11)	1	LS	1018150	1018150
		Subtotal for General Items for WTP			$ 3,140,750
Operations & Maintenance Facilities		Size = 40' x 100' x 15'			
2	Sitework				
	Excavation	400	CY	4	3200
	Backfill	200	CY	10	3000

3	Cast-in-Place Concrete				
	Slabs on Grade	100	CY	350	35000
	Walls	100	CY	450	45000
	Suspended Slabs & Beams	60	CY	600	36000
	Columns	25	CY	600	15000
	Precast Roofing	4000	SF	8	32000
	Garage / Shop				
	Slabs on Grade	75	CY	350	26250
	Walls	300	CY	450	135000
4	Masonry				
	Composite Wall (8" block, 4"brick)	4200	SF	15	63000
6	Wood And Plastics				
	Fiberglass Chemical Storage Tanks Alum (8000 gal)	1	EA	8000	8000
	Fiberglass Chemical Storage Tanks Permanganate (2500 gal)	2	EA	2500	5000
	Fiberglass Chemical Storage Tanks Caustic Soda (8000 gal) (Alkalinity adjustment)	1	EA	8000	8000
	Polymer Day Tanks (250 gal)	6	EA	500	3000
	Fiberglass Chemical Storage Tanks NaOCL (whole systeml)	1	EA	50000	50000
7	Thermal & Moisture Protection				
	Membrane Roofing (including ballast)	4000	SF	1.5	6000
	Rigid Insulation (Roof)	4000	SF	1.25	5000
	Roof Flashing	400	LF	12	4800
8	Doors & Windows				
	Doors-Operations Area				
	Exterior (Pedestrian)	2	EA	2000	4000
	Interior (Pedestrian)	4	EA	1500	6000
	Roll Up Door (8 x 10)	1	EA	5500	5500
	Windows- Operations Area	200	SF	15	3000
9	Finishes				
	Interior				
	Operations Complex				
	Chemical Area	150	SF	50	7500
	Restrooms / Lockers	250	SF	25	6250
	Carpeting	150	SY	30	4500
	Misc Trim & Finishes	1	LS	10000	10000
	Acoustical Suspended Ceiling (Operations Area)	400	SF	7	2800
	Vinyl Composition Flooring	1000	SF	3.7	3700
10	Specialties				
	Operations Bldg.				
	Lockers	1	LS	2500	2500
	Toilet Accessories	1	LS	2500	2500
11	Equipment				
	Chemical Transfer Pumps (25 gpm @ 50' TDH)	2	EA	20000	40000
	Alum Chemical Feed Metering Pumps (15-20 gph)	3	EA	4500	13500
	Polymer Feed System	1	EA		
	Garage / Shop		0	10000	10000
	Misc.	1	LS	20000	20000
	Subtotal for Operations & Maintenance Facilities			$	625,000

High Rate Clarification		Size =	60	70	25

		Subtotal for High Rate Clarification			**$**	**4,405,055**
RO Filter Complex Plus DMF as Shown in Others		Size =	120	180		50
2	**Sitework**					
	Excavation	30,000	CY	**$0**	$	-
	Backfill	15,000	CY	**$0**	$	-
2	**Yard Piping**					
	Filter Effluent - 30"	300	LF	$120	$	36,000
	Backwash Supply - 20"	250	LF	$80	$	20,000
3	**Cast-in-Place Concrete**					
	Slabs on Grade	825	CY	$350	$	288,750
	Walls	675	CY	$450	$	303,750
	Suspended Slabs & Beams	150	CY	$600	$	90,000
	Columns	75	CY	$600	$	45,000
	Precast Roofing	21,600	SF	$8	$	172,800
4	**Masonry**					
	Composite Wall (8" block, 4"brick)	13,500	SF	$15	$	202,500
7	**Thermal & Moisture Protection**					
	Membrane Roofing (including ballast)	21,600	SF	$1.50	$	32,400
	Rigid Insulation (Roof)	21,600	SF	$1.25	$	27,000
	Rigid Insulation (Wall)	13,500	SF	$0.50	$	6,750
	Roof Flashing	188	SF	$12.00	$	2,250
8	**Doors & Windows**					
	Doors					
	Exterior (Pedestrian)	2	EA	$2,000	$	4,000
	Windows		SF	$10	$	-
9	**Interior Finishes**	3,000	SF	$4	$	12,000
11	**Equipment**					
	Membrane Module	1	LS	**$14,500,000**	$	14,500,000
	Pressure Booster Pump Station	1	LS	**$250,000**	$	250,000
	Backwash Equipment	1	LS	**$150,000**	$	150,000
	Instrumentation & Controls	1	LS	**$250,000**	$	250,000
	Backwash Water Pumps					
	2,500 gpm @ 30'TDH	4	EA	**$50,000**	$	200,000

	Compressed Air Package	1	LS	$100,000	$	100,000
15	**Mechanical**					
	Piping					
	30" Drain	100	LF	$360	$	36,000
	20" Filter Influent	40	LF	$240	$	9,600
	20" Back Wash Supply	100	LF	$160	$	16,000
	20" Back Wash Supply (Suction & Discharge)	40	LF	$160	$	6,400
	12" Filter Drain	80	LF	$96	$	7,680
	Valves w/Actuator					
	20" BFV	12	EA	$12,000	$	144,000
	12" BFV	4	EA	$6,000	$	24,000
	Piping					
	8" Suction & Discharge	100	LF	$240	$	24,000
	Valves w/Actuator					
	8" BFV	4	EA	$2,000	$	8,000
				Subtotal Filter Complex	**$**	**16,936,880**
Clearwell & Effluent Pumping Facilities						
				Subtotal Clearwell	**$**	**1,823,823**
Plant Waste-Handling incd. Backwash holding + Sludge Holding/Recycling Basin						

	Subtotal WW Recovery Basin Complex			$	705,325

Chlorine Feed System Building	Size =	20	20	25

				Subtotal Chlorine Building	$	263,750
Sludge Drying Beds						
				Subtotal Decant Pump Station	$	592,470

Other						
2	**Sitework** Manhole	10	EA	$2,000	$	20,000
11	**DMF System** Dual-Media Equipment + Building	1	LS	**$3,565,295**	**$**	**3,565,295**
2	**DMF and NF Effluent Mixing Flow Vault** Valve, Pipe, and Concrete Structure	1	LS	$225,000	$	225,000
				Subtotal Sendimentation Ponds	**$**	**3,810,295**

SUBTOTAL	**$**	**32,303,348**
Construction Contingency (30%)	**$**	**9,691,004**
Engineering, Survey & Const Mngmnt (20%)	**$**	**8,398,870**

PROJECT TOTAL	**$**	**50,393,223**

Cost ($/MG) ***$3.36***

Estimated Operation and Maintenance Costs
Estimated Operation and Maintenance Costs
Option D_ ACTIFLO + DMF + RO
Hildago County Drainage District No. 1
Regional Water Supply Facilities Planning

Total	Labor	$ 704,000	20.4%
$3,447,000	Operation	$2,393,000	69.4%
	Maintenance	$ 250,000	7.3%
	Professional Services	$ 45,000	1.3%
	Other	$ 55,000	1.6%
		$3,447,000	1

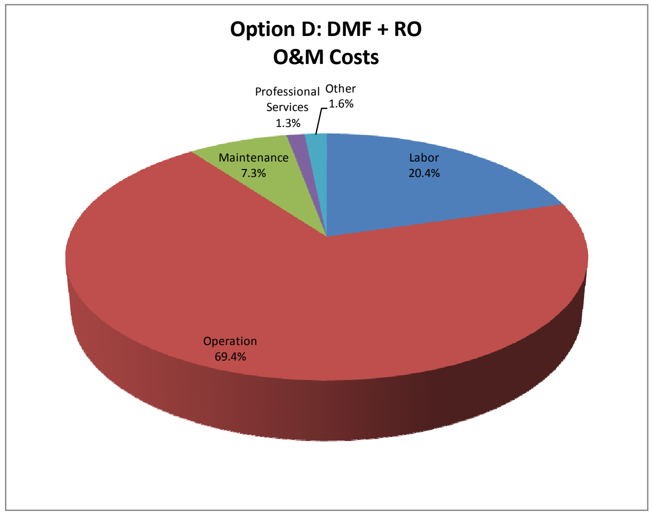
Assumptions:

Design Flow (Peak), mgd:	**3.0**
Average Day Flow, mgd:	3.0
Labor Burden (%)	40
Power Costs, $/kW-h	0.06

Water supply costs not included
Estimated effluent pumping costs included
(total pumping head estimated at 200')

Description	Unit	Quantity	Unit Cost ($)	Total Cost ($)
Labor				
Plant Manager	EA	1	75,000	$ 75,000
Operators	EA	6	50,000	$ 300,000
Mechanics	EA	4	45,000	$ 180,000
Electrical/Instrumentation	EA	1	65,000	$ 65,000
General Maintenance	EA	2	42,000	$ 84,000
			Subtotal	**$ 704,000**
Operation				
Chemicals	LS	1	1,350,000	$ 1,350,000
Sludge Disposal	LS	1	31,500	$ 31,500
Electric Costs				
On-site	LS	1	945,000	$ 945,000
Effluent Pumping	LS	1	45,000	$ 45,000
Other Utilities (Gas & Phone)	LS	1	15,000	$ 15,000
Office Supplies	LS	1	3,000	$ 3,000
Custodial Supplies	LS	1	1,500	$ 1,500
Lab Fees & Supplies	LS	1	2,000	$ 2,000
			Subtotal	**$ 2,393,000**
Maintenance				
Parts & Replacement	LS	1	250,000	$ 250,000
			Subtotal	**$ 250,000**
Professional Services				
Engineering, Legal & Acctng.	LS	1	45,000	$ 45,000
			Subtotal	**$ 45,000**
Other				
Travel, Training, Dues, etc.	LS	1	15,000	$ 15,000
Insurance	LS	1	40,000	$ 40,000
			Subtotal	**$ 55,000**
TOTAL				**$3,447,000**

Chemical Costs ($/1000G)	**$1.23**
Total O&M Costs ($/1000G)	**$3.15**



Estimated Operation and Maintenance Costs
Estimated Operation and Maintenance Costs
Option D_ ACTIFLO + DMF + RO
Hildago County Drainage District No. 1
Regional Water Supply Facilities Planning

Total	Labor	$ 704,000	15.7%
$4,473,000	Operation	$ 3,419,000	76.4%
	Maintenanc	$ 250,000	5.6%
	Professiona	$ 45,000	1.0%
	Other	$ 55,000	1.2%
		$ 4,473,000	100.0%

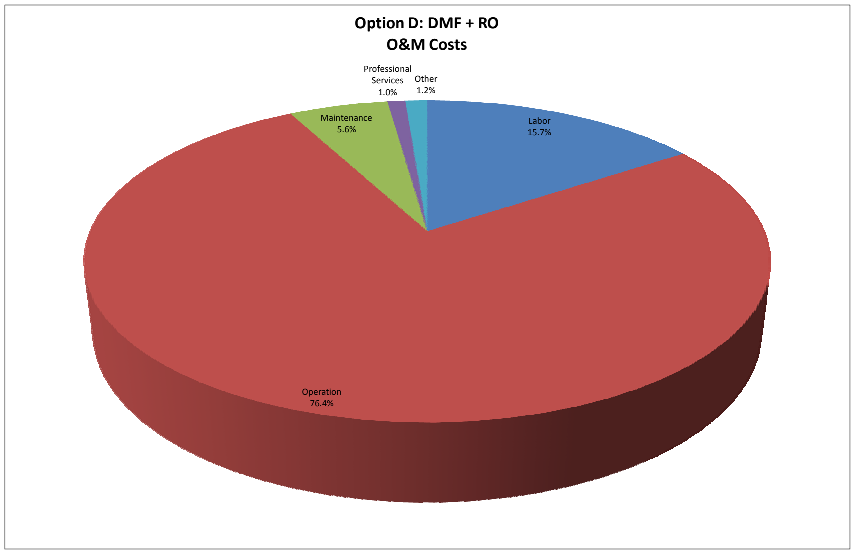
Assumptions:

Design Flow (Peak), mgd:	**5.0**
Average Day Flow, mgd:	5.0
Labor Burden (%)	40
Power Costs, $/kW-h	0.06

Water supply costs not included
Estimated effluent pumping costs included
(total pumping head estimated at 200')

Description	Unit	Quantity	Unit Cost ($)	Total Cost ($)
Labor				
Plant Manager	EA	1	75,000	$ 75,000
Operators	EA	6	50,000	$ 300,000
Mechanics	EA	4	45,000	$ 180,000
Electrical/Instrumentation	EA	1	65,000	$ 65,000
General Maintenance	EA	2	42,000	$ 84,000
			Subtotal	**$ 704,000**
Operation				
Chemicals	LS	1	2,250,000	$ 2,250,000
Sludge Disposal	LS	1	52,500	$ 52,500
Electric Costs				
On-site	LS	1	1,050,000	$ 1,050,000
Effluent Pumping	LS	1	45,000	$ 45,000
Other Utilities (Gas & Phone)	LS	1	15,000	$ 15,000
Office Supplies	LS	1	3,000	$ 3,000
Custodial Supplies	LS	1	1,500	$ 1,500
Lab Fees & Supplies	LS	1	2,000	$ 2,000
			Subtotal	**$ 3,419,000**
Maintenance				
Parts & Replacement	LS	1	250,000	$ 250,000
			Subtotal	**$ 250,000**
Professional Services				
Engineering, Legal & Acctng.	LS	1	45,000	$ 45,000
			Subtotal	**$ 45,000**
Other				
Travel, Training, Dues, etc.	LS	1	15,000	$ 15,000
Insurance	LS	1	40,000	$ 40,000
			Subtotal	**$ 55,000**
TOTAL				**$4,473,000**

Chemical Costs ($/1000G)	**$1.23**
Total O&M Costs ($/1000G)	**$2.45**



Estimated Operation and Maintenance Costs
Estimated Operation and Maintenance Costs
Option D_ ACTIFLO + DMF + RO
Hildago County Drainage District No. 1
Regional Water Supply Facilities Planning

Total	Labor	$ 707,000	8.8%
$8,018,500	Operation	$ 6,811,500	84.9%
	Maintenanc	$ 400,000	5.0%
	Profession	$ 45,000	0.6%
	Other	$ 55,000	0.7%
		$ 8,018,500	100.0%

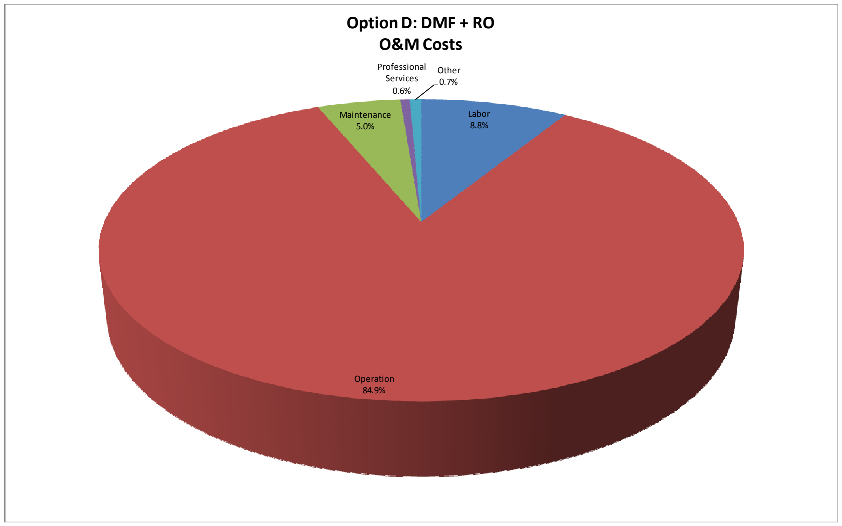
Assumptions:

Design Flow (Peak), mgd:	**10.0**
Average Day Flow, mgd:	10.0
Labor Burden (%)	40
Power Costs, $/kW-h	0.06

Water supply costs not included
Estimated effluent pumping costs included
(total pumping head estimated at 200')

Description	Unit	Quantity	Unit Cost ($)	Total Cost ($)
Labor				
Plant Manager	EA	1	75,000	$ 75,000
Operators	EA	6	50,000	$ 300,000
Mechanics	EA	5	45,000	$ 225,000
Electrical/Instrumentation	EA	1	65,000	$ 65,000
General Maintenance	EA	1	42,000	$ 42,000
			Subtotal	**$ 707,000**
Operation				
Chemicals	LS	1	4,500,000	$ 4,500,000
Sludge Disposal	LS	1	105,000	$ 105,000
Electric Costs				
On-site	LS	1	2,100,000	$ 2,100,000
Effluent Pumping	LS	1	85,000	$ 85,000
Other Utilities (Gas & Phone)	LS	1	15,000	$ 15,000
Office Supplies	LS	1	3,000	$ 3,000
Custodial Supplies	LS	1	1,500	$ 1,500
Lab Fees & Supplies	LS	1	2,000	$ 2,000
			Subtotal	**$ 6,811,500**
Maintenance				
Parts & Replacement	LS	1	400,000	$ 400,000
			Subtotal	**$ 400,000**
Professional Services				
Engineering, Legal & Acctng.	LS	1	45,000	$ 45,000
			Subtotal	**$ 45,000**
Other				
Travel, Training, Dues, etc.	LS	1	15,000	$ 15,000
Insurance	LS	1	40,000	$ 40,000
			Subtotal	**$ 55,000**
TOTAL				**$8,018,500**

Chemical Costs ($/1000G)	**$1.23**
Total O&M Costs ($/1000G)	**$2.20**



Estimated Operation and Maintenance Costs
Estimated Operation and Maintenance Costs
Option D_ ACTIFLO + DMF + RO
Hildago County Drainage District No. 1
Regional Water Supply Facilities Planning

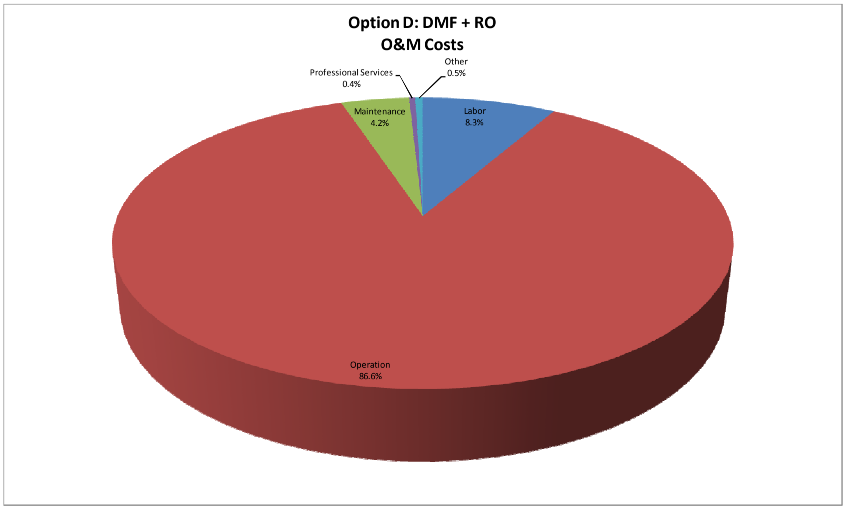
Total				
$11,790,000	Labor	$	981,000	8.3%
	Operation	$	10,209,000	86.6%
	Maintenanc	$	500,000	4.2%
	Profession	$	45,000	0.4%
	Other	$	55,000	0.5%
		$	11,790,000	100.0%

Assumptions:

Design Flow (Peak), mgd:	**15.0**
Average Day Flow, mgd:	15.0
Labor Burden (%)	40
Power Costs, $/kW-h	0.06
Water supply costs not included	
Estimated effluent pumping costs included (total pumping head estimated at 200')	

Description	Unit	Quantity	Unit Cost ($)	Total Cost ($)
Labor				
Plant Manager	EA	1	75,000	$ 75,000
Operators	EA	8	50,000	$ 400,000
Mechanics	EA	7	45,000	$ 315,000
Electrical/Instrumentation	EA	1	65,000	$ 65,000
General Maintenance	EA	3	42,000	$ 126,000
			Subtotal	**$ 981,000**
Operation				
Chemicals	LS	1	6,750,000	$ 6,750,000
Sludge Disposal	LS	1	157,500	$ 157,500
Electric Costs				
On-site	LS	1	3,150,000	$ 3,150,000
Effluent Pumping	LS	1	130,000	$ 130,000
Other Utilities (Gas & Phone)	LS	1	15,000	$ 15,000
Office Supplies	LS	1	3,000	$ 3,000
Custodial Supplies	LS	1	1,500	$ 1,500
Lab Fees & Supplies	LS	1	2,000	$ 2,000
			Subtotal	**$ 10,209,000**
Maintenance				
Parts & Replacement	LS	1	500,000	$ 500,000
			Subtotal	**$ 500,000**
Professional Services				
Engineering, Legal & Acctng.	LS	1	45,000	$ 45,000
			Subtotal	**$ 45,000**
Other				
Travel, Training, Dues, etc.	LS	1	15,000	$ 15,000
Insurance	LS	1	40,000	$ 40,000
			Subtotal	**$ 55,000**
TOTAL				**$11,790,000**

Chemical Costs ($/1000G)	**$1.23**
Total O&M Costs ($/1000G)	**$2.15**



Hildago County Draing District No. 1 - Water treatment Plant					7/13/2010
Plant Capcity of		3		MGD	
Project Cost Estimate				Factor =	0.30
Option C High Rate Actiflo + DMF+NF + Drying Beds Configuration Option					
DIV	**ITEM DESCRIPTION**	**Unit Quant**	**Unit**	**Unit Cost**	**Total Cost**
GENERAL ITEMS including Shop+Admin.+Lab		Size = 40' x 100' x 15'			
1	General Requirements				
	Bonds & Insurance		LS	250000	250000
	Mobilization		LS	150000	150000
2	Sitework				
	Clearing & Grubbing / General Grading	1	LS	20000	20000
	Curb & Gutter	2600	LF	18	46800
	Asphalt Surfacing	3000	SY	20	60000
	Chain Link Fencing (6 ft)	2500	LF	10	25000
	Landscaping	1	LS	100000	100000
2	Yard Piping				
	Plant Influent - 36"	200	LF	125	25000
	Plant Sewer & Manholes (8" PVC)	2000	LF	40	80000
	Water Distribution & Valves (6" PVC)	1500	LF	30	45000
	Plant Effluent - 30 "	200	LF	120	24000
3	Concrete				
	Miscellaneous	100	CY	500	50000
5	Metals				
	Aluminum Railing	500	LF	25	12500
	Misc Metal Fabrications	1	LS	100000	100000
7	Thermal & Moisture Protection				
	Damproofing	4000	SF	3	12000
	Downspouts & Scuppers	250	LF	30	7500
8	Doors & Windows				
	Doors-Operations Area				
	Exterior (Pedestrian)	4	EA	2000	8000
	Interior (Pedestrian)	8	EA	1500	12000
	Roll Up Door (8 x 10)	1	EA	5500	5500
	Windows- Operations Area	200	SF	15	3000
9	Finishes	0	0	0	0
	Misc. Painting (Piping)	1	LS	50000	50000
	General Office & Misc.	2500	SF	20	50000
	Restrooms	100	SF	25	2500
11	Equipment	0	0	0	0
	House Water System	1	LS	20000	20000
12	Furnishings				
	Laboratory	1	LS	30000	30000
	Miscellaneous	1	LS	50000	50000
13	Special Construction				
	Security System	1	LS	50000	50000
15	Mechanical				
	HVAC	4000	SF	30	120000
	Fire Protection	4000	SF	4	16000
	Plumbing	4000	SF	4	16000
16	Electrical				
	Standby Generator	1	LS	100000	100000
	Electrical Work (20% of Div 11)	1	LS	581800	581800
	Instrumentation & Control (35% of Div 11)	1	LS	1018150	1018150
		Subtotal for General Items for WTP			$ 3,140,750
Operations & Maintenance Facilities		Size = 40' x 100' x 15'			

