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# Legal & Regulatory Framework for Brackish Groundwater Desalination and Water Recycling in Texas

## Part 2: Water Recycling Technical Report for Direct Non-Potable Use



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**May 1, 2020**



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# Legal and Regulatory Framework for Brackish Groundwater Desalination and Water Recycling in Texas

Part 1: Brackish Groundwater  
Desalination Technical Report

## **Part 2: Water Recycling Technical Report for Direct Non-Potable Use**

Part 3: Case Study Appendices  
to the Technical Reports

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**May 1, 2020**



# Table of Contents

I.	Introduction .....	1
II.	Background and Methodology .....	1
III.	Stakeholders .....	4
A.	Texas Water Development Board (TWDB) .....	4
B.	Texas Commission on Environmental Quality (TCEQ) .....	4
C.	Potential Customers .....	5
IV.	Legal and Regulatory Landscape .....	5
A.	Building Permits .....	5
1.	Federal.....	5
2.	State .....	6
B.	Ongoing Monitoring Standards.....	6
1.	Federal.....	6
2.	State .....	6
V.	Conclusion .....	13

**DISCLAIMER:** This Technical Report and its student authors do not in any way purport to opine, advise (legally or non-legally), or otherwise direct any person or entity to come to a certain conclusion. **This is not legal advice** and should not be construed that way. This Technical Report and the corresponding summary materials are merely **educational resources** that may **inform** municipal leaders and interested members of the public of legal and regulatory considerations in Texas.

## **I. Introduction**

This Water Recycling Technical Report examines the legal frameworks that affect water recycling in Texas. The goal of this report is to provide insight into the legal and regulatory barriers, challenges, and opportunities for these technologies to go online. Each water recycling implementation site has to find ways of complying with various laws and regulations. The information in this Report comes from the study of water recycling facilities currently operating in Texas, as well as extensive research into available literature and documents from various agencies. While there is no updated “one-stop-shop” resource that provides detailed information on all the necessary permits to build, operate, and maintain such facilities, this Technical Report aims to compile the existing, available information in an organized and accessible fashion.

The Water Recycling Technical Report is the second of three reports that make up the work product of a project undertaken by students at Texas A&M University School of Law in a select capstone seminar. These reports examine regulations surrounding desalination and water recycling. The companion report entitled Brackish Groundwater Desalination Technical Report highlights building, operating, and monitoring requirements for desalination facilities in Texas. Finally, the Case Study Report expands on regulations in San Antonio and El Paso where these water alternatives are in place.

## **II. Background and Methodology**

There are a number of considerations that must be taken into account when producing a toolkit or education guide of this nature. This section is intended as a brief overview of why this Technical Report and the corresponding summary materials focused on the areas that it did.

Water recycling has been practiced in Texas for nearly 200 years. Initially, water recycling was primarily used for agricultural irrigation. However, today water recycling has a broad range of beneficial uses that

include augmenting water supplies for non-potable uses like watering parks and golf courses. Water is recycled through several methods. The most common method for water recycling is called the Return Activated Sludge process.<sup>1</sup> This biological process combines physical and chemical principles to remove contaminants from water.<sup>2</sup> During the primary treatment phase, large contaminants are removed by screening, grit removal, and clarification.<sup>3</sup> In the secondary treatment phase, chemicals such as chlorine are added to the water to kill microorganisms that were not removed during clarification. Lastly, the water may undergo tertiary treatment to remove trace chemicals and dissolved solids.<sup>4</sup>

The Texas Administrative Code defines reclaimed water as “[d]omestic or municipal wastewater which has been treated to a quality suitable for a beneficial use, pursuant to the provisions of this chapter and other applicable rules and permits.”<sup>5</sup> While the Code references “reclaimed water,” this is what the TWDB and other agencies in Texas frequently call “recycled water.”<sup>6</sup> Notably, states other than Texas use the term “water reuse,” but all three terms are synonymous. Because Texas agencies use the term “recycled water,” more often in their supplementary materials, this Technical Report will also use that term.

