



## Tampa Bay Water Desalination Plant



**In Tampa Bay Region, multiple service delivery methods, each with different risk sharing approaches, contributed to the construction of one of the nation’s largest seawater desalination plants.**

Tampa Bay Water, A Regional Water Supply Authority’s (“Tampa Bay Water’s”) Desalination Plant is currently an integral part of the utility’s water supply portfolio. The utility’s experience in developing the plant illustrates how public private partnership agreements can be structured to reduce a public entity’s exposure to various risks associated with constructing and operating a major water facility. However, the experience also shows that partnership models are not necessarily guaranteed to shield a public entity from all transferred risks. Despite its overall final success, the project was not without challenges, including multiple contract terminations and re-negotiations, two private partner bankruptcies, lawsuits, and multiple project delays. The project began as a comprehensive 30-year Design, Build, Operate, Own, and Transfer (DBOOT). Over time, the project transitioned to a modified Design, Build and Operate (DBO) model, and it finally finished as (and remains) an Operation, Management, and Maintenance (OM&M) agreement. Despite the challenges associated with the original DBOOT model, it provided Tampa Bay Water with important benefits during the early planning and construction phases, by transferring extensive regulatory and permitting risks to the private sector. After being developed and operated for ten years under multiple agreements and service delivery models, the plant met its final performance targets in 2010, and the completed plant can provide more than 2.5 million people with up to 10 percent of their drinking water.<sup>1</sup> The current unit cost to produce water is considerably higher than initial projections as a result of higher construction costs as well as drops in customer demand that have resulted in the plant running at lower production levels than anticipated.

<sup>1</sup> *Tampa Bay Seawater Desalination Plant*. The National Council for Public-Private Partnerships. <http://www.ncppp.org/resources/case-studies/waterwastewater-infrastructure/tampa-bay-seawater-desalination-plant/>

**Table 1. Key Project Details**

|                                 |   |
|---------------------------------|---|
| <b>Project Title:</b>           | <b>Tampa Bay Water Desalination Plant</b>   |
| <b>Primary Facility:</b>        | Seawater desalination plant (25 Million Gallons per Day)  |
| <b>Local Government Entity:</b> | Tampa Bay Water, A Regional Water Supply Authority  |
| <b>Primary Partner(s):</b>      | <i>Initial:</i> S&W Water, LLC, a partnership of Stone & Webster and Poseidon Resources Corporation<br><i>Intermediate:</i> Tampa Bay Desal, a partnership of Poseidon Resources Corporation and Covanta Tampa Construction<br><i>Current:</i> American Water-Acciona, a joint venture of American Water and Acciona Agua |
| <b>Delivery Model:</b>          | Conceived as a Design Build Own Operate Transfer (DBOOT) project, later transformed to a modified Design Build Operate (DBO) model, and completed as an Operations, Management, and Maintenance Contract (OM&M) <sup>2</sup>  |
| <b>Contract Period:</b>         | Original DBOOT 30 years, terminated after 3 years; Current OM&M 20 years  |
| <b>Population Served:</b>       | More than 2.5 million people <sup>3</sup>   |
| <b>Major Initial Outlays:</b>   | \$158 million (\$110 million prior to remediation and \$48 million for remediation) <sup>4</sup>  |
| <b>Flow of Revenues:</b>        | Tampa Bay Water sells wholesale water to retail water distributors and uses revenues to pay debt service and make OM&M contract payments  |

## Background

Florida's Tampa Bay region has historically relied primarily on groundwater to meet potable water needs.<sup>5</sup> As the region experienced rapid growth, increased groundwater pumping to meet increased demand led to a variety of environmental problems, including saltwater intrusion, sink holes, and vanishing wetlands.<sup>6</sup> By the 1990s, population growth had outpaced the development of new drinking water supplies.<sup>7</sup> In 1995, the West Coast Regional Water Supply Authority approved a Master Water Plan that included a seawater desalination plant as well as several other new alternative sources of water for the region.<sup>8</sup> In 1998, the West Coast Regional Water Supply Authority became Tampa Bay Water. Shortly thereafter, Tampa Bay Water and its member governments entered into a partnership agreement with the Southwest Florida Water Management District (SWFWMD) to reduce groundwater pumping and develop alternative water supplies.<sup>9</sup>

Tampa Bay Water decided to construct a seawater desalination plant to serve as one of the future water sources for the region. The project began as a Design Build Own Operate Transfer (DBOOT) facility, but eventually evolved into a model in which Tampa Bay Water would finance the construction, own the facility, and rely on a private operator for operations, management, and maintenance. The change in partnership models occurred because two construction firms

<sup>2</sup> *Tampa Bay Seawater Desalination Water Treatment Plant Operation, Maintenance and Management Services Agreement*. Tampa Bay Water and American Water-Pridesa LLC. November 15, 2004.

<sup>3</sup> *Tampa Bay Seawater Desalination Plant*. American Water. [http://files.shareholder.com/downloads/AMERPR/0x0x189111/e8c4687e-03db-487e-a2be-8f7b185a17b5/AMER0158\\_Project%20Sheets\\_Tampa-2.22.pdf](http://files.shareholder.com/downloads/AMERPR/0x0x189111/e8c4687e-03db-487e-a2be-8f7b185a17b5/AMER0158_Project%20Sheets_Tampa-2.22.pdf)

<sup>4</sup> *Tampa Bay Seawater Desalination Plant*. The National Council for Public-Private Partnerships. <http://www.ncppp.org/resources/case-studies/waterwastewater-infrastructure/tampa-bay-seawater-desalination-plant/>

