CHAPTER 19
MEETING WATER SUPPLY NEEDS
PLANNING, PERMITTING, AND IMPLEMENTATION
021108 – With Editors' Revisions

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1. Overview of Issues

The climate and hydrology of Texas is vastly different from one area of the state to the next. Because of its sheer size, Texas encompasses multiple ecological and hydrologic zones, with different resources, climates, and demands for water. The varied nature of water resources in Texas is particularly evident when examining the state from east to west. The eastern part of Texas is blessed with abundant rainfall in most years, ranging from 40-55 inches per year over large areas of the region, which allows for plentiful water resources in many parts of East Texas. 2 TEXAS WATER DEVELOPMENT BOARD, WATER FOR TEXAS 2007 132 (2007), *available at* http://www.twdb.state.tx.us/publications/reports/State_Water_Plan/2007/2007StateWaterPlan/2007StateWaterPlan.htm (hereinafter "STATE WATER PLAN"), Figure 5.3. West and South Texas are not so blessed, and many areas in these portions of the state receive less than 10-20 inches of rainfall annually. STATE WATER PLAN at 132. Not surprisingly, water supply has played a large role in development and population growth throughout the state's history. The Trinity River provides the vast majority of the existing water supplies for the two largest metropolitan areas in the state, the Dallas-Fort Worth metroplex and the Houston metropolitan area. Other rivers and river basins in the state, notably the Sabine and Neches in the east, and the Brazos, Colorado, and Guadalupe basins to the west, are also prolific, resulting from sizeable drainage areas, plentiful rainfall in most years, or spring-

flow contributions. These basins all generate water supplies for cities, industries, and agricultural interests. STATE WATER PLAN at 142, 144, 146, 148 and 152.

The history of water development in Texas begins at the end of the nineteenth century, when the state passed legislation allowing the formal recognition of water rights and the issuance of debt for water supply projects. Irrigation Act of Mar. 19, 1889, 2lst Leg., R.S., ch. 88, §§ 1-17, 1889 Tex. Gen. Laws 100, 100-03, *reprinted in* 9 H.P.N. GAMMEL, LAWS OF TEXAS 1128, 1128-31 (1889); Irrigation Act of Mar. 21, 1895, 24th Leg., R.S., ch. 21, § 1, 1895 Tex. Gen. Laws 21-26, *reprinted in* 1O H.P.N. GAMMEL, LAWS OF TEXAS 751-756 (1895). *See generally,* Ronald A. Kaiser, *Texas Water Marketing in the Next Millennium: A Conceptual and Legal Analysis*, 27 TEX. TECH L. REV. 183, 229-244 (1996) (discussing history of water rights and surface water law in Texas). *See* Chapter Jarvis for a discussion of the history of surface water development. With the passage of the Conservation Amendment to the Texas Constitution in 1917, the Legislature enabled the creation of political subdivisions entitled to issue debt to develop water-related infrastructure. TEX. CONST. art. XVI, § 59. Since the passage of that amendment, literally thousands of such political subdivisions have been formed, from large river authorities charged with conserving, preserving, protecting, and developing the water resources within their boundaries to geographically small municipal utility districts and other water districts created primarily for supporting land development. *See, e.g.*, Sabine River Authority, Acts of 1949, 51st Leg., R.S., 1949 Tex. Gen. Laws 193, ch. 110; Lower Colorado River Authority, Acts of 1934, 43d Leg., 4th C.S., 1934 Tex. Gen. Laws 19, ch. 7; Brazos River Authority, Acts of 1929, 41st Leg., 2nd C.S., 1929 Tex. Gen. Laws 22, ch. 13; Guadalupe River Authority, Acts of 1933, 43d Leg., 1st C.S., 1933

Tex. Gen. Laws 198, ch. 75; Trinity River Authority, Acts of 1955, 54th Leg., R.S., 1955 Tex. Gen. Laws 1314, ch. 518. *See* Chapter [Stepherson] for a discussion of the various water-related political subdivisions.

While there are remaining supplies available for development, much of the state's surface water has already been appropriated and, in some areas of the state, groundwater resources are not readily available in significant quantities. STATE WATER PLAN at 138, 176. The Texas Water Development Board (TWDB) projects that by 2010 only 9 million acre-feet per year of surface water supply will be legally and physically available. STATE WATER PLAN at 138. The state's current annual demand for water has reached over 16.9 million acre-feet per year (STATE WATER PLAN at 120, Table 4.2.), and a shortfall of 8.8 million acre-feet of water is projected by 2060 (STATE WATER PLAN at 2). Thus, for the state to successfully respond to future demand, it will be necessary to plan, permit as necessary, and implement a variety of water supply projects and strategies over the next several decades. This chapter provides a brief discussion of the state's current water planning protocol, an overview of some of the sources of water supplies and strategies available for meeting projected water supply demands, a brief discussion of the various state and federal permitting that is generally associated with the development of water supply and delivery systems, and a description of the most common means available to finance the implementation of such projects. An in-depth treatment of many of these topics is included in other chapters of this treatise, as noted.

2. Regional and State Water Planning

In 1957 a constitutional amendment created the TWDB in response to the worst drought in the state's history. TEX. CONST. art. III, § 49(c). The drought lasted seven

years, and by the end of 1956 over 96 percent of the counties in the state were considered disaster areas. STATE WATER PLAN at 110. The epic drought ended in 1957 with a flood that replenished the aquifers, reservoirs, and surface water flows, but public awareness of the lack of drought protection led to the development of a structured system for water planning and strategy implementation. The TWDB was authorized in 1957 to manage and distribute a $200 million water development fund to aid communities in the development of reliable water supplies. The Legislature also mandated that the TWDB initiate a planning process to project future water needs and determine appropriate steps to address projected shortfalls. The TWDB has been provided with funding and other resources to assist in water supply development, maintenance, and planning from the agency's inception to the present day.

Over the past fifty years, the TWDB has prepared eight state water plans. Plans have been produced in 1961, 1968, 1984, 1990, 1992, 1997, 2002, and 2007. The early plans were created at a time when the primary method of water supply was the large-scale construction of reservoirs. From 1950 to 1970 over 90 "major reservoirs" (*i.e.*, reservoirs having a capacity of 5,000 acre-feet or more) were constructed in Texas. STATE WATER PLAN at 114. In addition to providing a reliable source of water, these reservoirs controlled flooding, provided a cheap form of electricity, and offered recreational opportunities. Currently, there are 196 major reservoirs in Texas, and 175 function as a water supply source for the state, region, or local community. STATE WATER PLAN at 142. More than one-half of the surface water supply in Texas comes from reservoirs, but the accumulation of sediment in reservoirs will lessen this supply over time. STATE WATER PLAN at 138, 142. The focus on reservoirs was reflected in the

first two state water plans, but by 1980 reservoir construction had declined precipitously because of a lack of viable sites, increased difficulty in environmental permitting, and a cost of construction that had risen faster than inflation. STATE WATER PLAN at 142.

Because of the challenges associated with reservoir development, the water plans of the 1980s and 1990s instead focused on water management and infrastructure development to best utilize existing water resources. For example, after 1984, the plans became increasingly more open to consider conservation, reuse, desalination, and other water supply proposals to address the growing water supply needs of Texas. The process for developing the state water plan changed over time, as well. In 1992, the TWDB increased the participation in the development of the water plan by including stakeholders, the Texas Parks and Wildlife Department, and the Texas Natural Resource Conservation Commission, a predecessor agency of the current Texas Commission on Environmental Quality ("TCEQ"). Even with the increased participation of other entities, the TWDB was still primarily in charge of developing the state water plan and was required to consider the varied needs of the entire state.

This top-down system changed, however, after the devastating drought of 1996. The drought reminded the public of the imminent need for efficient water planning and development of dependable supplies throughout the state. The water shortage and extensive crop failures across the state spurred legislative action that has reshaped water planning in Texas. In 1997, the 75th Legislature passed Senate Bill 1 ("SB 1"), which rewrote many sections of the Texas Water Code and created a "bottom-up" approach to water planning. SB 1 directed the TWDB to divide the state into regional planning areas based on the agency's assessment of relevant criteria, including: river basin and aquifer

locations, utility development patterns, boundaries of political subdivisions, a public involvement and comment process, and existing planning area boundaries. Acts 1997, 75th Leg., R.S., Ch. 1010, Eff. Sept. 1, 1997 (S.B. 1). At least once every five years, the TWDB must review the regional planning area boundaries and update them if necessary. In response, the TWDB created sixteen regional water planning areas ("RWPG"s). Each region is charged with developing its own fifty-year water plan tailored to the unique needs and resources of the area. STATE WATER PLAN at 4-7. Each RWPG is charged with developing a plan consistent with the guiding principles of the State Water Plan that also conforms to guidelines adopted by the TWDB, and with making recommendations based on data provided by or approved by the TWDB. TEX. WATER CODE § 16.053. *See* Chapters [Rosenberg] and [Norman] for an in-depth discussion of state water planning.

Through the regional water planning process, the state water plan is forged out of the grassroots, bottom-up assessments of water needs and supply performed by the RWPGs. Each of the sixteen approved plans are aggregated to form the state water plan. Every five years, the RWPGs are required to prepare a revised regional water plan, which again is submitted to the TWDB for approval and inclusion in the revised state water plan. The final state water plan is published by the TWDB and contains a wealth of information and projections of future population, water demand, climate, and alternative water supplies over the next fifty years.

In the 2007 state water plan, RWPGs identified over 4,500 water management strategies that could potentially create 9 million acre-feet of new water by 2060. This would compensate for the projected shortfall of 8.8 million acre-feet at an estimated cost of $30.7 billion dollars. This expense may be a bargain since the TWDB projects that if

no action is taken, water shortages and droughts may cost the state upwards of $98.4 billion by 2060. STATE WATER PLAN at 2. While many water supply projects or strategies are being considered, permitting and funding lengthen the time before a project can be implemented. In 2006, a TWDB study of the implementation of the 2002 state water plan showed that 63 percent of the entities contacted had made some type of progress toward carrying out water supply strategies and 5 percent had begun construction, but only 9 percent reported some type of strategy that was operational. STATE WATER PLAN at 118.