More specifically this Technical Report focuses on recycled water being put to direct, non-potable use. Direct non-potable reuse “refers to the use of reclaimed water that is piped directly from a wastewater treatment facility to a site for non-potable beneficial uses such as golf course and landscape irrigation, power plant cooling, or manufacturing.”<sup>7</sup> The reason for this focus is that direct, non-potable water recycling is the most common type of use in cities researched for this Report. It is very rare that a city in Texas

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<sup>1</sup> *Water Recycling and Reuse*, EDWARDSAQUIFER.NET, <https://www.edwardsaquifer.net/waterrecycling.html> (last visited Mar. 22, 2020).

<sup>2</sup> *Id.*

<sup>3</sup> *Id.*

<sup>4</sup> *Id.*

<sup>5</sup> Tex. Admin. Code § 210.3(24).

<sup>6</sup> *Frequently Asked Questions*, TEX. WATER DEV. BD., <http://www.twdb.texas.gov/innovativewater/reuse/faq.asp> (last visited Dec. 4, 2019).

<sup>7</sup> *Water Reuse*, WATER FOR TEX., <http://www.bcragd.org/wp-content/uploads/2016/12/TX-Water-Development-Board-WaterReuse.pdf> (last visited Dec. 4, 2019).

would resort to direct, potable water recycling. This option is usually reserved for emergency situations when reservoirs levels decline or when aquifers or springs used for drinking water are depleted or reach a critical low. When implemented, it earned the nickname “toilet-to-tap” and faced significant public critiques.<sup>8</sup> Nonetheless, indirect uses of recycled water face potentially even more restrictions and regulations that have not been widely studied in Texas.

Table 1. Manner in which recycled wastewater can be differentiated.:<sup>9</sup>

	<b><u>Direct</u></b>	<b><u>Indirect</u></b>
<b><u>Potable</u></b>	“[T]he use of reclaimed water that is piped directly from a wastewater treatment facility to a drinking water treatment and distribution system.”	“[T]he use of reclaimed water to augment drinking water supplies by discharging it to a water body, such as groundwater or surface water, which is subsequently treated for potable consumption.”
<b><u>Non-Potable</u></b>	“[T] use of reclaimed water that is piped directly from a wastewater treatment facility to a site for non-potable beneficial uses such as golf course and landscape irrigation, power plant cooling, or manufacturing.”	“[T]he use of reclaimed water for non-potable purposes by discharging it to a water body that is a supply source for non-potable uses.”

<sup>8</sup> See generally *From Toilet to Tap: How Big Spring Fights the Effect of Drought*, TEX. STANDARD, <https://www.texasstandard.org/stories/how-big-spring-fights-the-effects-of-drought-with-its-toilet-to-tap-water-system/> (last visited Feb. 26, 2020).

<sup>9</sup> *Water Reuse and Recycling: Community and Environmental Benefits*, U.S. ENVTL. PROT. AGENCY, <https://www3.epa.gov/region9/water/recycling/#regs> (last visited Nov. 17, 2019) (containing all information from the chart).

### III. Stakeholders

In order to have a comprehensive understanding of the legal and regulatory regime governing brackish groundwater desalination and water recycling in Texas, it is necessary to identify the key stakeholders involved in these water issues.

#### A. Texas Water Development Board (TWDB)

The Texas Water Development Board was created by legislation and supported by a Constitutional Amendment in 1957.<sup>10</sup> “TWDB is to provide leadership, information, education, and support for planning, financial assistance, and outreach for the conservation and responsible development of water in Texas.”<sup>11</sup> Importantly, the TWDB provides loans to develop water supply projects, studies the availability of ground and surface water, and manages the state’s water plan.<sup>12</sup> As such, various municipalities rely on TWDB for both financial assistance and resource information for developing water supply diversity like desalination and water recycling.

#### B. Texas Commission on Environmental Quality (TCEQ)

TCEQ is the head environmental agency in the state of Texas.<sup>13</sup> TCEQ is tasked with monitoring the quality of surface water, defining standards for water quality, permitting discharges to Texas water, and restoring water quality when necessary.<sup>14</sup> TCEQ is often the permitting authority with respect to projects that will affect water quality or supply.<sup>15</sup>

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<sup>10</sup> *About the Texas Water Development Board*, TEX. WATER DEV. BD., <https://www.twdb.texas.gov/about/> (last visited Mar. 28, 2020).

