



Bighorn Desert View Water Agency

Water Capacity Fee Study

Final Report

February 2021

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Section 1. Executive Summary

A. Background and Purpose

Bighorn Desert View Water Agency retained NBS to conduct a water capacity fee study in conjunction with the water rate study for two primary reasons: (1) to ensure that the fees are updated to comply with legal requirements and industry standards, and (2) to ensure that these fees reflect the cost of capital infrastructure needed to serve new connections, or any person requesting additional capacity in the Agency’s water system (referred to throughout as “future customers”).

Please note, the fees updated in this study are commonly referred to as “connection fees,” “capital facility fees,” “capacity charges,” or in this case, “capacity fees.” BDVWA refers to this as the Basic Facilities Charge. The terms are often used interchangeably, and California Government Code Section 66013 defines these types of fees (referred to as a “capacity charge”) as a one-time “charge for public facilities in existence at the time a charge is imposed or charges for new public facilities to be acquired or constructed in the future that are of proportional benefit to the person or property being charged, including supply or capacity contracts for rights or entitlements, real property interests, and entitlements and other rights of the local agency involving capital expense relating to its use of existing or new public facilities.” It authorizes public agencies to impose “connection fees” (e.g., capacity fees) which are more appropriately called system capacity charges or capacity fees, on customers connecting to or upsizing their connection to the water system, to ensure that they pay their fair share of existing utility asset costs, plus the costs of new facilities needed to serve them. In its simplest form, capacity fees are the result of dividing the cost (or value) of the Utility’s current system assets plus planned capital improvements, by the expected number of future customers. As a result, future customers connecting to the Agency’s water utility would enter as equal participants, along with current customers, regarding their financial commitment and obligations to the utility.

Whereas water rate increases imposed on existing customers require a protest ballot procedure (under Proposition 218), capacity fees do not because they are an appropriate funding mechanism for facilities that benefit new development agencywide and may be imposed by a majority vote of the governing legislative body, which in this case is the Bighorn Desert View Water Agency’s Board of Directors. This report provides the documentation and findings necessary for the adoption of proposed capacity (system capacity) fees.

B. Overview of Capacity Fee Program Methodology

Various methodologies have been and are currently used to calculate water capacity fees. The most common methodologies are based on the following from the American Water Works Association’s Principles of Water Rates, Fees and Charges¹, also referred to as Manual M1:

- The value of existing (historical) system assets, often called a “system buy-in” or “replacement cost” methodology.

¹ *Principles of Water Rates, Fees, and Charges, Manual of Water Supply Practices, M1, AWWA, seventh edition, 2017.*

- The value of planned future improvements, also called the “incremental” or “system development” methodology.
- A combination of these two approaches.

This analysis uses the “Combination Approach,²” which requires new customers to pay both their fair share of existing system assets as well as their share of the planned future capital improvements needed to provide them with capacity in the Agency’s water system. As a result, new customers connecting to the Agency’s water system would enter as equal participants with existing customers regarding their financial commitment and obligations to the utility.

In its simplest form, capacity fees (also referred to as connection fees, capacity fees, or system development charges) are calculated by dividing the costs allocated to future development by the number of units of new development anticipated:

- Costs of planned future facilities and improvements required to serve new development are those that can reasonably be allocated to future development.
- The number of new units (i.e., growth) are those units projected to occur within the timeframe covered by the capacity fee analysis.

Capacity fees are one-time fees intended to reflect the cost of existing infrastructure and planned improvements available to new services, and place new utility customers or existing customers requesting an increase in service capacity on equal basis from a financial perspective with existing customers. Once new customers are added to the system, they then incur the obligation to pay the same service charges or water rates that existing customers pay.

This capacity fee study and the recommended fees assume a given level of development activity over the course of the study period based on data available from the Agency’s 2007 Water Master Plan. The development that occurs may result in both different impacts and fee revenues than those that are calculated in this study. For that reason, regular updates are recommended to adjust the fees to match the needs created by the rate of actual development.

In developing the proposed fees, NBS worked cooperatively with Agency staff. The fees presented in this study reflect input provided by Agency staff regarding financial matters, available capacity in the water system, existing asset values, and planned capital improvements.

Section 2 discusses in more detail the development of the water capacity fees and present the updated fees recommended for new and upsized connections.

