5A.16 Regional Surface Water Systems to Augment Groundwater

The Trinity Aquifer is a major source of water in the Brazos G Region and supplies water to numerous communities, homes, and farms along a north-south band extending from Williamson County to Johnson County. Based on significant water level declines in the confined zone, the Trinity Aquifer is considered to be overdeveloped in several regions, including Bosque, Johnson, and Williamson Counties. In these regions, and possibly others, the Trinity Aquifer cannot be relied on to meet increased water demands.

The Edwards Aquifer is also a major source of water to part of the Brazos G Region and supplies water to Williamson and Bell Counties. This aquifer also extends south of the Brazos G Region into Travis County, but is not hydraulically connected to the Edwards Aquifer south of the Colorado River or in the San Antonio area. The Edwards Aquifer in Williamson and Bell Counties can meet current demands during average and wet years, but is overdeveloped to meet demands during extended droughts. Therefore, the Edwards Aquifer cannot be relied upon to meet increased water demands in Williamson and Bell Counties.

This option considers three possible regional surface water systems to meet projected needs in areas dependent on the Trinity or Edwards Aquifers. Bosque County currently relies on the Trinity Aquifer for about 54 percent of its municipal and industrial water supply and not all projected demands can be met from current supplies. The cities of Meridian, Valley Mills, Walnut Springs, along with entities in the County Other category have a combined projected shortage of 1,327 acft/yr in 2030 and increases to a shortage of 1,601 acft/yr in 2050. Section 5A.16.1 describes a possible regional surface water system to meet these projected shortages.

Johnson County currently relies on the Trinity Aquifer for about 8 percent of its water supply and projected demands cannot be fully met by current supplies. The City of Keene and entities in the County Other category have a combined projected shortage of 3,221 acft/yr in 2030 and increases to a shortage of 5,295 acft/yr in 2050. Section 5A.16.2 describes a possible expansion of the SWATS regional surface water system to meet these projected shortages.

Williamson County currently relies on the Edwards and Trinity Aquifers for about 20 percent of its water supply and projected demands cannot be fully met by supplies available to the county. The combined municipal and industrial projected shortfall is 10,500 acft/yr in 2030 and grows to 36,500 acft/yr in 2050. (Note: expected increased industrial water demand in

Williamson County will drive the projected shortages higher.) Section 5A.16.3 describes a possible regional surface water system to meet these projected shortages from a supply source outside of the Brazos G region.

5A.16.1 Bosque County Regional Surface Water Supply from Lake Whitney

5A.16.1.1 Description of Option

Several entities in Bosque County are projected to have a water shortage in the year 2050. The combined shortage of the City of Meridian, the City of Valley Mills, the City of Walnut Springs, and the County Other entities is 1,601 acft/yr in 2050.

This water supply option (Bosque County Regional Surface Water Supply from Lake Whitney) is an evaluation of the potential for purchasing 1,475 acft/yr of water from the BRA at Lake Whitney and delivering it to the City of Meridian, Childress Creek Water Supply Corporation, and Mustang Valley Water Supply Corporation. Two additional alternatives were also evaluated, delivering water to the City of Walnut Springs through an extension of the transmission system through the City of Meridian and to the City of Valley Mills through an extension of the transmission system from Childress Creek Water Supply Corporation. Walnut Springs' shortages could potentially also be met by the extension of the Somervell County Water Supply Project from the City of Glen Rose. Valley Mills shortages could potentially also be met by an extension of the City of Waco's water supply system. Figure 5A.16-1 shows the location of the transmission system in Bosque County.

Previous water supply studies[1,2] for entities in Bosque County have also evaluated Lake Whitney as a potential source of water for Bosque County.

Because the total dissolved solids (TDS) and chloride content of the raw water from Lake Whitney is above drinking water standards, as shown in Table 5A.16-1, the treatment process considered here includes a conventional process with a capacity of 3 MGD followed by a electrodialysis reversal (EDR) process with a capacity of 3 MGD for TDS and chloride removal.

[1] HDR Engineering, Inc. (HDR), "Water Supply Alternatives for Bosque County," 1982.
[2] HDR, "City of Clifton and Meridian Regional Water Supply Study," 1995.