<sup>5</sup> *Tampa Bay Seawater Desalination Plant*. American Water. [http://files.shareholder.com/downloads/AMERPR/0x0x189111/e8c4687e-03db-487e-a2be-8f7b185a17b5/AMER0158\\_Project%20Sheets\\_Tampa-2.22.pdf](http://files.shareholder.com/downloads/AMERPR/0x0x189111/e8c4687e-03db-487e-a2be-8f7b185a17b5/AMER0158_Project%20Sheets_Tampa-2.22.pdf)

<sup>6</sup> *Tampa Bay's Water Wars*. Hillsborough Water Works, Hillsborough County, Florida. <http://www.hillsboroughwaterworks.com/water-wars/0103.html>

<sup>7</sup> *Tampa Bay Seawater Desalination Plant*. American Water. [http://files.shareholder.com/downloads/AMERPR/0x0x189111/e8c4687e-03db-487e-a2be-8f7b185a17b5/AMER0158\\_Project%20Sheets\\_Tampa-2.22.pdf](http://files.shareholder.com/downloads/AMERPR/0x0x189111/e8c4687e-03db-487e-a2be-8f7b185a17b5/AMER0158_Project%20Sheets_Tampa-2.22.pdf)

<sup>8</sup> *The Tampa Bay Seawater Desalination Plant*. Tampa Bay Water. <http://www.tampabaywater.org/watersupply/tbdesaloverview.aspx>

<sup>9</sup> *The Tampa Bay Seawater Desalination Plant*. Tampa Bay Water. <http://www.tampabaywater.org/watersupply/tbdesaloverview.aspx>

tasked with constructing the facility went bankrupt (for reasons not solely related to this project). In 2007, the final private partner completed the plant and began supplying the region with treated water.<sup>10</sup>

Despite continued population growth, water demand has continued to fall in the Tampa Bay Water region due to loss of large customers and increased adoption of water efficiency practices. Tampa Bay Water anticipates that it will sell an average of 164 million gallons a day (mgd) in 2016, which is 3.6 mgd less than what was sold in 2015 and 30 mgd less than in 1998 when Tampa Bay Water began developing the desalination plant.<sup>11</sup>

## Project Development and Procurement

The procurement process started with West Coast Regional Water Supply Authority’s original Request for Proposals (RFP). Six firms responded to the original RFP in 1997 (see timeline of key events). The RFP allowed developers to select their own project site, facility size, and desalination technology.<sup>12</sup>

By 1998, the newly formed entity, Tampa Bay Water, selected four teams based on analysis and ranking of proposals by its engineering consultant, PB Water. These rankings incorporated evaluations of each proposal’s environmental impact, capability of meeting water quality standards, cost, ease of permitting, and design. After the finalists resubmitted their best and final offers, PB Water again ranked the proposals. Tampa Bay Water awarded the contract to S&W Water, LLC, a development partnership between Stone & Webster and Poseidon Resources Corporation. Shortly after being awarded the contract in 2000, Stone & Webster went bankrupt. Poseidon took over full ownership of the project, as well as ownership of S&W Water (which was later renamed Tampa Bay Desal). Poseidon subsequently replaced Stone & Webster with Covanta Tampa Construction.<sup>13</sup>

In December 2001, Covanta failed to post a required construction bond, thereby postponing the sale of private activity bonds to fund the construction of the project.<sup>14</sup> Tampa Bay Water proceeded to resume ownership of the project in March 2002 in order to secure long-term financing. Covanta continued as a construction contractor, but it failed to meet two construction related milestones in 2003 and declared bankruptcy later that year.

In 2004, Tampa Bay Water sought new proposals to repair and operate the plant. Tampa Bay Water contracted with American Water-Acciona, a joint venture of American Water and Acciona Agua. American Water-Acciona was able to complete the plant in 2007 and meet all agreed upon milestones by 2010. By completion, the various procurement difficulties had ultimately caused a nearly six year delay in the completion of the plant.<sup>15</sup>

**Table 2. Select Project Milestones<sup>16</sup>**

| Date | Milestone |
|------|-----------|
|------|-----------|

<sup>10</sup> Herd, Ken. *Tampa Bay Water: A Case Study*. Presentation to Council of Infrastructure Financing Authorities 2015 SRF National Workshop. November 2, 2015. <http://www.cifanet.org/documents/15Workshop/KenHerd.pdf>.

<sup>11</sup> *Annual Operating Budget Fiscal Year 2016*. Tampa Bay Water. June 15, 2015.

<sup>12</sup> *Tampa Bay Seawater Desalination Plant: Project History*. Tampa Bay Water. <http://www.tampabaywater.org/documents/fact-sheets/desal-fact-sheet.pdf>

<sup>13</sup> *The Tampa Bay Seawater Desalination Plant*. Tampa Bay Water. <http://www.tampabaywater.org/watersupply/tbdesaloverview.aspx>

<sup>14</sup> *Fact Sheet: Tampa Bay Seawater Desalination Plant*. American Water. [http://www.amwater.com/files/TampaBay\\_Desal\\_FactSheet\\_v10.pdf](http://www.amwater.com/files/TampaBay_Desal_FactSheet_v10.pdf)

<sup>15</sup> *Tampa Bay Seawater Desalination Plant*. The National Council for Public-Private Partnerships. <http://www.ncppp.org/resources/case-studies/waterwastewater-infrastructure/tampa-bay-seawater-desalination-plant/>