<sup>11</sup> *Id.*

<sup>12</sup> *Id.*

<sup>13</sup> *About Us*, TEX. COMM’N ON ENVTL. QUALITY, <https://www.tceq.texas.gov/agency/about-the-tceq> (last visited Mar. 28, 2020).

<sup>14</sup> *Water Quality Program Successes*, TEX. COMM’N ON ENVTL. QUALITY, <https://www.tceq.texas.gov/waterquality/watersuccess/waterqualitysuccess> (last visited Mar. 28, 2020).

<sup>15</sup> *Id.*



Municipal entities need to work with TCEQ to secure the necessary permits for building and operating desalination and water recycling plants.

### **C. Potential Customers**

With regard to water recycling, it is important to note that potential customers that buy recycled water are an important stakeholder group. If the recycled water is intended only to be put to direct, non-potable use, it is critical to understand who can potentially benefit from this product and where they are located.

## **IV. Legal and Regulatory Landscape**

### **A. Building Permits**

#### **1. Federal**

There are few federal regulations that directly govern water recycling in specific states.<sup>16</sup> Practically none of which discuss the specifics of building a water recycling facility. However, it is important to note that the Clean Water Act (CWA) authorizes the delegation of federal standards to state agencies upon a showing that the state has the capacity to undertake the implementation and enforcement of federal regulations as well as any additional more stringent state regulations.<sup>17</sup> Texas is one such state that has federal authorization to implement the federal scheme and as such, these regulations will be discussed in the context of the state agency's responsibilities.

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<sup>16</sup> U.S. ENVTL. PROT. AGENCY, *supra* note 9.

<sup>17</sup> *Id.*

## 2. State

No state-level permits were identified as required for building the infrastructure of a water recycling facility itself. We suspect that this is because the permits needed to build any facility are common to those involved in building and planning of any structure. It may be helpful to reference the *Brackish Groundwater Desalination Technical Report*, which was created to exist independently but contemporaneously with this *Water Recycling Technical Report*. However, because there was little or no information available regarding permits that were unique to building a water recycling facility, there is little to note in this section.

### B. Ongoing Monitoring Standards

#### 1. Federal

There are no applicable ongoing monitoring standards at the federal level for water recycling as they pertain to direct non-potable water recycling. Though potable water recycling is beyond the scope of this Technical Report, there are additional considerations for using recycled water in that manner. For example, the Environmental Protection Agency (EPA) requires that the recycled water meet the requirements of the Safe Drinking Water Act's total dissolved solids concentration. Notably, this requirement could also implicate state standards as states can implement more stringent secondary standards.

#### 2. State

### TPDES Permits

One of the only permits needed to operate a water recycling facility in Texas is the Texas Pollution Discharge Elimination System (TPDES) permit.<sup>18</sup> The permit is the state version of the National Pollution Discharge

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<sup>18</sup> Conclusion based on email interview with Gregg Eckhardt, San Antonio Water Systems (Nov. 3, 2019).

Elimination System (NPDES) permitting required under CWA.<sup>19</sup> The CWA authorized the NPDES permitting program in 1972.<sup>20</sup> “An NPDES permit is typically a license for a facility to discharge a specified amount of a pollutant into a receiving water under certain conditions. Permits may also authorize facilities to process, incinerate, landfill, or beneficially use sewage sludge.”<sup>21</sup> In 1998, Texas was approved to assume responsibility from the federal government to implement the NPDES program at the state level, thus creating the TPDES program.<sup>22</sup> As such, TCEQ “now has federal regulatory authority over discharges of pollutants to Texas surface water.”<sup>23</sup>

TCEQ is the primary regulatory body that issues permits and monitors the process for wastewater plants from construction to operation. “Prior to constructing or altering domestic wastewater collection systems, collection system units, wastewater treatment facilities, and treatment units, a wastewater treatment facility must acquire a wastewater permit.”<sup>24</sup> Obtaining a wastewater permit requires several steps. The application includes: (1) The wastewater permit application itself, (2) a domestic administrative report, (3) a domestic technical report, (4) a sewage sludge technical report, and (5) a core data form.<sup>25</sup> The permit application then undergoes several review processes.<sup>26</sup>

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<sup>19</sup> *About NPDES*, U.S. ENVTL. PROT. AGENCY, <https://www3.epa.gov/region9/water/recycling/#regs> (last visited Nov. 17, 2019).