² Method of calculating capital facility fees (also known as System Development Fees, Connection Fees, Capacity Fees) are set forth in the American Water Works Association’s *Principles of Water Rates, Fees and Charges* Seventh Edition (2017) pages 311 to 347.

Section 2. Water Capacity Fee Study

A. Existing Connections and Projected Future Growth

The Agency currently has approximately 2,700 equivalent 1-inch water meter connections to the water system. The Agency has implemented 1-inch meters as the standard (or base) meter size installed, but there are over 1,600 3/4-inch meters connected to the system. For the purpose of this study, 3/4-inch meters are treated the same as 1-inch meters; which is a common industry practice when setting rates and fees for smaller meter sizes. **Figure 1** shows the current number of meters by size connected to the system, meter equivalency factors and meter equivalent units.

FIGURE 1. CURRENT WATER CUSTOMERS

Meter Size	Existing Water Meters ¹	Meter Equivalence		1-inch Meter Equivalent Units
		Maximum Flow (gpm) ²	Equivalency to 1 inch meter	
3/4 inch	1,660	30	1.00	1,660
1 inch	1,019	50	1.00	1,019
1.5 inch	0	100	2.00	0
2 inch	26	160	3.20	83
3 inch	0	320	6.40	0
Total	2,705			2,762

1. Number of meters by size and customer class for July-August 2020. Includes 121 Bulk meters.

Source file for meters and consumption: CUSTOMER BILLING DATA 10.13.2020_v2.xlsx

2. Source: AWWA M1, Table B-2. Assumes displacement meters for 5/8" through 2", Compound Class I for 3".

Larger meters have the potential to use more of the system’s capacity, compared to smaller meters. The potential capacity demanded by each meter is proportional to the maximum hydraulic flow through each meter size as established by the AWWA³ hydraulic capacity ratios. The AWWA hydraulic capacity ratios (also known as flow factors, or meter equivalencies) used in this study are shown in the fourth column of Figure 1. The maximum flow rate, in gallons per minute (gpm) for each size meter is used to determine the number of equivalent 1-inch meter units currently connected.

As an example, a 2-inch meter has a greater capacity, or potential peak demand than a 1-inch meter. The “equivalency to a 1-inch meter” is calculated by dividing the maximum capacity or flow of larger meters by the capacity of the base (1-inch) meter size. The meter capacity factors shown in Figure 1 are the ratio of potential flow through each meter size compared to the flow through a 1-inch meter. The 1-inch meter is the base meter size for the utility and is used to compare the capacities of the larger meters. For example, column 4 in Figure 1 shows that a 2-inch meter is equivalent to 3.2 1-inch meters.

The actual number of meters by size is multiplied by the corresponding meter equivalency to calculate the total number of equivalent meters. The number of equivalent meters is used as a proxy for the

³ “AWWA” is the American Water Works Association.

potential demand that each customer can place on the water system. A significant portion of a water system’s peak capacity, and in turn the utility’s fixed capital costs, are related to meeting system capacity requirements. Therefore, the capacity fee for a new connection will be proportional to the service’s meter equivalence.

The equivalent meter calculation is summarized for standard use meters in Figure 1. Given that the state now requires fire suppression systems in all new single-family home construction, the minimum meter size going forward is a 1-inch meter. This difference has not changed the expected use within the home. Consequently, the District has chosen to treat 3/4-inch meters equivalent to 1-inch meters for the following reasons:

- The desire for a single, fixed meter charge across all customer classes.
- The desire for a single capacity fee for new connections.
- The overwhelming number of meters between 3/4-inch and 1 inch are for residential and non-residential properties.

The result of this analysis, summarized in Figure 1, is that while there are currently 2,705 connections to the water system, there are 2,762 potable water equivalent (i.e., 1-inch) meter units.

Figure 2 shows existing and projected service numbers for the water system. The anticipated future connections are based on the Agency’s planned customer growth rate of 40 meters added annually, for the next 20 years. Existing capacity in the Agency’s water system is allocated to current and future customers and the percentage assigned to current and future customers is based upon their assigned share of 1-inch meter equivalent units. As shown in Figure 2, new customers will be allocated about 27.6% of existing assets and planned assets. This is calculated by taking the expected number of new units (763) divided by the existing total of equivalent meters (2,762).