<sup>16</sup> *Fact Sheet: Tampa Bay Seawater Desalination Plant*. American Water. [http://www.amwater.com/files/TampaBay\\_Desal\\_FactSheet\\_v10.pdf](http://www.amwater.com/files/TampaBay_Desal_FactSheet_v10.pdf)

|                       |   |
|-----------------------|---|
| <b>Winter 1997</b>    | West Coast Regional Water Supply Authority issues RFP   |
| <b>August 1998</b>    | West Coast Regional Water Supply Authority becomes Tampa Bay Water  |
| <b>February 1999</b>  | S&W Water, a partnership between Poseidon Resources Corporation and Stone & Webster, submits a best and final offer to sell desalinated water to Tampa Bay Water  |
| <b>July 1999</b>      | Tampa Bay Water's Board of Directors awards the final construction contract and water purchase agreement to S&W Water   |
| <b>July 2000</b>      | Stone & Webster declares bankruptcy, Poseidon takes 100 percent ownership of S&W Water and partners with Covanta  |
| <b>December 2001</b>  | Covanta fails to post a required construction bond for the project  |
| <b>March 22, 2002</b> | Tampa Bay Water receives authorization from its Board of Directors to purchase the plant from Tampa Bay Desal (design, permitting, and 30 percent of construction is complete). Tampa Bay Water contracts Covanta to finish the project |
| <b>April 2002</b>     | Tampa Bay Water purchases incomplete plant from Tampa Bay Desal   |
| <b>September 2003</b> | Covanta fails to meet the new acceptance test deadline  |
| <b>October 2003</b>   | Covanta declares bankruptcy   |
| <b>February 2004</b>  | Tampa Bay Water assumes full control of the plant through a mediated settlement   |
| <b>March 2004</b>     | Tampa Bay Water seeks proposals from qualified teams to repair and operate the desalination plant   |
| <b>November 2004</b>  | Tampa Bay Water's Board of Directors approves contracts with American Water-Acciona, a joint venture between American Water and Acciona Agua, to repair and operate the plant   |
| <b>September 2007</b> | Plant remediation is complete, plant run-in period begins   |
| <b>November 2007</b>  | Plant passes acceptance testing   |
| <b>December 2007</b>  | Operation begins <sup>17</sup>  |
| <b>December 2007</b>  | Project achieves first funding milestone and receives \$21.25 million from SWFWMD <sup>18</sup>   |
| <b>December 2008</b>  | Plant achieves 12.5 MGD 12-month average, the second funding milestone, and receives \$42.5 million from SWFWMD <sup>19</sup>   |
| <b>February 2010</b>  | Plant achieves 20 MGD 12-month average and four consecutive months at 25 MGD, the third and fourth funding milestones, and receives \$21.25 million from SWFWMD, for a total of \$85 million <sup>20</sup>                              |

<sup>17</sup> *Tampa Bay Seawater Desalination Plant*. The National Council for Public-Private Partnerships. <http://www.ncppp.org/resources/case-studies/waterwastewater-infrastructure/tampa-bay-seawater-desalination-plant/>

<sup>18</sup> *Tampa Bay Seawater Desalination Plant: Project History*. Tampa Bay Water. <http://www.tampabaywater.org/documents/fact-sheets/desal-fact-sheet.pdf>

<sup>19</sup> *ibid.*

<sup>20</sup> *ibid.*

## Key Financial Features and Outcomes

Tampa Bay Water initially conceived and bid the project as a long-term Design, Build, Own, Operate and Transfer (DBOOT) and water purchase contract. The structure of this agreement highlighted the risk transfer characteristics of many DBOOT models, in which most responsibilities and the risks associated with them are delegated to the developer:

**“Tampa Bay Water is not the owner or co-owner, lessee or co-lessee, nor a partner in, nor joint venture with [the] Water Developer in the ownership or operation of the Facilities. Rather Tampa Bay Water is to be a customer of [the] Water Developer. [The] Water Developer shall own and operate all Facilities as principal for its own account and not as manager or agent of Tampa Bay Water.”<sup>21</sup>**

The agreement covered the initial permitting, design, land acquisition, and capital construction costs associated with the plant, which were estimated to be approximately \$88 million when the agreement was signed in 1999. The total upfront cost of the facility, at the time, was estimated to be \$110 million (after taking into consideration supplemental design, advising, and transaction costs). Under the agreement, the developer was responsible for putting up 10% (\$8 Million) of its own funds towards the project that would remain as equity in the project after construction was completed.<sup>22</sup> Tampa Bay Water intended for the remainder of the project costs to be financed with short-term debt during the construction phase, which would then be transferred to long-term private activity tax-exempt debt once the plant was operational. Tampa Bay Water arranged the long-term debt, but gave full responsibility for making the debt service payments to the developer, who would apply revenue receipts from a long-term water purchase agreement with Tampa Bay Water.<sup>23</sup> According to the Tampa Bay Finance Officer at the time, the bond was ready to be issued and had received a provisional AA rating.<sup>24</sup>

The water purchase component of the agreement guaranteed the developer a long-term revenue stream once the plant became operational. Under the original terms of the agreement, Tampa Bay Water was obligated to purchase treated water in an amount equal to the design capacity of the plant (25 MGD). If Tampa Bay Water was unable to purchase 25MGD, it was required to pay a significant “Standby Compensation Rate” calculated to cover all of the fixed costs associated with the facility. Such fixed costs included property taxes, debt service payment (projected at terms of 5.2% over 30 years) and operating costs. Table 3 shows the complete list of Estimated Base Compensation items in the original DBOOT agreement.<sup>25</sup>

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<sup>21</sup> *Agreement for the Construction and Operation of a Seawater Desalination Plant and Water Purchase Agreement*. Tampa Bay Water and S&W Water, LLC. July 21, 1999.

<sup>22</sup> *ibid.*

<sup>23</sup> Koni Cassini (Former Finance Director, Tampa Bay Water), interview with author, Jun 24, 2016.

<sup>24</sup> *ibid.*

<sup>25</sup> *Agreement for the Construction and Operation of a Seawater Desalination Plant and Water Purchase Agreement*. Tampa Bay Water and S&W Water, LLC. July 21, 1999.