2	Sitework				
	Excavation	400	CY	4	3200
	Backfill	200	CY	10	3000
3	Cast-in-Place Concrete				
	Slabs on Grade	100	CY	350	35000
	Walls	100	CY	450	45000
	Suspended Slabs & Beams	60	CY	600	36000
	Columns	25	CY	600	15000
	Precast Roofing	4000	SF	8	32000
	Garage / Shop				
	Slabs on Grade	75	CY	350	26250
	Walls	300	CY	450	135000
4	Masonry				
	Composite Wall (8" block, 4"brick)	4200	SF	15	63000
6	Wood And Plastics				
	Fiberglass Chemical Storage Tanks Alum (8000 gal)	1	EA	8000	8000
	Fiberglass Chemical Storage Tanks Permanganate (2500 gal)	2	EA	2500	5000
	Fiberglass Chemical Storage Tanks Caustic Soda (8000 gal) (Alkalinity adjustment)	1	EA	8000	8000
	Polymer Day Tanks (250 gal)	6	EA	500	3000
	Fiberglass Chemical Storage Tanks NaOCL (whole systeml)	1	EA	50000	50000
7	Thermal & Moisture Protection				
	Membrane Roofing (including ballast)	4000	SF	1.5	6000
	Rigid Insulation (Roof)	4000	SF	1.25	5000
	Roof Flashing	400	LF	12	4800
8	Doors & Windows				
	Doors-Operations Area				
	Exterior (Pedestrian)	2	EA	2000	4000
	Interior (Pedestrian)	4	EA	1500	6000
	Roll Up Door (8 x 10)	1	EA	5500	5500
	Windows- Operations Area	200	SF	15	3000
9	Finishes				
	Interior				
	Operations Complex				
	Chemical Area	150	SF	50	7500
	Restrooms / Lockers	250	SF	25	6250
	Carpeting	150	SY	30	4500
	Misc Trim & Finishes	1	LS	10000	10000
	Acoustical Suspended Ceiling (Operations Area)	400	SF	7	2800
	Vinyl Composition Flooring	1000	SF	3.7	3700
10	Specialties				
	Operations Bldg.				
	Lockers	1	LS	2500	2500
	Toilet Accessories	1	LS	2500	2500
11	Equipment				
	Chemical Transfer Pumps (25 gpm @ 50' TDH)	2	EA	20000	40000
	Alum Chemical Feed Metering Pumps (15-20 gph)	3	EA	4500	13500
	Polymer Feed System	1	EA		
	Garage / Shop		0	10000	10000
	Misc.	1	LS	20000	20000
	Subtotal for Operations & Maintenance Facilities			$	625,000
High Rate Clarification		Size =	60	70	25

		Subtotal for High Rate Clarification			**$ 1,265,879**
NF Filter Complex + DMF As Shown in Others		Size =	120	120	50

				Subtotal Filter Complex		$ 2,728,309
Clearwell & Effluent Pumping Facilities						

			Subtotal Clearwell	$	531,965
Plant Waste-Handling incd. Backwash holding + Sludge Holding/Recycling Basin					
	Subtotal WW Recovery Basin Complex			$	474,505

Chlorine Feed System Building	Size =	20	20	25

				Subtotal Chlorine Building	**$**	**163,750**
Sludge Drying Beds						
				Subtotal Decant Pump Station	**$**	**178,870**

OTHERS					
2	**Sitework** Manhole	10	EA	$2,000	$ 20,000
11	**DMF System** Dual-Media Equipment + Building	1	LS	**$1,914,019**	**$ 1,914,019**
2	**DMF and NF Effluent Mixing Flow Vault** Valve, Pipe, and Concrete Structure	1	LS	$45,000	$ 45,000
				Subtotal Sendimentation Ponds	**$ 1,979,019**

SUBTOTAL	**$ 11,088,046**
Construction Contingency (30%)	**$ 3,326,414**
Engineering, Survey & Const Mngmnt (20%)	**$ 2,882,892**
PROJECT TOTAL	**$ 17,297,352**

Cost ($/MG) ***$5.77***

Hildago County Draing District No. 1 - Water treatment Plant					7/13/2010
Plant Capcity of		5		MGD	
Project Cost Estimate				Factor =	0.50
Option C High Rate Actiflo + DMF+NF + Drying Beds Configuration Option					
DIV	ITEM DESCRIPTION	Unit Quant	Unit	Unit Cost	Total Cost
GENERAL ITEMS including Shop+Admin.+Lab		Size = 40' x 100' x 15'			
1	General Requirements				
	Bonds & Insurance		LS	250000	250000
	Mobilization		LS	150000	150000
2	Sitework				
	Clearing & Grubbing / General Grading	1	LS	20000	20000
	Curb & Gutter	2600	LF	18	46800
	Asphalt Surfacing	3000	SY	20	60000
	Chain Link Fencing (6 ft)	2500	LF	10	25000
	Landscaping	1	LS	100000	100000
2	Yard Piping				
	Plant Influent - 36"	200	LF	125	25000
	Plant Sewer & Manholes (8" PVC)	2000	LF	40	80000
	Water Distribution & Valves (6" PVC)	1500	LF	30	45000
	Plant Effluent - 30 "	200	LF	120	24000
3	Concrete				
	Miscellaneous	100	CY	500	50000
5	Metals				
	Aluminum Railing	500	LF	25	12500
	Misc Metal Fabrications	1	LS	100000	100000
7	Thermal & Moisture Protection				
	Dampproofing	4000	SF	3	12000
	Downspouts & Scuppers	250	LF	30	7500
8	Doors & Windows				
	Doors-Operations Area				
	Exterior (Pedestrian)	4	EA	2000	8000
	Interior (Pedestrian)	8	EA	1500	12000
	Roll Up Door (8 x 10)	1	EA	5500	5500
	Windows- Operations Area	200	SF	15	3000
9	Finishes	0	0	0	0
	Misc. Painting (Piping)	1	LS	50000	50000
	General Office & Misc.	2500	SF	20	50000
	Restrooms	100	SF	25	2500
11	Equipment	0	0	0	0
	House Water System	1	LS	20000	20000
12	Furnishings				
	Laboratory	1	LS	30000	30000
	Miscellaneous	1	LS	50000	50000
13	Special Construction				
	Security System	1	LS	50000	50000
15	Mechanical				
	HVAC	4000	SF	30	120000
	Fire Protection	4000	SF	4	16000
	Plumbing	4000	SF	4	16000
16	Electrical				
	Standby Generator	1	LS	100000	100000
	Electrical Work (20% of Div 11)	1	LS	581800	581800
	Instrumentation & Control (35% of Div 11)	1	LS	1018150	1018150
			Subtotal for General Items for WTP		$ 3,140,750

Operations & Maintenance Facilities		Size = 40' x 100' x 15'			
2	Sitework				
	Excavation	400	CY	4	3200
	Backfill	200	CY	10	3000
3	Cast-in-Place Concrete				
	Slabs on Grade	100	CY	350	35000
	Walls	100	CY	450	45000
	Suspended Slabs & Beams	60	CY	600	36000
	Columns	25	CY	600	15000
	Precast Roofing	4000	SF	8	32000
	Garage / Shop				
	Slabs on Grade	75	CY	350	26250
	Walls	300	CY	450	135000
4	Masonry				
	Composite Wall (8" block, 4"brick)	4200	SF	15	63000
6	Wood And Plastics				
	Fiberglass Chemical Storage Tanks Alum (8000 gal)	1	EA	8000	8000
	Fiberglass Chemical Storage Tanks Permanganate (2500 gal)	2	EA	2500	5000
	Fiberglass Chemical Storage Tanks Caustic Soda (8000 gal) (Alkalinity adjustment)	1	EA	8000	8000
	Polymer Day Tanks (250 gal)	6	EA	500	3000
	Fiberglass Chemical Storage Tanks NaOCL (whole systeml)	1	EA	50000	50000
7	Thermal & Moisture Protection				
	Membrane Roofing (including ballast)	4000	SF	1.5	6000
	Rigid Insulation (Roof)	4000	SF	1.25	5000
	Roof Flashing	400	LF	12	4800
8	Doors & Windows				
	Doors-Operations Area				
	Exterior (Pedestrian)	2	EA	2000	4000
	Interior (Pedestrian)	4	EA	1500	6000
	Roll Up Door (8 x 10)	1	EA	5500	5500
	Windows- Operations Area	200	SF	15	3000
9	Finishes				
	Interior				
	Operations Complex				
	Chemical Area	150	SF	50	7500
	Restrooms / Lockers	250	SF	25	6250
	Carpeting	150	SY	30	4500
	Misc Trim & Finishes	1	LS	10000	10000
	Acoustical Suspended Ceiling (Operations Area)	400	SF	7	2800
	Vinyl Composition Flooring	1000	SF	3.7	3700
10	Specialties				
	Operations Bldg.				
	Lockers	1	LS	2500	2500
	Toilet Accessories	1	LS	2500	2500
11	Equipment				
	Chemical Transfer Pumps (25 gpm @ 50' TDH)	2	EA	20000	40000
	Alum Chemical Feed Metering Pumps (15-20 gph)	3	EA	4500	13500
	Polymer Feed System	1	EA		
	Garage / Shop		0	10000	10000
	Misc.	1	LS	20000	20000
	Subtotal for Operations & Maintenance Facilities			$	625,000

High Rate Clarification		Size =	60	70	25

			Subtotal for High Rate Clarification		**$**	**1,537,095**
NF Filter Complex + DMF As Shown in Others		Size =	120	120	50	

		Subtotal Filter Complex			$	4,280,248
Clearwell & Effluent Pumping Facilities						

				Subtotal Clearwell	**$**	**693,941**
Plant Waste-Handling incd. Backwash holding + Sludge Holding/Recycling Basin						
	Subtotal WW Recovery Basin Complex				**$**	**512,975**

Chlorine Feed System Building		Size =	20	20	25

		Subtotal Chlorine Building			$	163,750
Sludge Drying Beds						

		Subtotal Decant Pump Station			$	241,970

OTHERS						
2	**Sitework** Manhole	10	EA	$2,000	$	20,000
11	**DMF System** Dual-Media Equipment + Building	1	LS	**$2,272,165**	**$**	**2,272,165**
2	**DMF and NF Effluent Mixing Flow Vault** Valve, Pipe, and Concrete Structure	1	LS	$75,000	$	75,000
				Subtotal Sendimentation Ponds	**$**	**2,367,165**

SUBTOTAL	**$**	**13,562,894**
Construction Contingency (30%)	**$**	**4,068,868**
Engineering, Survey & Const Mngmnt (20%)	**$**	**3,526,352**
PROJECT TOTAL	**$**	**21,158,115**

Cost ($/MG) ***$4.23***

Hildago County Draing District No. 1 - Water treatment Plant					7/13/2010
Plant Capcity of		10		MGD	
Project Cost Estimate					
Option C High Rate Actiflo + DMF+NF + Drying Beds Configuration Option					
DIV	**ITEM DESCRIPTION**	**Unit Quant**	**Unit**	**Unit Cost**	**Total Cost**
GENERAL ITEMS including Shop+Admin.+Lab		Size = 40' x 100' x 15'			
1	General Requirements				
	Bonds & Insurance		LS	250000	250000
	Mobilization		LS	150000	150000
2	Sitework				
	Clearing & Grubbing / General Grading	1	LS	20000	20000
	Curb & Gutter	2600	LF	18	46800
	Asphalt Surfacing	3000	SY	20	60000
	Chain Link Fencing (6 ft)	2500	LF	10	25000
	Landscaping	1	LS	100000	100000
2	Yard Piping				
	Plant Influent - 36"	200	LF	125	25000
	Plant Sewer & Manholes (8" PVC)	2000	LF	40	80000
	Water Distribution & Valves (6" PVC)	1500	LF	30	45000
	Plant Effluent - 30 "	200	LF	120	24000
3	Concrete				
	Miscellaneous	100	CY	500	50000
5	Metals				
	Aluminum Railing	500	LF	25	12500
	Misc Metal Fabrications	1	LS	100000	100000
7	Thermal & Moisture Protection				
	Dampproofing	4000	SF	3	12000
	Downspouts & Scuppers	250	LF	30	7500
8	Doors & Windows				
	Doors-Operations Area				
	Exterior (Pedestrian)	4	EA	2000	8000
	Interior (Pedestrian)	8	EA	1500	12000
	Roll Up Door (8 x 10)	1	EA	5500	5500
	Windows- Operations Area	200	SF	15	3000
9	Finishes	0	0	0	0
	Misc. Painting (Piping)	1	LS	50000	50000
	General Office & Misc.	2500	SF	20	50000
	Restrooms	100	SF	25	2500
11	Equipment	0	0	0	0
	House Water System	1	LS	20000	20000
12	Furnishings				
	Laboratory	1	LS	30000	30000
	Miscellaneous	1	LS	50000	50000
13	Special Construction				
	Security System	1	LS	50000	50000
15	Mechanical				
	HVAC	4000	SF	30	120000
	Fire Protection	4000	SF	4	16000
	Plumbing	4000	SF	4	16000
16	Electrical				
	Standby Generator	1	LS	100000	100000
	Electrical Work (20% of Div 11)	1	LS	581800	581800
	Instrumentation & Control (35% of Div 11)	1	LS	1018150	1018150
				Subtotal for General Items for WTP	$ 3,140,750
Operations & Maintenance Facilities		Size = 40' x 100' x 15'			

2	**Sitework**				
	Excavation	400	CY	4	3200
	Backfill	200	CY	10	3000
3	**Cast-in-Place Concrete**				
	Slabs on Grade	100	CY	350	35000
	Walls	100	CY	450	45000
	Suspended Slabs & Beams	60	CY	600	36000
	Columns	25	CY	600	15000
	Precast Roofing	4000	SF	8	32000
	Garage / Shop				
	Slabs on Grade	75	CY	350	26250
	Walls	300	CY	450	135000
4	**Masonry**				
	Composite Wall (8" block, 4"brick)	4200	SF	15	63000
6	**Wood And Plastics**				
	Fiberglass Chemical Storage Tanks Alum (8000 gal)	1	EA	8000	8000
	Fiberglass Chemical Storage Tanks Permanganate (2500 gal)	2	EA	2500	5000
	Fiberglass Chemical Storage Tanks Caustic Soda (8000 gal) (Alkalinity adjustment)	1	EA	8000	8000
	Polymer Day Tanks (250 gal)	6	EA	500	3000
	Fiberglass Chemical Storage Tanks NaOCL (whole systeml)	1	EA	50000	50000
7	**Thermal & Moisture Protection**				
	Membrane Roofing (including ballast)	4000	SF	1.5	6000
	Rigid Insulation (Roof)	4000	SF	1.25	5000
	Roof Flashing	400	LF	12	4800
8	**Doors & Windows**				
	Doors-Operations Area				
	Exterior (Pedestrian)	2	EA	2000	4000
	Interior (Pedestrian)	4	EA	1500	6000
	Roll Up Door (8 x 10)	1	EA	5500	5500
	Windows- Operations Area	200	SF	15	3000
9	**Finishes**				
	Interior				
	Operations Complex				
	Chemical Area	150	SF	50	7500
	Restrooms / Lockers	250	SF	25	6250
	Carpeting	150	SY	30	4500
	Misc Trim & Finishes	1	LS	10000	10000
	Acoustical Suspended Ceiling (Operations Area)	400	SF	7	2800
	Vinyl Composition Flooring	1000	SF	3.7	3700
10	**Specialties**				
	Operations Bldg.				
	Lockers	1	LS	2500	2500
	Toilet Accessories	1	LS	2500	2500
11	**Equipment**				
	Chemical Transfer Pumps (25 gpm @ 50' TDH)	2	EA	20000	40000
	Alum Chemical Feed Metering Pumps (15-20 gph)	3	EA	4500	13500
	Polymer Feed System	1	EA		
	Garage / Shop		0	10000	10000
	Misc.	1	LS	20000	20000
				Subtotal for Operations & Maintenance Facilities	**$ 625,000**
	High Rate Clarification	Size =	60	70	25

	Subtotal for High Rate Clarification				**$ 3,001,320**
NF Filter Complex + DMF As Shown in Others		Size =	120	120	50

				Subtotal Filter Complex	$	8,034,096
Clearwell & Effluent Pumping Facilities						
2	**Sitework**	Size =	60	104		10
	Excavation	5,000	CY	**$0**	$	-
	Backfill	2,500	CY	**$0**	$	-
2	**Yard Piping**					
	Reservoir Overflow/Drain - 18"	250	LF	$72	$	18,000
3	**Cast-in-Place Concrete**					
	Slabs on Grade	350	CY	$350	$	122,500
	Walls	800	CY	$450	$	360,000
	Suspended Slabs & Beams	250	CY	$600	$	150,000
	Columns	50	CY	$600	$	30,000
	Precast Roofing	1,100	SF	$8	$	8,800
4	**Masonry**					
	Composite Wall (8" block, 4" brick)	2,000	SF	$15	$	30,000
	Interior (8" Concrete Block)	5,000	SF	$5	$	25,000
7	**Thermal & Moisture Protection**					
	Membrane Roofing (including ballast)	1,000	SF	$1.50	$	1,500
	Reservoir Membrane	5,000	SF	$2.00	$	10,000
	Rigid Insulation (Roof)	1,000	SF	$1.25	$	1,250
	Rigid Insulation (Wall)	5,104	SF	$0.50	$	2,552
	Roof Flashing	140	SF	$12.00	$	1,680
8	**Doors & Windows**					
	Doors					
	Exterior (Pedestrian)	1	EA	$2,000	$	2,000
	Roll Up Door (8 x 10)	1	EA	$5,500	$	5,500
	Windows	50	SF	$10	$	500
9	**Interior Finishes**	1,000	SF	$4	$	4,000
11	**Equipment**					
	Effluent Pumping Station					
	Effluent Pumps					

	3500 gpm @ 200'TDH	4	EA	$80,000	$ 320,000
15	**Mechanical**				
	Effluent Pumping Station				
	Piping				
	30" Effluent	50	LF	$240	$ 12,000
	24" Suction & Discharge	50	LF	$192	$ 9,600
	Valves w/Actuator				
	24" BFV	6	EA	$15,000	$ 90,000
	18" BFV (Drain)	1	EA	$9,000	$ 9,000
			Subtotal Clearwell		**$ 1,213,882**
Plant Waste-Handling incd. Backwash holding + Sludge Holding/Recycling Basin					
2	**Sitework**				
	Excavation	**6,000**	CY	**$0**	$ -
	Backfill	**2,500**	CY	**$0**	$ -
2	**Yard Piping**				
	Wash Water Recovery - 30"	250	LF	$120	$ 30,000
	Wash Water Return - 12"	300	LF	$48	$ 14,400
	Sediment Transmission Line - 12"	650	LF	$48	$ 31,200
	Decant Return Line - 8"	1,000	LF	$32	$ 32,000
	Wash Water By-pass - 24"	200	LF	$96	$ 19,200
3	**Cast-in-Place Concrete**				
	Slabs on Grade	75	CY	$350	$ 26,250
	Walls	50	CY	$450	$ 22,500
	Suspended Slabs	25	CY	$600	$ 15,000
	Columns	0	CY	$600	$ -
	Precast Roofing	0	SF	$8	$ -
4	**Mebbrane Lining**				
	5-mil lining	**35,000**	SF	$2	$ 70,000
7	**Backwash Holding Tank - Concrete**				
	Slab on Grade	140	CY	$350.00	$ 49,000
	Walls	100	CY	$450.00	$ 45,000
	Suspended Slab	50	CY	$600.00	$ 30,000
	Column	0	CY	$600.00	$ -
8	**Doors & Windows**				
	Exterior (Pedestrian)	0	EA	$2,000	$ -
	Roll Up Door (8 x 10)	0	EA	$5,500	$ -
	Windows	0	SF	$10	$ -
9	**Interior Finishes**	0	SF	$4	$ -
11	**Equipment**				
	Filter Backwah Transfer Pumps 2000 gpm at 50'	2	EA	$30,000	$ 60,000
	Sludge Recycle Return Pumps				
	7000 gpm @ 100' TDH	2	LS	$45,000	$ 90,000
15	**Mechanical**				
	Piping				
	8" Suction & Discharge	60	LF	$64	$ 3,840
	12" Combined Return (2 Pumps)	60	LF	$96	$ 5,760
	Valves w/Actuator				
	8" BFV	4	EA	$2,000	$ 8,000
	8" Check	2	EA	$1,000	$ 2,000
	12" BFV	1	EA	$6,000	$ 6,000
	Subtotal WW Recovery Basin Complex				**$ 560,150**

Chlorine Feed System Building	Size =	20	20	25

		Subtotal Chlorine Building			$	213,750
Sludge Drying Beds						
2	**Sitework**					
	Excavation	500	CY	**$0**	$	-
	Backfill	100	CY	**$0**	$	-
3	**Cast-in-Place Concrete**					
	Slabs on Grade	700	CY	$350	$	245,000
	Walls	150	CY	$450	$	67,500
	Suspended Slabs & Beams	0	CY	$600	$	-
	Columns	0	CY	$600	$	-
	Precast Roofing	0	SF	$8	$	-
4	**Masonry**					
	Composite Wall (8" block, 4" brick)	0	SF	$15	$	-
7	**Thermal & Moisture Protection**					
	Membrane Roofing (including ballast)	0	SF	$1.50	$	-
	Rigid Insulation (Roof)	0	SF	$1.25	$	-
	Rigid Insulation (Wall)	0	SF	$0.50	$	-
	Roof Flashing	0	SF	$12.00	$	-
8	**Doors & Windows**					
	Doors					
	Exterior (Pedestrian)	0	EA	$2,000	$	-
	Windows	0	SF	$10	$	-
9	**Interior Finishes**	0	SF	$4	$	-
11	**Equipment**					
	Pumps					
	3500 gpm @ 100' TDH	3	EA	$35,000	$	105,000
15	**Mechanical**					
	Piping					
	6" Suction & Discharge	60	LF	$48	$	2,880
	8" Combined Return (2 Pumps)	60	LF	$64	$	3,840
	Valves w/Actuator					
	6" BFV	4	EA	$1,000	$	4,000
	6" Check	2	EA	$750	$	1,500
	8" BFV	1	EA	$2,000	$	2,000
		Subtotal Decant Pump Station			**$**	**431,720**

OTHERS					
2	**Sitework** Manhole	10	EA	$2,000	$ 20,000
11	**DMF System** Dual-Media Equipment + Building	1	LS	**$2,817,430**	**$ 2,817,430**
2	**DMF and NF Effluent Mixing Flow Vault** Valve, Pipe, and Concrete Structure	1	LS	$150,000	$ 150,000
		Subtotal Sendimentation Ponds			**$ 2,987,430**

SUBTOTAL	**$ 20,208,098**
Construction Contingency (30%)	**$ 6,062,429**
Engineering, Survey & Const Mngmnt (20%)	**$ 5,254,105**
PROJECT TOTAL	**$ 31,524,633**