Table 5A.16-1.
Lake Whitney Water Quality Data
(Selected Constituents)

Constituent	*Range*	*Drinking Water Standards*
Total Dissolved Solids (mg/L)	850 to 2,200	500
Chloride (mg/L)	300 to 900	250

Source: HDR Engineering, Inc. "City of Clifton and Meridian Regional Water Supply Study," 1995.

5A.16.1.2 Available Yield

Currently, there is little or no water available to be purchased from the BRA at Lake Whitney. In order to expand the develop the Bosque County water system, raw water supply would need to be acquired from one or more of several possible sources: purchase of water from an entity that has unused supply (such as Texas Utilities); enhancement of yield from an existing source, such as reallocation of storage at Lake Whitney; or negotiating a water trade among BRA customers to make water available in Lake Whitney.

5A.16.1.3 Environmental

The construction of a new intake structure on Lake Whitney and transmission pipeline to Bosque County would involve relatively low environmental impacts. Possible impacts include:

- Reduced flows in Brazos River below Lake Whitney would likely have low impacts on environmental water needs, instream flows, bays and estuaries.
- Pipeline construction could have a low impact on fish and wildlife habitat at the crossing of the North Bosque River.
- Impacts on cultural resources and endangered bird species would be low if the pipeline route follows existing highway right-of-way.

5A.16.1.4 Engineering and Costing

The facilities that would be required to deliver treated water from Lake Whitney to the City of Meridian, Childress Creek Water Supply Corporation, and Mustang Valley Water Supply Corporation are:

- Lake Whitney raw water intake and pump station;
- Water treatment plant near Lake Whitney (demineralization);
- Treated water pump station; and

- Transmission pipelines to the City of Meridian, Childress Creek Water Supply Corporation, and Mustang Valley Water Supply Corporation.

This alternative system would require a new intake, pump station, water treatment facilities, and transmission pipelines to deliver 1,601 acft. The water treatment facilities and transmission lines are sized to deliver water at a uniform annual flow rate of 1.3 MGD and a peak flow of 2.8 MGD. Table 5A.16-2 lists the pipeline segments, diameters, and delivery rates for the system components.

Table 5A.16-2.
Facility Sizes for Bosque County Regional Water System

Pipe Segment	Length (miles)	Diameter (inches)	Pipeline Flow Rate		Water Delivery	
			Average (MGD)	Peak (MGD)	Average (MGD)	Peak (MGD)
Intake to WTP	3.0	16	1.3	2.8		
WTP to Junction	2.1	16	1.3	2.8		
Junction to Childress Creek WSC	10.1	10	0.5	1.1	0.5	1.0
Junction to City of Meridian	11.7	12	0.8	1.7	0.3	0.6
City of Meridian to Mustang Valley WSC	8.3	10	1.1	2.4	0.5	1.0

As shown in Table 5A.16-3, the total capital cost of this option is $16,751,000, a total project cost of $25,782,000, and a total annual cost of $2,587,000. This is an annual unit cost of $1,753 per acft, or $5.38 per 1,000 gallons of water.

An additional alternative considered was extending an additional 7 miles of pipeline to the City of Valley Mills to meet their projected 2050 shortage of 83 acft/yr. This alternative has a total annual cost of $152,000.

Another alternative considered was extending an additional 11 miles of pipeline to the City of Walnut Springs to meet the projected 2050 shortage of 43 acft/yr. This has a total annual cost of $187,000.

All alternatives considered together have a total annual cost of $2,926,000 and a unit cost of $1,827 acft, or $5.61 per 1,000 gallons.

Table 5A.16-3
Cost Estimate Summary
Bosque County Regional Surface Water Supply from Lake Whitney
Second Quarter 1999 Prices

Item	*Estimated Costs for Facilities*
Capital Costs	
Intake	$1,022,000
Water Treatment Plant	4,506,000
Transmission Pump Stations	2,623,000
Transmission Pipeline	8,600,000
Total Capital Cost	**$16,751,000**
Engineering, Legal Costs and Contingencies	$5,075,000
Environmental & Archaeology Studies and Mitigation	887,000
Land Acquisition and Surveying	1,235,000
Interest During Construction	1,834,000
Total Project Cost	**$25,782,000**
Annual Costs	
Debt Service	$1,871,000
Operation and Maintenance:	
Intake, Pipeline, Pump Station	94,000
Water Treatment Plant	496,000
Energy Costs	93,000
Purchase of Water ($23 per acft)[1]	33,000
Total Annual Cost	**$2,587,000**
Available Project Yield (acft/yr)	1,475
Annual Cost of Water ($ per acft)	$1,753
Annual Cost of Water ($ per 1,000 gallons)	$5.38

[1] Water purchase price is set equal to current BRA system price.