**Table 3. Estimated Base Compensation Items in Original DBOOT Agreement (never used)**

| <b>Component</b>                                 | <b>Rate per 1,000 Gallons</b> |
|--|-------------------------------|
| <b>Cash Contribution Investment Recovery</b>     | \$0.107                       |
| <b>Estimated Debt Recovery</b>                   | \$0.620                       |
| <b>Property Taxes</b>                            | \$0.147                       |
| <b>Membrane Replacement</b>                      | \$0.009                       |
| <b>Energy Costs</b>                              | \$0.490                       |
| <b>Chemicals and Other Consumables</b>           | \$0.074                       |
| <b>Insurance and Bonds</b>                       | \$0.016                       |
| <b>Water/concentrate disposal access charges</b> | \$0.022                       |
| <b>Rent or Lease</b>                             | \$0.004                       |
| <b>Operation/Maintenance</b>                     | \$0.101                       |
| <b>Additional compliance monitoring</b>          | \$0.011                       |
| <b>Labor</b>                                     | \$0.074                       |
| <b>Developer/operator fee</b>                    | \$0.036                       |
| <b>Total First Year</b>                          | \$1.712                       |

***Transitioning from DBOOT/Water Purchase Agreement to DBO***

Once Tampa Bay took ownership of the plant, the project service delivery model effectively transitioned from a DBOOT model to a modified DBO model. The plan, at the time, was to retain Covanta as the primary construction company and to use Covanta’s sister entity, Covanta Tampa Bay Inc., to operate the facility.

While Tampa Bay Water did not purchase a fully functioning plant, it did acquire a plant that had already been granted a large number of permits. This is important because at the outset of the project, one of the primary objectives for relying on a public private partnership model was to shift some of the substantial permitting challenges and risks to the private sector. Appendix A illustrates the long list of permits that were transferred at the time of the sale (as described in the asset transfer agreement).<sup>26</sup> From this perspective, the transfer of permitting risk to the private sector was successful.

The new construction firm (Covanta) also encountered problems. After additional delays and performance problems, Covanta failed to meet its performance requirements and to correct plant deficiencies. Before Tampa Bay Water could formally terminate its contract, Covanta declared bankruptcy, requiring Tampa Bay Water to reach a settlement to assume full control of the incomplete plant. A settlement was reached in February 2004, effectively giving Tampa Bay Water control of the plant, which was further along in the development process, but still unable to operate as designed. The \$75.5 million settlement was substantially lower than the \$91 million Covanta reportedly spent on plant construction.<sup>27</sup> In one respect, the difference (\$15 million) can be viewed as a monetization of construction risk that materialized which had been transferred to Covanta.

At this point in the process, Tampa Bay Water realized that it would have to make significant additional investments to assure it could meet the required alternative water supply requirements.<sup>28</sup> Contractually, Tampa Bay Water had been theoretically protected from much of the construction and technology risk and could have conceivably walked away from the project. However, the structure of the contract did not change the fact that Tampa Bay Water was under a regulatory obligation and strict timeline to complete the plant and reduce dependence on groundwater. Table 4 shows a summary of how some of the key project risks were allocated under the initial DBOOT agreement. When asked about lessons learned from the procurement process, the Tampa Bay Water Construction and Contracts Section Leader

<sup>26</sup> *Asset Purchase and Sale Agreement for Seawater Desalination Plant and Related Assets*. Tampa Bay Desal, LLC and Tampa Bay Water. April 29, 2002.

<sup>27</sup> *Tampa Bay Seawater Desalination Plant: Project History*. Tampa Bay Water. <http://www.tampabaywater.org/documents/fact-sheets/desal-fact-sheet.pdf>

<sup>28</sup> Ken Herd (Director of Operations and Facilities, Tampa Bay Water), email correspondence with author, June 27, 2016

stressed the importance of realistic risk allocation. He believes that for some projects, no amount of contractual clauses can truly insulate the public sector from certain risks.<sup>29</sup>

**“Looking back on our experience at Tampa Bay Water, selection of the most suitable delivery method and partner is vital to achieving project success. Clearly identifying each project’s individual risk profile and understanding how best to allocate those risks between the public and private sector is fundamental to delivering a project that best meets the needs of our customers.”**

- Ken Herd, Construction and Contracts Section Leader, Tampa Bay Water<sup>30</sup>

**Table 4. Risks and Responsible Parties under the initial DBOOT Agreement**

| Risk Category  | Responsible Parties | Description   |
|--|---------------------|---|
| Permitting Risk  | S&W Water           | Responsible for obtaining permits   |
|  | Tampa Bay Water     | Responsible for assisting developer in obtaining permits  |
| Construction   | S&W Water           | Responsible for the majority of construction risks under the DBOOT agreement (developer was not to be paid until plant was complete and met performance targets)                  |
|  | Tampa Bay Water     | Protected from most construction risk under normal circumstances, but became exposed to risk once two construction companies declared bankruptcy                                  |
| Operations and maintenance, including costs associated with regulatory changes | S&W Water           | Responsible for obtaining permits for the project   |
|  | Tampa Bay Water     | Relied on the outputs of the plant to meet regulatory requirements  |
| Demand   | S&W Water           | Guaranteed payment regardless of actual demands; defined as “Take or Pay” fees in the agreement   |
|  | Tampa Bay Water     | Responsible for demand risk: if circumstances led to reduced demands, the utility was still required to pay fees based on higher demands  |
| Financial/Debt   | S&W Water           | Responsible for all financing during construction; responsible for investing 10% of estimated initial capital cost as equity  |
|  | Tampa Bay Water     | Minimally responsible for acquiring financing under initial agreement; once plant was operating, developer’s debt service would be retired by Tampa Bay Water’s Take or Pay fees. |

***Shifting to an Operate, Manage, and Maintain (OM&M) Model***

<sup>29</sup> *ibid.*

<sup>30</sup> Ken Herd (Director of Operations and Facilities, Tampa Bay Water), interview with author November 2, 2015.