The State Water Plan is only a guide and is not binding on any agency, but the TCEQ is required to consider approved state and regional water plans when it makes permit decisions regarding surface water rights. TEX. WATER CODE § 11.1501. Unless affirmatively waived, the TCEQ can only grant a permit for the appropriation of surface water if that appropriation addresses a water supply need that is "consistent with the state or approved regional plan" in the area of appropriation. TEX. WATER CODE § 11.134(b)(3)(E). Further, the TCEQ may not issue a water right for municipal purposes unless the region has an approved regional water plan, but this requirement may also be waived. TEX. WATER CODE § 11.134(c). The State Water Plan, even if not binding on the TCEQ, also has important implications on the funding for water supply projects -- large-scale regional water supply projects are not eligible for TWDB funding unless the proposed project is consistent with state and regional water plans. *See* TEX. WATER CODE § 16.053(j).

3. Sources of Supplies

One of the most important steps in the state water planning process is adequately identifying and considering all water supply options. There may be a number of sources, or a combination of sources, that can be used to meet projected water supply demands. Traditionally, water suppliers have focused on surface water and groundwater, but with the decreasing availability of these supplies and the increasing protection afforded such natural resources, more emphasis has been placed on nontraditional sources of supply. This subchapter provides an overview of the potential sources of available water supplies.

A. Surface Water

Surface water is a readily available and renewable source of supply. However, like groundwater, fresh surface water is a finite resource. Within the state, there are 23 river basins that produce fresh surface water. *See* STATE WATER PLAN at 139. Regardless of the apparent supply from these basins, existing allocations of surface water will determine whether or not any particular river basin should be considered a viable source of supply.

For the most part, surface water is considered "state water." There are a few exemptions, such as diffused surface water runoff, but the definition of state water is broad and includes all "water of the ordinary flow, underflow, and tides of every flowing river, natural stream, and lake, and 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." TEX. WATER CODE § 11.021(a). Thus, "state water" represents rainfall and spring flows that have reached a watercourse or other surface water body. State water also includes water imported from outside the

boundaries of the state for use in the state. TEX. WATER CODE § 11.021(b). State water is the property of the state and may be regulated for use by the state. *See, e.g.*, *Texas Water Rights Comm'n v. Wright*, 464 S.W.2d 642 (Tex. 1971). Although there are certain exemptions from permitting, the authority to use state water must be granted by the TCEQ. *See* TEX. WATER CODE § 11.121.

When planning for the use of surface water supplies, one must first evaluate the reliability and availability of the source. The TCEQ may not issue a permit unless it has been shown that sufficient water is available for appropriation. TEX. WATER CODE § 11.134(b)(2). In this regard, the TCEQ must review and consider an application pursuant to its rules regarding water availability. *See* 30 TEX. ADMIN. CODE § 297.42. Assuming a sufficient supply of surface water exists for appropriation, the TCEQ may grant a permit for the diversion and use of surface water. *See* Chapter [Caroom] for an in-depth discussion of permitting surface water.

In addition to securing the right to use surface water supplies from the TCEQ, there are other practical issues that must be considered. The method of taking, storing, or diverting surface water may impact the yield, efficiency, and feasibility of a surface water supply project. For example, it stands to reason that surface water captured during high-flow events and stored in a reservoir will be more reliable than run-of-river or direct diversions because the latter lack a means of storage. Though reservoirs are more reliable, the cost of construction and the environmental impacts will typically be much greater for reservoir development than those associated with a direct diversion. *See* Chapter [Clancy] for a thorough discussion of reservoirs.

B. Groundwater

Groundwater is the most utilized source of water supply in rural areas of the state, and particularly in the western portion of the state, but unlike surface water, groundwater has not been the subject of statewide regulation. *See* Chapter [Mace] for a discussion of the attributes of groundwater. Principles of rights to produce groundwater have been established in a series of cases, dating back to the early 20th century. In a 1904 decision, the Texas Supreme Court opined that groundwater was "secret [and] occult." *See Houston & Texas Central Railway Co. v. East*, 81 S.W. 279 (1904); *Contra Sipriano v. Great Spring Waters of America, Inc.*, 1 S.W.3d 75, 77 (Tex. 1999) (citing *City of Corpus Christi v. City of Pleasanton*, 276 S.W.2d 798, 805-06 (1955) (Wilson, J. dissenting)) (advancing knowledge of geology and hydrology have made groundwater not so secret and occult). Through these cases the English common law "rule of capture" has been ratified by Texas courts, although, in the past 50-60 years, the Legislature has embraced a system of groundwater management by groundwater conservation districts ("GCDs"). The Legislature has created a number of GCDs across the state to regulate groundwater withdrawals within those districts' jurisdictional boundaries. Groundwater production in areas outside of GCDs is generally unregulated, and the rule of capture continues to prevail. In areas with GCDs, the type and degree of regulation varies widely. *See* Chapter [Booth] for a fuller discussion of groundwater and regulation by GCDs.

When planning for the use of groundwater, ample consideration must be given to the method and means of accessing the aquifer where groundwater is stored. Some of the State's most prolific aquifers cover vast geographical areas, and may be accessed at various points, which provides an opportunity for many diverse water users to site wells

and withdraw groundwater. Other aquifers are confined to smaller geographical areas or located far from those who would put the water to use, and above-ground transmission lines are required to transfer supplies from the well site to the place of use. Groundwater quality is also an important consideration. Waters in some aquifers are of a higher water quality than others, and accessing pristine groundwater supplies may be impossible or more costly. Furthermore, some aquifers, like the Ogallala aquifer in the Texas panhandle, have a limited ability to recharge, while others, like the Edwards aquifer in central Texas, are highly dependent upon surface water recharge and diffused surface water runoff. When planning a water supply project dependent upon the use of groundwater, these issues should be carefully considered.

C. Conjunctive Use

Conjunctive use is the concurrent use of groundwater and surface water supplies to meet demands. Conjunctive use recognizes that an entity can balance its demands by supplementing one source of supply with another. Often alternative supplies are used to meet peak daily demands. For example, readily available groundwater supplies in rural areas of the state have allowed many utilities to meet water needs exclusively with groundwater. The population of Texas, however, has grown rapidly over the last 50 years. Many areas that have historically relied on groundwater supplies have seen demand grow to a level requiring the supplementing of water sources with a renewable source of surface water supplies.

As with any project that involves blending distinct sources of supply, conjunctive use requires consideration of water quality as well as quantity. Groundwater resources may have higher levels of total dissolved solids or metals, while surface water supplies

may have higher levels of nutrients or bacteria. A utility needs to carefully consider the ramifications of blending these sources. For instance, blending groundwater and surface water sources may produce water with a chemical composition different from either individual source. Often, this may change the overall pH of the water, resulting in the precipitation of undesirables into the water source.

Additionally, consideration must be given to meeting drinking water quality requirements (*See, e.g.*, 40 C.F.R. §§ 141.1-.723) when potable water is the end use, as well as the potential impact that return flows resulting from such use may have on stream standards compliance. *See* 33 U.S.C. § 1313 (2006) (federal surface water standards); 30 TEX. ADMIN. CODE §§ 307.1-.10 (Texas surface water standards). *See also* Chapter [Moorman] for a discussion of drinking water standards. Conjunctive use is a proven water supply management strategy that has wide support and, in some instances, has been mandated by state or federal governments. *See* HARRIS-GALVESTON COASTAL SUBSIDENCE DISTRICT, DISTRICT REGULATORY PLAN 1999, amended September 12, 2001, *available at* http://www.hgsubsidence.org/Assets/PDFDocuments/ HG RegPlan.pdf. *See* Chapter [Terrill] for further discussion of conjunctive use.

D. Reuse

Reuse is a water supply strategy that has gained significant interest in Texas during the last 10-20 years, but the water rights and water quality laws and regulations associated with reuse are complex. Not only are there distinctions in law between direct and indirect reuse but there are also legal differences between the indirect reuse of surface water-based effluent and groundwater-based effluent. *See generally*, TEX.

WATER CODE §§ 11.042, 11.046. *See*, TCEQ reclaimed water regulations at 30 TAC Chapter 210. *See* Chapter [Smith] for a further discussion of reuse.

In planning a reuse project, there are a number of issues to consider. The first is whether a utility desires to fully control the corpus of the water from creation to the end point of use, or whether there is a need to use the bed and banks of a state watercourse to convey the water. Secondly, assuming the utility seeks to use water via indirect reuse, questions related to the use of surface water for drinking water purposes arise: *e.g.*, where will the water be diverted? If the water will be stored in a reservoir, there may be concerns regarding the ratio of the reuse water to natural runoff in the total volume of the reservoir, as well as concerns regarding hydraulic detention time. These concerns regarding the end use of reclaimed water, as well as the yield of a project given special conditions that may be imposed on the authorizations and rights to use such water, can greatly impact the viability of a reuse project. *See* Chapter [Smith] for further discussion of water reuse.

E. Conservation

Like reuse, conservation is also a valuable water supply strategy. Every gallon per capita per day that is saved by a utility serving a population of 10,000 equates to an end-of-year savings of approximately 3.65 million gallons of water. This type of savings can be considered a supply strategy because it serves to reduce the overall demand requirements of a utility.

The Texas Legislature has recognized the need for conservation. Not only is there a requirement to prepare a water conservation plan before appropriating state water (*see* TEX. WATER CODE § 11.1271(a)), but the Legislature has also created a task force to

consider and enhance conservation across the state. *See* TEX. WATER CODE §§ 10.001-10.012 (establishing Texas Water Conservation Advisory Council). Conservation is the first water supply strategy employed by many utilities because it is much less costly, and more certain, than permitting and constructing new facilities. However, conservation alone is rarely a water supply strategy that can fulfill long-term projected demands. Utilities should look to the regional water planning process to determine how their own conservation efforts can be improved as well as to ascertain how much of their projected future demands can be met through conservation.

Conservation and drought planning are requirements for any utility serving more than 3,300 connections. *See* 30 TEX. ADMIN. CODE § 288.30(10)(A). Moreover, wholesale contracts are required to include language that imposes conservation planning on end users. *See,* 30 TEX. ADMIN. CODE § 288.5(1)(G).

Annual reporting is required to ensure that tasks are being implemented to achieve water conservation goals. *See* 30 TEX. ADMIN. CODE § 288.30(10)(C). Oversight for water conservation activities is shared between the TCEQ and the TWDB. See chapter [Caroom] for further discussion of conservation plans.