Cost ($/MG) ***$3.15***

Hildago County Draing District No. 1 - Water treatment Plant					7/13/2010
Plant Capcity of		15		MGD	
Project Cost Estimate				Factor =	1.50
Option C High Rate Actiflo + DMF+NF + Drying Beds Configuration Option					
DIV	ITEM DESCRIPTION	Unit Quant	Unit	Unit Cost	Total Cost
GENERAL ITEMS including Shop+Admin.+Lab		Size = 40' x 100' x 15'			
1	General Requirements				
	Bonds & Insurance		LS	250000	250000
	Mobilization		LS	150000	150000
2	Sitework				
	Clearing & Grubbing / General Grading	1	LS	20000	20000
	Curb & Gutter	2600	LF	18	46800
	Asphalt Surfacing	3000	SY	20	60000
	Chain Link Fencing (6 ft)	2500	LF	10	25000
	Landscaping	1	LS	100000	100000
2	Yard Piping				
	Plant Influent - 36"	200	LF	125	25000
	Plant Sewer & Manholes (8" PVC)	2000	LF	40	80000
	Water Distribution & Valves (6" PVC)	1500	LF	30	45000
	Plant Effluent - 30 "	200	LF	120	24000
3	Concrete				
	Miscellaneous	100	CY	500	50000
5	Metals				
	Aluminum Railing	500	LF	25	12500
	Misc Metal Fabrications	1	LS	100000	100000
7	Thermal & Moisture Protection				
	Dampproofing	4000	SF	3	12000
	Downspouts & Scuppers	250	LF	30	7500
8	Doors & Windows				
	Doors-Operations Area				
	Exterior (Pedestrian)	4	EA	2000	8000
	Interior (Pedestrian)	8	EA	1500	12000
	Roll Up Door (8 x 10)	1	EA	5500	5500
	Windows- Operations Area	200	SF	15	3000
9	Finishes	0	0	0	0
	Misc. Painting (Piping)	1	LS	50000	50000
	General Office & Misc.	2500	SF	20	50000
	Restrooms	100	SF	25	2500
11	Equipment	0	0	0	0
	House Water System	1	LS	20000	20000
12	Furnishings				
	Laboratory	1	LS	30000	30000
	Miscellaneous	1	LS	50000	50000
13	Special Construction				
	Security System	1	LS	50000	50000
15	Mechanical				
	HVAC	4000	SF	30	120000
	Fire Protection	4000	SF	4	16000
	Plumbing	4000	SF	4	16000
16	Electrical				
	Standby Generator	1	LS	100000	100000
	Electrical Work (20% of Div 11)	1	LS	581800	581800
	Instrumentation & Control (35% of Div 11)	1	LS	1018150	1018150
				Subtotal for General Items for WTP $	3,140,750

Operations & Maintenance Facilities		Size = 40' x 100' x 15'			
2	Sitework				
	Excavation	400	CY	4	3200
	Backfill	200	CY	10	3000
3	Cast-in-Place Concrete				
	Slabs on Grade	100	CY	350	35000
	Walls	100	CY	450	45000
	Suspended Slabs & Beams	60	CY	600	36000
	Columns	25	CY	600	15000
	Precast Roofing	4000	SF	8	32000
	Garage / Shop				
	Slabs on Grade	75	CY	350	26250
	Walls	300	CY	450	135000
4	Masonry				
	Composite Wall (8" block, 4"brick)	4200	SF	15	63000
6	Wood And Plastics				
	Fiberglass Chemical Storage Tanks Alum (8000 gal)	1	EA	8000	8000
	Fiberglass Chemical Storage Tanks Permanganate (2500 gal)	2	EA	2500	5000
	Fiberglass Chemical Storage Tanks Caustic Soda (8000 gal) (Alkalinity adjustment)	1	EA	8000	8000
	Polymer Day Tanks (250 gal)	6	EA	500	3000
	Fiberglass Chemical Storage Tanks NaOCL (whole systeml)	1	EA	50000	50000
7	Thermal & Moisture Protection				
	Membrane Roofing (including ballast)	4000	SF	1.5	6000
	Rigid Insulation (Roof)	4000	SF	1.25	5000
	Roof Flashing	400	LF	12	4800
8	Doors & Windows				
	Doors-Operations Area				
	Exterior (Pedestrian)	2	EA	2000	4000
	Interior (Pedestrian)	4	EA	1500	6000
	Roll Up Door (8 x 10)	1	EA	5500	5500
	Windows- Operations Area	200	SF	15	3000
9	Finishes				
	Interior				
	Operations Complex				
	Chemical Area	150	SF	50	7500
	Restrooms / Lockers	250	SF	25	6250
	Carpeting	150	SY	30	4500
	Misc Trim & Finishes	1	LS	10000	10000
	Acoustical Suspended Ceiling (Operations Area)	400	SF	7	2800
	Vinyl Composition Flooring	1000	SF	3.7	3700
10	Specialties				
	Operations Bldg.				
	Lockers	1	LS	2500	2500
	Toilet Accessories	1	LS	2500	2500
11	Equipment				
	Chemical Transfer Pumps (25 gpm @ 50' TDH)	2	EA	20000	40000
	Alum Chemical Feed Metering Pumps (15-20 gph)	3	EA	4500	13500
	Polymer Feed System	1	EA		
	Garage / Shop		0	10000	10000
	Misc.	1	LS	20000	20000
	Subtotal for Operations & Maintenance Facilities			$	625,000

High Rate Clarification		Size =	60	70	25

		Subtotal for High Rate Clarification			$	4,405,055
NF Filter Complex + DMF As Shown in Others		Size =	120	120	50	

					Subtotal Filter Complex	**$ 11,374,944**
Clearwell & Effluent Pumping Facilities						

			Subtotal Clearwell		$ 1,823,823
Plant Waste-Handling incd. Backwash holding + Sludge Holding/Recycling Basin					
	Subtotal WW Recovery Basin Complex				**$ 705,325**

Chlorine Feed System Building	Size =	20	20	25

		Subtotal Chlorine Building			$	263,750
Sludge Drying Beds						

		Subtotal Decant Pump Station			$	592,470

OTHERS						
2	**Sitework** Manhole	10	EA	$2,000	$	20,000
11	**DMF System** Dual-Media Equipment + Building	1	LS	**$3,565,295**	**$**	**3,565,295**
2	**DMF and NF Effluent Mixing Flow Vault** Valve, Pipe, and Concrete Structure	1	LS	$225,000	$	225,000
		Subtotal Sendimentation Ponds			**$**	**3,810,295**

SUBTOTAL	**$**	**26,741,412**
Construction Contingency (30%)	**$**	**8,022,424**
Engineering, Survey & Const Mngmnt (20%)	**$**	**6,952,767**
PROJECT TOTAL	**$**	**41,716,603**

Cost ($/MG) ***$2.78***

Estimated Operation and Maintenance Costs
Estimated Operation and Maintenance Costs
Option C_ ACTIFLO + DMF + NF
Hildago County Drainage District No. 1
Regional Water Supply Facilities Planning

Total				
$2,118,000	Labor	$ 464,000	21.9%
	Operation	$1,314,000	62.0%
	Maintenanc	$ 240,000	11.3%
	Profession	$ 45,000	2.1%
	Other	$ 55,000	2.6%
		$2,118,000	1

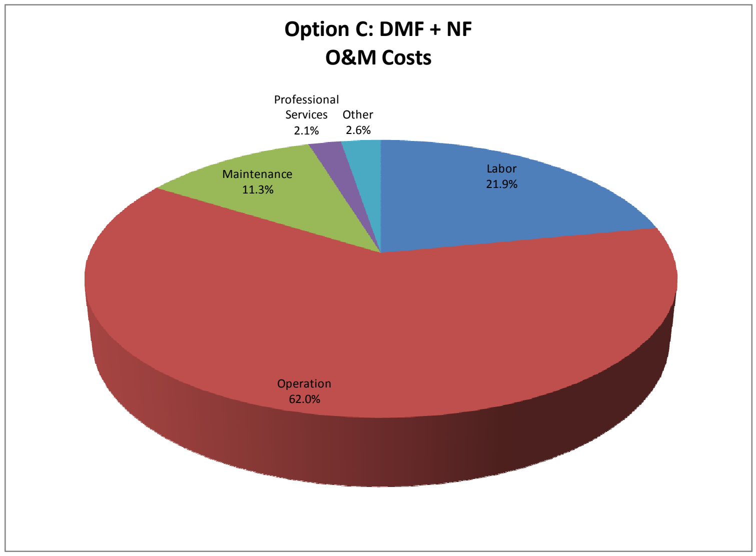
Assumptions:

Design Flow (Peak), mgd:	3.0
Average Day Flow, mgd:	3.0
Labor Burden (%)	40
Power Costs, $/kW-h	0.06

Water supply costs not included
Estimated effluent pumping costs included
(total pumping head estimated at 200')

Description	Unit	Quantity	Unit Cost ($)	Total Cost ($)
Labor				
Plant Manager	EA	1	75,000	$ 75,000
Operators	EA	3	50,000	$ 150,000
Mechanics	EA	2	45,000	$ 90,000
Electrical/Instrumentation	EA	1	65,000	$ 65,000
General Maintenance	EA	2	42,000	$ 84,000
			Subtotal	**$ 464,000**
Operation				
Chemicals	LS	1	645,000	$ 645,000
Sludge Disposal	LS	1	22,500	$ 22,500
Electric Costs				
On-site	LS	1	580,000	$ 580,000
Effluent Pumping	LS	1	45,000	$ 45,000
Other Utilities (Gas & Phone)	LS	1	15,000	$ 15,000
Office Supplies	LS	1	3,000	$ 3,000
Custodial Supplies	LS	1	1,500	$ 1,500
Lab Fees & Supplies	LS	1	2,000	$ 2,000
			Subtotal	**$ 1,314,000**
Maintenance				
Parts & Replacement	LS	1	240,000	$ 240,000
			Subtotal	**$ 240,000**
Professional Services				
Engineering, Legal & Acctng.	LS	1	45,000	$ 45,000
			Subtotal	**$ 45,000**
Other				
Travel, Training, Dues, etc.	LS	1	15,000	$ 15,000
Insurance	LS	1	40,000	$ 40,000
			Subtotal	**$ 55,000**
TOTAL				**$2,118,000**

Chemical Costs ($/1000G)	**$0.59**
Total O&M Costs ($/1000G)	**$1.93**

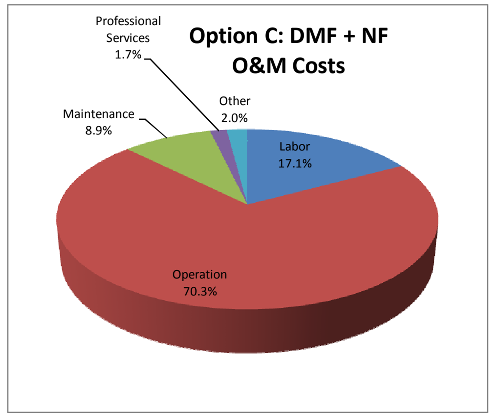


Estimated Operation and Maintenance Costs
Estimated Operation and Maintenance Costs
Option C_ ACTIFLO + DMF + NF
Hildago County Drainage District No. 1
Regional Water Supply Facilities Planning

Total	Labor	$ 464,000	17.1%
$2,708,000	Operation	$ 1,904,000	70.3%
	Maintenanc	$ 240,000	8.9%
	Profession	$ 45,000	1.7%
	Other	$ 55,000	2.0%
		$ 2,708,000	100.0%

Assumptions:

Design Flow (Peak), mgd:	**5.0**
Average Day Flow, mgd:	5.0
Labor Burden (%)	40
Power Costs, $/kW-h	0.06
Water supply costs not included	
Estimated effluent pumping costs included	
(total pumping head estimated at 200')	



Description	Unit	Quantity	Unit Cost ($)	Total Cost ($)
Labor				
Plant Manager	EA	1	75,000	$ 75,000
Operators	EA	3	50,000	$ 150,000
Mechanics	EA	2	45,000	$ 90,000
Electrical/Instrumentation	EA	1	65,000	$ 65,000
General Maintenance	EA	2	42,000	$ 84,000
			Subtotal	**$ 464,000**
Operation				
Chemicals	LS	1	1,075,000	$ 1,075,000
Sludge Disposal	LS	1	37,500	$ 37,500
Electric Costs				
On-site	LS	1	725,000	$ 725,000
Effluent Pumping	LS	1	45,000	$ 45,000
Other Utilities (Gas & Phone)	LS	1	15,000	$ 15,000
Office Supplies	LS	1	3,000	$ 3,000
Custodial Supplies	LS	1	1,500	$ 1,500
Lab Fees & Supplies	LS	1	2,000	$ 2,000
			Subtotal	**$ 1,904,000**
Maintenance				
Parts & Replacement	LS	1	240,000	$ 240,000
			Subtotal	**$ 240,000**
Professional Services				
Engineering, Legal & Acctng.	LS	1	45,000	$ 45,000
			Subtotal	**$ 45,000**
Other				
Travel, Training, Dues, etc.	LS	1	15,000	$ 15,000
Insurance	LS	1	40,000	$ 40,000
			Subtotal	**$ 55,000**
TOTAL				**$2,708,000**

Chemical Costs ($/1000G)	**$0.59**
Total O&M Costs ($/1000G)	**$1.48**

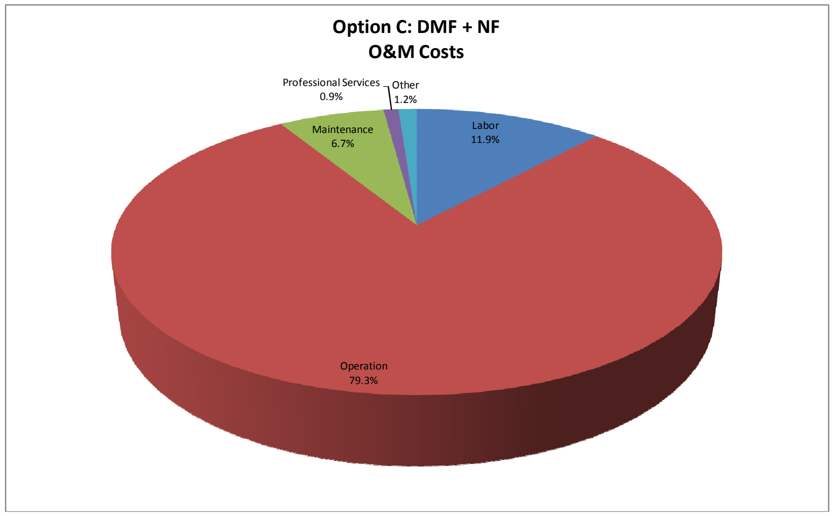
Estimated Operation and Maintenance Costs
Estimated Operation and Maintenance Costs
Option C_ ACTIFLO + DMF + NF
Hildago County Drainage District No. 1
Regional Water Supply Facilities Planning

Total	Labor	$ 567,000	11.9%
$4,768,500	Operation	$ 3,781,500	79.3%
	Maintenanc	$ 320,000	6.7%
	Professiona	$ 45,000	0.9%
	Other	$ 55,000	1.2%
		$ 4,768,500	100.0%

Assumptions:

Design Flow (Peak), mgd:	10.0
Average Day Flow, mgd:	10.0
Labor Burden (%)	40
Power Costs, $/kW-h	0.06
Water supply costs not included	
Estimated effluent pumping costs included	
(total pumping head estimated at 200')	

Description	Unit	Quantity	Unit Cost ($)	Total Cost ($)
Labor				
Plant Manager	EA	1	75,000	$ 75,000
Operators	EA	5	50,000	$ 250,000
Mechanics	EA	3	45,000	$ 135,000
Electrical/Instrumentation	EA	1	65,000	$ 65,000
General Maintenance	EA	1	42,000	$ 42,000
			Subtotal	**$ 567,000**
Operation				
Chemicals	LS	1	2,150,000	$ 2,150,000
Sludge Disposal	LS	1	75,000	$ 75,000
Electric Costs				
On-site	LS	1	1,450,000	$ 1,450,000
Effluent Pumping	LS	1	85,000	$ 85,000
Other Utilities (Gas & Phone)	LS	1	15,000	$ 15,000
Office Supplies	LS	1	3,000	$ 3,000
Custodial Supplies	LS	1	1,500	$ 1,500
Lab Fees & Supplies	LS	1	2,000	$ 2,000
			Subtotal	**$ 3,781,500**
Maintenance				
Parts & Replacement	LS	1	320,000	$ 320,000
			Subtotal	**$ 320,000**
Professional Services				
Engineering, Legal & Acctng.	LS	1	45,000	$ 45,000
			Subtotal	**$ 45,000**
Other				
Travel, Training, Dues, etc.	LS	1	15,000	$ 15,000
Insurance	LS	1	40,000	$ 40,000
			Subtotal	**$ 55,000**
TOTAL				**$4,768,500**



Chemical Costs ($/1000G)	**$0.59**
Total O&M Costs ($/1000G)	**$1.31**

Estimated Operation and Maintenance Costs
Estimated Operation and Maintenance Costs
Option C_ ACTIFLO + DMF + NF
Hildago County Drainage District No. 1
Regional Water Supply Facilities Planning

Assumptions:

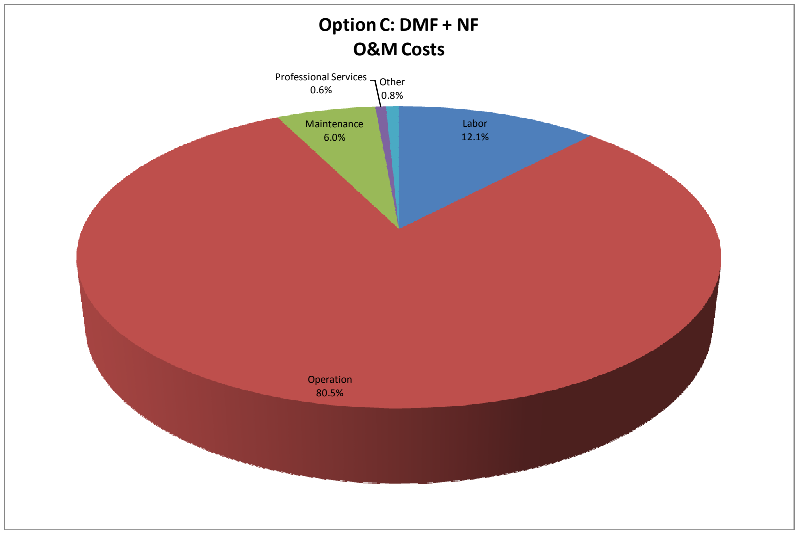
Design Flow (Peak), mgd:	15.0
Average Day Flow, mgd:	15.0
Labor Burden (%)	40
Power Costs, $/kW-h	0.06

Water supply costs not included
Estimated effluent pumping costs included
(total pumping head estimated at 200')

Total			
$7,033,000	Labor	$ 849,000	12.1%
	Operation	$5,664,000	80.5%
	Maintenanc	$ 420,000	6.0%
	Profession	$ 45,000	0.6%
	Other	$ 55,000	0.8%
		$7,033,000	100.0%

Description	Unit	Quantity	Unit Cost ($)	Total Cost ($)
Labor				
Plant Manager	EA	1	75,000	$ 75,000
Operators	EA	8	50,000	$ 400,000
Mechanics	EA	5	45,000	$ 225,000
Electrical/Instrumentation	EA	1	65,000	$ 65,000
General Maintenance	EA	2	42,000	$ 84,000
			Subtotal	**$ 849,000**
Operation				
Chemicals	LS	1	3,225,000	$ 3,225,000
Sludge Disposal	LS	1	112,500	$ 112,500
Electric Costs				
On-site	LS	1	2,175,000	$ 2,175,000
Effluent Pumping	LS	1	130,000	$ 130,000
Other Utilities (Gas & Phone)	LS	1	15,000	$ 15,000
Office Supplies	LS	1	3,000	$ 3,000
Custodial Supplies	LS	1	1,500	$ 1,500
Lab Fees & Supplies	LS	1	2,000	$ 2,000
			Subtotal	**$ 5,664,000**
Maintenance				
Parts & Replacement	LS	1	420,000	$ 420,000
			Subtotal	**$ 420,000**
Professional Services				
Engineering, Legal & Acctng.	LS	1	45,000	$ 45,000
			Subtotal	**$ 45,000**
Other				
Travel, Training, Dues, etc.	LS	1	15,000	$ 15,000
Insurance	LS	1	40,000	$ 40,000
			Subtotal	**$ 55,000**
TOTAL				**$7,033,000**

Chemical Costs ($/1000G)	**$0.59**
Total O&M Costs ($/1000G)	**$1.28**



Hildago County Draing District No. 1 - Water treatment Plant					7/13/2010
Plant Capcity of		3		MGD	
Project Cost Estimate				Factor =	0.30
Option D High Rate Actiflo + DMF+RO + Drying Beds Configuration Option					
DIV	ITEM DESCRIPTION	Unit Quant	Unit	Unit Cost	Total Cost
GENERAL ITEMS including Shop+Admin.+Lab		Size = 40' x 100' x 15'			
1	General Requirements				
	Bonds & Insurance		LS	250000	250000
	Mobilization		LS	150000	150000
2	Sitework				
	Clearing & Grubbing / General Grading	1	LS	20000	20000
	Curb & Gutter	2600	LF	18	46800
	Asphalt Surfacing	3000	SY	20	60000
	Chain Link Fencing (6 ft)	2500	LF	10	25000
	Landscaping	1	LS	100000	100000
2	Yard Piping				
	Plant Influent - 36"	200	LF	125	25000
	Plant Sewer & Manholes (8" PVC)	2000	LF	40	80000
	Water Distribution & Valves (6" PVC)	1500	LF	30	45000
	Plant Effluent - 30 "	200	LF	120	24000
3	Concrete				
	Miscellaneous	100	CY	500	50000
5	Metals				
	Aluminum Railing	500	LF	25	12500
	Misc Metal Fabrications	1	LS	100000	100000
7	Thermal & Moisture Protection				
	Dampproofing	4000	SF	3	12000
	Downspouts & Scuppers	250	LF	30	7500
8	Doors & Windows				
	Doors-Operations Area				
	Exterior (Pedestrian)	4	EA	2000	8000
	Interior (Pedestrian)	8	EA	1500	12000
	Roll Up Door (8 x 10)	1	EA	5500	5500
	Windows- Operations Area	200	SF	15	3000
9	Finishes	0	0	0	0
	Misc. Painting (Piping)	1	LS	50000	50000
	General Office & Misc.	2500	SF	20	50000
	Restrooms	100	SF	25	2500
11	Equipment	0	0	0	0
	House Water System	1	LS	20000	20000
12	Furnishings				
	Laboratory	1	LS	30000	30000
	Miscellaneous	1	LS	50000	50000
13	Special Construction				
	Security System	1	LS	50000	50000
15	Mechanical				
	HVAC	4000	SF	30	120000
	Fire Protection	4000	SF	4	16000
	Plumbing	4000	SF	4	16000
16	Electrical				
	Standby Generator	1	LS	100000	100000
	Electrical Work (20% of Div 11)	1	LS	581800	581800
	Instrumentation & Control (35% of Div 11)	1	LS	1018150	1018150
		Subtotal for General Items for WTP			$ 3,140,750
Operations & Maintenance Facilities		Size = 40' x 100' x 15'			

2	**Sitework**				
	Excavation	400	CY	4	3200
	Backfill	200	CY	10	3000
3	**Cast-in-Place Concrete**				
	Slabs on Grade	100	CY	350	35000
	Walls	100	CY	450	45000
	Suspended Slabs & Beams	60	CY	600	36000
	Columns	25	CY	600	15000
	Precast Roofing	4000	SF	8	32000
	Garage / Shop				
	Slabs on Grade	75	CY	350	26250
	Walls	300	CY	450	135000
4	**Masonry**				
	Composite Wall (8" block, 4"brick)	4200	SF	15	63000
6	**Wood And Plastics**				
	Fiberglass Chemical Storage Tanks Alum (8000 gal)	1	EA	8000	8000
	Fiberglass Chemical Storage Tanks Permanganate (2500 gal)	2	EA	2500	5000
	Fiberglass Chemical Storage Tanks Caustic Soda (8000 gal) (Alkalinity adjustment)	1	EA	8000	8000
	Polymer Day Tanks (250 gal)	6	EA	500	3000
	Fiberglass Chemical Storage Tanks NaOCL (whole systeml)	1	EA	50000	50000
7	**Thermal & Moisture Protection**				
	Membrane Roofing (including ballast)	4000	SF	1.5	6000
	Rigid Insulation (Roof)	4000	SF	1.25	5000
	Roof Flashing	400	LF	12	4800
8	**Doors & Windows**				
	Doors-Operations Area				
	Exterior (Pedestrian)	2	EA	2000	4000
	Interior (Pedestrian)	4	EA	1500	6000
	Roll Up Door (8 x 10)	1	EA	5500	5500
	Windows- Operations Area	200	SF	15	3000
9	**Finishes**				
	Interior				
	Operations Complex				
	Chemical Area	150	SF	50	7500
	Restrooms / Lockers	250	SF	25	6250
	Carpeting	150	SY	30	4500
	Misc Trim & Finishes	1	LS	10000	10000
	Acoustical Suspended Ceiling (Operations Area)	400	SF	7	2800
	Vinyl Composition Flooring	1000	SF	3.7	3700
10	**Specialties**				
	Operations Bldg.				
	Lockers	1	LS	2500	2500
	Toilet Accessories	1	LS	2500	2500
11	**Equipment**				
	Chemical Transfer Pumps (25 gpm @ 50' TDH)	2	EA	20000	40000
	Alum Chemical Feed Metering Pumps (15-20 gph)	3	EA	4500	13500
	Polymer Feed System	1	EA		
	Garage / Shop		0	10000	10000
	Misc.	1	LS	20000	20000
				Subtotal for Operations & Maintenance Facilities	**$ 625,000**