After the DBOOT and first DBO approach were unsuccessful, Tampa Bay Water evaluated alternative management and operation models to finish the plant. It decided to pursue a modified approach which involved hiring a company to complete construction of the plant under one contract and then enter into a separate contract to operate, manage and maintain it (OM&M). Given the technical and operational problems with the project to date, Tampa Bay Water required potential partners to carry out extensive pilot treatment tests and use the results to make informed recommendations on how to complete the plant. Two competing firms participated in this process. Tampa Bay Water ultimately selected American Water-Acciona Aqua (previously American Water –Pridesa) to complete the construction and serve as contract operator. Tampa Bay Water entered into separate agreements for the construction and OM&M phase of the project.

The final construction contract costs for repair and completion were approximately \$30 Million. By the time plant acceptance testing was complete in 2007, Tampa Bay Water reported that the final plant remediation had added \$48 million to the project, resulting in a total project development cost of \$158 million.<sup>31</sup>

The total project cost included a wide array of outlays to diverse groups over an eight-year period, making it difficult to precisely track the flow of funds for this project. The original plan was to finance the majority of the project's capital costs through private activity bonds in which the debt service payments were included in the required water purchase fees. Prior to entering into the agreement, Tampa Bay Water had secured a large grant commitment from the Southwest Florida Water Management District (SWFWMD) for the balance of project capital. SWFWMD is funded through ad valorem taxes and serves as a regional environmental regulator as well as a funder for projects that address regulatory goals.

Since state laws prohibited the grant funds from being disbursed directly to the private entity for a privately owned facility, Tampa Bay Water worked with SWFWMD to develop an innovative approach that would have involved placing the grant funds in escrow and drawing down the funds to offset the capital component of the water price. However, this plan was not needed after Tampa Bay Water took over direct ownership of the plant. In the end, Tampa Bay Water arranged and serviced the capital financing directly. The amount Tampa Bay Water had to borrow was greatly reduced by its participation in the SWFWMD Partnership Plan. The SWFWMD funding was disbursed in phases as the plant met its performance milestones. SWFWMD made the final disbursement to Tampa Bay Water in February 2010.

The tax-exempt bonds issued by Tampa Bay Water were rated AAA by S&P.<sup>32</sup> The bonds were structured fixed rate revenue bonds serial and term bonds due 2008-2036 with coupon rates between 4% and 5% (with an all in true interest cost reported as 4.63%).<sup>33</sup> Tampa Bay Water's strong credit rating has supported on-going access to low-cost capital. According to Tampa Bay Water staff, the primary driver of its choice of service delivery method was not to access capital, but rather to transfer risk. As the project advanced and various risks (such as regulatory and technology risks) were reduced, Tampa Bay Water was more willing to follow traditional tax-exempt bonding methods, particularly given its credit rating.<sup>34</sup>

Unlike the original DBOOT agreement, in which capital costs were rolled into the long-term water purchase agreement, the current OM&M agreement with American Water-Acciona does not include any of the initial capital cost in the volumetric price paid by Tampa Bay Water. The agreement requires the payment of a "Service Fee" that includes a base OM&M fee and a number of pass-through payments for items such as electricity and chemicals.<sup>35</sup> The base OM&M charge is a fixed charge calculated to cover all labor, laboratory, vehicles, ordinary repair, waste disposal and cartridge filter replacement.

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<sup>31</sup> *Tampa Bay Seawater Desalination Plant*. The National Council for Public-Private Partnerships. <http://www.ncppp.org/resources/case-studies/waterwastewater-infrastructure/tampa-bay-seawater-desalination-plant/>

<sup>32</sup> This is the insured rating, underlying rating was AA-.

<sup>33</sup> *Annual Operating Budget Fiscal Year 2016*. Tampa Bay Water. June 15, 2015.

<sup>34</sup> Ken Herd (Director of Operations and Facilities, Tampa Bay Water), email correspondence with author, June 27, 2016

<sup>35</sup> *Tampa Bay Seawater Desalination Water Treatment Plant Operation, Maintenance And Management Services Agreement*. Tampa Bay Water and American Water-Pridesa LLC. November 15, 2004.

Pass-through charges include the cost of residual disposal, electricity, and chemicals. Membrane replacement and major renewal, repairs, and replacements are supported through separate sinking funds created as part of the agreement. Sinking funds follow a set schedule and are paid to the operator to support the above costs.<sup>36</sup> American Water-Acciona must have written approval from Tampa Bay Water to withdraw these funds. The FY 2017 Tampa Bay Water budgeted Service Fee is \$6,664,000; the pass through chemical budget is \$1,303,000; and the power budget is \$3,399,000, based on a plant average production level of 8 mgd over a 12 month period.

The agreement allows American Water-Acciona to invest in new capital improvements that will generate savings. American Water-Acciona is able to retain the savings until it pays off its investments, after which Tampa Bay Water retains 40% of the savings.<sup>37</sup> The agreement also allows Tampa Bay Water to initiate and pay for cost saving improvements, thus allowing Tampa Bay Water to retain the savings until its investment has been fully recovered. The OM&M agreement was structured so that the operator was guaranteed a significant payment even if Tampa Bay Water did not need water. This has placed significant demand risk on Tampa Bay Water (see next section).

The creation of the desalination facility created approximately 447 temporary jobs, 370 of which were within the Tampa Bay Water service counties of Hillsborough, Pinellas, and Pasco. The Tampa Bay Seawater Desalination Plant itself directly employs 22 workers.<sup>38</sup>

### ***Lower Water Demand and the Ultimate Financial Outcome***

The financial outcome of this project was considerably less favorable than had originally been projected. However, Tampa Bay Water did not promote the project or the service delivery model primarily as a cost savings strategy. The utility believed the DBOOT approach would be an effective method of developing a new technology and transferring risk under complex circumstances. It is impossible to know what the outcome would have been if Tampa Bay Water had utilized a more traditional procurement approach from the outset, and specifically, it is unclear whether the permitting process would have been faster. Further, it is uncertain how quickly construction would have proceeded if Tampa Bay Water had hired an engineering firm to do the design and put a separate bid for the construction.