F. Desalination

Desalination involves the treatment and removal of dissolved solids from brackish groundwater or seawater. As noted above, and as further discussed in Chapter [Johnson], groundwater is regulated differently from surface water. Seawater is considered within the definition of state water. *See* TEX. WATER CODE § 11.021(a). Any desalination project that involves the diversion and use of brackish surface water and seawater will be required to have a surface water use permit in order to use this state water, while

desalination of groundwater may require approval by a GCD. Thus, permitting for desalination projects differs significantly depending on the source of supply and location.

In addition to permitting considerations, planning a desalination project raises a number of other issues, such as the type and cost of treatment that must be employed to remove dissolved solids. Membrane technology options include ultrafiltration, nanofiltration, microfiltration, and reverse osmosis, each of which involves the use of a progressively less porous membrane to remove dissolved solids. There are also additional treatment technologies, such as electro dialysis, that can be employed. Often, however, the limiting factor for a desalination project is how to handle the byproduct produced from treatment. In arid portions of the state, byproduct is often disposed of via salt drying beds. In other areas of the state it may be possible to deep well inject the byproduct. *See* TEX. WATER CODE § 27.051; 30 TEX. ADMIN. CODE §§ 331.1-.186. Where neither of these options exist or are practical, a permit authorizing discharge of the byproduct into a receiving water may be obtained. *See* TEX. WATER CODE § 26.121.

G. Aquifer Storage and Recovery

Aquifer Storage and Recovery ("ASR") is a means by which entities construct groundwater wells that can inject water into, and subsequently extract water from, a single aquifer. ASR wells are typically used to store surface water that is available during periods of high flow for use during periods of drought. ASR wells can be used to facilitate conjunctive use, and often they assist in off-setting peak pumping demands otherwise dependent upon distant or less reliable sources.

ASR wells are regulated under the Texas Water Code (*See, e.g.*, TEX. WATER CODE § 11.154) and TCEQ rules. To secure the authority to operate an ASR well, an

application must be submitted to the TCEQ that includes the same information necessary to appropriate state water, as well as information necessary to demonstrate compliance with the TCEQ injection wells regulations. *See* TEX. WATER CODE § 27.051; *see also,* 30 TEX. ADMIN. CODE §§ 331.1-.186 (TCEQ, Underground Injection Control). If an ASR application is filed within the territory of a GCD, the application must also demonstrate cooperation with the district, and it must include permit conditions referencing any contract by and between the applicant and the district. *See* TEX. WATER CODE § 11.154(b)(2). When reviewing an application for a permit authorizing an ASR well, the TCEQ must consider any potential impacts on water quality, whether the stored water can be successfully harvested for beneficial use, and whether the applicant can protect the water it is storing such that the water can be put to beneficial use without experiencing unreasonable loss. *See* TEX. WATER CODE § 11.154(c).

ASR wells have certain unique features that differ from single production or injection wells. Because of this, when considering ASR, it is recommended that a three-phase approach be taken to assess the viability of any proposed well. *See generally*, E. McCarthy, Jr., et al., *Aquifer Storage and Recovery*, THE WATER REPORT, Issue #19, September 2005. The first phase involves a preliminary feasibility study and conceptual design, which includes siting and designing certain monitoring wells. The second phase includes a field testing program to ensure that the aquifer can store the source of supply planned, and that it can be secured and subsequently retrieved without excessive loss or adverse impact to the existing aquifer. The third phase involves the permitting of an ASR well(s), which includes securing any necessary surface water permits under Texas Water Code Chapter 11 or groundwater permits required by Texas Water Code Chapter 36 (for

projects located inside a GCD). Additionally, the project must be authorized by injection permits required pursuant to Chapter 27 of the Texas Water Code.

H. System Operations

In order to secure the right to divert and use state water for certain uses, an applicant must demonstrate that water is available for appropriation for a sufficient percentage of time, pursuant to TCEQ rule. 30 TEX. ADMIN. CODE § 297.42. However, if an entity has additional, alternate supplies and can supplement its diversions with other sources, TCEQ rules allow the agency discretion regarding the necessary availability requirement. 30 TEX. ADMIN. CODE § 297.42(c). This type of supplementation is often available through use of a "system operation" for water supplies.

When contemplating a system operation, there are a number of considerations that must be given to the type of system being proposed. One concept that may be considered is the ability to overdraft one reservoir by relying upon the permitted yield of another reservoir. Another concept that may be considered is the ability to operate a series of reservoirs or run-of-river rights as a system, thereby allowing diversions or releases from any one reservoir or diversion location to meet water supply obligations. For large utilities with numerous sources of supply, the concept of networking a system of supplies can lead to enhanced yield as well as redundant reliability. *See* Chapter [Clancy] for a more detailed discussion regarding system operations.

I. Portfolio Management

When planning and implementing water supply strategies, it is important to consider all supplies available to a utility. Managing a portfolio of supplies is akin to managing a portfolio of monetary investments. The goal is to provide long-term reliable service at the lowest possible cost and risk. A prudent water supplier will evaluate all available water supply options, including the means for more efficient use of existing resources. This may be accomplished through reuse and conservation. A supplier should also consider ways to diversify and limit its exposure to short- or long-term water deficits. Potential causes of failure may include natural disasters such as hurricanes, source water contamination, drought, or catastrophic system collapse. Every catastrophic scenario cannot be addressed, but to ensure long-term success a supplier should consider diversifying its supply portfolio, which may include possible partnerships with other suppliers to gain access to additional or back-up supply, as well as planning for regulatory changes. *See, generally,* B. Castleberry, *Maintaining a Diverse Water Supply*, 33 OpFlow No. 7, July 2007, at 14-17 (discussing portfolio management in depth).

4. Permitting of Water Supply Projects

Once a project is identified in the State and Regional Water Plans as a recommended strategy to meet a community's water supply needs, a water supplier can begin to work toward the realization of that project. Before construction can commence on a specific project, there are a variety of local, state and federal permits that may need to be obtained to give the water supplier the legal right to construct a project. Permitting a major long-term water project is time-intensive and costly, particularly when applications are protested. The state and federal permitting aspect of a new reservoir, for

example, may take 5 to 10 years to complete, and sometimes more if litigation occurs. Depending on the urgency with which a project must be completed, many water suppliers choose to apply for and obtain all necessary permits before acquiring land for the project, obtaining additional financing, or beginning construction because of the uncertainty involved in the permitting process. Others risk this uncertainty by pursuing certain aspects of the project, such as land acquisition, in conjunction with their applications for the necessary permits. This subsection focuses on how water suppliers obtain the legal right to construct and pursue a water supply project.

A. State and Local Permitting

Surface water supply projects in Texas require authorization from the state, as the state holds in trust all surface water (*i.e.,* "state water") within the state. TEX. WATER CODE § 11.021(a). State water is defined as all "water of the ordinary flow, underflow, and tides of every flowing 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 is the property of the state." TEX. WATER CODE § 11.021(a). TCEQ is the agency charged with regulating surface water use, including the issuance of permits to divert and use such state water and the approval of sales and transfers of water already authorized for diversion. Local entities are not typically involved in permitting surface water projects, unless local regulation of real property is involved (for example, property upon which the storage or diversion facilities will be constructed). However, because groundwater is not regulated as state water, depending on the location groundwater projects may involve the oversight and approval

of local groundwater control districts. Thus, the regulation of a water supply project depends in large part on whether the project is surface water or groundwater based.

i. Surface Water Projects

Chapter 11 of the Texas Water Code outlines the legal and regulatory requirements to apply for a new surface water right from the TCEQ, to amend an existing surface water right, to transfer an existing surface water right to a third party, to transfer water supplies to another water basin, and to seek reuse of wastewater effluent. In allocating the right to the use of state water, Texas adheres to the doctrine of prior appropriation, where the actual "use" of water is a major element in acquiring and perfecting a water right. Texas Water Code Section 11.022 provides that the "right to the use of state water may be acquired by appropriation," and that when such a right of use "is lawfully acquired, [water] may be taken or diverted from its natural channel." TEX. WATER CODE § 11.022. This provision, along with others in the Texas Water Code, contemplates the "use" of water within an appropriations system and also requires the taking, storage, or diversion of such water. For example, Texas Water Code Section 11.002 defines a "water right" as a right to "impound, divert, or use state water." Texas Water Code Section 11.023 identifies the uses for which "state water may be appropriated, stored, or diverted." Texas Water Code Section 11.121 provides that "no person may appropriate any state water or begin construction of any work designed for the storage, taking or diversion of water without first obtaining a permit from the Commission."

New appropriations of state water and amendments to existing authorizations are obtained through an application and permitting process with TCEQ, which is often

subject to public notice and participation requirements. *See* Chapter [Caroom] for a detailed discussion of this process. When an application is submitted for a new appropriation of state water, the threshold issues that TCEQ must address is whether unappropriated water is actually available for use at the proposed diversion point. TEX. WATER CODE § 11.134(b)(2). The TCEQ makes this determination by use of a Water Availability Model ("WAM"). Generally, the WAM uses historic flow data and hydrological conditions, and consideration of all existing water rights. WAMs can be manipulated to consider other factors, such as return flows from wastewater treatment facilities and the extent to which existing rights are actually being utilized. Thus, in preparing an application for a water supply project, it is important for an applicant to be aware of hydrological conditions that will play a role in the agency's water availability assessment. An applicant might opt to provide the agency with its own water availability assessment for the agency's review in order to benefit the permitting effort, such as including the flows from a wastewater treatment plant the applicant may control, or a consideration of unused water rights. Additionally, in evaluating the feasibility of a project, it might be beneficial to employ the applicable WAM to identify any water availability issues that might delay or hinder the water rights permitting of a project. See Chapter [Chenoweth] for a discussion of WAMs.

Once the agency determines that water is available for appropriation, TCEQ staff will focus on other significant issues, such as environmental impacts, whether the proposed diversion will be put to a beneficial use, and whether there will be a harm to the public welfare based on the proposed diversion. *See* TEX. WATER CODE §§ 11.134, 11.147, 11.150, 11.151, and 11.152. After performing all necessary reviews, TCEQ will

prepare a draft permit that may limit the diversion allowed, include stream flow restrictions as special conditions of the permit, or include other limitations and special conditions to ensure the water authorized for diversion will be lawfully utilized in a manner that addresses the requirements for permitting the use of state water in the Texas Water Code. *See* TEX. WATER CODE § 11.134. For example, a low-flow condition might be included that limits the times when water can be diverted to periods of higher flows in the river. A permit might also be drafted to require the approval of an accounting plan to determine when water can be diverted under the permit.