FIGURE 2. EXISTING AND PROJECTED SERVICE NUMBERS

Demographic Statistics	Existing Total	Projected Service Total ¹ (thru FY2037/38)	% Allocation Factors		Cumulative Change	
			Existing Customers	New Customers	Number of Units	% Increase
Equivalent 1-inch meters	2,762	3,525	72.4%	27.6%	763	27.6%

1. Customer growth estimated in 2007 Urban Water Master Plan. Assumes 40 new connections per year.

Source file: Water Master Plan 2007.pdf, page 16.

B. Existing and Planned Assets

The capital assets addressed in this study include existing assets and planned capital improvements (i.e. the system buy-in and incremental assets). An important aspect of this study is how the value of existing utility assets is determined. For example, the purchase price does not account for wear and tear, and current book value (purchase price less accumulated depreciation) typically underestimates the “true value” of facilities as it does not account for cost increases over time. Therefore, this study uses the replacement cost (RC) approach summarized in **Figure 3** to estimate existing asset values, because it provides an up-to-date asset value that reflects estimated cost inflation.

FIGURE 3. SUMMARY OF EXISTING ASSET VALUES

Asset Category ¹	Original Values ¹	Replication Value ²	System Buy-In
	Asset Cost	Asset Cost	Cost Basis ³
Water Fund			
Infrastructure	\$ 582,157	\$ 1,416,064	\$ 1,416,064
Land	38,690	38,690	38,690
Large Machinery	595,257	914,242	914,242
Mains and Piping	1,845,242	4,762,862	4,762,862
Meters and Hydrants	257,851	318,347	318,347
Office Equipment	576,474	719,186	719,186
Pumps, Tanks & Wells	3,443,496	8,175,586	8,175,586
Treatment Plant	4,003,823	16,369,245	16,369,245
Vehicle	253,208	265,048	265,048
Total Capital Facilities & Equipment	\$ 11,596,198	\$ 32,979,269	\$ 32,979,269

1. Source file for Bighorn Desert View Water Agency current assets as of August 2020: 2020.09.02-58227744-FA-Asset Listing.xlsx

Fully depreciated assets have been excluded from this analysis.

2. Takes into account estimated cost inflation, noted in Footnote 3.

3. System Buy-In Cost Basis values are calculated by escalating the book values (from Districts fixed asset report) from service date to current year values using historical cost inflation factors from the Handy-Whitman Index of Public Utility Construction Costs for Water Utility Construction in the Pacific Region. The percentage change in the asset cost is shown in column M of the Existing Assets Detail tab, labeled "Adjusted % of Original Value".

The replacement cost is calculated by escalating the book value of existing assets to current-day values using inflation factors from the Handy-Whitman Index of Public Utility Construction Costs for Water Utility Construction. Figure 3 summarizes the System Buy-In Cost Basis by Asset Category for the water utility. For this analysis, assets that have exceeded their useful life (as defined in the Agency’s asset records) were considered to have no remaining value.

Most of the replacement costs were allocated to current customers based on the 72.4 percent allocation factor previously shown in Figure 2 (and the 27.6 percent allocation factor for future customers). Meters are allocated 100 percent to current customers since they do not benefit future customers. **Figure 4** shows the allocation of about \$33 million system buy-in costs to current and future customers. Future customers are allocated approximately \$9 million of the existing water utility assets, or about 27.4%, due to meters being allocated to current customers only.

FIGURE 4. EXISTING ASSET VALUES ALLOCATED TO CURRENT & FUTURE CUSTOMERS

Asset Category ¹	System Buy-In Cost Basis	Allocation Basis (%) ²		Distribution of Cost Basis (\$)	
		Existing Customers	Future Customers	Existing Customers	Future Customers
Water Fund					
Infrastructure	\$ 1,416,064	72.4%	27.6%	\$ 1,024,906	\$ 391,158
Land	38,690	72.4%	27.6%	28,002	10,687
Large Machinery	914,242	72.4%	27.6%	661,702	252,540
Mains and Piping	4,762,862	72.4%	27.6%	3,447,221	1,315,641
Meters and Hydrants	318,347	93.2%	6.8%	296,842	21,505
Office Equipment	719,186	72.4%	27.6%	520,526	198,660
Pumps, Tanks & Wells	8,175,586	72.4%	27.6%	5,917,251	2,258,335
Treatment Plant	16,369,245	72.4%	27.6%	11,847,583	4,521,662
Vehicle	265,048	72.4%	27.6%	191,834	73,214
Total Capital Facilities & Equipment	\$ 32,979,269	72.6%	27.4%	\$ 23,935,867	\$ 9,043,402