There are relatively few desalination plants operating in the United States. Each one operates in a unique cost environment with different electricity and environmental issues; therefore, comparing unit costs is challenging. In the end, the project cost significantly more than was projected under the original approach and the structure of the flow of funds was radically different than originally envisioned. (see schematic in Appendix B). An analysis by Tampa Bay Water staff shows that depending on the average flow, the operating cost per 1,000 gallons can vary from approximately \$2.20 to almost \$4.00 (see Figure 1). To put this in perspective, Tampa Bay Water's current member "all in" wholesale rate is \$2.559 per 1,000 gallons, meaning that Tampa Bay Water is not able to cover the operating cost of the plant with its wholesale rate. The high cost of Tampa Bay Water's desalinated water is balanced by its other lower cost water supplies.

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<sup>36</sup> *ibid.*

<sup>37</sup> *Tampa Bay Seawater Desalination Water Treatment Plant Operation, Maintenance And Management Services Agreement.* Tampa Bay Water and American Water-Pridesa LLC. November 15, 2004.

<sup>38</sup> *The Tampa Bay Seawater Desalination Plant.* Tampa Bay Water. <http://www.tampabaywater.org/watersupply/tbdesaloverview.aspx>

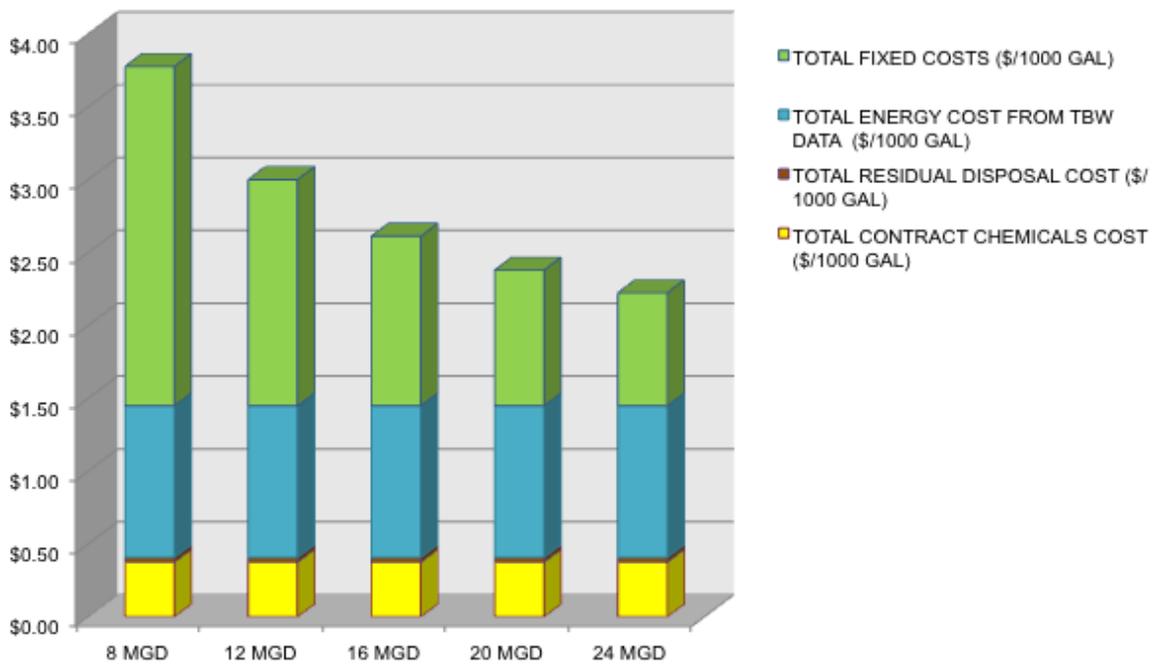


Figure 1. Desalination Costs vs. Production Rate (\$/1000 gal)<sup>39</sup>

One of the financial implications of the current operations agreement (as well as the original DBOOT contract) is that Tampa Bay Water retains a high level of demand risk. If falling demand leads Tampa Bay Water to use significantly less water from the plant than projected, it will have more limited control in reducing expenditures than if it operated the plant itself. From the perspective of Tampa Bay Water, operating the plant now has two components: fixed costs and variable costs. The negotiated fee structure assumed that Tampa Bay Water would need more water than it has needed. As a result, the negotiated fixed fees were likely calculated taking into consideration more repairs and staff time than current demand requires. If Tampa Bay Water operated the plant itself, it could potentially have flexibility to reduce operating costs below its current fixed OM&M payments.<sup>40</sup>

Despite the continued growth of the region, Tampa Bay Water has seen its water demand decline. Tampa Bay Water projects an additional 3.6 mgd decline in 2016 leading to a total drop in demand since 2008 of 30 mgd.<sup>41</sup> At present, since Tampa Bay Water does not need the desalination water to meet its current demands, it is in a situation where it can decide how much desalination water to use each year in order to optimize its overall expenditures. The variable costs of operating the plant are high compared to Tampa Bay Water's other source waters, and for that reason, Tampa Bay Water has a financial incentive to run the plant at levels below the maximum capacity. Tampa Bay Water estimates it costs \$0.55 cents in variable costs to produce 1,000 gallons of water from their non-desalination surface plant and \$0.28 cents in variable costs to produce 1,000 gallons from their groundwater systems. Figure 1 shows that the variable costs associated with desalination water are much higher than this, even at high production levels. As a result, Tampa Bay Water has developed an operating plan that only uses enough desalination water to keep the plant functioning well. In 2017, it will likely operate the plant at 12 mgd for nine months of the year and in a zero production mode for three months (leading to an average annual daily production rate of 8 mgd). Tampa Bay Water has also engaged several consulting firms to evaluate additional methods for optimizing costs, and to evaluate the potential to renegotiate its agreement with American Water.<sup>42</sup>

<sup>39</sup> Herd, Ken. *Tampa Bay Water: A Case Study*. Presentation to Council of Infrastructure Financing Authorities 2015 SRF National Workshop. November 2, 2015. <http://www.cifanet.org/documents/15Workshop/KenHerd.pdf>.