High Rate Clarification	Size =	60	70	25

	Subtotal for High Rate Clarification				**$**	**1,265,879**
RO Filter Complex Plus DMF as Shown in Others		Size =	120	36	50	
2	**Sitework**					
	Excavation	6,000	CY	**$0**	$	-
	Backfill	3,000	CY	**$0**	$	-
2	**Yard Piping**					
	Filter Effluent - 30"	300	LF	$120	$	36,000
	Backwash Supply - 20"	250	LF	$80	$	20,000
3	**Cast-in-Place Concrete**					
	Slabs on Grade	165	CY	$350	$	57,750
	Walls	135	CY	$450	$	60,750
	Suspended Slabs & Beams	30	CY	$600	$	18,000
	Columns	15	CY	$600	$	9,000
	Precast Roofing	4,320	SF	$8	$	34,560
4	**Masonry**					
	Composite Wall (8" block, 4"brick)	2,700	SF	$15	$	40,500
7	**Thermal & Moisture Protection**					
	Membrane Roofing (including ballast)	4,320	SF	$1.50	$	6,480
	Rigid Insulation (Roof)	4,320	SF	$1.25	$	5,400
	Rigid Insulation (Wall)	2,700	SF	$0.50	$	1,350
	Roof Flashing	38	SF	$12.00	$	450
8	**Doors & Windows**					
	Doors					
	Exterior (Pedestrian)	2	EA	$2,000	$	4,000

	Windows		SF	$10	$	-
9	**Interior Finishes**	600	SF	$4	$	2,400
11	**Equipment**					
	Membrane Module	1	LS	**$1,750,000**	$	1,750,000
	Pressure Booster Pump Station	1	LS	**$350,000**	$	350,000
	Backwash Equipment	1	LS	**$300,000**	$	300,000
	Instrumentation & Controls	1	LS	**$300,000**	$	300,000
	Backwash Water Pumps					
	2,500 gpm @ 30'TDH	4	EA	**$75,000**	$	300,000
	Compressed Air Package	1	LS	**$100,000**	$	100,000
15	**Mechanical**					
	Piping					
	30" Drain	100	LF	$72	$	7,200
	20" Filter Influent	40	LF	$48	$	1,920
	20" Back Wash Supply	100	LF	$160	$	16,000
	20" Back Wash Supply (Suction & Discharge)	40	LF	$160	$	6,400
	12" Filter Drain	80	LF	$96	$	7,680
	Valves w/Actuator					
	20" BFV	12	EA	$12,000	$	144,000
	12" BFV	4	EA	$6,000	$	24,000
	Piping					
	8" Suction & Discharge	100	LF	$48	$	4,800
	Valves w/Actuator					
	8" BFV	4	EA	$2,000	$	8,000
				Subtotal Filter Complex	**$**	**3,603,840**
Clearwell & Effluent Pumping Facilities						

				Subtotal Clearwell	$ 531,965
Plant Waste-Handling incd. Backwash holding + Sludge Holding/Recycling Basin					
	Subtotal WW Recovery Basin Complex				$ 474,505

Chlorine Feed System Building		Size =	20	20	25

				Subtotal Chlorine Building	$	163,750
Sludge Drying Beds						
				Subtotal Decant Pump Station	$	178,870

Other					
2	**Sitework** Manhole	10	EA	$2,000	$ 20,000
11	**DMF System** Dual-Media Equipment + Building	1	LS	**$1,914,019**	**$ 1,914,019**
2	**DMF and NF Effluent Mixing Flow Vault** Valve, Pipe, and Concrete Structure	1	LS	$45,000	$ 45,000
	Subtotal Sendimentation Ponds				**$ 1,979,019**

SUBTOTAL	**$ 11,963,578**
Construction Contingency (30%)	**$ 3,589,073**
Engineering, Survey & Const Mngmnt (20%)	**$ 3,110,530**
PROJECT TOTAL	**$ 18,663,181**

Cost ($/MG) ***$6.22***

Hildago County Draing District No. 1 - Water treatment Plant				7/13/2010
Plant Capcity of	5		MGD	
Project Cost Estimate			Factor =	0.50
Option D High Rate Actiflo + DMF+RO + Drying Beds Configuration Option				

DIV	ITEM DESCRIPTION	Unit Quant	Unit	Unit Cost	Total Cost
GENERAL ITEMS including Shop+Admin.+Lab		Size = 40' x 100' x 15'			
1	General Requirements				
	Bonds & Insurance		LS	250000	250000
	Mobilization		LS	150000	150000
2	Sitework				
	Clearing & Grubbing / General Grading	1	LS	20000	20000
	Curb & Gutter	2600	LF	18	46800
	Asphalt Surfacing	3000	SY	20	60000
	Chain Link Fencing (6 ft)	2500	LF	10	25000
	Landscaping	1	LS	100000	100000
2	Yard Piping				
	Plant Influent - 36"	200	LF	125	25000
	Plant Sewer & Manholes (8" PVC)	2000	LF	40	80000
	Water Distribution & Valves (6" PVC)	1500	LF	30	45000
	Plant Effluent - 30 "	200	LF	120	24000
3	Concrete				
	Miscellaneous	100	CY	500	50000
5	Metals				
	Aluminum Railing	500	LF	25	12500
	Misc Metal Fabrications	1	LS	100000	100000
7	Thermal & Moisture Protection				
	Damproofing	4000	SF	3	12000
	Downspouts & Scuppers	250	LF	30	7500
8	Doors & Windows				
	Doors-Operations Area				
	Exterior (Pedestrian)	4	EA	2000	8000
	Interior (Pedestrian)	8	EA	1500	12000
	Roll Up Door (8 x 10)	1	EA	5500	5500
	Windows- Operations Area	200	SF	15	3000
9	Finishes	0	0	0	0
	Misc. Painting (Piping)	1	LS	50000	50000
	General Office & Misc.	2500	SF	20	50000
	Restrooms	100	SF	25	2500
11	Equipment	0	0	0	0
	House Water System	1	LS	20000	20000
12	Furnishings				
	Laboratory	1	LS	30000	30000
	Miscellaneous	1	LS	50000	50000
13	Special Construction				
	Security System	1	LS	50000	50000
15	Mechanical				
	HVAC	4000	SF	30	120000
	Fire Protection	4000	SF	4	16000
	Plumbing	4000	SF	4	16000
16	Electrical				
	Standby Generator	1	LS	100000	100000
	Electrical Work (20% of Div 11)	1	LS	581800	581800
	Instrumentation & Control (35% of Div 11)	1	LS	1018150	1018150
	Subtotal for General Items for WTP			$	3,140,750

Operations & Maintenance Facilities		Size = 40' x 100' x 15'			
2	Sitework				
	Excavation	400	CY	4	3200
	Backfill	200	CY	10	3000
3	Cast-in-Place Concrete				
	Slabs on Grade	100	CY	350	35000
	Walls	100	CY	450	45000
	Suspended Slabs & Beams	60	CY	600	36000
	Columns	25	CY	600	15000
	Precast Roofing	4000	SF	8	32000
	Garage / Shop				
	Slabs on Grade	75	CY	350	26250
	Walls	300	CY	450	135000
4	Masonry				
	Composite Wall (8" block, 4"brick)	4200	SF	15	63000
6	Wood And Plastics				
	Fiberglass Chemical Storage Tanks Alum (8000 gal)	1	EA	8000	8000
	Fiberglass Chemical Storage Tanks Permanganate (2500 gal)	2	EA	2500	5000
	Fiberglass Chemical Storage Tanks Caustic Soda (8000 gal) (Alkalinity adjustment)	1	EA	8000	8000
	Polymer Day Tanks (250 gal)	6	EA	500	3000
	Fiberglass Chemical Storage Tanks NaOCL (whole systeml)	1	EA	50000	50000
7	Thermal & Moisture Protection				
	Membrane Roofing (including ballast)	4000	SF	1.5	6000
	Rigid Insulation (Roof)	4000	SF	1.25	5000
	Roof Flashing	400	LF	12	4800
8	Doors & Windows				
	Doors-Operations Area				
	Exterior (Pedestrian)	2	EA	2000	4000
	Interior (Pedestrian)	4	EA	1500	6000
	Roll Up Door (8 x 10)	1	EA	5500	5500
	Windows- Operations Area	200	SF	15	3000
9	Finishes				
	Interior				
	Operations Complex				
	Chemical Area	150	SF	50	7500
	Restrooms / Lockers	250	SF	25	6250
	Carpeting	150	SY	30	4500
	Misc Trim & Finishes	1	LS	10000	10000
	Acoustical Suspended Ceiling (Operations Area)	400	SF	7	2800
	Vinyl Composition Flooring	1000	SF	3.7	3700
10	Specialties				
	Operations Bldg.				
	Lockers	1	LS	2500	2500
	Toilet Accessories	1	LS	2500	2500
11	Equipment				
	Chemical Transfer Pumps (25 gpm @ 50' TDH)	2	EA	20000	40000
	Alum Chemical Feed Metering Pumps (15-20 gph)	3	EA	4500	13500
	Polymer Feed System	1	EA		
	Garage / Shop		0	10000	10000
	Misc.	1	LS	20000	20000
				Subtotal for Operations & Maintenance Facilities $	625,000

High Rate Clarification		Size =	60	70	25

		Subtotal for High Rate Clarification			**$**	**1,537,095**
RO Filter Complex Plus DMF as Shown in Others		Size =	120	60		50
2	**Sitework**					
	Excavation	10,000	CY	**$0**	$	-
	Backfill	5,000	CY	**$0**	$	-
2	**Yard Piping**					
	Filter Effluent - 30"	300	LF	$120	$	36,000
	Backwash Supply - 20"	250	LF	$80	$	20,000
3	**Cast-in-Place Concrete**					
	Slabs on Grade	275	CY	$350	$	96,250
	Walls	225	CY	$450	$	101,250
	Suspended Slabs & Beams	50	CY	$600	$	30,000
	Columns	25	CY	$600	$	15,000
	Precast Roofing	7,200	SF	$8	$	57,600
4	**Masonry**					
	Composite Wall (8" block, 4"brick)	4,500	SF	$15	$	67,500
7	**Thermal & Moisture Protection**					
	Membrane Roofing (including ballast)	7,200	SF	$1.50	$	10,800
	Rigid Insulation (Roof)	7,200	SF	$1.25	$	9,000
	Rigid Insulation (Wall)	4,500	SF	$0.50	$	2,250
	Roof Flashing	63	SF	$12.00	$	750
8	**Doors & Windows**					
	Doors					

	Exterior (Pedestrian)	2	EA	$2,000	$ 4,000
	Windows		SF	$10	$ -
9	**Interior Finishes**	1,000	SF	$4	$ 4,000
11	**Equipment**				
	Membrane Module	1	LS	**$2,250,000**	$ 2,250,000
	Pressure Booster Pump Station	1	LS	**$350,000**	$ 350,000
	Backwash Equipment	1	LS	**$300,000**	$ 300,000
	Instrumentation & Controls	1	LS	**$300,000**	$ 300,000
	Backwash Water Pumps				
	2,500 gpm @ 30'TDH	4	EA	**$75,000**	$ 300,000
	Compressed Air Package	1	LS	**$100,000**	$ 100,000
15	**Mechanical**				
	Piping				
	30" Drain	100	LF	$120	$ 12,000
	20" Filter Influent	40	LF	$80	$ 3,200
	20" Back Wash Supply	100	LF	$160	$ 16,000
	20" Back Wash Supply (Suction & Discharge)	40	LF	$160	$ 6,400
	12" Filter Drain	80	LF	$96	$ 7,680
	Valves w/Actuator				
	20" BFV	12	EA	$12,000	$ 144,000
	12" BFV	4	EA	$6,000	$ 24,000
	Piping				
	8" Suction & Discharge	100	LF	$80	$ 8,000
	Valves w/Actuator				
	8" BFV	4	EA	$2,000	$ 8,000
		Subtotal Filter Complex			**$ 4,267,680**
Clearwell & Effluent Pumping Facilities					

				Subtotal Clearwell	$	693,941
Plant Waste-Handling incd. Backwash holding + Sludge Holding/Recycling Basin						
	Subtotal WW Recovery Basin Complex				$	512,975

Chlorine Feed System Building	Size =	20	20	25

			Subtotal Chlorine Building		**$**	**163,750**
Sludge Drying Beds						

		Subtotal Decant Pump Station			$	**241,970**

Other						
2	**Sitework** Manhole	10	EA	$2,000	$	20,000
11	**DMF System** Dual-Media Equipment + Building	1	LS	**$2,272,165**	**$**	**2,272,165**
2	**DMF and NF Effluent Mixing Flow Vault** Valve, Pipe, and Concrete Structure	1	LS	$75,000	$	75,000
		Subtotal Sendimentation Ponds			**$**	**2,367,165**

SUBTOTAL	**$**	**13,550,326**
Construction Contingency (30%)	**$**	**4,065,098**
Engineering, Survey & Const Mngmnt (20%)	**$**	**3,523,085**
PROJECT TOTAL	**$**	**21,138,509**

Cost ($/MG) ***$4.23***

Hildago County Draing District No. 1 - Water treatment Plant					7/13/2010
Plant Capcity of		10		MGD	
Project Cost Estimate					
Option D High Rate Actiflo + DMF+RO + Drying Beds Configuration Option					
DIV	ITEM DESCRIPTION	Unit Quant	Unit	Unit Cost	Total Cost
GENERAL ITEMS including Shop+Admin.+Lab		Size = 40' x 100' x 15'			
1	General Requirements				
	Bonds & Insurance		LS	250000	250000
	Mobilization		LS	150000	150000
2	Sitework				
	Clearing & Grubbing / General Grading	1	LS	20000	20000
	Curb & Gutter	2600	LF	18	46800
	Asphalt Surfacing	3000	SY	20	60000
	Chain Link Fencing (6 ft)	2500	LF	10	25000
	Landscaping	1	LS	100000	100000
2	Yard Piping				
	Plant Influent - 36"	200	LF	125	25000
	Plant Sewer & Manholes (8" PVC)	2000	LF	40	80000
	Water Distribution & Valves (6" PVC)	1500	LF	30	45000
	Plant Effluent - 30 "	200	LF	120	24000
3	Concrete				
	Miscellaneous	100	CY	500	50000
5	Metals				
	Aluminum Railing	500	LF	25	12500
	Misc Metal Fabrications	1	LS	100000	100000
7	Thermal & Moisture Protection				
	Dampproofing	4000	SF	3	12000
	Downspouts & Scuppers	250	LF	30	7500
8	Doors & Windows				
	Doors-Operations Area				
	Exterior (Pedestrian)	4	EA	2000	8000
	Interior (Pedestrian)	8	EA	1500	12000
	Roll Up Door (8 x 10)	1	EA	5500	5500
	Windows- Operations Area	200	SF	15	3000
9	Finishes	0	0	0	0
	Misc. Painting (Piping)	1	LS	50000	50000
	General Office & Misc.	2500	SF	20	50000
	Restrooms	100	SF	25	2500
11	Equipment	0	0	0	0
	House Water System	1	LS	20000	20000
12	Furnishings				
	Laboratory	1	LS	30000	30000
	Miscellaneous	1	LS	50000	50000
13	Special Construction				
	Security System	1	LS	50000	50000
15	Mechanical				
	HVAC	4000	SF	30	120000
	Fire Protection	4000	SF	4	16000
	Plumbing	4000	SF	4	16000
16	Electrical				
	Standby Generator	1	LS	100000	100000
	Electrical Work (20% of Div 11)	1	LS	581800	581800
	Instrumentation & Control (35% of Div 11)	1	LS	1018150	1018150
	Subtotal for General Items for WTP				$ 3,140,750
Operations & Maintenance Facilities		Size = 40' x 100' x 15'			

2	**Sitework**				
	Excavation	400	CY	4	3200
	Backfill	200	CY	10	3000
3	**Cast-in-Place Concrete**				
	Slabs on Grade	100	CY	350	35000
	Walls	100	CY	450	45000
	Suspended Slabs & Beams	60	CY	600	36000
	Columns	25	CY	600	15000
	Precast Roofing	4000	SF	8	32000
	Garage / Shop				
	Slabs on Grade	75	CY	350	26250
	Walls	300	CY	450	135000
4	**Masonry**				
	Composite Wall (8" block, 4"brick)	4200	SF	15	63000
6	**Wood And Plastics**				
	Fiberglass Chemical Storage Tanks Alum (8000 gal)	1	EA	8000	8000
	Fiberglass Chemical Storage Tanks Permanganate (2500 gal)	2	EA	2500	5000
	Fiberglass Chemical Storage Tanks Caustic Soda (8000 gal) (Alkalinity adjustment)	1	EA	8000	8000
	Polymer Day Tanks (250 gal)	6	EA	500	3000
	Fiberglass Chemical Storage Tanks NaOCL (whole systeml)	1	EA	50000	50000
7	**Thermal & Moisture Protection**				
	Membrane Roofing (including ballast)	4000	SF	1.5	6000
	Rigid Insulation (Roof)	4000	SF	1.25	5000
	Roof Flashing	400	LF	12	4800
8	**Doors & Windows**				
	Doors-Operations Area				
	Exterior (Pedestrian)	2	EA	2000	4000
	Interior (Pedestrian)	4	EA	1500	6000
	Roll Up Door (8 x 10)	1	EA	5500	5500
	Windows- Operations Area	200	SF	15	3000
9	**Finishes**				
	Interior				
	Operations Complex				
	Chemical Area	150	SF	50	7500
	Restrooms / Lockers	250	SF	25	6250
	Carpeting	150	SY	30	4500
	Misc Trim & Finishes	1	LS	10000	10000
	Acoustical Suspended Ceiling (Operations Area)	400	SF	7	2800
	Vinyl Composition Flooring	1000	SF	3.7	3700
10	**Specialties**				
	Operations Bldg.				
	Lockers	1	LS	2500	2500
	Toilet Accessories	1	LS	2500	2500
11	**Equipment**				
	Chemical Transfer Pumps (25 gpm @ 50' TDH)	2	EA	20000	40000
	Alum Chemical Feed Metering Pumps (15-20 gph)	3	EA	4500	13500
	Polymer Feed System	1	EA		
	Garage / Shop		0	10000	10000
	Misc.	1	LS	20000	20000
	Subtotal for Operations & Maintenance Facilities			$	**625,000**
	High Rate Clarification	Size =	60	70	25

				Subtotal for High Rate Clarification	$ 3,001,320
RO Filter Complex Plus DMF as Shown in Others		Size =	120	120	50
2	**Sitework**				
	Excavation	20,000	CY	**$0**	$ -
	Backfill	10,000	CY	**$0**	$ -
2	**Yard Piping**				
	Filter Effluent - 30"	300	LF	$120	$ 36,000
	Backwash Supply - 20"	250	LF	$80	$ 20,000
3	**Cast-in-Place Concrete**				
	Slabs on Grade	550	CY	$350	$ 192,500
	Walls	450	CY	$450	$ 202,500
	Suspended Slabs & Beams	100	CY	$600	$ 60,000
	Columns	50	CY	$600	$ 30,000
	Precast Roofing	14,400	SF	$8	$ 115,200
4	**Masonry**				
	Composite Wall (8" block, 4"brick)	9,000	SF	$15	$ 135,000
7	**Thermal & Moisture Protection**				
	Membrane Roofing (including ballast)	14,400	SF	$1.50	$ 21,600
	Rigid Insulation (Roof)	14,400	SF	$1.25	$ 18,000
	Rigid Insulation (Wall)	9,000	SF	$0.50	$ 4,500
	Roof Flashing	125	SF	$12.00	$ 1,500
8	**Doors & Windows**				
	Doors				
	Exterior (Pedestrian)	2	EA	$2,000	$ 4,000

	Windows		SF	$10	$	-
9	**Interior Finishes**	2,000	SF	$4	$	8,000
11	**Equipment**					
	Membrane Module	1	LS	**$5,500,000**	$	5,500,000
	Pressure Booster Pump Station	1	LS	$150,000	$	150,000
	Backwash Equipment	1	LS	$250,000	$	250,000
	Instrumentation & Controls	1	LS	$350,000	$	350,000
	Backwash Water Pumps					
	2,500 gpm @ 30'TDH	4	EA	$50,000	$	200,000
	Compressed Air Package	1	LS	$100,000	$	100,000
15	**Mechanical**					
	Piping					
	30" Drain	100	LF	$240	$	24,000
	20" Filter Influent	40	LF	$160	$	6,400
	20" Back Wash Supply	100	LF	$160	$	16,000
	20" Back Wash Supply (Suction & Discharge)	40	LF	$160	$	6,400
	12" Filter Drain	80	LF	$96	$	7,680
	Valves w/Actuator					
	20" BFV	12	EA	$12,000	$	144,000
	12" BFV	4	EA	$6,000	$	24,000
	Piping					
	8" Suction & Discharge	100	LF	$160	$	16,000
	Valves w/Actuator					
	8" BFV	4	EA	$2,000	$	8,000
			Subtotal Filter Complex		**$**	**7,627,280**
Clearwell & Effluent Pumping Facilities						
2	**Sitework**	Size =	60	104		10
	Excavation	5,000	CY	**$0**	$	-
	Backfill	2,500	CY	**$0**	$	-
2	**Yard Piping**					
	Reservoir Overflow/Drain - 18"	250	LF	$72	$	18,000
3	**Cast-in-Place Concrete**					
	Slabs on Grade	350	CY	$350	$	122,500
	Walls	800	CY	$450	$	360,000
	Suspended Slabs & Beams	250	CY	$600	$	150,000
	Columns	50	CY	$600	$	30,000
	Precast Roofing	1,100	SF	$8	$	8,800
4	**Masonry**					
	Composite Wall (8" block, 4" brick)	2,000	SF	$15	$	30,000
	Interior (8" Concrete Block)	5,000	SF	$5	$	25,000
7	**Thermal & Moisture Protection**					
	Membrane Roofing (including ballast)	1,000	SF	$1.50	$	1,500
	Reservoir Membrane	5,000	SF	$2.00	$	10,000
	Rigid Insulation (Roof)	1,000	SF	$1.25	$	1,250
	Rigid Insulation (Wall)	5,104	SF	$0.50	$	2,552
	Roof Flashing	140	SF	$12.00	$	1,680
8	**Doors & Windows**					
	Doors					
	Exterior (Pedestrian)	1	EA	$2,000	$	2,000
	Roll Up Door (8 x 10)	1	EA	$5,500	$	5,500
	Windows	50	SF	$10	$	500
9	**Interior Finishes**	1,000	SF	$4	$	4,000
11	**Equipment**					
	Effluent Pumping Station					
	Effluent Pumps					