5A.16.1.5 Implementation

This water supply option has been compared to the plan development criteria, as shown in Table 5A.16-4, and the option meets each criterion.

Table 5A.16-4.
Comparison of Bosque County Regional Surface Water Supply from Lake Whitney Option to Plan Development Criteria

Impact Category	*Comment(s)*
A. Water Supply:	
1. Quantity	1. Sufficient to meet needs
2. Reliability	2. High reliability
3. Cost	3. Reasonable (moderate to high)
B. Environmental factors	
1. Environmental Water Needs	1. Low impact
2. Habitat	2. Low impact
3. Cultural Resources	3. Low impact
4. Bays and Estuaries	4. Low impact
C. Impact on Other State Water Resources	• No apparent negative impacts on state water resources; no effect on navigation
D. Threats to Agriculture and Natural Resources	• Low to none
E. Equitable Comparison of Strategies Deemed Feasible	• Option is considered to meet municipal and industrial shortages
F. Requirements for Interbasin Transfers	• Not applicable
G. Third Party Social and Economic Impacts from Voluntary Redistribution	• None

Implementation will require the following, not the least of which is acquiring water either from the Brazos River Authority or others.

1. It will be necessary to obtain these permits:
   a. U.S. Army Corps of Engineers Sections 10 and 404 dredge and fill permits for stream crossings impacting wetlands or navigable waters of the United States.
   b. TPWD Sand, Gravel and Marl permit for construction in state-owned streambeds.
   c. NPDES Storm Water Pollution Prevention Plan.
2. Right-of-Way and easement acquisition.
3. Crossings:
   a. Highways and Railroads.
   b. Creeks and Rivers.
   c. Other Utilities.
4. Financing:
   a. Sponsoring entity must be identified and be able to incur debt to finance project.
   b. Participating entities must negotiate water purchase contract with BRA or others and establish rate structure.

5. Environmental Mitigation:
    a. Mitigation requirements would vary depending on impacts, but could include vegetation restoration, wetland creation or enhancement, or additional land acquisition.

5A.16.2 Lake Granbury Supply to Johnson County

5A.16.2.1 Description of Option

Currently, the BRA operates a SWATS plant near Lake Granbury to serve four wholesale customers. Johnson County Rural Water Supply Corporation (JCRWSC) and Johnson County Fresh Water Supply District (JCFWSD) are in Johnson County, and Acton Municipal Utility District (AMUD) and the City of Granbury are in Hood County. The SWATS plant is not currently operating at its maximum capacity of 21-MGD, and more recent expansion planning indicates a need for increased plant capacities sooner than originally expected, as reported in the previous Section 5A.11 and in Table 5A.11-8.

Several entities in Johnson County are projected to be water short by the year 2050. The Cities of Alvarado, Briar Oaks, Burleson, Grand View, and the County Other entities are projected to have a total combined shortage of 13,015 acft per year by the year 2050. Not including the City of Burleson shortage of 1,544 acft per year, (which could be met from other sources), the remaining shortages in Johnson County total 11,471 acft per year and these needs could be met by expanding the existing SWATS plant above its planned capacity of 21 MGD and building a pipeline to deliver the treated water to water short areas. The pipeline would deliver water from the expanded SWATS plant to the City of Keene, which would serve as a distribution point to other water short entities in Johnson County. The City of Keene would be a convenient location for County Other entities to connect to the system. From the City of Keene, one spur could deliver water to the City of Briar Oaks, and the other spur could deliver to the City of Alvarado and then continue on to the City of Grand View. Figure 5A.16-2 shows Lake Granbury and a possible pipeline route to supply water to entities in eastern Johnson County.

An expansion of the SWATS water treatment plant is also discussed in more detail in Section 5A.11.4.3 and could provide 11,471 acft/yr or more of treated water to Johnson County.