<sup>40</sup> Ken Herd (Director of Operations and Facilities, Tampa Bay Water), email correspondence with author, June 27, 2016

<sup>41</sup> *Annual Operating Budget Fiscal Year 2016*. Tampa Bay Water. June 15, 2015.

<sup>42</sup> Ken Herd (Director of Operations and Facilities, Tampa Bay Water), email correspondence with author, August 30, 2016

The Tampa Bay experience is a lesson for utilities that want to better understand the reality of risk transfer under different service delivery models. The first half of Tampa Bay Water’s experience was dominated by the impacts of permitting, construction, and technology risk. More recently, Tampa Bay Water has been experiencing the repercussions of how it allocates demand risk in an O&M agreement. The risk allocations and agreements were made based on the best available assumptions at the time, which in the end, as is possible with any assumptions, did not materialize. However, it is clear that as more communities experience water stress, desalination is increasingly being considered as a potential source of potable water. Tampa Bay Water was an early adopter of this technology and always anticipated that water from the desalination plant would cost more than other sources. Tampa Bay Water continues to view the desalination plant as an essential component of a broader water portfolio that it believes will eventually be needed given the region’s continued rapid growth.<sup>43</sup>

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<sup>43</sup> Ken Herd (Director of Operations and Facilities, Tampa Bay Water), interview with author, November 2, 2015.

## Appendix A. Permits transferred at the sale of Tampa Bay Desal from Covanta to Tampa Bay Water

### Schedule 2.2(a)(iv) - Transferable Permits

| I. Desalination Facility Permitting Requirements        |                                       |             |  |
|---|---------------------------------------|-------------|--|
| Permit  | Issuing Agency                        | Date Issued | Status   |
| FDEP Water Facility Construction Permit                 | Hillsborough County Health Department | 11/21/2000  | Issued #0169063-001-WC/01  |
| Industrial Wastewater Permit                            | FDEP Tallahassee                      | 11/27/2001  | Issued #FL0186813  |
| Standard General ERP                                    | FDEP Tampa                            | 1/31/2001   | Issued #29-0178169-001   |
| Development Review                                      | Hillsborough County                   | 1/4/2001    | Issued   |
| EPC Review  | Hills. Co. EPC                        | 1/3/2000    | Issued   |
| Domestic Wastewater Permit                              | Hills. Co. EPC                        | 11/30/2000  | Issued #017027-001-DWC   |
| Stormwater NPDES NOI                                    | FDEP Tampa                            | 3/21/2001   | Issued #FLR101035  |
| Air Pollution Permit                                    | Hills. Co. EPC                        | 3/1/2001    | Issued 0571256-001-AC, extended  |
| Natural Resources Permit                                | Hillsborough County                   | 2/16/2001   | Issued #51476  |
| Industrial User Permit                                  | Hillsborough County Water Dept.       | 4/20/2001   | Permit #0044   |
| Right-of-Way Use  | Hillsborough County                   | 1/4/2001    | Issued ROW 02647   |
| II. Water Transmission Pipeline Permitting Requirements |                                       |             |  |
| Permit  | Issuing Agency                        | Date Issued | Status   |
| Individual ERP  | FDEP Tampa                            | 1/8/2001    | Issued #29-01709603-002-DS/C   |
| Dredge & Fill Permit Nationwide                         | ACOE NW-12                            | 3/20/2001   | Issued   |
| Dredge and Fill General                                 | SAJ14                                 | 3/20/2001   | Issued   |
| FDOT Permits  | FDOT                                  |             |  |
| State Road 60   |                                       | 6/19/2000   | Extended #00-H-796-0158  |
| US 301 (SR 43)  |                                       | 6/19/2000   | Extended #00-H-796-0159  |
| US 41 (SR 45)   |                                       | 6/19/2000   | Extended #00-H-796-0160  |
| Lee Roy Selman Expwy                                    |                                       | 12/27/2000  | Issued #00-H-796-157, extended   |
| Natural Resources Permit                                | Hillsborough County                   | 2/21/2001   | Issued #44546  |
| Right-of-Way Use Permit                                 | Hillsborough County                   | 2/20/2001   | Issued ROW 02363   |
| Development Review                                      | Hillsborough County                   | 2/21/2001   | Issued   |
| EPC Review  | Hills. Co. EPC                        | 10/2/2000   | Issued   |
| CSX Railroad Permits                                    | CSX                                   |             |  |
|   | 1st Crossing                          | 5/8/2000    | Issued CSX-038367  |
|   | 2nd Crossing                          | 5/8/2000    | Issued CSX-038368  |
|   | 3rd Crossing                          | 5/8/2000    | Issued CSX-038369  |
| Tampa Port Permit for Crossing Alafia/Bullfrog Creek    | Tampa Port Authority                  | 4/13/2001   | Permit #01-017 issued to Tampa Bay Water for Crossing of Alafia River and Bullfrog Creek |

## Appendix B. Simplified Project Financial Flows



Figure 2. Flow of anticipated initial outlays (under the DBOOT model)