The Texas Legislature augmented the process to be employed for identifying environmental flow requirements in 2007 with its passage of Senate Bill 3. These new provisions require the TCEQ to adopt environmental flow regulations for certain bay and basin areas within the state, following the development of environmental flow recommendations developed by bay and basin expert science teams and bay and basin stakeholder groups. *See*, TEX. WATER CODE §§ 11.0235 - 11.0237. The evaluation of environmental flow issues will also be key to any surface water supply project in Texas. Applicants might consider initially approaching TCEQ with a proposed solution for addressing environmental flow concerns before a draft permit is prepared. Such solution might be an agreement to a certain low-flow condition for the permit that does not significantly impair the reliability of the water right, dedication of a certain portion of the water right (once issued) to the environment, or dedication of an existing water right (with senior priority) to the environment, in exchange for a fuller right to divert under the new appropriation. Negotiations with regulators and environmental interests regarding environmental flow protection measures will almost always be a major component in the

permitting of water supply projects in Texas due to a heightened focus on environmental impacts resulting from water supply projects. See Chapter [Wells] regarding environmental flows.

The agency's development of a draft permit typically occurs after notice regarding the underlying application is issued to potentially "affected persons." *See* TEX. WATER CODE § 11.132; *see, also,* 30 TEX. ADMIN. CODE §§ 295.151-.161 (notice provisions regarding a water rights permit application). For an application seeking a new appropriation of water, individual notice will be mailed to all water right holders located in the river basin where the project is located. The issuance of notice before a draft permit is available for review often results in protests to the underlying application, particularly from downstream interests, and protests can significantly delay the TCEQ's final action on an application. Many protests are withdrawn after the agency's draft permit and proposed special conditions designed to protect downstream water rights and the environment are issued. To the extent a draft permit does not successfully address protestant concerns, the protestant, the applicant and the agency will have an opportunity to negotiate a mutually acceptable draft permit. If an applicant knows that a particular water supply project will be controversial and may raise concerns among other water right holders or public interests, the applicant should consider framing an application in a way that may minimize the issues a protestant might raise in a contested case hearing. For example, an applicant should ensure it has the proper authorization to act on an application (*e.g.,* a board resolution for districts; a council action for cities) that allows the filing and defending of an application. An applicant should ensure that its water conservation plan and drought contingency plan, if required, address all current agency

requirements. Additionally, an applicant might want to plan for negotiations with any possible protestants by evaluating environmental and downstream impacts of the proposed project and what can be removed or added to the application to address potential issues of concern.

If a request for a contested case hearing is filed regarding a water rights application and the agency is unable to address a protestant's concerns in the development of a draft permit, TCEQ may refer the application and hearing request to TCEQ's alternative dispute resolution director, who will try to resolve any dispute between the applicant and the protestant. 30 TEX. ADMIN. CODE § 55.254. Additionally, TCEQ will schedule the hearing request for a meeting of the agency's Commissioners ("Commission Meeting"). *Id.* Prior to the Commission Meeting, TCEQ's executive director, the public interest counsel and the applicant are given an opportunity to submit responses to the hearing request. 30 TEX. ADMIN. CODE § 55.254(e). At the Commission Meeting, interested parties will be given an opportunity to comment, and Commissioners will evaluate the hearing request and will either 1) determine that a hearing request does not meet the requirements of the Texas Administrative Code and act on the application, 2) determine that the hearing request does not meet the requirements of the Texas Administrative Code and refer the application to a public meeting to develop public comment before acting on the application, 3) determine that a hearing request meets the requirements of the Texas Administrative Code and direct the chief clerk to refer the application to the State Office of Administrative Hearings ("SOAH") for a hearing, or 4) have the hearing request referred to SOAH to have an Administrative Law Judge ("ALJ")

determine whether it meets the requirements of the Texas Administrative Code. 30 TEX. ADMIN. CODE § 55.255(a), related to the adequacy of the request.

If the Commissioners grant a request for a contested case hearing on a water rights application and refer the matter to SOAH, the applicant will be faced with a 6-12 month process leading up to an evidentiary hearing on the merits of the application. Such a process includes the development and implementation of a discovery and hearing schedule, and the development of an evidentiary case to support the application. Following the end of a contested case hearing, the ALJ will order the parties to file written closing arguments and responses to same, and those arguments, together with the evidentiary record made at the hearing, will enable the ALJ to issue a proposal for decision ("PFD") for the Commissioners' consideration. It is important for applicants to review and analyze any such PFD, participate in the Commission Meeting where the PFD will be considered, and prepare to respond to and/or preserve any objections to either the PFD and/or the Commissioners' final decision on the application. Once the agency has issued a final order regarding an application, that decision can then be appealed to the District Court in Travis County, Texas. Should the issuance of an application for a water supply project be tied up in post-agency litigation, it may be years before the project will be legally authorized. In some cases, such action will effectively kill a water supply project.

Once issued, permits for water rights identify the date on which the permit was declared administratively complete, which is used for the purpose of setting the priority date for the water right and establishing a water right's place in the hierarchy of the prior appropriation system. Water rights also include provisions related to: (1) the purpose of

use for which water can be appropriated, (2) the annual diversion amount, (3) the instantaneous rate at which water can be diverted, (4) a timeframe in which construction of storage and diversion facilities must commence and be completed, and, (5) any special conditions the agency deems necessary. *See* TEX. WATER CODE § 11.135(a). In order to maintain flexibility for the use of the water right, applicants might propose a reach of stream from which water can be diverted under the water right. A stream reach, if authorized for a diversion point, will allow the permittee options when constructing diversion facilities, which may help avoid unnecessary amendments, if it is necessary to adjust the location of a diversion point, at least within the stream reach. Additionally, the purposes for which water may be lawfully appropriated include domestic and municipal, agricultural (including irrigation), industrial, mining, hydroelectric power, navigation, and recreation. *See* TEX. WATER CODE § 11.023(a). Many permittees are seeking authorizations for multiple purposes of use in order to respond to water market forces and thereby maintain flexibility for the use of the water and avoid the need for future amendment applications.

Amendments to existing appropriative rights that seek to increase the amount of water diverted or the rate at which water is diverted are assessed by TCEQ and noticed as any application for a new appropriation. *See*, TEX. WATER CODE § 11.122(a), 30 TEX. ADMIN. CODE § 295.158. Applications that do not request an additional appropriation of water or an increased rate of diversion may not require full notice to other water rights holders in the basin, if the amendment would authorize no greater impact on other water rights or the environment than would full use of the existing right, and in light of the terms and conditions of the existing right. *See*, TEX. WATER CODE § 11.122(b).

However, a recent decision by the Texas Supreme Court suggests that even minor amendments to water rights may, under certain circumstances, require notice and the opportunity for a contested case hearing. *City of Marshall v. City of Uncertain*, 206 S.W.3d 97, 110-11 (Tex. 2006) (requiring the TCEQ to consider the impact of several limited public interest criteria when determining whether to issue notice of a water right amendment application, including whether the application is intended for a beneficial use, whether it will harm the public welfare, and any impacts on groundwater). Applicants for amendments are now framing applications, even for minor amendments, to address the limited public interest criteria identified by the Supreme Court in its *City of Marshall* decision and so as to avoid the issuance of notice, where appropriate and if possible. To the extent that many of Texas' rivers are nearly fully appropriated, if not over-appropriated, the ability for existing water right holders to efficiently amend their authorizations is critical to many water projects across the state. By adding uses, moving diversion points, and altering the rate at which water can be diverted, water supply projects are able to put existing supplies to more efficient use, particularly as demands for water change. Additionally, water that has already been authorized for appropriation can be sold to other water suppliers. Such sales will either require an amendment to the base water right to authorize a new user, or will require the execution of a water supply contract, which must be approved by the agency. 30 TEX. ADMIN. CODE § 297.101, *et seq*. *See* Chapter [Smith] for a discussion of the four corners doctrine and the Marshall case.

For portions of the state where surface water supplies are limited, many water supply projects focus on delivering water from a neighboring river basin to areas where

supplies can be utilized. Interbasin transfers of surface water are contemplated in the Texas Water Code and are an important tool for water suppliers seeking to move water resources to portions of the state where they are needed. Texas Water Code Section 11.085 provides a permitting framework under which the TCEQ may authorize such transfers of water. In 1997, with the passage of Senate Bill 1 during the Texas Legislative Session, the widespread amendments to the Texas Water Code included several changes to Section 11.085. These changes served to make interbasin transfers of water more difficult. Among the provisions included is the "junior rights provision." *See* TEX. WATER CODE § 11.085(s). The junior rights provision requires that existing water rights that are amended to allow for interbasin transfers of surface waters must be assigned a new priority date (fixed as of the date the amendment application is declared administratively complete by TCEQ). This adjustment in priority and other changes made to Section 11.085 have impeded many interbasin diversions of water. However, there are certain interbasin transfers that are subject to exemptions from the notice and hearing requirements of Section 11.085, the junior rights provision, and the other provisions of SB 1 that impede interbasin transfers of surface water. *See* TEX. WATER CODE § 11.085(v). *See* Chapter [Smith] for a detailed discussion of interbasin transfers.

The reuse of water supplies, usually in the form of discharged treated wastewater, has increasingly been viewed as a viable means for water suppliers to supplement their water resources. There are, however, major legal implications for reuse projects such as: environmental sustainability concerns, water quality issues, and a potential negative impact on downstream water right holders, some of whose rights may have been granted based on an assumption of continued municipal return flows or are made more reliable as

a result of such discharges. Nonetheless, reuse is a key approach for many water suppliers in the state seeking to ensure future demands can be met. Reused wastewater is considered a drought-proof supply of water, and technology now allows the treatment of such water to a high level of quality.