5A.16.2.2 Available Yield

Currently, there is little or no uncommitted water available to be purchased from the BRA at Lake Granbury. In order to expand the SWATS regional system, raw water supply would need to be acquired from one or more of several possible sources: purchase of water from an entity that has unused supply (such as Texas Utilities); enhancement of yield from an existing source, such as reallocation of storage at Lake Whitney; or negotiating a water trade among BRA customers to make water available in Lake Granbury.

5A.16.2.3 Environmental

The construction of a new intake structure on Lake Granbury and transmission pipeline to Johnson County would involve relatively low environmental impacts:

- Reduced flows in the Brazos River below Lake Granbury could have a low impact on environmental water needs and instream flows.
- Pipeline construction effects on fish and wildlife habitat at creek and river crossings and on cultural resources would be low if inside existing highway right-of-way, possibly moderate if outside right-of-way.
- Diversion point would be immediately upstream of a Potential Unique Stream Segment on the Brazos River.
- Low impacts on two endangered bird species, the Golden-cheeked warbler and the Black-capped vireo, would be possible as a result of the pipeline construction.

5A.16.2.4 Engineering and Costing

The facilities needed to provide water for the projected shortages in Johnson County through expansion of the SWATS plant are:

- New raw water intake structure at Lake Granbury;
- Expanded SWATS water treatment plant (Electrodialysis reversal process, EDR) preceded by a conventional water treatment plant;
- Treated water pump station ; and
- Water transmission pipelines to receiving entities

The Lake Granbury Supply to Johnson County option would consist of a new raw water intake facility at Lake Granbury, a conventional water treatment plant, followed by an EDR demineralization water treatment plant, a pump station, and water transmission pipelines to receiving entities. The raw water intake, water treatment facilities, pump station, and transmission pipelines are all designed to be peaking facilities, delivering an average of

11,471 acft per year of treated water. Using a peaking factor of 2, this is a maximum daily rate of 20.48 MGD. The raw water intake and water treatment facilities are summarized more completely in section 5.11.4.3.

The treated water pump station at the water treatment plant is sized for a maximum daily rate of 20.48 MGD. Table 5A.16-5 summarizes each segment of the transmission pipeline system, including diameter, length, destination, and delivery quantity.

Table 5A.16-5.
Pipelines Needed for Lake Granbury Supply to Johnson County

Pipeline Segment	*Diameter (inches)*	*Length (miles)*	*Design Capacity (MGD)*	*Delivery Destination*	*Delivery Quantity (acft/yr)*
SWATS Plant to Keene	36	24.7	20.5	Keene, County Other	10,954
Keene to Briar Oaks	6	7.8	0.10	Briar Oaks	50
Keene to Alvarado	10	7.5	0.9	Alvarado	255
Alvarado to Grand View	8	9.0	0.4	Grand View	212
Totals		49.0			11,471

Costs to expand the SWATS plant intake and treatment plant were summarized in Table 5.11-8. The total project cost for the treatment plant is estimated to be $73,647,000, resulting in a unit cost for the treatment plant alone of $778 per acft or $2.39 per 1,000 gallons. These costs include the purchase of raw water at the BRA system price.

Table 5A.16-6 summarizes the cost estimate for the pump station and pipeline needed to deliver water for this option. The total capital cost for the pump station and transmission pipelines is $23,661,000. Including engineering, legal, contingency, environmental studies and mitigation, land acquisition and surveying, and interest during the construction period of 2 years, the total project cost is estimated to be $36,602,000. Taking into account a 30-year loan at a 6% interest rate, operation and maintenance costs for the pipeline and pump station, pumping energy costs, the total annual cost would be $3,244,000. For a delivery of 11,471 acft/yr, this represents a unit cost of $283 per acft or $0.87 per 1,000 gallons. Unit costs would be higher in the early years of the project when less water is used.

Table 5A.16-6.
Cost Estimate Summary for Expansion of
SWATS Plant and Delivery of Treated Water

Component	*Unit Cost*
SWATS Plant Expansion (11.4 MGD) (Table 5A.11-2)	$778 per acft
Treated Water Pump Station & Pipeline	$283 per acft
Total Unit Cost	$1061 per acft $3.26 per 1,000 gallons

Combining the demineralization treatment cost of $779 per acft with the pump station and pipeline cost of $283 per acft results in a total cost of $1061 per acft ($3.26 per 1,000 gallons for treated water delivered to the central part of Johnson County. These cost components are summarized in Table 5A.16-7.