	3500 gpm @ 200'TDH	4	EA	$80,000	$ 320,000
15	**Mechanical**				
	Effluent Pumping Station				
	Piping				
	30" Effluent	50	LF	$240	$ 12,000
	24" Suction & Discharge	50	LF	$192	$ 9,600
	Valves w/Actuator				
	24" BFV	6	EA	$15,000	$ 90,000
	18" BFV (Drain)	1	EA	$9,000	$ 9,000
				Subtotal Clearwell	**$ 1,213,882**
Plant Waste-Handling incd. Backwash holding + Sludge Holding/Recycling Basin					
2	**Sitework**				
	Excavation	**6,000**	CY	**$0**	$ -
	Backfill	2,500	CY	**$0**	$ -
2	**Yard Piping**				
	Wash Water Recovery - 30"	250	LF	$120	$ 30,000
	Wash Water Return - 12"	300	LF	$48	$ 14,400
	Sediment Transmission Line - 12"	650	LF	$48	$ 31,200
	Decant Return Line - 8"	1,000	LF	$32	$ 32,000
	Wash Water By-pass - 24"	200	LF	$96	$ 19,200
3	**Cast-in-Place Concrete**				
	Slabs on Grade	75	CY	$350	$ 26,250
	Walls	50	CY	$450	$ 22,500
	Suspended Slabs	25	CY	$600	$ 15,000
	Columns	0	CY	$600	$ -
	Precast Roofing	0	SF	$8	$ -
4	**Mebbrane Lining**				
	5-mil lining	**35,000**	SF	$2	$ 70,000
7	**Backwash Holding Tank - Concrete**				
	Slab on Grade	140	CY	$350.00	$ 49,000
	Walls	100	CY	$450.00	$ 45,000
	Suspended Slab	50	CY	$600.00	$ 30,000
	Column	0	CY	$600.00	$ -
8	**Doors & Windows**				
	Exterior (Pedestrian)	0	EA	$2,000	$ -
	Roll Up Door (8 x 10)	0	EA	$5,500	$ -
	Windows	0	SF	$10	$ -
9	**Interior Finishes**	0	SF	$4	$ -
11	**Equipment**				
	Filter Backwah Transfer Pumps 2000 gpm at 50'	2	EA	$30,000	$ 60,000
	Sludge Recycle Return Pumps				
	7000 gpm @ 100' TDH	2	LS	$45,000	$ 90,000
15	**Mechanical**				
	Piping				
	8" Suction & Discharge	60	LF	$64	$ 3,840
	12" Combined Return (2 Pumps)	60	LF	$96	$ 5,760
	Valves w/Actuator				
	8" BFV	4	EA	$2,000	$ 8,000
	8" Check	2	EA	$1,000	$ 2,000
	12" BFV	1	EA	$6,000	$ 6,000
	Subtotal WW Recovery Basin Complex				**$ 560,150**

Chlorine Feed System Building		Size =	20	20	25

		Subtotal Chlorine Building			$	213,750
Sludge Drying Beds						
2	**Sitework**					
	Excavation	500	CY	**$0**	$	-
	Backfill	100	CY	**$0**	$	-
3	**Cast-in-Place Concrete**					
	Slabs on Grade	700	CY	$350	$	245,000
	Walls	150	CY	$450	$	67,500
	Suspended Slabs & Beams	0	CY	$600	$	-
	Columns	0	CY	$600	$	-
	Precast Roofing	0	SF	$8	$	-
4	**Masonry**					
	Composite Wall (8" block, 4" brick)	0	SF	$15	$	-
7	**Thermal & Moisture Protection**					
	Membrane Roofing (including ballast)	0	SF	$1.50	$	-
	Rigid Insulation (Roof)	0	SF	$1.25	$	-
	Rigid Insulation (Wall)	0	SF	$0.50	$	-
	Roof Flashing	0	SF	$12.00	$	-
8	**Doors & Windows**					
	Doors					
	Exterior (Pedestrian)	0	EA	$2,000	$	-
	Windows	0	SF	$10	$	-
9	**Interior Finishes**	0	SF	$4	$	-
11	**Equipment**					
	Pumps					
	3500 gpm @ 100' TDH	3	EA	$35,000	$	105,000
15	**Mechanical**					
	Piping					
	6" Suction & Discharge	60	LF	$48	$	2,880
	8" Combined Return (2 Pumps)	60	LF	$64	$	3,840
	Valves w/Actuator					
	6" BFV	4	EA	$1,000	$	4,000
	6" Check	2	EA	$750	$	1,500
	8" BFV	1	EA	$2,000	$	2,000
		Subtotal Decant Pump Station			**$**	**431,720**

Other					
2	**Sitework** Manhole	10	EA	$2,000	$ 20,000
11	**DMF System** Dual-Media Equipment + Building	1	LS	**$2,817,430**	**$ 2,817,430**
2	**DMF and NF Effluent Mixing Flow Vault** Valve, Pipe, and Concrete Structure	1	LS	$150,000	$ 150,000
		Subtotal Sendimentation Ponds			**$ 2,987,430**

SUBTOTAL	**$ 19,801,282**
Construction Contingency (30%)	**$ 5,940,385**
Engineering, Survey & Const Mngmnt (20%)	**$ 5,148,333**
PROJECT TOTAL	**$ 30,890,000**

Cost ($/MG) ***$3.09***

Hildago County Draing District No. 1 - Water treatment Plant					7/14/2010
Plant Capcity of		15		MGD	
Project Cost Estimate				Factor =	1.50
Option D High Rate Actiflo + DMF+RO + Drying Beds Configuration Option					
DIV	ITEM DESCRIPTION	Unit Quant	Unit	Unit Cost	Total Cost
GENERAL ITEMS including Shop+Admin.+Lab		Size = 40' x 100' x 15'			
1	General Requirements				
	Bonds & Insurance		LS	250000	250000
	Mobilization		LS	150000	150000
2	Sitework				
	Clearing & Grubbing / General Grading	1	LS	20000	20000
	Curb & Gutter	2600	LF	18	46800
	Asphalt Surfacing	3000	SY	20	60000
	Chain Link Fencing (6 ft)	2500	LF	10	25000
	Landscaping	1	LS	100000	100000
2	Yard Piping				
	Plant Influent - 36"	200	LF	125	25000
	Plant Sewer & Manholes (8" PVC)	2000	LF	40	80000
	Water Distribution & Valves (6" PVC)	1500	LF	30	45000
	Plant Effluent - 30 "	200	LF	120	24000
3	Concrete				
	Miscellaneous	100	CY	500	50000
5	Metals				
	Aluminum Railing	500	LF	25	12500
	Misc Metal Fabrications	1	LS	100000	100000
7	Thermal & Moisture Protection				
	Dampproofing	4000	SF	3	12000
	Downspouts & Scuppers	250	LF	30	7500
8	Doors & Windows				
	Doors-Operations Area				
	Exterior (Pedestrian)	4	EA	2000	8000
	Interior (Pedestrian)	8	EA	1500	12000
	Roll Up Door (8 x 10)	1	EA	5500	5500
	Windows- Operations Area	200	SF	15	3000
9	Finishes	0	0	0	0
	Misc. Painting (Piping)	1	LS	50000	50000
	General Office & Misc.	2500	SF	20	50000
	Restrooms	100	SF	25	2500
11	Equipment	0	0	0	0
	House Water System	1	LS	20000	20000
12	Furnishings				
	Laboratory	1	LS	30000	30000
	Miscellaneous	1	LS	50000	50000
13	Special Construction				
	Security System	1	LS	50000	50000
15	Mechanical				
	HVAC	4000	SF	30	120000
	Fire Protection	4000	SF	4	16000
	Plumbing	4000	SF	4	16000
16	Electrical				
	Standby Generator	1	LS	100000	100000
	Electrical Work (20% of Div 11)	1	LS	581800	581800
	Instrumentation & Control (35% of Div 11)	1	LS	1018150	1018150
				Subtotal for General Items for WTP $	3,140,750

Operations & Maintenance Facilities		Size = 40' x 100' x 15'			
2	Sitework				
	Excavation	400	CY	4	3200
	Backfill	200	CY	10	3000
3	Cast-in-Place Concrete				
	Slabs on Grade	100	CY	350	35000
	Walls	100	CY	450	45000
	Suspended Slabs & Beams	60	CY	600	36000
	Columns	25	CY	600	15000
	Precast Roofing	4000	SF	8	32000
	Garage / Shop				
	Slabs on Grade	75	CY	350	26250
	Walls	300	CY	450	135000
4	Masonry				
	Composite Wall (8" block, 4"brick)	4200	SF	15	63000
6	Wood And Plastics				
	Fiberglass Chemical Storage Tanks Alum (8000 gal)	1	EA	8000	8000
	Fiberglass Chemical Storage Tanks Permanganate (2500 gal)	2	EA	2500	5000
	Fiberglass Chemical Storage Tanks Caustic Soda (8000 gal) (Alkalinity adjustme	1	EA	8000	8000
	Polymer Day Tanks (250 gal)	6	EA	500	3000
	Fiberglass Chemical Storage Tanks NaOCL (whole systeml)	1	EA	50000	50000
7	Thermal & Moisture Protection				
	Membrane Roofing (including ballast)	4000	SF	1.5	6000
	Rigid Insulation (Roof)	4000	SF	1.25	5000
	Roof Flashing	400	LF	12	4800
8	Doors & Windows				
	Doors-Operations Area				
	Exterior (Pedestrian)	2	EA	2000	4000
	Interior (Pedestrian)	4	EA	1500	6000
	Roll Up Door (8 x 10)	1	EA	5500	5500
	Windows- Operations Area	200	SF	15	3000
9	Finishes				
	Interior				
	Operations Complex				
	Chemical Area	150	SF	50	7500
	Restrooms / Lockers	250	SF	25	6250
	Carpeting	150	SY	30	4500
	Misc Trim & Finishes	1	LS	10000	10000
	Acoustical Suspended Ceiling (Operations Area)	400	SF	7	2800
	Vinyl Composition Flooring	1000	SF	3.7	3700
10	Specialties				
	Operations Bldg.				
	Lockers	1	LS	2500	2500
	Toilet Accessories	1	LS	2500	2500
11	Equipment				
	Chemical Transfer Pumps (25 gpm @ 50' TDH)	2	EA	20000	40000
	Alum Chemical Feed Metering Pumps (15-20 gph)	3	EA	4500	13500
	Polymer Feed System	1	EA		
	Garage / Shop		0	10000	10000
	Misc.	1	LS	20000	20000
	Subtotal for Operations & Maintenance Facilities			$	625,000

High Rate Clarification		Size =	60	70	25

				Subtotal for High Rate Clarification	**$ 4,405,055**
RO Filter Complex Plus DMF as Shown in Others		Size =	120	180	50
2	**Sitework**				
	Excavation	30,000	CY	**$0**	$ -
	Backfill	15,000	CY	**$0**	$ -
2	**Yard Piping**				
	Filter Effluent - 30"	300	LF	$120	$ 36,000
	Backwash Supply - 20"	250	LF	$80	$ 20,000
3	**Cast-in-Place Concrete**				
	Slabs on Grade	825	CY	$350	$ 288,750
	Walls	675	CY	$450	$ 303,750
	Suspended Slabs & Beams	150	CY	$600	$ 90,000
	Columns	75	CY	$600	$ 45,000
	Precast Roofing	21,600	SF	$8	$ 172,800
4	**Masonry**				
	Composite Wall (8" block, 4"brick)	13,500	SF	$15	$ 202,500
7	**Thermal & Moisture Protection**				
	Membrane Roofing (including ballast)	21,600	SF	$1.50	$ 32,400
	Rigid Insulation (Roof)	21,600	SF	$1.25	$ 27,000
	Rigid Insulation (Wall)	13,500	SF	$0.50	$ 6,750
	Roof Flashing	188	SF	$12.00	$ 2,250
8	**Doors & Windows**				
	Doors				

	Exterior (Pedestrian)	2	EA	$2,000	$ 4,000
	Windows		SF	$10	$ -
9	**Interior Finishes**	3,000	SF	$4	$ 12,000
11	**Equipment**				
	Membrane Module	1	LS	**$7,250,000**	$ 7,250,000
	Pressure Booster Pump Station	1	LS	**$250,000**	$ 250,000
	Backwash Equipment	1	LS	**$150,000**	$ 150,000
	Instrumentation & Controls	1	LS	**$250,000**	$ 250,000
	Backwash Water Pumps				
	2,500 gpm @ 30'TDH	4	EA	**$50,000**	$ 200,000
	Compressed Air Package	1	LS	**$100,000**	$ 100,000
15	**Mechanical**				
	Piping				
	30" Drain	100	LF	$360	$ 36,000
	20" Filter Influent	40	LF	$240	$ 9,600
	20" Back Wash Supply	100	LF	$160	$ 16,000
	20" Back Wash Supply (Suction & Discharge)	40	LF	$160	$ 6,400
	12" Filter Drain	80	LF	$96	$ 7,680
	Valves w/Actuator				
	20" BFV	12	EA	$12,000	$ 144,000
	12" BFV	4	EA	$6,000	$ 24,000
	Piping				
	8" Suction & Discharge	100	LF	$240	$ 24,000
	Valves w/Actuator				
	8" BFV	4	EA	$2,000	$ 8,000
		Subtotal Filter Complex			**$ 9,686,880**
Clearwell & Effluent Pumping Facilities					

			Subtotal Clearwell	$	1,823,823
Plant Waste-Handling incd. Backwash holding + Sludge Holding/Recycling Basin					
	Subtotal WW Recovery Basin Complex			$	705,325

Chlorine Feed System Building	Size =	20	20	25

		Subtotal Chlorine Building			**$**	**263,750**
Sludge Drying Beds						

				Subtotal Decant Pump Station	**$**	**592,470**

Other						
2	**Sitework** Manhole	10	EA	$2,000	$	20,000
11	**DMF System** Dual-Media Equipment + Building	1	LS	**$3,565,295**	**$**	**3,565,295**
2	**DMF and NF Effluent Mixing Flow Vault** Valve, Pipe, and Concrete Structure	1	LS	$225,000	$	225,000
				Subtotal Sendimentation Ponds	**$**	**3,810,295**

SUBTOTAL	**$**	**25,053,348**
Construction Contingency (30%)	**$**	**7,516,004**
Engineering, Survey & Const Mngmnt (20%)	**$**	**6,513,870**
PROJECT TOTAL	**$**	**39,083,223**

Cost ($/MG) ***$2.61***

Estimated Operation and Maintenance Costs
Estimated Operation and Maintenance Costs
Option D_ ACTIFLO + DMF + RO
Hildago County Drainage District No. 1
Regional Water Supply Facilities Planning

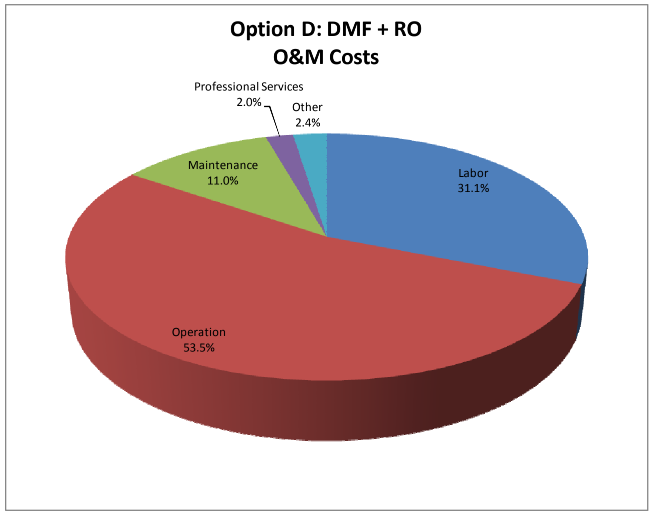
Assumptions:

Design Flow (Peak), mgd:	**3.0**
Average Day Flow, mgd:	3.0
Labor Burden (%)	40
Power Costs, $/kW-h	0.06

Water supply costs not included
Estimated effluent pumping costs included
(total pumping head estimated at 200')

Total			
$2,265,000	Labor	$ 704,000	31.1%
	Operation	$1,211,000	53.5%
	Maintenance	$ 250,000	11.0%
	Professional Services	$ 45,000	2.0%
	Other	$ 55,000	2.4%
		$2,265,000	1

Description	Unit	Quantity	Unit Cost ($)	Total Cost ($)
Labor				
Plant Manager	EA	1	75,000	$ 75,000
Operators	EA	6	50,000	$ 300,000
Mechanics	EA	4	45,000	$ 180,000
Electrical/Instrumentation	EA	1	65,000	$ 65,000
General Maintenance	EA	2	42,000	$ 84,000
			Subtotal	**$ 704,000**
Operation				
Chemicals	LS	1	735,000	$ 735,000
Sludge Disposal	LS	1	19,500	$ 19,500
Electric Costs				
On-site	LS	1	390,000	$ 390,000
Effluent Pumping	LS	1	45,000	$ 45,000
Other Utilities (Gas & Phone)	LS	1	15,000	$ 15,000
Office Supplies	LS	1	3,000	$ 3,000
Custodial Supplies	LS	1	1,500	$ 1,500
Lab Fees & Supplies	LS	1	2,000	$ 2,000
			Subtotal	**$ 1,211,000**
Maintenance				
Parts & Replacement	LS	1	250,000	$ 250,000
			Subtotal	**$ 250,000**
Professional Services				
Engineering, Legal & Acctng.	LS	1	45,000	$ 45,000
			Subtotal	**$ 45,000**
Other				
Travel, Training, Dues, etc.	LS	1	15,000	$ 15,000
Insurance	LS	1	40,000	$ 40,000
			Subtotal	**$ 55,000**
TOTAL				**$2,265,000**



Chemical Costs ($/1000G)	**$0.67**
Total O&M Costs ($/1000G)	**$2.07**

Estimated Operation and Maintenance Costs
Estimated Operation and Maintenance Costs
Option D_ ACTIFLO + DMF + RO
Hildago County Drainage District No. 1
Regional Water Supply Facilities Planning

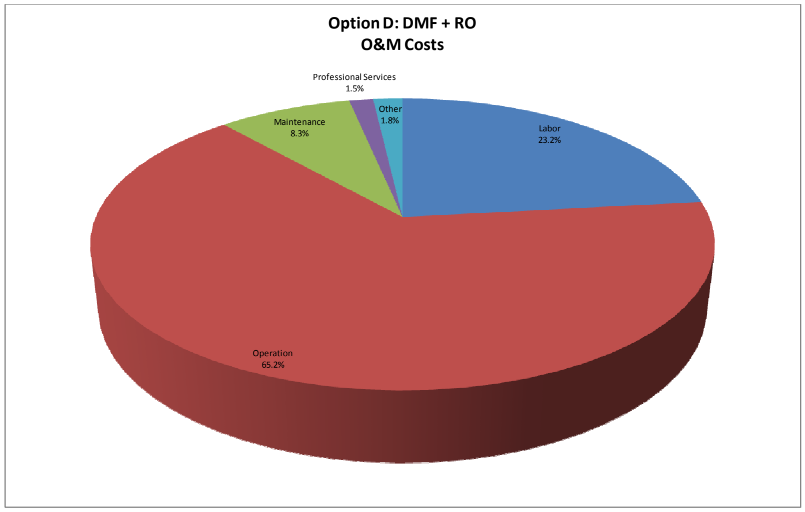
Total		Labor	$ 704,000	23.2%
$3,028,000		Operation	$ 1,974,000	65.2%
		Maintenanc	$ 250,000	8.3%
		Profession	$ 45,000	1.5%
		Other	$ 55,000	1.8%
			$ 3,028,000	100.0%

Assumptions:

Design Flow (Peak), mgd:	**5.0**
Average Day Flow, mgd:	5.0
Labor Burden (%)	40
Power Costs, $/kW-h	0.06
Water supply costs not included	
Estimated effluent pumping costs included	
(total pumping head estimated at 200')	

Description	Unit	Quantity	Unit Cost ($)	Total Cost ($)
Labor				
Plant Manager	EA	1	75,000	$ 75,000
Operators	EA	6	50,000	$ 300,000
Mechanics	EA	4	45,000	$ 180,000
Electrical/Instrumentation	EA	1	65,000	$ 65,000
General Maintenance	EA	2	42,000	$ 84,000
			Subtotal	**$ 704,000**
Operation				
Chemicals	LS	1	1,225,000	$ 1,225,000
Sludge Disposal	LS	1	32,500	$ 32,500
Electric Costs				
On-site	LS	1	650,000	$ 650,000
Effluent Pumping	LS	1	45,000	$ 45,000
Other Utilities (Gas & Phone)	LS	1	15,000	$ 15,000
Office Supplies	LS	1	3,000	$ 3,000
Custodial Supplies	LS	1	1,500	$ 1,500
Lab Fees & Supplies	LS	1	2,000	$ 2,000
			Subtotal	**$ 1,974,000**
Maintenance				
Parts & Replacement	LS	1	250,000	$ 250,000
			Subtotal	**$ 250,000**
Professional Services				
Engineering, Legal & Acctng.	LS	1	45,000	$ 45,000
			Subtotal	**$ 45,000**
Other				
Travel, Training, Dues, etc.	LS	1	15,000	$ 15,000
Insurance	LS	1	40,000	$ 40,000
			Subtotal	**$ 55,000**
TOTAL				**$3,028,000**

Chemical Costs ($/1000G) **$0.67**
Total O&M Costs ($/1000G) **$1.66**



Estimated Operation and Maintenance Costs
Estimated Operation and Maintenance Costs
Option D_ ACTIFLO + DMF + RO
Hildago County Drainage District No. 1
Regional Water Supply Facilities Planning

Assumptions:

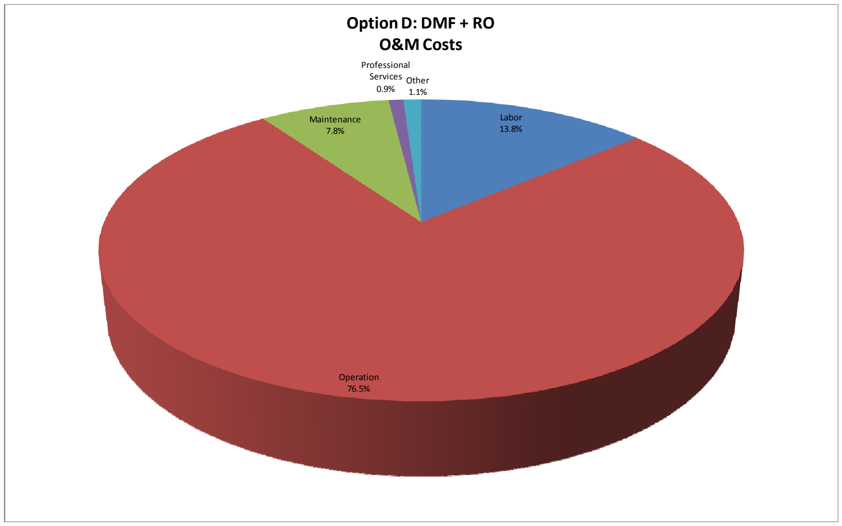
Design Flow (Peak), mgd:	**10.0**
Average Day Flow, mgd:	10.0
Labor Burden (%)	40
Power Costs, $/kW-h	0.06

Water supply costs not included
Estimated effluent pumping costs included
(total pumping head estimated at 200')

Description	Unit	Quantity	Unit Cost ($)	Total Cost ($)
Labor				
Plant Manager	EA	1	75,000	$ 75,000
Operators	EA	6	50,000	$ 300,000
Mechanics	EA	5	45,000	$ 225,000
Electrical/Instrumentation	EA	1	65,000	$ 65,000
General Maintenance	EA	1	42,000	$ 42,000
			Subtotal	**$ 707,000**
Operation				
Chemicals	LS	1	2,450,000	$ 2,450,000
Sludge Disposal	LS	1	65,000	$ 65,000
Electric Costs				
On-site	LS	1	1,300,000	$ 1,300,000
Effluent Pumping	LS	1	85,000	$ 85,000
Other Utilities (Gas & Phone)	LS	1	15,000	$ 15,000
Office Supplies	LS	1	3,000	$ 3,000
Custodial Supplies	LS	1	1,500	$ 1,500
Lab Fees & Supplies	LS	1	2,000	$ 2,000
			Subtotal	**$ 3,921,500**
Maintenance				
Parts & Replacement	LS	1	400,000	$ 400,000
			Subtotal	**$ 400,000**
Professional Services				
Engineering, Legal & Acctng.	LS	1	45,000	$ 45,000
			Subtotal	**$ 45,000**
Other				
Travel, Training, Dues, etc.	LS	1	15,000	$ 15,000
Insurance	LS	1	40,000	$ 40,000
			Subtotal	**$ 55,000**
TOTAL				**$5,128,500**