Both legally and practically, the direct and indirect reuse of such water supplies in Texas is treated differently. Under the Texas Water Code, once a water right has been granted, "direct reuse" projects (*i.e.*, the use of effluent directly from a wastewater treatment facility to an end user, also known as "flange-to-flange" reuse) are generally possible without seeking separate water right authorization from the TCEQ. *See* TEX. WATER CODE § 11.046(c). Despite this general authority for direct reuse projects, water quality issues surrounding such reuse are subject to TCEQ's regulations. 30 TEX. ADMIN. CODE §§ 210.1-.85 (2007) (TCEQ rules on the use of reclaimed water). Thus, a water supplier pursuing a "direct reuse" project must first obtain water quality authorization from the TCEQ, which, generally, regulates the quality of the reused water and the place and manner of use. *Id.*

Once water has been returned to a watercourse or stream of the state, such water is legally considered "surplus water" and, arguably, becomes subject to appropriation by others. "Once water has been diverted under a permit, certified filing, or certificate of adjudication and then returned to a watercourse or stream, however, it is considered surplus water and therefore subject to reservation for instream uses or beneficial inflows or to appropriation by others unless expressly provided otherwise in the permit, certified filing, or certificate of adjudication." TEX. WATER CODE § 11.046(c). Thus, in order for a water supplier to obtain "indirect reuse" authorization (*i.e.*, the use of effluent after it

has been discharged from a wastewater treatment facility to a state stream), the producer must seek a permit from the TCEQ to divert the water, and a bed and banks authorization to transport such water to the point of diversion. *See* Chapter [Smith] for additional information regarding reuse authorization.

Although most diversions of water from state watercourses require an appropriative right from the state, several exemptions from the permitting process exist in the Texas Water Code which allow the development of certain water supply projects to proceed without permit authority. *See* Chapter [Caroom] for further discussion of exemptions related to state water permitting.

ii. Groundwater Projects

Texas law controlling groundwater production poses many challenges to development of a groundwater project. First, some areas are locally regulated by groundwater conservation districts while others are unregulated. Second, each groundwater conservation district develops its own plan for managing the groundwater resources within the district and rules to implement the plan. Third, the State is in the process of regional groundwater management planning that has the potential to impact all future groundwater projects. In evaluating a groundwater-based project it is essential to consider all of these variables.

Unlike most western states, Texas does not have a uniform, statewide system of groundwater regulation. Historically, the common law "rule of capture" has been the governing legal principle throughout the state. *See, generally, Houston & Texas Central Railway Co. v. East*, 81 S.W. 279 (1904); *Sipriano v. Great Spring Waters of America, Inc.*, 1 S.W.3d 75 (Tex. 1999). Under the rule of capture, a landowner can pump as much

groundwater as he can use without concern for any detrimental effects on third parties so long as the pumping does not result in a wanton or wasteful use of water, the pumping landowner does not maliciously intend to harm a third party, or the pumping does not cause subsidence. *Sipriano,* 1 S.W.3d at 76. Thus, the rule of capture does not impose limitations on groundwater pumping or use that would protect other groundwater users, nor does it take into consideration long-term sustainability of the groundwater resource. A detailed discussion of the rule of capture is provided in Chapter [Johnson].

The Legislature has expressed its clear preference for groundwater resource management by local groundwater conservation districts (GCDs). TEX. WATER CODE § 36.0015. GCDs are political subdivisions and conservation and reclamation districts formed under the Conservation Amendment (TEX. CONST. art. XVI, § 59) and operating pursuant to each GCD's enabling legislation and the general law of Chapter 36 of the Water Code. *See* TEX. WATER CODE Chapters 36. Currently, at least 144 counties, comprising over half of the total land area in Texas, are either partially or fully within a GCD. More importantly, the most current TWDB data available reflects that roughly ninety percent (90%) of groundwater withdrawals and usage occur within the boundaries of a GCD. Texas Water Development Board, GCD Facts (March 25, 2007), *available at http://www.twdb.state.tx.us/gwrd/gcd/factoids.htm* (February 7, 2008). Each legislative session since 1997, the year in which the Legislature indicated its preference for management by GCDs, the Legislature has created new GCDs across the state. For example, the 80th Texas Legislature created seven GCDs: Panola County [Tex. H.B. 1498, 80th Leg., R.S. (2007)]; Northern Trinity [Tex. H.B. 4028, 80th Leg., R.S. (2007)] (Tarrant County); Lavaca County [Tex. H.B. 4029, 80th Leg. R.S. (2007)]; Colorado

County [Tex. H.B. 4032, 80th Leg., R.S. (2007)]; Upper Trinity [Tex. S.B. 1983, 80th Leg., R.S. (2007)] (Hood, Montague, Parker, and Wise counties); McLennan County [Tex. S.B. 1985, 80th Leg., R.S. (2007)]; and Tablerock [Tex. S.B. 3, art. 11, 80th Leg., R.S. (2007)] (Coryell County). For a detailed discussion of GCDs, *see* Chapter [Booth]. Because most groundwater being produced in the Texas is located within a GCD, the remainder of this section discusses groundwater projects within GCDs.

GCDs are created "[i]n order to provide for the conservation, preservation, protection, recharging, and prevention of waste of groundwater..." TEX. WATER CODE § 36.0015. These goals are reflected in a groundwater management plan developed by the district and approved by the Texas Water Development Board. TEX. WATER CODE §36.1071, 36.1072, and 36.1073. *See also*, Chapters [Booth] and [Norman]. One aspect of this process that is particularly important to groundwater projects is the determination of the amount of groundwater that is available for production. See discussion below regarding groundwater management area joint planning and the calculation of the managed available groundwater.

The goals reflected in the groundwater management plan are accomplished by adoption and implementation of rules covering permitting, well spacing, and other management tools. See Tex. Water Code Chapter 36, subchapter D. The manner in which GCDs manage groundwater resources and employ these regulatory options to regulate the use of groundwater varies significantly from district to district, and depends upon local hydrogeological conditions and the priorities of each GCD's board.

One of the primary tools a GCD uses to manage groundwater resources and the one of primary importance to a groundwater project, is well permitting. Texas Water

Code Chapter 36 gives GCDs the authority to alter the rule of capture by regulating and restricting groundwater production. *See* TEX. WATER CODE §§ 36.002 and 36.101. GCDs often use the permitting process to restrict or limit production from a well. For example:

- A district's rules may limit groundwater production based on tract size or the spacing of wells (TEX. WATER CODE § 36.101(a) and § 36.116(a)(2)) and may regulate the spacing of wells relative to property lines or adjoining wells. TEX. WATER CODE § 36.116(a)(1).
- Production limits may preserve historic use. TEX. WATER CODE § 36.116(b). When issuing a permit for historic or existing use, a district is prohibited from discriminating between land that is irrigated for production and land that is enrolled in a federal conservation program. TEX. WATER CODE §§ 36.113(g) and (h).
- Production limits may vary within different geographical areas of the district based on differences in the aquifer or in the use of the aquifer. TEX. WATER CODE §§ 36.116 (d) and (e).
- A district may require a production permit that controls the rate and amount of withdrawal. TEX. WATER CODE §§ 36.1131(b)(8) and 36.116(a)(2). Such permits have various names, such as production permit, operating permit, high production permit, historic use permit, etc.
- A district may base production limits on managed depletion. TEX. WATER CODE §36.116(a)(2)(E).
- A district may base production limits on consideration of the service needs or service area of a retail water utility. TEX. WATER CODE § 36.116(c).

In addition to evaluating the method a GCD uses to limit production, the permit term or duration is of significant important in evaluating a groundwater-based project. GCDs set various term limits, which range from one- to ten-year terms to indefinite, renewable terms. Some GCDs provide options for temporary permits, emergency permits, and other short-term, limited permits. As discussed below, when a project involves production of groundwater inside a GCD for use outside that GCD, different rules may apply. With regard to permit duration, there is some question as to how the permit term is set for projects involving the export of groundwater outside a district's boundaries, although very few projects have been implemented that would test those statutory sections. S*ee* TEX. WATER CODE § 36.122; *see also* Chapters [Maxwell] and [Booth].

A significant issue for GCDs is the authority to regulate the export of groundwater across their boundaries. Concern has increased regarding water shortages. New projects to transport groundwater from one area of the state to another is a popular means for addressing such shortages. Senate Bill 2 in 2001 made extensive revisions to Chapter 36 related to a district's authority to regulate in this area. TEX. WATER CODE §36.122. GCDs are authorized to adopt rules requiring permits for groundwater transports (either increases of previous arrangements or new transfers) out of their boundaries occurring after March 2, 1997. TEX. WATER CODE § 36.122(b). Districts cannot prohibit the export of groundwater if the purchase was in effect on or before June 1, 1997. In addition to the requirements in an operating or production permit mentioned above, export permits must also specify the amount of water that may be transferred out of the district and the period for which the water may be transferred.

When reviewing a proposed transfer, a GCD must consider: (1) the availability of water in the district and in the proposed receiving area during the period for which the water supply is requested; (2) the projected effect of the proposed transfer on aquifer conditions, depletion, subsidence, or effects on existing permit holders or other groundwater users within the district; and, (3) the approved regional water plan and certified management plan. TEX. WATER CODE § 36.122(f). Some GCDs also take into special consideration the circumstance occurring when a defined retail service is bisected by the GCD's boundaries. A GCD is prohibited from discriminating between in-district users and transporters. A GCD may not deny a permit based on the fact that the applicant seeks to transfer groundwater outside of the district, but may limit a permit if conditions warrant the limitation, so long as it does not impose more restrictive permit conditions on transporters than on existing in-district users. TEX. WATER CODE § 36.122(g). Groundwater export applications must be considered and processed in the same manner as in-district water use applications. TEX. WATER CODE §36.122(d). A GCD may not impose more restrictive permit conditions on transporters than the district imposes on existing in-district users, unless the more restrictive conditions apply to all subsequent in-district and transport permit applications, bear a reasonable relationship to the GCD management plan, and are reasonably necessary to protect existing uses. TEX. WATER CODE § 36.122(c), 36.113(e). Significantly, a GCD may periodically review the amount of water that may be transferred under a permit. TEX. WATER CODE § 36.122(k). When determining whether to renew an export permit, a district must consider relevant and current data for the conservation of groundwater resources and must consider the permit

in the same manner it would consider any other permit in the district. TEX. WATER CODE § 36.122(k). *See also* Chapter [Maxwell].