5A.16.2.5 Implementation

This water supply option has been compared to the plan development criteria, as shown in Table 5A.16-8, and the option meets each criterion.

Implementation will require these steps, not the least of which is actually finding water available for sale from the BRA.

1. It will be necessary to obtain these permits:
   a. U.S. Army Corps of Engineers Sections 10 and 404 dredge and fill permits for stream crossings
   b. General Land Office (GLO) sand and Gravel Removal Permits
   c. TPWD Sand, Gravel and Marl permit for river crossings
2. Right-of-Way and easement acquisition.
3. Crossings
   a. Highways and Railroads
   b. Creeks and Rivers
   c. Other Utilities
4. Financing
   a. Sponsoring entity must be identified and be able to incur debt to finance project.
   b. Participating entities must negotiate water purchase contract with BRA and establish rate structure.

Table 5A.16-7.
Cost Estimate Summary
Lake Granbury Supply to Johnson County
Second Quarter 1999 Prices

Item	*Estimated Costs for Facilities*
Capital Costs	
Transmission Pump Station	$3,927,000
Transmission Pipeline	$19,734,000
Total Capital Cost	**$23,661,000**
Engineering, Legal Costs and Contingencies	$7,294,000
Environmental & Archaeology Studies and Mitigation	$1,226,000
Land Acquisition and Surveying	$1,709,000
Interest During Construction	$2,712,000
Total Project Cost	**$36,602,000**
Annual Costs	
Debt Service	$2,659,000
Operation and Maintenance:	
Intake, Pipeline, Pump Station	$268,000
Water Treatment Plant[1]	$0
Raw Water Costs[2]	$0
Pumping Energy Costs	$317,000
Total Annual Cost	**$3,244,000**
Available Project Yield (acft/yr)	11,471
Annual Cost of Water ($ per acft)	$283
Annual Cost of Water ($ per 1,000 gallons)	$0.87

(1) Water Treatment costs summarized in Table 5.11-2.
(2) Purchase of raw water for this project was included in the Water Treatment Plant cost estimate in Table 5.11-2.

Table 5A.16-8.
Comparison of Lake Granbury Supply to Johnson County
Option to Plan Development Criteria

Impact Category	*Comment(s)*
A. Water Supply:	
1. Quantity	1. Sufficient to meet needs
2. Reliability	2. High reliability
3. Cost	3. Reasonable (moderate to high)
B. Environmental factors	
1. Environmental Water Needs	1. Low impact
2. Habitat	2. Low impact
3. Cultural Resources	3. Low impact
4. Bays and Estuaries	4. Low impact
C. Impact on Other State Water Resources	• No apparent negative impacts on state water resources; no effect on navigation
D. Threats to Agriculture and Natural Resources	• Low to none
E. Equitable Comparison of Strategies Deemed Feasible	• Option is considered to meet municipal and industrial shortages
F. Requirements for Interbasin Transfers	• Not applicable
G. Third Party Social and Economic Impacts from Voluntary Redistribution	• None

5A.16.3 Regional Surface Water Supply to Williamson County from Lake Travis

5A.16.3.1 Description of Alternative

Lake Travis is located on the Colorado River in western Travis County and is in the SB 1 Lower Colorado planning region. Lake Travis is one of the five reservoirs owned and operated by the Lower Colorado River Authority (LCRA), which along with Lake Austin, are known as the Highland Lakes. Two of the Highland Lakes, Lakes Buchanan and Travis, are water supply reservoirs and have dedicated conservation storage. The other four reservoirs in the Highland Lakes chain are constant level lakes and are not considered water supply reservoirs. The location of Lake Travis is shown in Figure 5A.16-3. The LCRA currently has contracts to supply water to two cities in Williamson County. The City of Cedar Park has a contract to purchase 16,500 acft/yr. Cedar Park owns and operates its own water treatment plant. The LCRA also has a contract with the City of Leander to provide 6,400 acft/yr of treated water and LCRA is currently building a treatment plant to provide water to Leander.