Chemical Costs ($/1000G)	**$0.67**
Total O&M Costs ($/1000G)	**$1.41**

Total			
$5,128,500	Labor	$ 707,000	13.8%
	Operation	$ 3,921,500	76.5%
	Maintenanc	$ 400,000	7.8%
	Profession	$ 45,000	0.9%
	Other	$ 55,000	1.1%
		$ 5,128,500	100.0%



Estimated Operation and Maintenance Costs
Estimated Operation and Maintenance Costs
Option D_ ACTIFLO + DMF + RO
Hildago County Drainage District No. 1
Regional Water Supply Facilities Planning

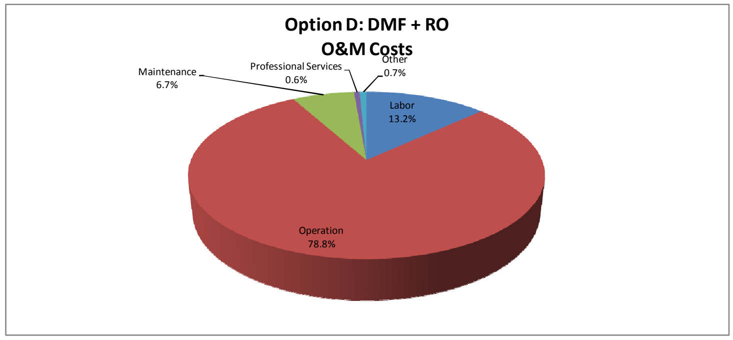
Total	Labor	$ 981,000	13.2%
$7,455,000	Operation	$ 5,874,000	78.8%
	Maintenanc	$ 500,000	6.7%
	Profession	$ 45,000	0.6%
	Other	$ 55,000	0.7%
		$ 7,455,000	100.0%

Assumptions:

Design Flow (Peak), mgd:	15.0
Average Day Flow, mgd:	15.0
Labor Burden (%)	40
Power Costs, $/kW-h	0.06

Water supply costs not included
Estimated effluent pumping costs included
(total pumping head estimated at 200')

Description	Unit	Quantity	Unit Cost ($)	Total Cost ($)
Labor				
Plant Manager	EA	1	75,000	$ 75,000
Operators	EA	8	50,000	$ 400,000
Mechanics	EA	7	45,000	$ 315,000
Electrical/Instrumentation	EA	1	65,000	$ 65,000
General Maintenance	EA	3	42,000	$ 126,000
			Subtotal	**$ 981,000**
Operation				
Chemicals	LS	1	3,675,000	$ 3,675,000
Sludge Disposal	LS	1	97,500	$ 97,500
Electric Costs				
On-site	LS	1	1,950,000	$ 1,950,000
Effluent Pumping	LS	1	130,000	$ 130,000
Other Utilities (Gas & Phone)	LS	1	15,000	$ 15,000
Office Supplies	LS	1	3,000	$ 3,000
Custodial Supplies	LS	1	1,500	$ 1,500
Lab Fees & Supplies	LS	1	2,000	$ 2,000
			Subtotal	**$ 5,874,000**
Maintenance				
Parts & Replacement	LS	1	500,000	$ 500,000
			Subtotal	**$ 500,000**
Professional Services				
Engineering, Legal & Acctng.	LS	1	45,000	$ 45,000
			Subtotal	**$ 45,000**
Other				
Travel, Training, Dues, etc.	LS	1	15,000	$ 15,000
Insurance	LS	1	40,000	$ 40,000
			Subtotal	**$ 55,000**
TOTAL				**$7,455,000**



Chemical Costs ($/1000G)	**$0.67**
Total O&M Costs ($/1000G)	**$1.36**

Appendix 12

2011 RWP WMS Prioritization

** Indicates that additional data may have to be collected by RWPG in order to score projects.

						Criteria 1 - Decade of Need for Project **				Criteria 2 - Project Feasibility ** **						Criteria 3 - Project Viability								Criteria 4 - Project Sustainability **				Criteria 5 - Project Cost Effectiveness		FINAL SCORE FOR PROJECT
			MAXIMUM SCORES --->			10	10	20	400	5	5	10	5	25	100	100	10	100	10	5	5	30.00	250.00	10	5	15.00	150	5	100	1000.00
Sponsor	Recommended Water Management Strategy Name	Capital Cost	WMS Supply Volume Listed with Another Strategy?	Rural/Agricultural Conservation?	Conservation/Reuse?	Uniform Standard 1A - What is the decade the RWP shows the project comes online? *[2060 = 0 points; 2050 = 2; 2040 = 4; 2030 = 6; 2020 = 8; 2010 = 10]*	Uniform Standard 1B - In what decade is initial funding needed? *[2060 = 0 points; 2050 = 2; 2040 = 4; 2030 = 6; 2020 = 8; 2010 = 10]*	Criteria 1 Total Score	*Weighted Criteria 1 Total*	Uniform Standard 2A - What supporting data is available to show that the quantity of water needed is available? *[Models suggest insufficient quantities of water or no modeling*	Uniform Standard 2B - If necessary, does the sponsor hold necessary legal rights, water rights and/or contracts to use the water that this project would require? *[Legal rights, water rights*	Uniform Standard 2C - What level of engineering and/or planning has been accomplished for this project? *[Project idea is outlinted in RWP = 1 point; feasibility studies initiated*	Uniform Standard 2D - Has theproject sponsor requested (in writing for the 2016 Plan) that the project be included in the Regional Water Plan? *[No = 0 points; yes = 5]*	Criteria 2 Total Score	*Weighted Criteria 2 Total*	Uniform Standard 3A - In the decade the project supply comes online, what is the % of the WUG's (or WUGs') needs satisfied by this project? *[Calculation is based on the needs of all*	*Converted Needs-based score for Uniform Standard 3A*	Uniform Standard 3B - In the final decade of the planning period, what is the % of the WUG's (or WUGs') needs satisfied by this project? *[Calculation is based on the needs of all*	*Converted Needs-based score for Uniform Standard 3A*	Uniform Standard 3C - Is this project the only economically feasible source of new supply for the WUG, other than conservation? *[No = 0 points; Yes = 5]*	Uniform Standard 3D - Does this project serve multiple WUGs? *[No = 0 points; Yes = 5]*	Criteria 3 Total Score	*Weighted Criteria 3 Total*	Uniform Standard 4A - Over what period of time is this project expected to provide water (regardless of the planning period)? *[Less than or equal to 20 yrs = 5 points; greater than 20 yrs = 10]*	Uniform Standard 4B - Does the volume of water supplied by the project change over the regional water planning period? *[Decreases = 0 points; no change = 3; increases = 5]*	Criteria 4 Total Score	*Weighted Criteria 4 Total*	Uniform Standard 5A - What is the expected unit cost of water supplied by this project compared to the median unit cost of all other recommended strategies in the region's current	*Weighted Criteria 5 Total*	
COUNTY-OTHER, ZAPATA	Acquisition of water rights through purchase	$29,210	N	y		10	10	20	400	3	2	7	0	12	48	100%	10.0	100%	10.0	5	0	25.00	208.33	10	5	15.00	150	5	100	906.33
WEBB COUNTY WATER UTILITY	Acquisition of water rights through purchase	$2,466,125	N	y		10	10	20	400	3	2	7	0	12	48	98%	9.8	93%	9.3	0	5	24.10	200.82	10	5	15.00	150	3	60	858.82
COUNTY-OTHER, JIM HOGG	Expand existing groundwater wells	$73,597	N	y		10	10	20	400	3	5	2	0	10	40	90%	9.0	90%	9.0	0	0	17.98	149.86	10	5	15.00	150	5	100	839.86
INDIAN LAKE	Brackish water desalination	$235,291	N			10	10	20	400	3	5	2	0	10	40	100%	10.0	100%	10.0	5	0	25.00	208.33	10	5	15.00	150	2	40	838.33
IRRIGATION, HIDALGO	Irrigation conveyance system conservation	$71,777,565	N	y	y	10	10	20	400	5	5	8	5	23	92	3%	0.3	93%	9.3	0	0	9.66	80.51	10	5	15.00	150	5	100	822.51
PALM VALLEY	Acquisition of water rights through purchase	$1,064,064	N			10	10	20	400	3	2	7	0	12	48	96%	9.6	455%	10.0	0	0	19.63	163.58	10	5	15.00	150	3	60	821.58
RIO WSC	Acquisition of water rights through purchase	$3,551,053	N	y		10	10	20	400	3	2	7	0	12	48	95%	9.5	95%	9.5	0	0	19.04	158.65	10	5	15.00	150	3	60	816.65
SOUTH PADRE ISLAND	Acquisition of water rights through purchase	$15,727,282	N			10	10	20	400	3	2	7	0	12	48	95%	9.5	95%	9.5	0	0	19.01	158.38	10	5	15.00	150	3	60	816.38
SAN JUAN	Acquisition of water rights through purchase	$30,511,511	N			10	10	20	400	3	2	7	0	12	48	95%	9.5	95%	9.5	0	0	19.00	158.31	10	5	15.00	150	3	60	816.31
EL JARDIN	Acquisition of water rights through purchase	$9,889,535	N			10	10	20	400	3	2	7	0	12	48	95%	9.5	95%	9.5	0	0	18.98	158.19	10	5	15.00	150	3	60	816.19
HIDALGO COUNTY MUD #1	Acquisition of water rights through purchase	$20,450,891	N			10	10	20	400	3	2	7	0	12	48	93%	9.3	93%	9.3	0	0	18.57	154.76	10	5	15.00	150	3	60	812.76
SHARYLAND WSC	Acquisition of water rights through purchase	$13,219,429	N	y		8	10	18	360	3	0	7	0	10	40	95%	9.5	95%	9.5	0	5	24.01	200.11	10	5	15.00	150	3	60	810.11
COUNTY-OTHER, WEBB	Acquisition of water rights through purchase	$3,647,027	N	y		10	10	20	400	3	2	7	0	12	48	62%	6.2	62%	6.2	5	0	17.47	145.61	10	5	15.00	150	3	60	803.61
HIDALGO	Expand existing groundwater wells	$742,763	N			10	10	20	400	3	5	2	0	10	40	5600%	10.0	36%	3.6	0	0	13.62	113.52	10	5	15.00	150	5	100	803.52
PALM VALLEY ESTATES UD	Acquisition of water rights through purchase	$312,960	N			10	10	20	400	3	2	7	0	12	48	75%	7.5	96%	9.6	0	0	17.12	142.63	10	5	15.00	150	3	60	800.63
EDCOUCH	Acquisition of water rights through purchase	$1,502,208	N			10	10	20	400	3	2	7	0	12	48	50%	5.0	70%	7.0	5	0	17.02	141.80	10	5	15.00	150	3	60	799.80
MILITARY HIGHWAY WSC	Expand existing groundwater wells	$1,415,326	N	y		8	10	18	360	3	5	2	0	10	40	87%	8.7	43%	4.3	0	5	17.94	149.51	10	5	15.00	150	5	100	799.51
MANUFACTURING, CAMERON	Non-potable reuse	$10,510,924	N		y	10	10	20	400	5	5	3	0	13	52	42%	4.2	72%	7.2	0	0	11.38	94.85	10	5	15.00	150	5	100	796.85
MCALLEN	Non-potable reuse	$38,212,973	N		y	8	10	18	360	5	5	3	0	13	52	18%	1.8	94%	9.4	0	5	16.17	134.71	10	5	15.00	150	5	100	796.71
BROWNSVILLE	Brownsville weir and reservoir	$98,411,077	N			8	10	18	360	5	5	5	5	20	80	121%	10.0	44%	4.4	0	0	14.42	120.16	10	3	13.00	130	5	100	790.16
ROMA CITY	Acquisition of water rights through purchase	$8,207,897	N			10	10	20	400	3	2	7	0	12	48	63%	6.3	90%	9.0	0	0	15.29	127.45	10	5	15.00	150	3	60	785.45
IRRIGATION, HIDALGO	On-farm water conservation	$115,491,102	N	y	y	10	10	20	400	3	5	5	5	18	72	0%	0.0	75%	7.5	0	0	7.50	62.52	10	5	15.00	150	5	100	784.52
MANUFACTURING, WILLACY	Non-potable reuse	$56,208	N		y	10	10	20	400	5	5	3	0	13	52	60%	6.0	60%	6.0	0	0	12.00	100.00	10	3	13.00	130	5	100	782.00
IRRIGATION, CAMERON	Irrigation conveyance system conservation	$39,543,934	N	y	y	10	10	20	400	5	5	8	5	23	92	3%	0.3	44%	4.4	0	0	4.62	38.51	10	5	15.00	150	5	100	780.51
SOUTHMOST REGIONAL WATER AU	Brackish water desalination	$788,992	N			10	10	20	400	3	5	2	0	10	40	0%	0.0	100%	10.0	5	5	20.00	166.67	10	3	13.00	130	2	40	776.67
RIO GRANDE CITY	Brackish water desalination	$5,507,279	N			10	10	20	400	3	5	2	0	10	40	116%	10.0	74%	7.4	0	0	17.36	144.71	10	5	15.00	150	2	40	774.71
OLMITO WSC	Acquisition of water rights through purchase	$7,189,734	N	y		8	8	16	320	3	0	7	0	10	40	95%	9.5	95%	9.5	0	5	24.03	200.27	10	5	15.00	150	3	60	770.27
EAST RIO HONDO WSC	Brackish water desalination	$3,330,838	N	y		10	10	20	400	3	5	2	5	15	60	0%	0.0	90%	9.0	0	5	14.01	116.72	10	5	15.00	150	2	40	766.72
IRRIGATION, WILLACY	Irrigation conveyance system conservation	$5,638,652	N	y	y	10	10	20	400	5	5	8	5	23	92	2%	0.2	25%	2.5	0	0	2.75	22.88	10	5	15.00	150	5	100	764.88
MISSION	Non-potable reuse	$19,938,904	N		y	10	10	20	400	5	5	3	5	18	72	24%	2.4	27%	2.7	0	0	5.10	42.49	10	5	15.00	150	5	100	764.49
ALTON	Advanced water conservation	$3,857,956	N		y	10	10	20	400	3	5	4	0	12	48	0%	0.0	100%	10.0	0	0	10.00	83.33	10	5	15.00	150	4	80	761.33
BROWNSVILLE	Brackish water desalination	$62,973,417	N			10	10	20	400	3	5	2	5	15	60	102%	10.0	32%	3.2	0	0	13.20	110.01	10	5	15.00	150	2	40	760.01
ALAMO	Non-potable reuse	$1,873,605	N		y	10	10	20	400	5	5	3	0	13	52	58%	5.8	11%	1.1	0	0	6.89	57.44	10	5	15.00	150	5	100	759.44
LOS FRESNOS	Brackish water desalination	$3,665,392	N			6	10	16	320	3	5	2	0	10	40	142%	10.0	113%	10.0	5	0	25.00	208.33	10	5	15.00	150	2	40	758.33
LA GRULLA	Acquisition of water rights through purchase	$1,268,531	N			10	10	20	400	3	2	7	0	12	48	70%	7.0	47%	4.7	0	0	11.70	97.49	10	5	15.00	150	3	60	755.49
LAGUNA MADRE WD	Brackish water desalination	$7,581,934	N			10	10	20	400	3	5	2	0	10	40	0%	0.0	104%	10.0	0	5	15.00	125.00	10	5	15.00	150	2	40	755.00
IRRIGATION, MAVERICK	Irrigation conveyance system conservation	$13,797,827	N	y	y	10	10	20	400	5	5	8	0	18	72	3%	0.3	36%	3.6	0	0	3.87	32.23	10	5	15.00	150	5	100	754.23
WESLACO	Potable reuse	$7,519,850	N		y	10	10	20	400	5	5	3	5	18	72	0%	0.0	34%	3.4	0	0	3.41	28.39	10	5	15.00	150	5	100	750.39
COUNTY-OTHER, MAVERICK	Acquisition of water rights through purchase	$7,565,286	N	y		10	10	20	400	3	2	7	0	12	48	40%	4.0	91%	9.1	5	0	18.15	151.21	10	5	15.00	150	0	0	749.21
COUNTY-OTHER, STARR	Acquisition of water rights through purchase	$65,095,675	N	y		10	10	20	400	3	2	7	0	12	48	65%	6.5	65%	6.5	0	0	12.95	107.90	10	5	15.00	150	2	40	745.90
EDCOUCH	Advanced water conservation	$107,433	N		y	10	10	20	400	3	5	4	0	12	48	50%	5.0	30%	3.0	0	0	8.06	67.18	10	5	15.00	150	4	80	745.18
COUNTY-OTHER, STARR	Expand existing groundwater wells	$4,404,494	N	y		10	10	20	400	3	5	2	0	10	40	34%	3.4	32%	3.2	0	0	6.56	54.64	10	5	15.00	150	5	100	744.64
COUNTY-OTHER, WEBB	Advanced water conservation	$364,309	N	y	y	10	10	20	400	3	5	4	0	12	48	38%	3.8	38%	3.8	0	0	7.53	62.72	10	5	15.00	150	4	80	740.72
PORT ISABEL	Acquisition of water rights through purchase	$5,796,019	N			10	10	20	400	3	2	7	0	12	48	47%	4.7	47%	4.7	0	0	9.50	79.14	10	5	15.00	150	3	60	737.14
MANUFACTURING, CAMERON	Expand existing groundwater wells	$1,132,261	N			10	10	20	400	3	5	2	0	10	40	53%	5.3	26%	2.6	0	0	7.84	65.29	10	3	13.00	130	5	100	735.29
NORTH ALAMO WSC	Brackish water desalination	$84,925,241	N	y		10	10	20	400	3	5	2	0	10	40	0%	0.0	267%	10.0	0	5	15.00	125.00	10	3	13.00	130	2	40	735.00
SAN PERLITA	Brackish water desalination	$91,911	N			10	10	20	400	3	5	2	0	10	40	0%	0.0	417%	10.0	5	0	15.00	125.00	10	3	13.00	130	2	40	735.00
PRIMERA	Expand existing groundwater wells	$190,220	N			10	10	20	400	3	5	2	0	10	40	33%	3.3	20%	2.0	0	0	5.31	44.28	10	5	15.00	150	5	100	734.28
LAREDO	Non-potable reuse	$45,427,426	N		y	10	10	20	400	5	5	3	0	13	52	23%	2.3	14%	1.4	0	0	3.69	30.73	10	5	15.00	150	5	100	732.73
IRRIGATION, CAMERON	On-farm water conservation	$54,946,207	N	y	y	10	10	20	400	3	5	5	0	13	52	0%	0.0	35%	3.5	0	0	3.51	29.26	10	5	15.00	150	5	100	731.26
LAREDO	Acquisition of water rights through purchase	$208,068,312	N			10	10	20	400	3	2	7	0	12	48	29%	2.9	59%	5.9	0	0	8.76	73.01	10	5	15.00	150	3	60	731.01
EL CENIZO	Acquisition of water rights through purchase	$6,159,052	N			8	8	16	320	3	0	7	0	10	40	97%	9.7	95%	9.5	0	0	19.15	159.61	10	5	15.00	150	3	60	729.61
RIO BRAVO	Acquisition of water rights through purchase	$9,413,836	N			8	8	16	320	3	0	7	0	10	40	95%	9.5	95%	9.5	0	0	19.01	158.43	10	5	15.00	150	3	60	728.43
MILITARY HIGHWAY WSC	Advanced water conservation	$80,575	N	y	y	10	10	20	400	3	5	4	0	12	48	100%	10.0	4%	0.4	0	5	15.40	128.32	10	5	15.00	150	0	0	726.32
IRRIGATION, MAVERICK	On-farm water conservation	$11,455,561	N	y	y	10	10	20	400	3	5	5	0	13	52	0%	0.0	29%	2.9	0	0	2.92	24.31	10	5	15.00	150	5	100	726.31
MISSION	Acquisition of water rights through urbanization	$41,486,821	N			10	10	20	400	3	2	7	0	12	48	20%	2.0	62%	6.2	0	0	8.19	68.28	10	5	15.00	150	3	60	726.28
LA GRULLA	Expand existing groundwater wells	$207,204	N			10	10	20	400	3	5	2	0	10	40	14%	1.4	28%	2.8	0	0	4.25	35.43	10	5	15.00	150	5	100	725.43
IRRIGATION, WILLACY	On-farm water conservation	$6,924,367	N	y	y	10	10	20	400	3	5	5	0	13	52	0%	0.0	20%	2.0	0	0	2.04	17.00	10	5	15.00	150	5	100	719.00
STEAM ELECTRIC POWER, HIDALGO	Non-potable reuse	$37,472,099	N		y	8	8	16	320	5	5	3	0	13	52	51%	5.1	66%	6.6	0	0	11.64	96.97	10	5	15.00	150	5	100	718.97
MCALLEN	Brackish water desalination	$32,429,710	N			10	10	20	400	3	5	2	5	15	60	0%	0.0	30%	3.0	0	5	7.99	66.62	10	5	15.00	150	2	40	716.62
PRIMERA	Advanced water conservation	$103,301	N		y	10	10	20	400	3	5	4	0	12	48	27%	2.7	18%	1.8	0	0	4.48	37.35	10	5	15.00	150	4	80	715.35
LAGUNA MADRE WD	Non-potable reuse	$93,680	N		y	10	10	20	400	5	5	3	5	18	72	0%	0.0	1%	0.1	0	5	5.06	42.21	10	0	10.00	100	5	100	714.21
PORT ISABEL	Brackish water desalination	$5,378,604	N			10	10	20	400	3	5	2	0	10	40	50%	5.0	50%	5.0	0	0	10.00	83.33	10	5	15.00	150	2	40	713.33
LAREDO	Expand existing groundwater wells	$8,965,239	N			10	10	20	400	3	5	2	0	10	40	16%	1.6	9%	0.9	0	0	2.55	21.22	10	5	15.00	150	5	100	711.22
MANUFACTURING, WILLACY	Acquisition of water rights through purchase	$41,728	N			10	10	20	400	3	2	7	0	12	48	40%	4.0	40%	4.0	0	0	8.00	66.67	10	3	13.00	130	3	60	704.67
UNITED IRRIGATION DISTRICT	On-farm water conservation	$152,028	N	y	y	10	10	20	400	3	5	5	0	13	52	0%	0.0	0%	0.0	0	5	5.00	41.67	10	3	13.00	130	4	80	703.67
PRIMERA	Acquisition of water rights through purchase	$1,414,579	N			10	10	20	400	3	2	7	0	12	48	15%	1.5	40%	4.0	0	0	5.45	45.40	10	5	15.00	150	3	60	703.40
PHARR	Non-potable reuse	$187,361	N		y	10	10	20	400	5	5	3	5	18	72	0%	0.0	0%	0.0	0	0	0.04	0.33	10	3	13.00	130	5	100	702.33
ELSA	Proposed elevated storage tank and infrastructure improv	$8,325,386	N			10	10	20	400	5	5	8	0	18	72	0%	0.0	0%	0.0	0	0	0.00	0.00	10	3	13.00	130	5	100	702.00
LA JOYA	Brackish water desalination	$441,171	N			10	10	20	400	3	5	2	0	10	40	0%	0.0	32%	3.2	0	5	8.17	68.12	10	5	15.00	150	2	40	698.12
HIDALGO	Advanced water conservation	$161,839	N		y	10	10	20	400	3	5	4	0	12	48	1600%	10.0	13%	1.3	0	0	11.30	94.15	10	5	15.00	150	0	0	692.15
PHARR	Expand existing groundwater wells	$283,065	N			10	10	20	400	3	5	2	0	10	40	0%	0.0	2%	0.2	0	0	0.20	1.64	10	5	15.00	150	5	100	691.64
LA GRULLA	Advanced water conservation	$44,075	N		y	10	10	20	400	3	5	4	0	12	48	6%	0.6	10%	1.0	0	0	1.56	13.00	10	5	15.00	150	4	80	691.00
ALAMO	Acquisition of water rights through purchase	$1,965,389	N			8	10	18	360	3	0	7	5	15	60	13%	1.3	11%	1.1	0	0	2.38	19.81	10	5	15.00	150	5	100	689.81
MILITARY HIGHWAY WSC	Acquisition of water rights through purchase	$6,213,299	N	y		6	10	16	320	3	0	7	0	10	40	34%	3.4	51%	5.1	0	5	13.43	111.90	10	5	15.00	150	3	60	681.90