1. Source file for Bighorn Desert View Water Agency current assets as of August 2020: 2020.09.02-58227744-FA-Asset Listing.xlsx

2. Based on proportionate allocation between existing and future users. See Table 2 in Exhibit 1 for demographic expectations.

The Agency’s capital improvement plans for the water utility extend to FY 2035/36. Some of the cost estimates for planned future improvements used to calculate the system development component of the capacity fees are allocated 100% to future customers, as these projects are needed specifically to serve future customers. There are a few other projects allocated using the same allocations found in Figure 2, as these projects benefit both current and future customers. **Figure 5** and **Figure 6** include a list of future capital improvement projects; where future customers are allocated about \$1.8 million of planned asset costs.

FIGURE 5. PLANNED ASSETS ALLOCATED TO CURRENT & FUTURE CUSTOMERS

Capital Project Description ¹	Future Cost Estimate (2020-2034) ¹	System Development Cost Basis ³	% Allocation		Distribution of Cost Basis (\$)	
			Existing Customers	Future Customers	Existing Customers	Future Customers
Refurbish and Replacement Projects						
Well 4 Rehab	\$ 78,850	\$ 78,850	100.0%	0.0%	\$ 78,850	\$ -
Well 6 Rehab	\$ -	\$ -	100.0%	0.0%	\$ -	\$ -
Well 7 Rehab	\$ 68,060	\$ 68,060	100.0%	0.0%	\$ 68,060	\$ -
Well 8 Rehab	\$ 130,310	\$ 130,310	100.0%	0.0%	\$ 130,310	\$ -
Well 9 Rehab	\$ 81,340	\$ 81,340	100.0%	0.0%	\$ 81,340	\$ -
Well 10 Rehab	\$ 69,720	\$ 69,720	100.0%	0.0%	\$ 69,720	\$ -
Well GMW1	\$ 24,900	\$ 24,900	100.0%	0.0%	\$ 24,900	\$ -
Well GMW2	\$ -	\$ -	100.0%	0.0%	\$ -	\$ -
Well GMW3	\$ 29,299	\$ 29,299	100.0%	0.0%	\$ 29,299	\$ -
Well 13	\$ -	\$ -	100.0%	0.0%	\$ -	\$ -
Pump Well 3	\$ 60,575	\$ 60,575	100.0%	0.0%	\$ 60,575	\$ -
Pump Well 4	\$ 200,000	\$ 200,000	100.0%	0.0%	\$ 200,000	\$ -
Pump Well 6	\$ -	\$ -	100.0%	0.0%	\$ -	\$ -
Pump Well 7	\$ 65,120	\$ 65,120	100.0%	0.0%	\$ 65,120	\$ -
Pump Well 8	\$ 129,880	\$ 129,880	100.0%	0.0%	\$ 129,880	\$ -
Pump Well 9	\$ 99,840	\$ 99,840	100.0%	0.0%	\$ 99,840	\$ -
Pump Well 10	\$ 44,000	\$ 44,000	100.0%	0.0%	\$ 44,000	\$ -
Pump Well GMW1	\$ 82,880	\$ 82,880	100.0%	0.0%	\$ 82,880	\$ -
Pump Well GMW2	\$ -	\$ -	100.0%	0.0%	\$ -	\$ -
Pump Well GMW3	\$ 82,880	\$ 82,880	100.0%	0.0%	\$ 82,880	\$ -
Pump Well 13	\$ 100,000	\$ 100,000	100.0%	0.0%	\$ 100,000	\$ -
New Replacement Well for BH or DV	\$ 500,000	\$ 500,000	0.0%	100.0%	\$ -	\$ 500,000
JV Booster Station Upgrade - VFD's/Pressure Vessels	\$ 15,000	\$ 15,000	100.0%	0.0%	\$ 15,000	\$ -
New Storage Tank	\$ 500,000	\$ 500,000	0.0%	100.0%	\$ -	\$ 500,000
Customer Meter w/ Box & Shutoff, Complete	\$ -	\$ -	100.0%	0.0%	\$ -	\$ -
Utility Billing Software Replacement	\$ 200,000	\$ 200,000	100.0%	0.0%	\$ 200,000	\$ -
Loop Kickapoo Trail	\$ 702,240	\$ 702,240	0.0%	100.0%	\$ -	\$ 702,240
Shop Building Upgrades - storage and work space	\$ 50,000	\$ 50,000	100.0%	0.0%	\$ 50,000	\$ -
Replace Generator - 90 KW mobile	\$ 50,000	\$ 50,000	100.0%	0.0%	\$ 50,000	\$ -
Dump truck	\$ 85,000	\$ 85,000	100.0%	0.0%	\$ 85,000	\$ -
Replace Tractor	\$ 175,000	\$ 175,000	100.0%	0.0%	\$ 175,000	\$ -
Replace Fleet Vehicles (avg life)	\$ 430,000	\$ 430,000	100.0%	0.0%	\$ 430,000	\$ -