<sup>20</sup> *Id.*

<sup>21</sup> *Id.*

<sup>22</sup> *What Is the "Texas Pollutant Discharge Elimination System (TPDES)"?*, TEX. COMM’N ON ENVTL. QUALITY, [https://www.tceq.texas.gov/permitting/wastewater/pretreatment/tpdes\\_definition.html](https://www.tceq.texas.gov/permitting/wastewater/pretreatment/tpdes_definition.html) (last updated Aug. 29, 2019).

<sup>23</sup> *Id.*

<sup>24</sup> *Wastewater System Design: Requirements*, TEX. COMM’N ON ENVTL. QUALITY, [https://www.tceq.texas.gov/permitting/wastewater/plans/WW\\_design\\_requirements.html](https://www.tceq.texas.gov/permitting/wastewater/plans/WW_design_requirements.html) (last updated Aug. 29, 2019).

<sup>25</sup> *Domestic Wastewater Permits: The Permitting Process*, TEX. COMM’N ON ENVTL. QUALITY, [https://www.tceq.texas.gov/permitting/wastewater/municipal/WQ\\_Domestic\\_Wastewater\\_Permits\\_Steps.html](https://www.tceq.texas.gov/permitting/wastewater/municipal/WQ_Domestic_Wastewater_Permits_Steps.html) (last updated Sept. 4, 2019).

<sup>26</sup> *Id.*

There is an administrative review to ensure the application is complete.<sup>27</sup> If it is incomplete, TCEQ will send a “Notice of Deficiency letter” and give the applicant a period of time by which to correct the application.<sup>28</sup> If the application is complete, TCEQ will send a “Notice of Receipt of Application and Intent to Obtain Permit” also known as a “NORI.”<sup>29</sup> The applicant must publish the NORI.<sup>30</sup> While TCEQ does not provide specific instructions on its website for NORI publishing requirements, an applicant should consult TCEQ for more information, if the publishing procedure is not provided in the NORI.

Next, the permit application undergoes technical review.<sup>31</sup> TCEQ will evaluate the technical information in the application and determine if it is complete.<sup>32</sup> “If the application is declared technically complete, staff will proceed with preparing a draft permit, technical summary or fact sheet for the application and public notice.”<sup>33</sup> Again the applicant will be required to publish the “Notice of Application and Preliminary Decision,” also known as a “NAPD.”<sup>34</sup> Again, the specific procedures for publishing the NAPD were not provided so an applicant is encouraged to consult with the agency if more specific publication procedures are not provided in the NPAD itself.

After the NORI and NAPD stages, the applicant itself is “given the opportunity to review and provide comments on the draft permit. In addition, certain permits are sent to EPA for their review and approval after comments from the applicant are resolved.”<sup>35</sup> If a draft permit is issued, the applicant has to go through a second round of public notice.<sup>36</sup> That notice must be published “in a local and widely distributed newspaper and make a copy of the application and draft permit available in a public place.”<sup>37</sup> These notices

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<sup>27</sup> *Id.*

<sup>28</sup> *Id.*

<sup>29</sup> *Id.*

<sup>30</sup> *Id.*

<sup>31</sup> *Id.*

<sup>32</sup> *Id.*

<sup>33</sup> *Id.*

<sup>34</sup> *Id.*

<sup>35</sup> *Id.*

<sup>36</sup> *Id.*

<sup>37</sup> *Id.*

provide the public with the procedures for interacting with the application in a public forum or hearing.<sup>38</sup> After the public hearing, TCEQ staff prepares a “Response to Comments.”<sup>39</sup>

If all proceeds as planned, eventually TCEQ takes a final action with respect to the permit.<sup>40</sup> “If a permit is issued, you will need to comply with the provisions of the permit which include effluent limits and monitoring requirements, standard provisions, sludge provisions, and other requirements. In addition, you will be required to pay an annual water quality fee.”<sup>41</sup>

Once the TPDES permit is obtained, the licensed facility can begin construction.<sup>42</sup> This permit also impliedly authorizes the facility to obtain the raw sewage itself that enters the system.<sup>43</sup> Once the waste enters the wastewater facility, there are no other permits involved until the end of the water recycling process where, if done correctly, two completely separate products are produced: biosolids and recycled water.