Another aspect of GCD regulation that often impacts a groundwater-based project is the procedure used by the GCD to process, evaluate, and issue the operating, production, and transfer permits discussed above. Chapter 36 of the Texas Water Code sets forth the minimum due process requirements for notice and hearing for permit and permit amendment actions. TEX. WATER CODE § 36.114. In 2005, the Legislature revamped these due process requirements, and imposed uniform and detailed notice and hearings requirements for all GCDs. H.B. 1763, 79th Leg., R.S. (2005). Under new subchapter M, a district must determine by rule which permit actions require a hearing and which ones do not. TEX. WATER CODE § 36.114(b). GCDs must define by rule the circumstances under which an application will be considered contested. TEX. WATER CODE § 36.415(b)(1). The permit applications that require a hearing must comply with detailed, statutory notice and hearing requirements. TEX. WATER CODE §§ 36.101(a), 36.114, 36.401, *et seq.* A hearing must be conducted by a quorum of the GCD's board or by a hearings examiner appointed by the GCD's board. TEX. WATER CODE § 36.406(a). If the hearing is not heard by a quorum of the board, the presiding officer is required to submit a report of the hearing to the board within thirty (30) days after a hearing. TEX. WATER CODE § 36.410(a). The report must include: (1) a summary of the subject matter of the hearing, (2) a summary of the evidence or public comments received, and (3) the presiding officer's recommendations for board action. TEX. WATER CODE § 36.410(b). Written exceptions to the report may be submitted. TEX. WATER CODE § 36.410(d). The

board is then required to act on a permit within sixty (60) days after the date of the final hearing on the application. TEX. WATER CODE § 36.411. *See also* Chapter [Booth].

Groundwater-based projects potentially became more complex in 2005 with the enactment of a process of regionalized decisions on water availability using groundwater management areas (GMAs) as the planning regions. H.B. 1763, 79th Leg., R.S. (2005); *see also*, chapter [Rosenberg] for a discussion of GMAs. Groundwater conservation districts in each groundwater management area are participating in joint planning as part of the State's overall water planning process ("GMA Joint Planning"). All the districts within a groundwater management area must meet at least annually for joint planning. TEX. WATER CODE § 36.108(c). By September 2010, they must determine how they want to manage the groundwater resources within the management area. This policy statement is known as the "desired future condition" of the aquifers in the area. TEX. WATER CODE § 36.108(d). The desired future condition will be submitted to the TWDB, which will translate it into an estimate of the amount of water that could be withdrawn from the aquifers while maintaining the desired future condition. This water estimate is called the "managed available groundwater." TEX. WATER CODE § 36.108(o). *See also*, TEX. WATER CODE §§ 36.001(25) and 36.1071(e)(3). This effectively, is the new term for groundwater availability.

Development of the desired future condition ("DFC") and calculation of the managed available groundwater ("MAG") is significant for several reasons. The managed available groundwater numbers will be used by a groundwater conservation district in its groundwater management plan. TEX. WATER CODE § 36.108(d-2). *See also*, 31 TEX. ADMIN. CODE § 356.5(b). It will also be used in groundwater production

permitting decisions. The MAG is critical because "to the extent possible" a district must issue permits "up to the point that total volume of groundwater permitted equals managed available groundwater" if applications for production are submitted. TEX. WATER CODE §36.1132. In other words, once the desired future condition is established and the TWDB calculates the managed available groundwater, a district cannot refuse to issue a production permit on the basis that no water is available if there is any amount of the managed available groundwater amount that has not been permitted.

The MAG will also be used by the regional water planning groups in the state water planning process. TEX. WATER CODE § 16.053(c)(3)(A). As a result, it affects the ability of political subdivisions to obtain TWDB loans for groundwater projects. *See* ROBERT E. MACE, ET AL, A STREETCAR NAMED DESIRED FUTURE CONDITIONS: THE NEW GROUNDWATER AVAILABILITY FOR TEXAS 1 (May 2006); *see also* Chapter [Norman] for a detailed discussion of joint planning.

Additionally, the MAG calculation can seriously impact planning on supply. Total permitted production which exceeds the MAG could result in forcing a reduction in use of an aquifer.

In summary, areas that are locally regulated by groundwater conservation districts pose particular challenges to groundwater-based projects, even as they can also provide protection for the long term viability of the project. Each GCD has a unique plan for managing the groundwater resources within the district and rules to implement the plan, increasing the complexity evaluating the project. The newly instituted regional groundwater management planning has the potential to impact all future groundwater

projects. In evaluating a groundwater-based project it is essential to consider all of these variables.

B. Federal Permitting

Depending on the scope of a particular water supply project, federal permitting under the Clean Water Act ("CWA") and assessments related to environmental impacts under the National Environmental Policy Act ("NEPA") may be required, and will certainly add another layer of challenges and delays to a water supply project. CWA permits and NEPA procedures involve the oversight of or consultation with agencies such as the Environmental Protection Agency ("EPA"), the U.S. Army Corps of Engineers ("USACE"), and the Fish and Wildlife Service ("FWS"). *See* Chapter [McQuaid] for a detailed discussion of these programs.

i. Clean Water Act Section 404

The USACE Section 404 permit program specifically applies to the discharge of "dredged or fill material" into "waters of the United States." *See,* 33 C.F.R. Part 323 (2007). The U.S. Constitution grants Congress the power to regulate “navigable waters” under the Commerce Clause. The extent to which non-navigable waters with some proximity to navigable waters are regulated under the CWA is unclear, as a major point of contention under the CWA is which bodies of water are subject to CWA jurisdiction and protection. *See Rapanos v. United States*, --- U.S. ----, 126 S.Ct. 2208, 165 L.Ed.2d 159 (2006); *see, also, Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers,* 531 U.S. 159 (2001). Thus, a threshold question for any water supply project that may be discharging dredged or fill material is whether such discharge will be into a jurisdictional "navigable waters." The discharge of "dredge material" and the

discharge of "fill material" are very broadly defined within the USACE's regulations but are often triggered for major water supply projects that include significant development activities, land clearing, placement of rip-rap, liners, slope paving, the installation of pipeline that crosses navigable waters, or the construction of a dam. Thus, water supply projects that contemplate any construction in "waters of the United States" will require permitting under CWA Section 404.

Most large-scale dredge and fill discharges, as those associated with a water supply project, require an individual permit from the USACE. Before it can be issued, a Section 404 permit requires public notice and hearing, a consideration of alternatives, public interest review, and conformity with EPA guidelines. *See* 33 U.S.C. § 1344(b), (c) (2005). *See, also*, 40 C.F.R. pt. 230 (2007) (EPA guidelines developed with the assistance and comments of the USACE). The public interest review associated with a § 404 permit involves an extensive analysis of the effects a discharge will have on the short- and long-term physical, chemical, and biological elements that comprise the aquatic ecosystem. *See* 40 C.F.R. § 230.11 (2007). A Section 404 permit will also be subjected to the procedural requirements of NEPA, but the public interest review in the two statutes overlap significantly. *See* 40 C.F.R. § 230.10(a)(4) (2007). The USACE also has the authority to issue general permits on a state, regional, or nationwide basis that exempt certain activities the agency believes have a minimal environmental impact. *See* 33 U.S.C. § 1344(e) (2005).

Before seeking individual 404 permit authorization, it is important for a water supplier to ensure it has conducted a thorough alternatives assessment and can demonstrate that the proposed project will have the least environmental impact and is

justified economically. Such an assessment should identify the water supply projects as the only practicable alternative, when considering environmental impacts, economics, and the overall project purpose. 40 C.F.R. § 230.10(a)(2) (2007) provides that practicable alternatives are "available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes."

The guidelines in 40 C.F.R. § 230 require that no Section 404 permit be issued if there is a practicable alternative that would have less impact on the aquatic ecosystem. *See* 40 C.F.R. § 230.10(a) (2007). Practicable alternatives include restructuring the project so that no discharge into the waters of the United States occurs, or discharging at a different location than proposed by the applicant. *See* 40 C.F.R. § 230.10(a)(1) (2007). So long as the dredge and fill operation is water dependent, this stringent consideration of alternatives typically does not require that a dramatically different alternative be used to effectively change the type of project. In contrast, a rebuttable presumption is that practicable non-aquatic alternatives exist when a non-water dependent activity is the subject of a Section 404 permit on a "special aquatic site." *See* 40 C.F.R. 230.10(a)(3) (2007). Still, the USACE has an affirmative duty to consider alternatives within the framework of costs, technology, and logistics in accordance with the overall project purpose. *See* 40 C.F.R. § 230.10(a)(2) (2007); *see, also*, *Louisiana Wildlife Federation, Inc. v. York*, 761 F.2d 1044, 1048 (5th Cir. 1985).

ii. Clean Water Act Section 401

Under CWA Section 401, any applicant for a federal permit to conduct an activity that may cause a discharge into waters of the United States must obtain certification that the discharge will comply with state water quality standards adopted by the state in which

the discharge will originate. *See* 33 U.S.C. § 1341(a) (2007). Certification under Section 401 ensures that states are involved in decisions made by the federal government that affect the water quality of their state. With the exception of oil and gas exploration, TCEQ is the state agency that administers the Section 401 certification program. *See* 30 TEX. ADMIN. CODE §§ 279.1, *et seq*. Certification of projects proposing a discharge resulting from oil and gas exploration is the responsibility of the Railroad Commission of Texas. *See* 16 TEX. ADMIN. CODE § 3.93.

The TCEQ has developed a tiered system for evaluating all individual Section 404 permit applications based upon the project size and the amount of state water affected. Tier I projects are small projects that affect less than 3 acres of water in the state or less than 1,500 linear feet of streams. The TCEQ has determined that incorporating certain best management practices ("BMPs") and other outlined requirements into Tier I projects will sufficiently minimize impacts to water quality. Therefore, applicants desiring to utilize Tier I for small projects should include a signed Tier I checklist with their application for an individual Section 404 permit to the USACE. TEXAS COMMISSION ON ENVIRONMENTAL QUALITY, TIER I CHECKLIST, *available at http://www.tceq.state.tx.us/assets/public/permitting/waterquality/forms/20228.pdf*. The Tier I checklist includes the selection and incorporation of applicable BMPs for erosion control, post-construction total suspended solids control, and sedimentation control necessary for the proposed project. Other items within the checklist include contaminated dredge material requirements, wetland mitigation requirements, and Coastal Zone Management Act requirements. Once a completed checklist is submitted, no further review or certification by the TCEQ is required. There are exceptions to this general rule if a project impacts

certain types of rare or ecologically significant wetlands. These projects are not eligible for Tier I review even if they meet the size requirements. *See* UNITED STATES ARMY CORPS OF ENGINEERS, NATIONWIDE PERMIT REGIONAL CONDITIONS FOR THE STATE OF TEXAS (March 2002), *available at http://www.swf.usace.army.mil/pubdata/environ/ regulatory/permitting/nwp/ 2002/rgcndtx02.pdf*.