This alternative evaluates the diversion of 36,514 acft/yr of raw water from Lake Travis for delivery to treatment facilities at, or near, the existing City of Round Rock Water Treatment Plant. This annual delivery rate is sufficient to meet the projected 2050 shortfall throughout the County, including Georgetown, Round Rock, and the entities in the County Other category. As part of the Trans-Texas Water Program and in independent studies for the BRA and LCRA, HDR Engineering has previously considered the use of water from the Highland Lakes to meet Williamson County needs.[3,4]

For this analysis, two delivery options to Williamson County were evaluated:

Option A: delivery at a uniform annual rate of 32.6 MGD (36,500 acft/yr); peak day demands would be met from existing water supply sources.

Option B: delivery and treatment capacity to meet peak day demands at a peak factor of 2.0, creating a delivery capacity of 65.2 MGD; annual delivery of 36,500 acft/yr.

Diversion facilities would be constructed in deep water on the main body of Lake Travis near the confluence of Sandy Creek with the main body of the lake. A raw water transmission pipeline would be constructed to either an expansion of the Round Rock treatment facility or to a new regional water treatment plant located near the Round Rock facility. The general location of the intake and transmission pipeline are shown in Figure 5A.16-3. Entities other than Round Rock (such as Georgetown, Chisholm Trail SUD, and others) would utilize water from this alternative by constructing treated water pipelines from the central treatment facility to their respective service areas and interconnecting with the distribution system.

5A.16.3.2 Available Yield

Under the provisions of HB 1437[5] and by agreement between the BRA and LCRA, 25,000 acft/yr of stored water in the Highland Lakes can be sold by LCRA to entities in Williamson County in addition to existing contracts with Cedar Park and Leander. However, the 25,000 acft allowed under HB 1437 does not meet the 2050 needs in Williamson County of 36,500 acft. Sufficient quantity of uncommitted stored water exists in the Highland Lakes to meet all of Williamson County's projected 2050 shortages and this supply option as conceptualized here is sized to meet the 2050 needs. This allows direct comparison to the option

[3] HDR Engineering, Inc. (HDR), "Trans-Texas Water Program, North Central Study Area, Phase I Report," February 1998.
[4] HDR, "West Williamson County Regional Water System," Conceptual Design Study (unpublished), November 1998.
[5] House Bill 1437, 76th Session, Texas Legislature.

of bringing in the same amount of Carrizo-Wilcox Aquifer water to meet Williamson County needs. It also requires that either HB 1437 be amended by the legislature to allow the sale of additional water, or other administrative measures, such as TNRCC interbasin transfer permit would be required to deliver the quantity above 25,000 acft.

HB 1437 also provides that a 25 percent surcharge be added to the cost of water from the Colorado River basin delivered to Williamson County to pay for development of replacement supplies in the Colorado River Basin.

5A.16.3.3 Environmental

The construction of a new intake structure on Lake Travis and transmission pipeline to Williamson County (an Interbasin Transfer from Region K to Region G) would entail low to moderate environmental effects, depending on the quantity of water diverted, and the specific alignment of the pipeline.

- The diversion of up to 36,500 acft/yr or more could have a low impact below Lake Travis on environmental water needs, instream flows and Matagorda Bay, depending on the quantity and timing of diversions.
- The pipeline construction could have moderate to high impacts on karst invertebrates in Travis and Williamson Counties and other wildlife in the Travis County portion of route, where the pipeline would not follow existing highway right-of-way.
- Low impacts could occur on three federally listed endangered bird species. Moderate to high impacts would be possible for seven federally listed endangered invertebrates.

5A.16.3.4 Engineering and Costing

Option A: Delivery at a Uniform Annual Rate. A raw water intake and pump station would be needed at Lake Travis, a 19-mile raw water transmission pipeline would take the water to a water treatment plant near the existing Round Rock Water Treatment Plant. All facilities sized for a uniform annual rate of 32.6 MGD.

The major facilities needed to implement this project are:

- Raw water intake and pump station at Lake Travis
- Raw water transmission pipeline from Lake Travis to Regional Water Treatment Plant near Round Rock
- Water Treatment Plant

Option B: Delivery at a Peak Day Use Rate. The same facilities would be needed for Option B as for Option A. Option B facilities would be sized for a peak day use of 65.2 MGD.

Table 5A.16-9 contains a cost estimate for both options. Delivery of 36,514 acft/yr at an annual rate would have a total project cost of $82,457,000, an annual cost of $15,479,000, resulting in a unit cost of $424/acft, or $1.30 per 1,000 gallons of water. Delivery of 36,514 acft/yr at a peaking rate would have a total project cost of approximately $126,457,000, an annual cost of $21,782,000, and a unit cost of $597 per acft, or $1.83 per 1,000 gallons of water.