Biosolids are monitored by the TCEQ as well. There are additional permits and permissions from TCEQ in order to further process the biosolids, apply them to land, or incinerate them.<sup>44</sup> These permits and notice requirements can differ based on if the biosolid is a Class A, AB, or B biosolid.<sup>45</sup>

If any portion of the recycled wastewater is discharged via an outfall to a stream, that outfall system is regulated by the TPDES permit as well.<sup>46</sup> But the recycled water that goes to customers is regulated under Chapter 210

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<sup>38</sup> *Id.*

<sup>39</sup> *Id.*

<sup>40</sup> *Id.*

<sup>41</sup> *Id.*

<sup>42</sup> TEX. COMM’N ON ENVTL. QUALITY, *supra* note 24.

<sup>43</sup> Email Interview with Gegg Eckhardt, *supra* note 18.

<sup>44</sup> *Sewage Sludge: Permits for Land Application, Processing, or Disposal*, TEX. COMM’N ON ENVTL. QUALITY, [https://www.tceq.texas.gov/permitting/wastewater/sludge/WQ\\_sludge\\_ClassB\\_forms.html](https://www.tceq.texas.gov/permitting/wastewater/sludge/WQ_sludge_ClassB_forms.html) (last updated June 5, 2019).

<sup>45</sup> *Id.*

<sup>46</sup> Email Interview with Gegg Eckhardt, *supra* note 18.

of the Texas Administrative Code, discussed below.<sup>47</sup> Chapter 210 authorization is required before the recycled water can be used.<sup>48</sup>

### **Chapter 210 Requirements**

Chapter 210 of the Texas Administrative Code (Chapter 210) sets forth requirements related to “transfer, storage, and irrigation using reclaimed water and design criteria of reclaimed water systems.”<sup>49</sup> Reclaimed water is defined as “[d]omestic or municipal wastewater which has been treated to a quality suitable for a beneficial use, pursuant to the provisions of this chapter and other applicable rules and permits.”<sup>50</sup> While the Code references “reclaimed water,” this is the same as what the TWDB and other agencies in Texas call “recycled water.”<sup>51</sup>

#### ***Storage***

Section 210.23 of the Texas Administrative Code entitled “Storage Requirements of Reclaimed Water” sets forth the threshold requirement that water recycling facilities cannot be located in floodways.<sup>52</sup> This is important because certain municipalities in Texas may not be able to utilize water recycling as a water diversification strategy based on their location as it relates to floodways.

One of the first steps in the water recycling process is when the water enters a holding pond, frequently called a stabilization pond, where the wastewater is initially stored.<sup>53</sup> While the wastewater is in the pond, some of the organic matter will settle to the bottom, which contributes to purifying the water.<sup>54</sup> This pond stabilization process is a key step in treating

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<sup>47</sup> Tex. Water Code ch. 210.

<sup>48</sup> Email Interview with Gegg Eckhardt, *supra* note 18.

<sup>49</sup> Tex. Admin. Code § 210.21.

<sup>50</sup> Tex. Admin Code § 210.3(24).

<sup>51</sup> TEX. WATER DEV. BD., *supra* note 6.

<sup>52</sup> Tex. Admin. Code § 210.23.

<sup>53</sup> Marcos von Sperling & Carlos Augusto de Lemos Chernicharo, *Biological Wastewater Treatment in Warm Climate Regions*, IWA Publishing (2005) at 184, <https://www.iwapublishing.com/sites/default/files/ebooks/9781780402734.pdf>.