FIGURE 6. PLANNED ASSETS ALLOCATED TO CURRENT & FUTURE CUSTOMERS, CONTINUED

Capital Project Description ¹	Future Cost Estimate (2020-2038) ¹	System Development Cost Basis ³	% Allocation		Distribution of Cost Basis (\$)		
			Existing Customers	Future Customers	Existing Customers	Future Customers	
Distribution System Projects							
Distribution Valve, 6" avg, both water systems 50%	\$ -	\$ -	72.4%	27.6%	\$ -	\$ -	
Fire Hydrants, both water systems 50%	\$ -	\$ -	72.4%	27.6%	\$ -	\$ -	
Pipe w/sand bedding, 6" avg. ID Goat Mtn	\$ -	\$ -	72.4%	27.6%	\$ -	\$ -	
Pipe w/sand bedding, 6" avg. BDVWA	\$ -	\$ -	72.4%	27.6%	\$ -	\$ -	
Operations Capital Projects							
Water Storage Tank Recoating (B1, B2), May 26, 2020	\$ 81,000	\$ 81,000	72.4%	27.6%	\$ 58,625	\$ 22,375	
Water Storage Tank Recoating (B1, B2), Feb. 2020	\$ 80,000	\$ 80,000	72.4%	27.6%	\$ 57,902	\$ 22,098	
C-Booster Station Upgrades	\$ 35,000	\$ 35,000	72.4%	27.6%	\$ 25,332	\$ 9,668	
Total	\$ 4,250,894	\$ 4,250,894	58.7%	41.3%	\$ 2,494,513	\$ 1,756,381	

1. Estimated capital improvement project costs found in source files: *BDVWA Replacement Refurbishment CIP and Min Rate Gen 5 1 2017.xlsx*

Cindy and Marina confirmed updated costs in source file: *CIP Estimates through 2035-36 V2.xlsx*

Certain projects being built in order to allocate new growth are 100% allocated to future customers.

2. Operation Capital projects are per page 14 of the District's 2020/21 budget (file: *FY2020.21 Budget adopted 5 26 2020 20R-14.pdf*).

C. Calculated Capacity Fees – Water Utility

The sum of the existing and future planned asset values (that is, the system buy-in and system development costs), defines the total cost basis allocated to future customers. **Figure 7** summarizes this calculation.

FIGURE 7. SUMMARY OF COST BASIS ALLOCATED TO FUTURE CUSTOMERS

System Asset Values Allocated to Future Development	Replacement Cost
<i>Costs Included in Existing System Buy-In:</i>	
Existing Assets	\$ 9,043,402
Planned, Future Capital Projects	1,756,381
Total Cost Basis for New Development	\$ 10,799,783

The total adjusted cost basis is then divided by the number of future customers, measured in 1-inch meter equivalents, expected to connect to the water utility (that is, the 763 meter equivalents) in order to determine the base capacity charge for a 1-inch water meter. This calculation is shown in **Figure 8**.