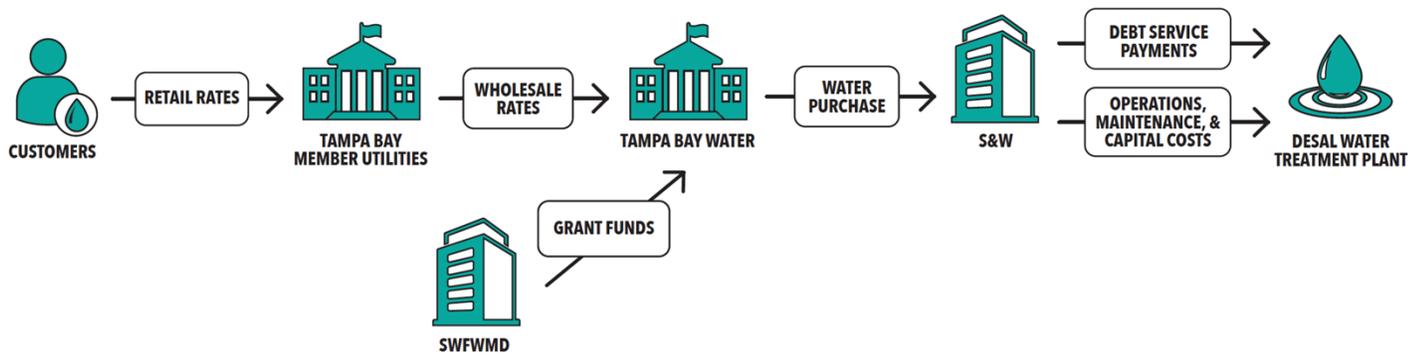


Figure 3. Anticipated recurring financial flows (under the DBOOT model)

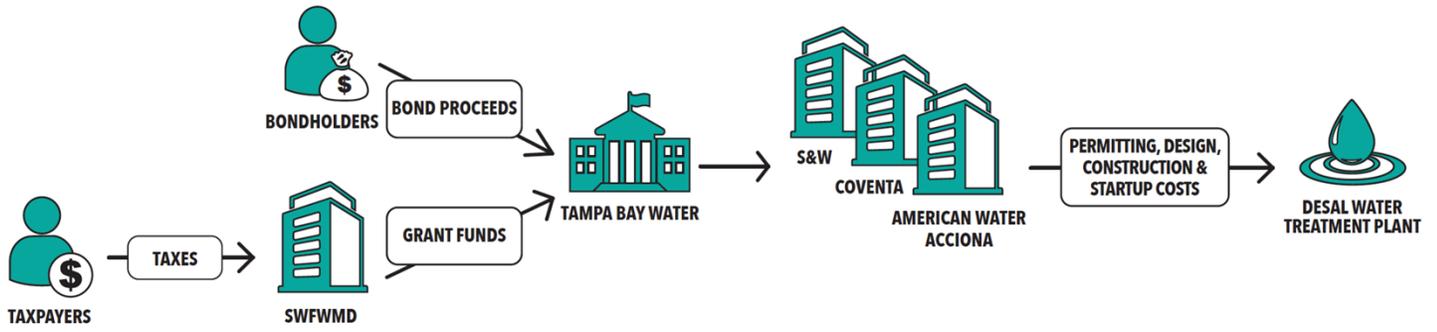


Figure 4. Flow of actual initial outlays

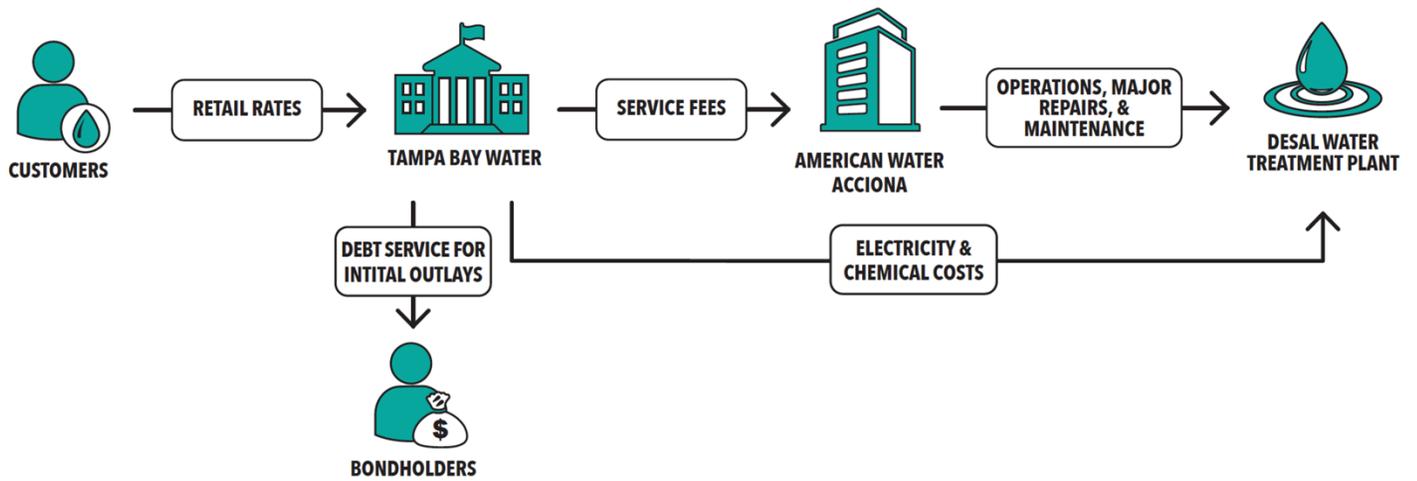


Figure 5. Actual recurring financial flows

## Acknowledgements

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Cover photo: Construction to upgrade Regina Wastewater Treatment Plant. Used with permission from Rob Court, City of Regina.

<sup>†</sup>Jeff Hughes is a member of the United States Environmental Protection Agency's Environmental Finance Advisory Board. At the time of writing, Jeff Hughes was under contract with Tampa Bay Water to carry out a policy analysis related to bond funding of conservation initiatives.

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