5A.16.3.5 Implementation Issues

This water supply option has been compared to the plan development criteria, as shown in Table 5A.16-10, and the option meets each criterion.

The transfer of water from Lake Travis to Williamson County would constitute an interbasin transfer and require a permit from the TNRCC. Under Senate Bill 1, a permit must be obtained to divert state water from one river basin to another (SB1, Section 11.085(a)). However, Senate Bill 1 provides an exemption (Section 11.085(v)) from most of the requirements of Section 11.085 for water transfers to another river basin when a portion of the county or municipality receiving the water is in the basin of origin. Because a small portion of Williamson County is in the Colorado River Basin, the exemptions allowed in Senate Bill 1 will probably apply. TNRCC permit amendments could be needed to add a point of diversion at Lake Travis.

Amendment of HB 1437 may also be needed to direct more than 25,000 acft/yr to Williamson County.

Requirements Specific to Pipelines

1. Necessary permits:
   a. U.S. Army Corps of Engineers Section 404 dredge and fill permit for stream crossings and lake intake impacting wetlands or navigable water of the United States.
   b. GLO Sand and Gravel Removal permits.
   c. TPWD Sand, Gravel and Marl permit for construction in state-owned streambeds.
2. Right-of-Way and easement acquisition.
3. Crossings:
   a. Highways and Railroads.
   b. Creeks and Rivers.
   c. Other Utilities.
4. Mitigation requirements would vary depending on impacts, but could include vegetation restoration, wetland creation or enhancement, or additional land acquisition.

Table 5A.16-9.
Cost Estimate Summary
Regional Surface Water supply to Williamson County from Lake Travis
Second Quarter 1999 Prices

Item	*Uniform Annual Delivery Rate 32.6 MGD*	*Peak Deliver Rate 65.4 MGD*
Capital Costs		
Intake and Pump Station	$8,750,000	$11,280,000
Raw Water Transmission Pipeline	22,612,000	29,649,000
Water Treatment Plant	25,221,000	46,140,000
Total Capital Cost	**$56,583,000**	**$87,069,000**
Engineering, Legal Costs and Contingencies	$18,674,000	$28,991,000
Environmental & Archaeology Studies and Mitigation	493,000	499,000
Land Acquisition and Surveying	905,000	912,000
Interest During Construction	5,802,000	8,986,000
Total Project Cost	**$82,457,000**	**$126,457,000**
Annual Costs		
Debt Service	$5,990,000	$9,187,000
Operation and Maintenance:		
Water Treatment Plant	2,801,000	5,628,000
Pipeline, Pump Station	445,000	578,000
Pumping Energy Costs	1,460,000	1,606,000
Purchase of Water ($131 per acft)[1]	4,783,000	4,783,000
Total Annual Cost	**$15,479,000**	**$21,782,000**
Available Project Yield (acft/yr)	**36,514**	**36,514**
Annual Cost of Water ($ per acft)	**$424**	**$597**
Annual Cost of Water ($ per 1,000 gallons)	**$1.30**	**$1.83**

[1] Water purchase price is LCRA System rate of $105 per acft plus 25 percent surcharge, as required by HB 1437.

Table 5A.16-10.
Comparison of Lake Travis Supply to Williamson County Option to Plan Development Criteria

Impact Category	*Comment(s)*
A. Water Supply:	
1. Quantity	1. Sufficient to meet needs
2. Reliability	2. High reliability
3. Cost	3. Reasonable (moderate to high)
B. Environmental factors	
1. Environmental Water Needs	1. Low impact
2. Habitat	2. Moderate to high impact
3. Cultural Resources	3. Low to moderate impact
4. Bays and Estuaries	4. Low impact
C. Impact on Other State Water Resources	• No apparent negative impacts on state water resources; no effect on navigation
D. Threats to Agriculture and Natural Resources	• Low to none
E. Equitable Comparison of Strategies Deemed Feasible	• Option is considered to meet municipal and industrial shortages
F. Requirements for Interbasin Transfers	• Permit required from TNRCC; will require legislative approval if more than 25,000 acft is transferred
G. Third Party Social and Economic Impacts from Voluntary Redistribution	• None