FIGURE 8. SUMMARY OF NEW BASE CAPACITY FEES

Summary of Capacity Fee Calculation	Adjusted System Cost Basis	Planned Additional Meter Equivalents (thru FY2037/38)	Base Capacity Fee
Proposed Fee -Replacement Cost	\$ 10,799,783	763	\$14,154

Based on the system buy-in capacity fee methodology, and the assumptions used in this analysis, NBS has calculated the new capacity fees for various water meter sizes, as shown in **Figure 9**. The updated fees represent the maximum that the Agency can charge for new connections.

FIGURE 9. UPDATED WATER CAPACITY FEES

Meter Size	Equivalency Factor		Capacity Fee Per Meter Size
	Maximum Continuous Flow (gpm) ¹	Equivalency to 1 inch meter	
3/4 inch	30	1.00	\$14,154
1 inch	50	1.00	\$14,154
1.5 inch	100	2.00	\$28,309
2 inch	160	3.20	\$45,294
3 inch	320	6.40	\$90,588
4 inch	500	10.00	\$141,544
6 inch	1,000	20.00	\$283,087
8 inch	2,800	56.00	\$792,645
10 inch	4,200	84.00	\$1,188,967

1. Source: AWWA M1, Table B-2. Assumes displacement meters for 3/4" through 2", Compound Class I for 3" through 6", and Turbine Class II for 8" through 10".

D. Water Capacity Fee Findings Statements

The new water capacity fees calculated in this report are based on regulatory requirements and generally accepted industry standards, and are further detailed in *Appendix A*. This study concludes the following:

- The purpose of the Agency’s water capacity fee is to ensure that new and upsized connections reimburse and/or mitigate a reasonable portion of the Agency’s planned capital investment projects. These investments are necessary to accommodate the increased demand for water service.
- The Agency uses capacity fee proceeds to fund capital investments in the water system, which include the future design and construction of planned facilities.
- Capacity fees for new water customers vary depending on the size of the water meter serving the connection. Meter size is generally proportionate to the demands that a parcel places on the water utility system, specifically the peaking requirements related to the meter size.
- Without capital investment in existing facilities, the water system capacity available to serve the needs of future connections would be uncertain. Without planned investments in future facilities, water service would not be sustainable at the level of service received by current users. The total value of planned water system assets that are attributable to serving future connections is identified in *Appendix A*.
- Upon payment of a capacity fee, a new customer incurs the obligation to pay the same ongoing service rates as existing customers, regardless of the date of connection to the system or the actual start of service. These fees ensure that, over time, ongoing service rates are not disproportionately burdened by the accommodation of system growth.

Section 3. Recommendations and Next Steps

A. Consultant Recommendations and Next Steps

NBS recommends the Agency take the following actions:

- **Accept this Study Report:** On January 12, 2021, the Board of Directors implemented the new capacity fees. This report is further documentation of the study and the basis for adopting the new capacity fees.
- **Implement New Water Capacity Fees:** Based on the analysis presented in this report, the Board should implement the new water capacity fee of \$14,154 per 1-inch water meter equivalent unit, as described in this study.
- **Periodically Review Capacity Fees:** Any time an Agency adopts capacity fees, they should be periodically reviewed to incorporate new capital improvement programs, significant repair and replacement projects, or new planning data (i.e. customer growth estimates). This will help ensure the fees generate sufficient revenue to cover the cost of capital projects, support the fiscal health of the Agency, and ensure future customers invest their fair share of infrastructure costs.
- **Annually Update Capacity Fees:** NBS recommends applying an inflation factor to the capacity fees on an annual basis. Annually, the Agency should review the Engineering News Record's Construction Cost Indices and calculate the percentage change in construction costs and apply that change to the capacity fees to ensure they keep pace with cost inflation.

B. Principal Assumptions and Considerations

In preparing this study and the recommendations included herein, NBS has relied on a number of principal assumptions and considerations with regard to financial matters, number of customer accounts, asset records, planned capital improvements, and other conditions and events that may occur in the future. This information and assumptions were provided by sources we believe to be reliable, although NBS has not independently verified this data.

While we believe NBS' use of such information and assumptions is reasonable for the purpose of this Study and its recommendations, some assumptions will invariably not materialize as stated herein or may vary significantly due to unanticipated events and circumstances. Therefore, the actual results can be expected to vary from those projected to the extent that actual future conditions differ from those assumed by us or provided to us by others.

Appendix A. Water Capacity Facility Fee Study Summary Tables

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