<sup>54</sup> *Id.*

wastewater in facilities across the country<sup>55</sup> Chapter 210 also regulates the construction, lining, design, and certification of the ponds.<sup>56</sup>

### ***Irrigation with Recycled Water***

There are a number of regulations that relate to how recycled water can be used for irrigation.<sup>57</sup> These regulations are key when it comes to contracting with potential recycled water clientele. For example, “[i]rrigation of edible crops that will be peeled, skinned, cooked, or thermally processed before consumption is allowed[,]”<sup>58</sup> but if the crop will not go through a thermal process, then contact with recycled water is “prohibited.”<sup>59</sup> This means that the water recycling facility needs to monitor who it contracts with to make sure that the recycled water is being put to uses that are allowed under the Texas Administrative Code.

Landscaped areas at public access facilities are governed by individual contracts with the reclaimed water providers, but Chapter 210 does not allow recycled wastewater to be used in structures “designed for contact recreation,” like pools or hot tubs.<sup>60</sup>

Chapter 210 also provides a number of general irrigation requirements related to preventing “water overflow, crop stress, and undesirable soil contamination.”<sup>61</sup>

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<sup>55</sup> Eugenia McNaughton, James E. Smith, Jr., & Sally Stoll, *Principles of Design and Operations of Wastewater Treatment Pond Systems for Plant Operators, Engineers, and Managers*, U.S. ENVTL. PROT. AGENCY at xxv (Jan. 21, 2011), <https://www.epa.gov/sites/production/files/2014-09/documents/lagoon-pond-treatment-2011.pdf>.

<sup>56</sup> Tex. Admin. Code § 210.23.

<sup>57</sup> See Tex. Admin. Code § 210.24.

<sup>58</sup> Tex. Admin. Code § 210.24(b)(1)(A).

<sup>59</sup> Tex. Admin. Code § 210.24(b)(1)(D).

<sup>60</sup> Tex. Admin. Code § 210.24(b)(3)(A)–(B).

<sup>61</sup> Tex. Admin. Code § 210.24(d).

### ***Special Design Criteria for Water Recycling Systems***

Finally, Chapter 210 also creates the purple pipe system for recycled water.<sup>62</sup> The SAWS Recycled Water Users' Handbook summarizes the regulations in bullet point form, which are excerpted here:

- “hose bibs will be required on all potable water faucets on users onsite facilities.
- all exposed piping should have proper color coding or stenciled
- where recycled water is stored signs will be posted reading, in both English and Spanish, ‘RECYCLED WATER, DO NOT DRINK’ or similar warning.
- quick couplers will be required for all recycled water faucets and signs will be posted reading, in both English and Spanish, ‘RECYCLED WATER, DO NOT DRINK’ or similar warning. quick couplers shall be keyed entry to restrict access, painted purple and designed to prevent connection to a standard hose[.]”<sup>63</sup>

Therefore, at the state level, water recycling facilities must obtain a TPDES permit and follow Chapter 210 of the Texas Administrative Code to comply with the requisite federal and state permits and regulations.

### **Texas Land Application Permit (TLAP)**

Domestic facilities that dispose of treated effluent by land application (surface irrigation, evaporation, drainfields, or subsurface land application) must obtain a TLAP.<sup>64</sup> Use of effluent on land can vary based on local and site-specific considerations so the specific type of TLAP required, if one is required at all may be a facility-specific inquiry.

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<sup>62</sup> Tex. Admin. Code § 210.25.

<sup>63</sup> *Recycled Water Users' Handbook*, SAN ANTONIO WATER SYS. at 7 (Sept. 2013), [https://www.saws.org/wp-content/uploads/2019/02/recycled\\_water\\_hb\\_rev\\_20130926.pdf](https://www.saws.org/wp-content/uploads/2019/02/recycled_water_hb_rev_20130926.pdf).

<sup>64</sup> *Permits for Municipal Wastewater Treatment Plants: Learning More*, TEX. COMM'N ON ENVTL. QUALITY, <https://www.tceq.texas.gov/agency/decisions/participation/permitting-participation/municipal-wastewater> (last visited April 1, 2020).



## **V. Conclusion**

As currently monitored and implemented, water recycling for direct, non-potable use is regulated at the state level in Texas. As such, it is imperative for city leaders, municipal entities, and potential operators of water recycling plants to understand the state regulations by which they must abide. The ability to make decisions regarding whether water recycling is appropriate for a particular community may depend on its location, its budget, and the feasibility of following all applicable Texas regulations.



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