Any project for a Section 404 individual permit that does not qualify for Tier I review or for which the applicant elects not to incorporate Tier I criteria will be considered a Tier II project. Tier II projects are subject to an individual certification review by TCEQ. A Certification Questionnaire and Alternatives Analysis Checklist must be submitted to the TCEQ for Section 401 approval. Applicants completing the Certification Questionnaire are required to provide information relating to the potential impacts the disposal of waste materials from a project may have upon the surface water quality in the state. The Alternatives Analysis Checklist generally covers the same requirements performed in determining the practicable alternative for Section 404 permit purposes. This checklist relates to determining how project needs could be satisfied in a way which does not affect surface water, how the project could be redesigned to fit the site without affecting surface water, how the project could be minimized, what other sites were considered, and to identify the consequences of not building the project. An applicant is also required to compare different alternatives, to explain why the preferred alternative was selected, and to explain what will be done to minimize adverse effects on surface water. TEXAS COMMISSION ON ENVIRONMENTAL QUALITY, TIER II CERTIFICATION QUESTIONNAIRE and ALTERNATIVE ANALYSIS CHECKLIST,

TCEQ Form TCEQ-20229 (June 15, 2004), *available at http://www.tceq.state.tx.us/ assets/public/permitting/waterquality/forms/ 20229.pdf.*

Either the USACE district engineer or a Section 404 permit applicant may submit a request for Section 401 certification to the TCEQ. 30 TEX. ADMIN. CODE § 279.4(b). If the USACE requests certification, the district engineer shall provide the TCEQ a copy of the public notice, a request for certification, and a copy of the complete permit application. 30 TEX. ADMIN. CODE § 279.4(b)(1). If the permit applicant requests certification, the applicant shall provide the TCEQ a copy of the completed permit application and any amendments, a list of the names and addresses of owners of tracts of land adjacent to the site to be permitted, and a request for certification. 30 TEX. ADMIN. CODE § 279.4(b)(2). An opportunity for notice and comment on an application for certification under Section 401 is available to interested parties. *See* 30 TEX. ADMIN. CODE §§ 279.5 – 279.8. The executive director of the TCEQ shall take final action on the application for certification within 60 days after receiving the certification request. 30 TEX. ADMIN. CODE § 279.11(a). However, the executive director can elect to delay acting on a request for certification until after reviewing a Section 404 final permit decision document. 30 TEX. ADMIN. CODE § 279.4(b)(3). The TCEQ will not certify a discharge if (1) there is a practicable alternative to the proposed discharge that would have less adverse impacts on the environment, (2) appropriate steps are not taken to minimize adverse impacts, (3) mitigation is not undertaken for all unavoidable adverse impacts, or, (4) the executive director determines that the impacts of the project are so significant that mitigation will not compensate for the damage of the project. *See* 30 TEX. ADMIN. CODE § 279.11.

The TCEQ has certified that the activities authorized by some Section 404 nationwide permits do not result in a violation of established Texas water quality standards and therefore do not need individual certification from the TCEQ under Section 401. *See* 30 TEX. ADMIN. CODE § 279.12. Other Section 404 nationwide permits may be conditionally certified by the TCEQ. *Id.*

iii. National Environmental Policy Act

The provisions of NEPA are integral to many water supply projects, as the issuance of federal permits under Section 404 of the CWA is conditioned upon NEPA compliance. The provisions of NEPA direct that "to the fullest extent possible . . . the policies, regulations, and public laws of the United States shall be interpreted and administered in accordance with the policies set forth in this chapter . . . ." 42 U.S.C. § 4332(1) (2005). NEPA is a procedural statute that can influence the decision-making process of any federal agency (such as the USACE) by requiring the agency to consider environmental impacts, alternatives, and mitigation strategies for projects pursued by the federal government or projects sanctioned through the issuance of a federal permit.

As a procedural statute, NEPA "prohibits uninformed, not unwise, agency actions." *Stewart v. Potts*, 996 F. Supp. 668, 672 (S.D. Tex. 1998) (citing *Sabine River Auth. v. United States Dep't of Interior*, 951 F.2d 669, 676 (5th Cir.1992)). The information required by NEPA allows for public accountability when major agency actions impact the human environment, and an injunction is appropriate to remedy an agency's failure to comply with NEPA procedures. Despite that remedy, other statutes are required in order for substantive environmental obligations to become binding upon an agency. NEPA procedures are required whenever "a proposal . . . for legislation or

other major federal actions significantly [affects] the human environment." 40 C.F.R. § 1508.5 (2007). "Major federal actions" include a federal agency's issuance of permits, such as Section 404 permits for water projects, the use of federal funds to construct projects, like federal flood control projects, and authorizing activities occurring on federal lands. *See*, *e.g., Maryland Conservation Council, Inc. v. Gilchrist*, 808 F.2d 1039, 1042 (4th Cir. 1986) (highway project requiring § 404 permit and federal approval is a "federal" action subject to NEPA); *Crutchfield v. U.S. Army Corps of Engineers*, 192 F. Supp. 2d 444, 448 (E.D. Va. 2001) (Section 404 permit for wastewater treatment plant triggered NEPA procedural requirement); and *Stewart,* 996 F. Supp. at 672 (Section 404 permit is a major federal action subject to NEPA).

NEPA requires a consideration of the consequences of the agency action and possible alternatives that are less damaging to the environment. NEPA is not required if the agency action falls within a limited number of categorical exemptions or has been previously determined to have no significant environmental impact. *See* 40 C.F.R. § 1508.4 (2007). Agency actions under certain statutes will never require NEPA compliance because it has been determined that these, mostly environmental protection statutes, are the functional equivalent of NEPA. For example, the EPA is exempted from NEPA for all actions the agency takes under the Clean Air Act. *See Portland Cement Ass'n v. Ruckelshaus*, 486 F.2d 375 (D.C. Cir., 1973) (decision codified at 15 U.S.C. § 793(c)(1)) (2005). *Portland* is redflagged on Westlaw as being superseded by statute as stated in *American Trucking v. EPA*, 175 F.3d 1027.

When NEPA does apply, the agency authorizing the major federal action must prepare an environmental assessment ("EA"). This relatively short document is issued to

determine whether an agency needs to prepare an environmental impact statement ("EIS") or if that lengthy process can be avoided by a finding of no significant impact ("FONSI"). A FONSI can be issued when a determination is made in the EA that an EIS is not necessary. *See* 40 C.F.R. § 1501.3(b) (2007). In order for a FONSI to be valid, the agency must prepare an adequate EA. The EA may be overturned if a court determines it to be superficial or manipulated. This is evidenced by a lack of documentation, internal inconsistencies, uncertainties, and a failure to consider the cumulative impacts of a proposed action. NOVICK, at § 8:49. A qualitative identification of the potential effects of a project on the natural environment can be enough for an adequate EA.

In an EIS, the agency must evaluate alternatives to the proposed action that might be employed to meet the objective. An alternative may be less environmentally damaging or it may make the proposed action unnecessary. The courts have adopted the standard that only "feasible" and "reasonable" alternatives need to be discussed, but some deference is given to an agency's determination that an alternative need not be considered. *See, Vermont Yankee Nuclear Power Corp. v. Natural Resources Defense Council*, 435 U.S. 519 (1978).

5. Funding Considerations

After a water supply project has secured the necessary permits, it may be brought "on-line" through project implementation. For the most part, large-scale water supply projects will require various project-specific construction methods and techniques but, in every project, new water supplies cannot be successfully and reliably obtained without adequate funding to support the completion of the project design, site and equipment acquisition, construction, and operations and maintenance of the project once

constructed. Creating a delivery system for large quantities of water also typically requires a significant expenditure of money that exceeds the existing financial capabilities of the project sponsor and the project's end users. Most projects will require public funding to allow implementation of a water supply system of an adequate scale to meet present and future demands. While Chapter [Leuschel] provides a detailed description of water supply project funding options available in Texas, this section includes a brief overview of some of these funding options.

A. Public Entity Financing Options

There are many options available to structure debt issued by a public entity for project implementation. This discussion is meant to provide only a general overview. The nuances of particular financing options will vary depending on the type of entity even under the general discussions noted here. The Conservation Amendment to the Texas Constitution authorizes conservation and reclamation districts created by the state to issue debt to further the purposes of the amendment through new water supply projects and management practices. *See* TEX. CONST. art. XVI, § 59. Political subdivisions in Texas are also authorized, with approval from the state, to issue debt to supply funding for public works projects throughout the project lifecycle, including planning, land acquisition, construction, and routine maintenance phases. TEX. CONST. art. III, § 49d-4. A rigorous assessment of the risks and costs involved in each potential financing avenue is necessary to allow for reliable and economically sustainable water supply delivery to end users. *See, generally,* American Water Works Association, *Water Works News*, 22 (November 2002) *available at http://www.miwater.org/awwa/Water%20Works%20News/NOV2002_WWNews_Final.PDF*; First Southwest Company, *Authorized City Debt*

Instruments (October 28, 1996), *available at http://www.utdallas.edu/ orgs/fma/files/200409/FirstSouthwestCompany.pps*. Both sources provided a great deal of the information contained in this section.

i. General Obligation Bonds

General obligation bonds ("GOBs") are issued by a political subdivision for a specifically approved public purpose project and are secured by the full faith and credit of the public entity through its power of *ad valorem* taxation. The requirement that a bond be issued for a "public purpose" means that the project must specifically benefit the entity issuing the debt and its residents. Municipalities, counties, towns, and other political corporations are prohibited from lending credit to any entity by the Texas Constitution, so a GOB could not be issued to fund a project that, upon completion, is entirely privately owned. *See* TEX. CONST. art. III, § 52. However, a project funded by GOB financing may be jointly owned or funded by another entity, so long as the political subdivision issuing the bond retains a divided or undivided interest in the project being financed.