** Indicates that additional data may have to be collected by RWPG in order to score projects.

						Criteria 1 - Decade of Need for Project				Criteria 2 - Project Feasibility						Criteria 3 - Project Viability								Criteria 4 - Project Sustainability				Criteria 5 - Project Cost Effectiveness		FINAL SCORE FOR PROJECT
							**				**	**												**						
			MAXIMUM SCORES --->			10	10	20	400	5	5	10	5	25	100	100	10	100	10	5	5	30.00	250.00	10	5	15.00	150	5	100	1000.00
Sponsor	Recommended Water Management Strategy Name	Capital Cost	WMS Supply Volume Listed with Another Strategy?	Rural/Agricultural Conservation?	Conservation/Reuse?	**Uniform Standard 1A** - What is the decade the RWP shows the project comes online? *[2060 = 0 points; 2050 = 2; 2040 = 4; 2030 = 6; 2020 = 8; 2010 = 10]*	**Uniform Standard 1B** - In what decade is initial funding needed? *[2060 = 0 points; 2050 = 2; 2040 = 4; 2030 = 6; 2020 = 8; 2010 = 10]*	Criteria 1 Total Score	*Weighted Criteria 1 Total*	**Uniform Standard 2A** - What supporting data is available to show that the quantity of water needed is available? *[Models suggest insufficient quantities of water or no modeling*	**Uniform Standard 2B** - If necessary, does the sponsor hold the necessary legal rights, water rights and/or contracts to use the water that this project would require? *[Legal rights, water rights*	**Uniform Standard 2C** - What level of engineering and/or planning has been accomplished for this project? *[Project idea is outlinted in RWP = 1 point; feasibility studies initiated*	**Uniform Standard 2D** - Has theproject sponsor requested (in writing for the 2016 Plan) that the project be included in the Regional Water Plan? *[No = 0 points; yes = 5]*	Criteria 2 Total Score	*Weighted Criteria 2 Total*	**Uniform Standard 3A** - In the decade the project supply comes online, what is the % of the WUG's (or WUGs') needs satisfied by this project? *[Calculation is based on the needs of all*	*Converted Needs-based score for Uniform Standard 3A*	**Uniform Standard 3B** - In the final decade of the planning period, what is the % of the WUG's (or WUGs') needs satisfied by this project? *[Calculation is based on the needs of all*	*Converted Needs-based score for Uniform Standard 3A*	**Uniform Standard 3C** - Is this project the only economically feasible source of new supply for the WUG, other than conservation? *[No = 0 points; Yes = 5]*	**Uniform Standard 3D** - Does this project serve multiple WUGs? *[No = 0 points; Yes = 5]*	Criteria 3 Total Score	*Weighted Criteria 3 Total*	**Uniform Standard 4A** - Over what period of time is this project expected to provide water (regardless of the planning period)? *[Less than or equal to 20 yrs = 5 points; greater than 20 yrs = 10]*	**Uniform Standard 4B** - Does the volume of water supplied by the project change over the regional water planning period? *[Decreases = 0 points; no change = 3; increases = 5]*	Criteria 4 Total Score	*Weighted Criteria 4 Total*	**Uniform Standard 5A** - What is the expected unit cost of water supplied by this project compared to the median unit cost of all other recommended strategies in the region's current	*Weighted Criteria 5 Total*	
IRRIGATION, STARR	On-farm water conservation	$5,600,456	N	y	y	10	10	20	400	3	5	5	0	13	52	1%	0.1	47%	4.7	0	0	4.77	39.74	10	5	15.00	150	2	40	681.74
PRIMERA	Brackish water desalination	$415,436	N			10	10	20	400	3	5	2	5	15	60	24%	2.4	13%	1.3	0	0	3.76	31.35	10	5	15.00	150	2	40	681.35
DONNA	Advanced water conservation	$81,264	N		y	10	10	20	400	3	5	4	0	12	48	0%	0.0	115%	10.0	0	0	10.00	83.33	10	5	15.00	150	0	0	681.33
PENITAS	Advanced water conservation	$11,019	N		y	10	10	20	400	3	5	4	0	12	48	0%	0.0	100%	10.0	0	0	10.00	83.33	10	5	15.00	150	0	0	681.33
RIO HONDO	Acquisition of water rights through purchase	$834,560	N			10	10	20	400	3	2	7	0	12	48	0%	0.0	0%	0.0	5	0	5.00	41.67	10	3	13.00	130	3	60	679.67
MCALLEN	Acquisition of water rights through purchase	$30,649,214	N			8	10	18	360	3	0	7	0	10	40	0%	0.0	25%	2.5	0	5	7.50	62.48	10	5	15.00	150	3	60	672.48
COUNTY-OTHER, HIDALGO	Expand existing groundwater wells	$4,969,492	N	y		8	8	16	320	3	5	2	0	10	40	46%	4.6	22%	2.2	0	0	6.80	56.65	10	5	15.00	150	5	100	666.65
NORTH ALAMO WSC	Advanced water conservation	$2,787,755	N	y	y	10	10	20	400	3	5	4	0	12	48	0%	0.0	32%	3.2	0	5	8.22	68.51	10	5	15.00	150	0	0	666.51
BROWNSVILLE	Non-potable reuse	$1,873,605	N		y	8	10	18	360	5	5	3	5	18	72	3%	0.3	1%	0.1	0	0	0.39	3.23	10	3	13.00	130	5	100	665.23
RIO GRANDE CITY	Acquisition of water rights through purchase	$588,365	N			10	10	20	400	3	2	7	0	12	48	1%	0.1	7%	0.7	0	0	0.80	6.64	10	5	15.00	150	3	60	664.64
UNITED IRRIGATION DISTRICT	Irrigation conveyance system conservation	$1,141,825	N	y	y	10	10	20	400	5	5	8	5	23	92	0%	0.0	0%	0.0	0	5	5.00	41.67	10	3	13.00	130	0	0	663.67
PHARR	Acquisition of water rights through purchase	$37,117,053	N			8	8	16	320	3	0	7	0	10	40	40%	4.0	70%	7.0	0	0	10.99	91.55	10	5	15.00	150	3	60	661.55
MCALLEN	Expand existing groundwater wells	$1,747,078	N			6	10	16	320	3	5	2	0	10	40	6%	0.6	5%	0.5	0	5	6.10	50.82	10	5	15.00	150	5	100	660.82
COUNTY-OTHER, HIDALGO	Acquisition of water rights through purchase	$32,906,698	N	y		8	8	16	320	3	0	7	0	10	40	54%	5.4	78%	7.8	0	0	13.20	110.01	10	5	15.00	150	2	40	660.01
LAREDO	Brackish water desalination	$37,131,853	N			10	10	20	400	3	5	2	0	10	40	23%	2.3	12%	1.2	0	0	3.45	28.73	10	5	15.00	150	2	40	658.73
LAGUNA MADRE WD	Seawater desalination	$20,330,672	N			10	10	20	400	5	5	2	0	12	48	0%	0.0	22%	2.2	0	5	7.24	60.30	10	5	15.00	150	0	0	658.30
WEBB COUNTY WATER UTILITY	Acquisition of water rights through contract	$111,420	N	y		10	10	20	400	3	2	7	0	12	48	5%	0.5	5%	0.5	0	5	5.98	49.85	5	5	10.00	100	3	60	657.85
COUNTY-OTHER, MAVERICK	Advanced water conservation	$148,754	N	y	y	10	10	20	400	3	5	4	0	12	48	60%	6.0	9%	0.9	0	0	6.85	57.12	10	5	15.00	150	0	0	655.12
VALLEY MUD #2	Brackish water desalination	$1,019,770	N			8	8	16	320	3	5	2	0	10	40	0%	0.0	113%	10.0	0	5	15.00	125.00	10	3	13.00	130	2	40	655.00
ALAMO	Acquisition of water rights through urbanization	$7,189,497	N			8	8	16	320	3	0	7	0	10	40	52%	5.2	47%	4.7	0	0	10.00	83.30	10	5	15.00	150	3	60	653.30
WEBB COUNTY WATER UTILITY	Advanced water conservation	$19,972	N	y	y	10	10	20	400	3	5	4	0	12	48	10%	1.0	5%	0.5	0	5	6.41	53.42	10	5	15.00	150	0	0	651.42
MCALLEN	Advanced water conservation	$2,357,334	N		y	10	10	20	400	3	5	4	0	12	48	0%	0.0	12%	1.2	0	5	6.16	51.35	10	5	15.00	150	0	0	649.35
SAN BENITO	Acquisition of water rights through purchase	$3,292,339	N			2	10	12	240	3	0	7	0	10	40	96%	9.6	95%	9.5	0	0	19.06	158.87	10	5	15.00	150	3	60	648.87
SEBASTIAN MUD	Acquisition of water rights through purchase	$367,206	N			6	6	12	240	3	0	7	0	10	40	94%	9.4	95%	9.5	0	0	18.86	157.14	10	5	15.00	150	3	60	647.14
OLMITO WSC	Advanced water conservation	$90,216	N	y	y	10	10	20	400	3	5	4	0	12	48	0%	0.0	7%	0.7	0	5	5.72	47.69	10	5	15.00	150	0	0	645.69
SHARYLAND WSC	Advanced water conservation	$159,084	N	y	y	10	10	20	400	3	5	4	0	12	48	0%	0.0	7%	0.7	0	5	5.69	47.44	10	5	15.00	150	0	0	645.44
HARLINGEN	Brackish water desalination	$7,072,621	N			8	8	16	320	3	5	2	0	10	40	0%	0.0	64%	6.4	0	5	11.41	95.05	10	5	15.00	150	2	40	645.05
MANUFACTURING, CAMERON	Acquisition of water rights through purchase	$417,280	N			10	10	20	400	3	2	7	0	12	48	5%	0.5	3%	0.3	0	0	0.78	6.53	10	3	13.00	130	3	60	644.53
MISSION	Brackish water desalination	$2,058,796	N			10	10	20	400	3	5	2	0	10	40	38%	3.8	3%	0.3	0	0	4.09	34.12	10	3	13.00	130	2	40	644.12
LAGUNA MADRE WD	Advanced water conservation	$112,943	N		y	10	10	20	400	3	5	4	0	12	48	0%	0.0	4%	0.4	0	5	5.42	45.20	10	5	15.00	150	0	0	643.20
MISSION	Advanced water conservation	$1,470,321	N		y	10	10	20	400	3	5	4	0	12	48	18%	1.8	11%	1.1	0	0	2.85	23.78	10	5	15.00	150	1	20	641.78
BROWNSVILLE	Resaca restoration	$52,000,000	N			10	10	20	400	5	5	10	5	25	100	11%	1.1	2%	0.2	0	0	1.23	10.25	10	3	13.00	130	0	0	640.25
STEAM ELECTRIC POWER, HIDALGO	Acquisition of water rights through purchase	$21,627,621	N			8	8	16	320	3	0	7	0	10	40	49%	4.9	34%	3.4	0	0	8.36	69.69	10	5	15.00	150	3	60	639.69
HEBBRONVILLE	Advanced water conservation	$4,132	N		y	10	10	20	400	3	5	4	0	12	48	0%	0.0	0%	0.0	0	5	5.00	41.67	10	5	15.00	150	0	0	639.67
EL INDIO WSC	Acquisition of water rights through purchase	$0	N	y		10	10	20	400	3	2	7	0	12	48	0%	0.0	0%	0.0	5	0	5.00	41.67	5	0	5.00	50	5	100	639.67
VALLEY MUD #2	Acquisition of water rights through purchase	$1,122,483	N			8	8	16	320	3	0	7	0	10	40	0%	0.0	57%	5.7	0	5	10.66	88.86	10	3	13.00	130	3	60	638.86
WESLACO	Brackish water desalination	$1,286,747	N			10	10	20	400	3	5	2	0	10	40	0%	0.0	9%	0.9	0	0	0.92	7.70	10	5	15.00	150	2	40	637.70
ALAMO	Advanced water conservation	$154,952	N		y	10	10	20	400	3	5	4	0	12	48	42%	4.2	5%	0.5	0	0	4.75	39.55	10	5	15.00	150	0	0	637.55
ROMA CITY	Advanced water conservation	$82,641	N		y	10	10	20	400	3	5	4	0	12	48	38%	3.8	6%	0.6	0	0	4.30	35.85	10	5	15.00	150	0	0	633.85
PALM VALLEY	Acquisition of water rights through contract	$45,264	N			10	10	20	400	3	2	7	0	12	48	5%	0.5	23%	2.3	0	0	2.82	23.46	5	5	10.00	100	3	60	631.46
LA FERIA	Expand existing groundwater wells	$11,323	N			8	10	18	360	3	5	2	0	10	40	0%	0.0	0%	0.0	0	0	0.00	0.00	10	3	13.00	130	5	100	630.00
LA GRULLA	Acquisition of water rights through contract	$355,152	N			10	10	20	400	3	2	7	0	12	48	9%	0.9	16%	1.6	0	0	2.49	20.75	5	5	10.00	100	3	60	628.75
RIO GRANDE CITY	Non-potable reuse	$468,401	N		y	8	8	16	320	5	5	3	0	13	52	1%	0.1	6%	0.6	0	0	0.75	6.23	10	5	15.00	150	5	100	628.23
HARLINGEN	Advanced water conservation	$666,637	N		y	10	10	20	400	3	5	4	0	12	48	0%	0.0	32%	3.2	0	0	3.18	26.53	10	5	15.00	150	0	0	624.53
ALAMO	Brackish water desalination	$4,794,053	N			8	10	18	360	3	5	2	0	10	40	11%	1.1	29%	2.9	0	0	4.04	33.64	10	5	15.00	150	2	40	623.64
PALM VALLEY ESTATES UD	Advanced water conservation	$2,755	N		y	10	10	20	400	3	5	4	0	12	48	25%	2.5	5%	0.5	0	0	3.01	25.11	10	5	15.00	150	0	0	623.11
SAN JUAN	Advanced water conservation	$524,770	N		y	10	10	20	400	3	5	4	0	12	48	20%	2.0	10%	1.0	0	0	2.98	24.81	10	5	15.00	150	0	0	622.81
WESLACO	Advanced water conservation	$721,731	N		y	10	10	20	400	3	5	4	0	12	48	0%	0.0	28%	2.8	0	0	2.77	23.06	10	5	15.00	150	0	0	621.06
LAGUNA VISTA	Seawater desalination	$588,272	N			10	10	20	400	5	5	2	0	12	48	0%	0.0	0%	0.0	5	0	5.00	41.67	10	3	13.00	130	0	0	619.67
HIDALGO COUNTY MUD #1	Acquisition of water rights through contract	$954,036	N			10	10	20	400	3	2	7	0	12	48	6%	0.6	5%	0.5	0	0	1.10	9.19	5	5	10.00	100	3	60	617.19
RIO WSC	Acquisition of water rights through contract	$156,685	N	y		10	10	20	400	3	2	7	0	12	48	5%	0.5	5%	0.5	0	0	1.02	8.50	5	5	10.00	100	3	60	616.50
SULLIVAN CITY	Advanced water conservation	$62,669	N		y	10	10	20	400	3	5	4	0	12	48	0%	0.0	22%	2.2	0	0	2.21	18.45	10	5	15.00	150	0	0	616.45
SOUTH PADRE ISLAND	Acquisition of water rights through contract	$689,413	N			10	10	20	400	3	2	7	0	12	48	5%	0.5	5%	0.5	0	0	1.01	8.38	5	5	10.00	100	3	60	616.38
SAN JUAN	Acquisition of water rights through contract	$1,340,525	N			10	10	20	400	3	2	7	0	12	48	5%	0.5	5%	0.5	0	0	1.00	8.35	5	5	10.00	100	3	60	616.35
EL JARDIN	Acquisition of water rights through contract	$435,235	N			10	10	20	400	3	2	7	0	12	48	5%	0.5	5%	0.5	0	0	0.98	8.21	5	5	10.00	100	3	60	616.21
RIO GRANDE CITY	Expand existing groundwater wells	$130,210	N			8	8	16	320	3	5	2	0	10	40	1%	0.1	6%	0.6	0	0	0.70	5.82	10	5	15.00	150	5	100	615.82
SAN BENITO	Advanced water conservation	$112,943	N		y	10	10	20	400	3	5	4	0	12	48	0%	0.0	20%	2.0	0	0	1.97	16.45	10	5	15.00	150	0	0	614.45
LA JOYA	Advanced water conservation	$50,273	N		y	10	10	20	400	3	5	4	0	12	48	0%	0.0	19%	1.9	0	0	1.93	16.09	10	5	15.00	150	0	0	614.09
EAGLE PASS	Brackish water desalination	$2,430,010	N			8	8	16	320	3	5	2	0	10	40	0%	0.0	0%	0.0	5	5	10.00	83.33	10	5	15.00	150	1	20	613.33
PORT ISABEL	Acquisition of water rights through contract	$254,177	N			10	10	20	400	3	2	7	0	12	48	2%	0.2	2%	0.2	0	0	0.50	4.15	5	5	10.00	100	3	60	612.15
INDIAN LAKE	Advanced water conservation	$4,821	N		y	10	10	20	400	3	5	4	0	12	48	6%	0.6	11%	1.1	0	0	1.65	13.74	10	5	15.00	150	0	0	611.74
PALMHURST	Advanced water conservation	$174,923	N		y	10	10	20	400	3	5	4	0	12	48	0%	0.0	16%	1.6	0	0	1.56	12.96	10	5	15.00	150	0	0	610.96
SEBASTIAN MUD	Advanced water conservation	$9,641	N		y	10	10	20	400	3	5	4	0	12	48	0%	0.0	15%	1.5	0	0	1.51	12.54	10	5	15.00	150	0	0	610.54
LAREDO	Acquisition of water rights through contract	$3,861,409	N			10	10	20	400	3	2	7	0	12	48	2%	0.2	1%	0.1	0	0	0.28	2.35	5	5	10.00	100	3	60	610.35
DONNA	Expand existing groundwater wells	$28,307	N			8	8	16	320	3	5	2	0	10	40	0%	0.0	24%	2.4	0	0	2.43	20.23	10	3	13.00	130	5	100	610.23
SHARYLAND WSC	Acquisition of water rights through contract	$581,475	N	y		8	10	18	360	3	0	7	0	10	40	5%	0.5	5%	0.5	0	5	6.01	50.10	5	5	10.00	100	3	60	610.10
MERCEDES	Brackish water desalination	$2,058,796	N			10	10	20	400	3	5	2	0	10	40	0%	0.0	0%	0.0	0	0	0.00	0.00	10	3	13.00	130	2	40	610.00
PALMVIEW	Advanced water conservation	$88,150	N		y	10	10	20	400	3	5	4	0	12	48	0%	0.0	14%	1.4	0	0	1.41	11.77	10	5	15.00	150	0	0	609.77
EDINBURG	Advanced water conservation	$755,476	N		y	10	10	20	400	3	5	4	0	12	48	0%	0.0	13%	1.3	0	0	1.28	10.65	10	5	15.00	150	0	0	608.65
LAREDO	Advanced water conservation	$2,411,739	N		y	10	10	20	400	3	5	4	0	12	48	9%	0.9	4%	0.4	0	0	1.28	10.63	10	5	15.00	150	0	0	608.63
RIO GRANDE CITY	Advanced water conservation	$106,745	N		y	10	10	20	400	3	5	4	0	12	48	5%	0.5	8%	0.8	0	0	1.24	10.32	10	5	15.00	150	0	0	608.32
LOS FRESNOS	Advanced water conservation	$69,556	N		y	10	10	20	400	3	5	4	0	12	48	0%	0.0	11%	1.1	0	0	1.14	9.50	10	5	15.00	150	0	0	607.50
EL JARDIN	Advanced water conservation	$81,952	N		y	10	10	20	400	3	5	4	0	12	48	6%	0.6	5%	0.5	0	0	1.09	9.08	10	5	15.00	150	0	0	607.08
EL CENIZO	Advanced water conservation	$99,169	N		y	10	10	20	400	3	5	4	0	12	48	0%	0.0	9%	0.9	0	0	0.93	7.72	10	5	15.00	150	0	0	605.72
RIO WSC	Advanced water conservation	$28,236	N	y	y	10	10	20	400	3	5	4	0	12	48	3%	0.3	5%	0.5	0	0	0.80	6.69	10	5	15.00	150	0	0	604.69