GOBs require voter approval. The amount of GOBs that can be issued is limited by the tax revenue that can be generated at the maximum *ad valorem* tax rate, specified by the constitution, less taxes used to pay for other functions, including debt, of the entity. For example, a general law city may only tax up to $1.50 per $100.00 taxable assessed valuation, and a home rule city may tax up to $2.50 per $100.00 taxable assessed valuation. *See* TEX. CONST. art. XI, §§ 4, 5. Public entities can avoid paying GOB debt through tax revenue if they are able to pay the debt from other sources.

GOBs are generally regarded as the most secure form of debt that a public entity may issue. This type of bond, as other forms of debt issued by public entities, must be

reviewed by the attorney general, receive prior approval, and ultimately be submitted to the comptroller for registration in the state records. *See* TEX. GOV'T CODE § 1202.003(a), (b). After approval and registration, GOBs issued by a public entity are binding obligations that are valid and incontestable in a court or other forum. TEX. GOV'T CODE § 1202.006(a). The only way to overturn this presumption is with a showing of fraud or forgery. While the interest income earned by the purchasers of some GOBs is taxable, the interest income earned by purchasers of most GOBs is tax-free, and such bonds typically have the lowest interest rate of any public securities. GOBs are a useful mechanism to finance project implementation, but voter and attorney general approval lengthen the time before funding is made available. Substantial reliance on GOBs requires planning ahead to avoid inefficient or postponed project implementation caused by delays associated with the bureaucratic system of GOB authorization.

ii. Revenue Bonds

Revenue bonds are issued on the foundation of a pledge of revenues that will be generated from the sale of services or water generated by the project. This revenue stream may also be created by the imposition of stand-by fees or groundwater management fees. Debt issued by a revenue bond cannot be repaid with *ad valorem* taxes, but a tax may be issued to help pay for the operating expenses of the revenue generating project. Revenue bonds do not require voter authorization, but they are subject to a voter referendum if a certain percentage of voters (usually 5 or 10%) petition to force an election.

The amount of financing available through revenue bonds is limited by the amount that rates for water services can be feasibly increased. Determining practical rate

increases to secure a bond involves a technical and economic study that should be performed in coordination with a professional rate consultant trained in analyzing projected population growth, water demand, and other relevant factors. Revenue bonds typically require a higher interest rate than GOBs because of the uncertainties involved in funding the debt. The amount of interest required for a successful bond will depend, in part, on the quality of the project's financial operations and business practices.

iii. Certificates of Obligation/Double-Barreled Bonds

A certificate of obligation (COO) (*see, generally,* TEX. GOV'T CODE §§ 1371.001-.106 (Vernon Supp. 2007) (specific authorization for state or local government to issue securities)), similar to a GOB, is available for funding projects but, unlike GOBs, COOs do not require voter approval. A COO, however, is subject to the same referendum by voter petition as a revenue bond. If a COO is funded entirely by *ad valorem* taxation, it may only be issued for limited purposes, such as land acquisition.

COOs may be used for any lawful purpose when they are supplemented with a pledge of surplus revenue ($1000 or more) from the project after it is implemented. A COO may also comprise half of a double-barreled bond ("DBB"). A DBB is primarily secured by a revenue bond, but if revenue generation fails to satisfy the bond obligation over a period of time, the principal and interest payments may be satisfied by tax revenues guaranteed by a COO.

iv. Contract Revenue Bonds

A project sponsor may issue a contract revenue bond based on wholesale contracts entered into with third-party users, such as regional river authorities or entities created by a political subdivision for water services. The contract may specify that

payments are secured by taxes, revenue, or a combination of both. Depending on the terms of the contract, the public entity may or may not retain ownership over all aspects of the project. The interest rate of the contract revenue bond will be based on the strength of the project sponsor's credit.

v. Anticipation Notes

Anticipation notes allow municipalities to fund water supply projects based on an ordinance passed by the city council. These bonds may be secured by a pledge of revenues, projected revenues, *ad valorem* taxes, or by already authorized bonds that the city may issue if necessary to repay the debt. Anticipation notes are required to mature in seven years or less. No voter approval is necessary for anticipation notes, but these securities typically require a fairly high interest rate.

vi. Public Property Finance Contractual Obligations

A political subdivision or governmental agency is authorized by statute to purchase equipment or other personal property necessary for implementing a water supply project though a debt obligation contract. *See* TEX. LOCAL GOV'T CODE § 271.005 (Vernon Supp. 2007) (providing authority to contract for personal property). The contract may be paid over the term of the contract with taxes, revenue from the project, or both.

vii. Commercial Paper Program

Commercial paper may be used to obtain funding for capital improvements through a short-term note program. These obligations are secured through a pledge of revenues, similar to a revenue bond, supplemented with a letter of credit from a bank guaranteeing that the purchaser will be repaid on time. These notes are used for

immediate funding needs and mature in periods from one day to one year. *See* TEX. GOV'T CODE §§ 1371.001 and 1371.056 (Vernon Supp. 2007).

viii. Non-Profit Corporations

To avoid the constitutional prohibition against the lending of credit, political subdivisions may create non-profit corporations to implement, finance, or operate a water supply project. *See* Texas Development Corporation Act of 1979, TEX. REV. CIV. STATS. art. 5109.6, §§ 1-42. These corporations are specifically exempt from Article 3, section 52 of the Texas Constitution, and are authorized to issue taxable and tax-exempt bonds. TEX. REV. CIV. STATS. art. 5109.6, § 22. Often non-profit corporations are created to be used as a conduit for channeling money necessary for project implementation, and they are also used to implement water supply projects operated under a public-private partnership.

B. Texas Water Development Board Funding

i. Recent Legislative Action

In House Bill 1 (HB 1), the 80th Legislature appropriated monies to allow for deferred debt-service payments to the TWDB in order to provide reduced-interest loan rates and deferral of annual principal and interest payments for state water plan projects funded through the Water Infrastructure Fund (WIF). Tex. H.B. 1, 80th Leg., R.S. (2007). *See, generally,* 31 Tex. Admin. Code §§ 382.1-.43 (Texas Water Development Board, Water Infrastructure Fund). The WIF is designed to fund current water project needs and pre-construction environmental and engineering studies. Up to ten years of payment deferral for principal and interest is available to conduct pre-construction studies. All political subdivisions of the state and non-profit water supply corporations are eligible to

apply for assistance from the WIF. In addition to WIF funding, HB 1 provided funding for debt service payments for the State Participation and Economically Distressed Areas Programs to fund state water plan projects. Public entities, and some private entities, are eligible to receive funding from these and other TWDB programs. *See, generally,* Texas Water Development Board, Financial Assistance, *available at http://twdb.state.tx.us/assistance/financial/financial_main.asp* (provides the following information as well as links to forms and more detailed information about the various funding opportunities).

ii. Agriculture Water Conservation Grants

Agriculture Water Conservation Grants are available annually and may be issued to state agencies and political subdivisions to fund research, technical assistance, education, and technologies associated with agricultural water conservation. Funding is also available to a political subdivision for installing metering devices to quantify the impact of a water conservation strategy on irrigation.

iii. Agricultural Water Conservation Loans

Agricultural Water Conservation Loans are available for various public entities and individuals (if the money is routed through a bank or farm credit system) to: (1) improve the efficiency of water use or delivery; (2) convert irrigated land to dry land farming; (3) improve the efficiency with which dry land farming areas use natural precipitation; (4) install devices measuring irrigation water use; (5) brush control activities conducted under Chapter 206 of the Agriculture Code; or (6) other conservation projects authorized by TWDB rules. *See* 31 TEX. ADMIN. CODE § 367 (2007).

iv. Clean Water State Revolving Fund Program

The Clean Water State Revolving Fund Program is available to political subdivisions for planning, land acquisition, project construction, wastewater treatment, reuse projects, and non-point source pollution control. Individuals are also eligible to receive funding, but only for non-point source pollution control projects.

v. Drinking Water State Revolving Fund Program

Drinking Water State Revolving Fund Program Loans to political subdivisions and private individuals are available for all aspects of the implementation of water-related infrastructure, as well as source water protection. Subsidies may be available for economically disadvantaged areas.

vi. Rural Water Assistance Fund Program

Political subdivisions and non-profit water supply corporations may apply for loans from the Rural Water Assistance Fund Program to aid in the planning, acquisition, and construction of water supply infrastructure in rural areas.

vii. State Participation in Regional Water and Wastewater Facilities Program

Under the State Participation in Regional Water and Wastewater Facilities Program, the TWDB provides funding to political subdivisions and public entities for the construction of a regional water or wastewater projects. Through this program the state secures an ownership interest in the project that is transferred to the applicant after the customer base grows enough to allow for repayment.

viii. Water and Wastewater Loan Program

The Water and Wastewater Loan Program makes various loans available to political subdivisions and non-profit water supply corporations for, among other things,

water supply projects including reservoir construction, water storage, and agricultural water conservation.

ix. Regional Facility Planning Grant Program

The Regional Facility Planning Grant Program provides funding to political subdivisions authorized to implement regional water supply projects to support research into potential alternatives that could be used to meet present and future regional needs. Non-profit water supply corporations may also receive funding under this program.

x. Economically Distressed Area Program

Grants, loans, or a combination of both may be issued under the Economically Distressed Area Program to finance water or wastewater services for economically distressed areas.

CONCLUSION

The 2007 Texas State Water Plan identifies the need to develop 8.8 million acre-feet of additional water supplies in order to meet the State's projected demands in 2060, the planning horizon required by law. *See* STATE WATER PLAN, at 2. Development of these supplies is the subject of significant planning and permitting requirements, and adequate funding is essential to project development. State law provides that water supply projects requiring state water rights permitting or state funding be consistent with the approved regional and state water plans. *See* TEX WATER CODE § 11.134(b)(3)(E) and § 16.053(j). Depending on the source of supply, permitting the storage and use of water by the state or a GCD may also be required, and federal permits are necessary for permits involving construction activities in federally-regulated waters. *See* 33 U.S.C. § 1344 (2005). These activities involve compliance with state and federal procedures,

which often require years to complete. Finally, adequate funding for planning, permitting, site and right-of-way acquisitions, and construction of projects is necessary in order for new water supplies to be developed.