** Indicates that additional data may have to be collected by RWPG in order to score projects.

Sponsor	Recommended Water Management Strategy Name	Capital Cost	WMS Supply Volume Listed with Another Strategy?	Rural/Agricultural Conservation?	Conservation/Reuse?	Criteria 1 - Decade of Need for Project				Criteria 2 - Project Feasibility						Criteria 3 - Project Viability								Criteria 4 - Project Sustainability				Criteria 5 - Project Cost Effectiveness		FINAL SCORE FOR PROJECT
							**				**	**												**						
			MAXIMUM SCORES --->			10	10	20	400	5	5	10	5	25	100	100	10	100	10	5	5	30.00	250.00	10	5	15.00	150	5	100	1000.00
						Uniform Standard 1A - What is the decade the RWP shows the project comes online? *[2060 = 0 points; 2050 = 2; 2040 = 4; 2030 = 6; 2020 = 8; 2010 = 10]*	**Uniform Standard 1B** - In what decade is initial funding needed? *[2060 = 0 points; 2050 = 2; 2040 = 4; 2030 = 6; 2020 = 8; 2010 = 10]*	Criteria 1 Total Score	*Weighted Criteria 1 Total*	**Uniform Standard 2A** - What supporting data is available to show that the quantity of water needed is available? *[Models suggest insufficient quantities of water or no modeling*	**Uniform Standard 2B** - If necessary, does the sponsor hold the necessary legal rights, water rights and/or contracts to use the water that this project would require? *[Legal rights, water rights*	**Uniform Standard 2C** - What level of engineering and/or planning has been accomplished for this project? *[Project idea is outlinted in RWP = 1 point; feasibility studies initiated*	**Uniform Standard 2D** - Has theproject sponsor requested (in writing for the 2016 Plan) that the project be included in the Regional Water Plan? *[No = 0 points; yes = 5]*	Criteria 2 Total Score	*Weighted Criteria 2 Total*	**Uniform Standard 3A** - In the decade the project supply comes online, what is the % of the WUG's (or WUGs') needs satisfied by this project? *[Calculation is based on the needs of all*	*Converted Needs-based score for Uniform Standard 3A*	**Uniform Standard 3B** - In the final decade of the planning period, what is the % of the WUG's (or WUGs') needs satisfied by this project? *[Calculation is based on the needs of all*	*Converted Needs-based score for Uniform Standard 3A*	**Uniform Standard 3C** - Is this project the only economically feasible source of new supply for the WUG, other than conservation? *[No = 0 points; Yes = 5]*	**Uniform Standard 3D** - Does this project serve multiple WUGs? *[No = 0 points; Yes = 5]*	Criteria 3 Total Score	*Weighted Criteria 3 Total*	**Uniform Standard 4A** - Over what period of time is this project expected to provide water (regardless of the planning period)? *[Less than or equal to 20 yrs = 5 points; greater than 20 yrs = 10]*	**Uniform Standard 4B** - Does the volume of water supplied by the project change over the regional water planning period? *[Decreases = 0 points; no change = 3; increases = 5]*	Criteria 4 Total Score	*Weighted Criteria 4 Total*	**Uniform Standard 5A** - What is the expected unit cost of water supplied by this project compared to the median unit cost of all other recommended strategies in the region's current	*Weighted Criteria 5 Total*	
PHARR	Advanced water conservation	$649,420	N		y	10	10	20	400	3	5	4	0	12	48	0%	0.0	7%	0.7	0	0	0.74	6.19	10	5	15.00	150	0	0	604.19
COUNTY-OTHER, ZAPATA	Advanced water conservation	$58,537	N	y	y	10	10	20	400	3	5	4	0	12	48	2%	0.2	5%	0.5	0	0	0.71	5.95	10	5	15.00	150	0	0	603.95
COUNTY-OTHER, HIDALGO	Advanced water conservation	$981,362	N	y	y	10	10	20	400	3	5	4	0	12	48	0%	0.0	7%	0.7	0	0	0.71	5.94	10	5	15.00	150	0	0	603.94
BROWNSVILLE	Advanced water conservation	$1,488,915	N		y	10	10	20	400	3	5	4	0	12	48	3%	0.3	4%	0.4	0	0	0.71	5.93	10	5	15.00	150	0	0	603.93
RIO BRAVO	Advanced water conservation	$115,009	N		y	10	10	20	400	3	5	4	0	12	48	0%	0.0	7%	0.7	0	0	0.70	5.86	10	5	15.00	150	0	0	603.86
PHARR	Acquisition of water rights through urbanization	$6,857,411	N			8	8	16	320	3	0	7	0	10	40	23%	2.3	16%	1.6	0	0	3.86	32.15	10	5	15.00	150	3	60	602.15
COUNTY-OTHER, STARR	Advanced water conservation	$296,130	N	y	y	10	10	20	400	3	5	4	0	12	48	1%	0.1	4%	0.4	0	0	0.50	4.13	10	5	15.00	150	0	0	602.13
EDINBURG	Non-potable reuse	$14,988,840	N		y	6	6	12	240	5	5	3	5	18	72	0%	0.0	47%	4.7	0	0	4.66	38.85	10	5	15.00	150	5	100	600.85
HIDALGO COUNTY MUD #1	Advanced water conservation	$77,132	N		y	10	10	20	400	3	5	4	0	12	48	1%	0.1	2%	0.2	0	0	0.34	2.80	10	5	15.00	150	0	0	600.80
SOUTH PADRE ISLAND	Advanced water conservation	$25,481	N		y	10	10	20	400	3	5	4	0	12	48	1%	0.1	1%	0.1	0	0	0.17	1.44	10	5	15.00	150	0	0	599.44
PORT ISABEL	Advanced water conservation	$13,773	N		y	10	10	20	400	3	5	4	0	12	48	0%	0.0	1%	0.1	0	0	0.08	0.70	10	5	15.00	150	0	0	598.70
COMBES	Advanced water conservation	$17,217	N		y	10	10	20	400	3	5	4	0	12	48	0%	0.0	0%	0.0	0	0	0.00	0.00	10	5	15.00	150	0	0	598.00
COUNTY-OTHER, CAMERON	Advanced water conservation	$201,782	N	y	y	10	10	20	400	3	5	4	0	12	48	0%	0.0	0%	0.0	0	0	0.00	0.00	10	5	15.00	150	0	0	598.00
EAGLE PASS	Advanced water conservation	$37,877	N		y	10	10	20	400	3	5	4	0	12	48	0%	0.0	0%	0.0	0	0	0.00	0.00	10	5	15.00	150	0	0	598.00
EL INDIO WSC	Advanced water conservation	$48,207	N	y	y	10	10	20	400	3	5	4	0	12	48	0%	0.0	0%	0.0	0	0	0.00	0.00	10	5	15.00	150	0	0	598.00
ELSA	Advanced water conservation	$11,707	N		y	10	10	20	400	3	5	4	0	12	48	0%	0.0	0%	0.0	0	0	0.00	0.00	10	5	15.00	150	0	0	598.00
LA FERIA	Advanced water conservation	$53,028	N		y	10	10	20	400	3	5	4	0	12	48	0%	0.0	0%	0.0	0	0	0.00	0.00	10	5	15.00	150	0	0	598.00
LAGUNA VISTA	Advanced water conservation	$16,528	N		y	10	10	20	400	3	5	4	0	12	48	0%	0.0	0%	0.0	0	0	0.00	0.00	10	5	15.00	150	0	0	598.00
LOS INDIOS	Advanced water conservation	$8,953	N		y	10	10	20	400	3	5	4	0	12	48	0%	0.0	0%	0.0	0	0	0.00	0.00	10	5	15.00	150	0	0	598.00
LYFORD	Advanced water conservation	$2,755	N		y	10	10	20	400	3	5	4	0	12	48	0%	0.0	0%	0.0	0	0	0.00	0.00	10	5	15.00	150	0	0	598.00
MERCEDES	Advanced water conservation	$36,500	N		y	10	10	20	400	3	5	4	0	12	48	0%	0.0	0%	0.0	0	0	0.00	0.00	10	5	15.00	150	0	0	598.00
PROGRESO	Advanced water conservation	$61,292	N		y	10	10	20	400	3	5	4	0	12	48	0%	0.0	0%	0.0	0	0	0.00	0.00	10	5	15.00	150	0	0	598.00
RANCHO VIEJO	Advanced water conservation	$4,132	N		y	10	10	20	400	3	5	4	0	12	48	0%	0.0	0%	0.0	0	0	0.00	0.00	10	5	15.00	150	0	0	598.00
RAYMONDVILLE	Advanced water conservation	$7,575	N		y	10	10	20	400	3	5	4	0	12	48	0%	0.0	0%	0.0	0	0	0.00	0.00	10	5	15.00	150	0	0	598.00
RIO HONDO	Advanced water conservation	$6,887	N		y	10	10	20	400	3	5	4	0	12	48	0%	0.0	0%	0.0	0	0	0.00	0.00	10	5	15.00	150	0	0	598.00
SANTA ROSA	Advanced water conservation	$20,660	N		y	10	10	20	400	3	5	4	0	12	48	0%	0.0	0%	0.0	0	0	0.00	0.00	10	5	15.00	150	0	0	598.00
COUNTY-OTHER, JIM HOGG	Acquisition of water rights through purchase	$9,288,652	N	y		10	10	20	400	3	2	7	0	12	48	10%	1.0	10%	1.0	0	0	2.02	16.81	10	3	13.00	130	0	0	594.81
LYFORD	Acquisition of water rights through purchase	$417,280	N			8	8	16	320	3	0	7	0	10	40	0%	0.0	0%	0.0	5	0	5.00	41.67	10	3	13.00	130	3	60	591.67
MERCEDES	Expand existing groundwater wells	$634,066	N			8	8	16	320	3	5	2	0	10	40	0%	0.0	0%	0.0	0	0	0.00	0.00	10	3	13.00	130	5	100	590.00
VALLEY MUD #2	Acquisition of water rights through contract	$59,192	N			8	8	16	320	3	0	7	0	10	40	0%	0.0	4%	0.4	0	5	5.36	44.65	5	5	10.00	100	4	80	584.65
PALM VALLEY	Advanced water conservation	$689	N		y	10	10	20	400	3	5	4	0	12	48	1%	0.1	2%	0.2	0	0	0.30	2.52	10	3	13.00	130	0	0	580.52
EAST RIO HONDO WSC	Advanced water conservation	$167,348	N	y	y	8	8	16	320	3	5	4	0	12	48	0%	0.0	24%	2.4	0	5	7.42	61.80	10	5	15.00	150	0	0	579.80
PRIMERA	Acquisition of water rights through contract	$295,960	N			8	10	18	360	3	0	7	0	10	40	5%	0.5	10%	1.0	0	0	1.48	12.30	5	5	10.00	100	3	60	572.30
COMBES	Brackish water desalination	$91,911	N			8	8	16	320	3	5	2	0	10	40	0%	0.0	0%	0.0	5	0	5.00	41.67	10	3	13.00	130	2	40	571.67
RAYMONDVILLE	Brackish water desalination	$367,642	N			8	8	16	320	3	5	2	0	10	40	0%	0.0	0%	0.0	5	0	5.00	41.67	10	3	13.00	130	2	40	571.67
BROWNSVILLE	Banco Morales Reservoir	$25,790,900	N			8	10	18	360	5	5	5	5	20	80	1%	0.1	0%	0.0	0	0	0.18	1.54	10	3	13.00	130	0	0	571.54
DONNA	Brackish water desalination	$183,821	N			8	8	16	320	3	5	2	0	10	40	0%	0.0	49%	4.9	0	0	4.85	40.45	10	3	13.00	130	2	40	570.45
OLMITO WSC	Acquisition of water rights through contract	$316,851	N	y		8	8	16	320	3	0	7	0	10	40	5%	0.5	5%	0.5	0	5	6.01	50.04	5	5	10.00	100	3	60	570.04
PALMHURST	Acquisition of water rights through purchase	$6,472,012	N			4	4	8	160	3	0	7	0	10	40	95%	9.5	95%	9.5	0	0	18.99	158.26	10	5	15.00	150	3	60	568.26
MCALLEN	Acquisition of water rights through contract	$1,504,174	N			6	10	16	320	3	0	7	0	10	40	3%	0.3	1%	0.1	0	5	5.41	45.10	5	5	10.00	100	3	60	565.10
LAGUNA MADRE WD	Acquisition of water rights through purchase	$3,755,520	N			6	6	12	240	3	0	7	0	10	40	8%	0.8	23%	2.3	0	5	8.17	68.12	10	5	15.00	150	3	60	558.12
EDINBURG	Acquisition of water rights through purchase	$27,619,761	N			6	6	12	240	3	0	7	0	10	40	0%	0.0	77%	7.7	0	0	7.71	64.29	10	5	15.00	150	3	60	554.29
LA FERIA	Brackish water desalination	$661,756	N			8	8	16	320	3	5	2	5	15	60	0%	0.0	0%	0.0	0	0	0.00	0.00	10	3	13.00	130	2	40	550.00
LA FERIA	Acquisition of water rights through purchase	$417,280	N			8	8	16	320	3	0	7	0	10	40	0%	0.0	0%	0.0	0	0	0.00	0.00	10	3	13.00	130	3	60	550.00
SAN PERLITA	Advanced water conservation	$1,377	N		y	8	8	16	320	3	5	4	0	12	48	0%	0.0	33%	3.3	0	0	3.33	27.78	10	5	15.00	150	0	0	545.78
MILITARY HIGHWAY WSC	Acquisition of water rights through contract	$271,587	N	y		6	10	16	320	3	0	7	0	10	40	2%	0.2	3%	0.3	0	5	5.44	45.33	5	5	10.00	100	2	40	545.33
BROWNSVILLE	Expand existing groundwater wells	$1,132,261	N			8	10	18	360	3	5	2	0	10	40	6%	0.6	2%	0.2	0	0	0.77	6.45	10	3	13.00	130	0	0	536.45
PALM VALLEY ESTATES UD	Acquisition of water rights through contract	$13,928	N			8	8	16	320	3	0	7	0	10	40	14%	1.4	5%	0.5	0	0	1.94	16.18	5	5	10.00	100	3	60	536.18
ELSA	Brackish water desalination	$367,642	N			8	8	16	320	3	5	2	0	10	40	0%	0.0	0%	0.0	0	0	0.00	0.00	10	3	13.00	130	2	40	530.00
EL CENIZO	Acquisition of water rights through contract	$271,587	N			8	8	16	320	3	0	7	0	10	40	5%	0.5	5%	0.5	0	0	1.02	8.49	5	5	10.00	100	3	60	528.49
RIO BRAVO	Acquisition of water rights through contract	$414,344	N			8	8	16	320	3	0	7	0	10	40	5%	0.5	5%	0.5	0	0	0.99	8.27	5	5	10.00	100	3	60	528.27
PHARR	Acquisition of water rights through contract	$1,928,963	N			8	8	16	320	3	0	7	0	10	40	5%	0.5	4%	0.4	0	0	0.94	7.87	5	5	10.00	100	3	60	527.87
ROMA CITY	Acquisition of water rights through contract	$306,406	N			8	8	16	320	3	0	7	0	10	40	4%	0.4	4%	0.4	0	0	0.81	6.77	5	5	10.00	100	3	60	526.77
BROWNSVILLE	Seawater desalination	$165,021,993	N			4	10	14	280	5	5	2	5	17	68	16%	1.6	13%	1.3	0	0	2.90	24.19	10	5	15.00	150	0	0	522.19
ALAMO	Acquisition of water rights through contract	$83,565	N			8	8	16	320	3	0	7	0	10	40	1%	0.1	1%	0.1	0	0	0.12	1.00	5	5	10.00	100	3	60	521.00
COUNTY-OTHER, JIM HOGG	Advanced water conservation	$689	N	y	y	8	8	16	320	3	5	4	0	12	48	1%	0.1	1%	0.1	0	0	0.28	2.30	10	3	13.00	130	0	0	500.30
LA VILLA	Advanced water conservation	$689	N		y	8	8	16	320	3	5	4	0	12	48	0%	0.0	0%	0.0	0	0	0.00	0.00	10	3	13.00	130	0	0	498.00
BROWNSVILLE	Acquisition of water rights through purchase	$8,024,294	N			0	10	10	200	3	0	7	0	10	40	4%	0.4	4%	0.4	0	0	0.72	5.99	10	5	15.00	150	5	100	495.99
LA JOYA	Acquisition of water rights through urbanization	$633,360	N			4	4	8	160	3	0	7	0	10	40	1%	0.1	49%	4.9	0	5	10.01	83.43	10	5	15.00	150	3	60	493.43
PALMVIEW	Acquisition of water rights through purchase	$3,588,608	N			2	2	4	80	3	0	7	0	10	40	95%	9.5	95%	9.5	0	0	19.00	158.33	10	5	15.00	150	3	60	488.33
SULLIVAN CITY	Acquisition of water rights through purchase	$1,627,392	N			2	2	4	80	3	0	7	0	10	40	94%	9.4	95%	9.5	0	0	18.93	157.76	10	5	15.00	150	3	60	487.76
LAGUNA MADRE WD	Acquisition of water rights through contract	$174,094	N			6	6	12	240	3	0	7	0	10	40	0%	0.0	1%	0.1	0	5	5.16	43.04	5	5	10.00	100	3	60	483.04
STEAM ELECTRIC POWER, CAMERO	Non-potable reuse	$1,498,884	N		y	2	2	4	80	5	5	3	0	13	52	65%	6.5	74%	7.4	0	0	13.85	115.39	10	5	15.00	150	4	80	477.39
WESLACO	Expand existing groundwater wells	$1,017,902	N			4	4	8	160	3	5	2	0	10	40	7%	0.7	24%	2.4	0	0	3.02	25.20	10	5	15.00	150	5	100	475.20
HIDALGO	Acquisition of water rights through purchase	$4,060,134	N			4	4	8	160	3	0	7	0	10	40	22%	2.2	54%	5.4	0	0	7.54	62.80	10	5	15.00	150	3	60	472.80
LAREDO	Laredo low water weir	$294,400,000	N			0	10	10	200	5	5	8	0	18	72	0%	0.0	0%	0.0	0	0	0.00	0.00	5	3	8.00	80	5	100	452.00
SEBASTIAN MUD	Acquisition of water rights through contract	$17,409	N			6	6	12	240	3	0	7	0	10	40	6%	0.6	5%	0.5	0	0	1.14	9.53	5	5	10.00	100	3	60	449.53
SAN BENITO	Acquisition of water rights through contract	$146,239	N			2	10	12	240	3	0	7	0	10	40	5%	0.5	5%	0.5	0	0	1.03	8.60	5	5	10.00	100	3	60	448.60
MANUFACTURING, HIDALGO	Expand existing groundwater wells	$226,452	N			2	2	4	80	3	5	2	0	10	40	39%	3.9	34%	3.4	0	0	7.29	60.74	10	5	15.00	150	5	100	430.74
STEAM ELECTRIC POWER, WEBB	Expand existing groundwater wells	$0	N			2	2	4	80	3	5	2	0	10	40	31%	3.1	39%	3.9	0	0	7.00	58.30	10	5	15.00	150	5	100	428.30
STEAM ELECTRIC POWER, CAMERO	Expand existing groundwater wells	$163,046	N			2	2	4	80	3	5	2	0	10	40	35%	3.5	26%	2.6	0	0	6.15	51.28	10	5	15.00	150	5	100	421.28
HARLINGEN	Non-potable reuse	$93,680	N		y	2	2	4	80	5	5	3	0	13	52	2%	0.2	1%	0.1	0	5	5.26	43.86	10	3	13.00	130	5	100	405.86
BROWNSVILLE	Acquisition of water rights through contract	$449,163	N			0	10	10	200	3	0	7	0	10	40	0%	0.0	0%	0.0	0	0	0.05	0.40	5	5	10.00	100	3	60	400.40
STEAM ELECTRIC POWER, WEBB	Non-potable reuse	$1,498,884	N		y	2	2	4	80	5	5	3	0	13	52	69%	6.9	61%	6.1	0	0	13.00	108.36	10	5	15.00	150	0	0	390.36
EAST RIO HONDO WSC	Acquisition of water rights through purchase	$396,416	N	y		2	2	4	80	3	0	7	0	10	40	34%	3.4	9%	0.9	0	5	9.37	78.12	10	3	13.00	130	3	60	388.12

** Indicates that additional data may have to be collected by RWPG in order to score projects.

Sponsor	Recommended Water Management Strategy Name	Capital Cost	WMS Supply Volume Listed with Another Strategy?	Rural/Agricultural Conservation?	Conservation/Reuse?	Criteria 1 - Decade of Need for Project: **Uniform Standard 1A** - What is the decade the RWP shows the project comes online? *[2060 = 0 points; 2050 = 2; 2040 = 4; 2030 = 6; 2020 = 8; 2010 = 10]* **	**Uniform Standard 1B** - In what decade is initial funding needed? *[2060 = 0 points; 2050 = 2; 2040 = 4; 2030 = 6; 2020 = 8; 2010 = 10]*	Criteria 1 Total Score	*Weighted Criteria 1 Total*	Criteria 2 - Project Feasibility: **Uniform Standard 2A** - What supporting data is available to show that the quantity of water needed is available? *[Models suggest insufficient quantities of water or no modeling*	**Uniform Standard 2B** - If necessary, does the sponsor hold necessary legal rights, water rights and/or contracts to use the water that this project would require? *[Legal rights, water rights* **	**Uniform Standard 2C** - What level of engineering and/or planning has been accomplished for this project? *[Project idea is outlinted in RWP = 1 point; feasibility studies initiated* **	**Uniform Standard 2D** - Has theproject sponsor requested (in writing for the 2016 Plan) that the project be included in the Regional Water Plan? *[No = 0 points; yes = 5]*	Criteria 2 Total Score	*Weighted Criteria 2 Total*	Criteria 3 - Project Viability: **Uniform Standard 3A** - In the decade the project supply comes online, what is the % of the WUG's (or WUGs') needs satisfied by this project? *[Calculation is based on the needs of all*	*Converted Needs-based score for Uniform Standard 3A*	**Uniform Standard 3B** - In the final decade of the planning period, what is the % of the WUG's (or WUGs') needs satisfied by this project? *[Calculation is based on the needs of all*	*Converted Needs-based score for Uniform Standard 3A*	**Uniform Standard 3C** - Is this project the only economically feasible source of new supply for the WUG, other than conservation? *[No = 0 points; Yes = 5]*	**Uniform Standard 3D** - Does this project serve multiple WUGs? *[No = 0 points; Yes = 5]*	Criteria 3 Total Score	*Weighted Criteria 3 Total*	Criteria 4 - Project Sustainability: **Uniform Standard 4A** - Over what period of time is this project expected to provide water (regardless of the planning period)? *[Less than or equal to 20 yrs = 5 points; greater than 20 yrs = 10]* **	**Uniform Standard 4B** - Does the volume of water supplied by the project change over the regional water planning period? *[Decreases = 0 points; no change = 3; increases = 5]*	Criteria 4 Total Score	*Weighted Criteria 4 Total*	Criteria 5 - Project Cost Effectiveness: **Uniform Standard 5A** - What is the expected unit cost of water supplied by this project compared to the median unit cost of all other recommended strategies in the region's current	*Weighted Criteria 5 Total*	FINAL SCORE FOR PROJECT
			MAXIMUM SCORES --->			10	10	20	400	5	5	10	5	25	100	100	10	100	10	5	5	30.00	250.00	10	5	15.00	150	5	100	1000.00
HARLINGEN	Acquisition of water rights through purchase	$521,600	N			2	2	4	80	3	0	7	0	10	40	5%	0.5	4%	0.4	0	5	5.96	49.63	10	5	15.00	150	3	60	379.63
MANUFACTURING, HIDALGO	Acquisition of water rights through purchase	$809,523	N			2	2	4	80	3	0	7	0	10	40	22%	2.2	33%	3.3	0	0	5.42	45.19	10	5	15.00	150	3	60	375.19
PALMHURST	Acquisition of water rights through contract	$285,514	N			4	4	8	160	3	0	7	0	10	40	5%	0.5	5%	0.5	0	0	1.01	8.41	5	5	10.00	100	3	60	368.41
HIDALGO	Acquisition of water rights through contract	$177,576	N			4	4	8	160	3	0	7	0	10	40	1%	0.1	3%	0.3	0	0	0.39	3.28	5	5	10.00	100	3	60	363.28
MANUFACTURING, HIDALGO	Non-potable reuse	$749,442	N		y	2	2	4	80	5	5	3	0	13	52	39%	3.9	34%	3.4	0	0	7.29	60.74	10	5	15.00	150	0	0	342.74
ELSA	Acquisition of water rights through purchase	$208,640	N			2	2	4	80	3	0	7	0	10	40	0%	0.0	0%	0.0	0	0	0.00	0.00	10	3	13.00	130	3	60	310.00
NORTH ALAMO WSC	Acquisition of water rights through purchase	$3,763,865	N	y		0	0	0	0	3	0	7	0	10	40	7%	0.7	7%	0.7	0	5	6.44	53.63	10	5	15.00	150	3	60	303.63
EAST RIO HONDO WSC	Acquisition of water rights through contract	$17,409	N	y		2	2	4	80	3	0	7	0	10	40	2%	0.2	0%	0.0	0	5	5.23	43.59	5	3	8.00	80	3	60	303.59
SULLIVAN CITY	Acquisition of water rights through contract	$73,120	N			2	2	4	80	3	0	7	0	10	40	5%	0.5	5%	0.5	0	0	1.02	8.49	5	5	10.00	100	3	60	288.49
PALMVIEW	Acquisition of water rights through contract	$156,685	N			2	2	4	80	3	0	7	0	10	40	5%	0.5	5%	0.5	0	0	0.99	8.24	5	5	10.00	100	3	60	288.24
WESLACO	Acquisition of water rights through purchase	$417,280	N			0	0	0	0	3	0	7	0	10	40	3%	0.3	3%	0.3	0	0	0.53	4.40	10	5	15.00	150	3	60	254.40
NORTH ALAMO WSC	Acquisition of water rights through contract	$167,130	N	y		0	0	0	0	3	0	7	0	10	40	0%	0.0	0%	0.0	0	5	5.08	42.30	5	5	10.00	100	3	60	242.30
WESLACO	Acquisition of water rights through contract	$348,188	N			0	0	0	0	3	0	7	0	10	40	3%	0.3	3%	0.3	0	0	0.53	4.40	5	5	10.00	100	3	60	204.40
HIDALGO COUNTY DRAINAGE DISTI	Delta Watershed Project	$53,788,355	N	Y	Y	10	10	20	400	5	2	4	5	16	64	3%	0.3	6%	0.6	0	5	5.95	49.62	5	3	8.00	80	0	0	593.62