



● **Board of Directors**
Finance and Insurance Committee

12/10/2019 Board Meeting

8-2

Subject

Direct staff: (1) to incorporate the use of the 2019/20 fiscal-year-end balance of the Water Stewardship Fund to fund all demand management costs in the proposed Fiscal Years 2020/21 and 2021/22 Biennial Budget; and (2) to not incorporate the Water Stewardship Rate, or any other rates or charges to recover demand management costs, with the proposed rates and charges for calendar years 2021 and 2022; the General Manager has determined that the proposed action is exempt or otherwise not subject to CEQA

Executive Summary

In April 2018, the Board approved Board Letter 8-2, which directed staff to undertake a process with input from member agencies to study and determine the most appropriate cost allocation of demand management costs. The Metropolitan Water District of Southern California's (Metropolitan) budgeted demand management costs include the Conservation program, the Local Resources Program (LRP), and the Future Supply Actions program. The cost allocation study was undertaken by staff in two phases. The first phase determined an appropriate functional assignment of Metropolitan's demand management costs. Mr. Peter Mayer, P.E., principal at Water DM, made presentations to the Finance and Insurance (F&I) Committee in May and July 2019 and to the member agency managers in July 2019, and provided a report entitled "Report on Functional Assignment of Metropolitan's Demand Management Costs" (WaterDM Report) to the Board in August 2019.

In the second phase, consideration was given to incorporating the functionalization recommendations into Metropolitan's cost-of-service process to recover demand management costs through the existing rate structure or through the development of a new rate and/or charge. Mr. Rick Giardina, Senior Vice President at Raftelis, a public utility and public agency management consulting firm, provided presentations to the F&I Committee on cost recovery options at their September and November 2019 meetings. Mr. Giardina's September 2019 presentation was also provided at the member agency managers meeting on September 13, 2019, which was followed up at the October 11, 2019 member agency managers meeting with a discussion of possible metrics for one of the fixed charge alternatives. **Attachment 1** is Mr. Giardina's report entitled "Demand Management Cost Recovery Alternatives Report" (Raftelis Report). Mr. Giardina's resume is provided as **Attachment 2**. A link to board materials and presentations, other related Metropolitan materials, and relevant industry articles and reports regarding the function and cost-recovery of demand management can be found on Metropolitan's website, www.mwdh2o.com, under the Financial Information webpage.

Having completed the demand management cost allocation process, the Board has at least four different rate-design alternatives for its consideration. Two alternatives represent a volumetric/variable cost-recovery approach and the other two represent fixed charges (see **Attachment 1** and **Table 1** below). The status quo for allocating the Water Stewardship Rate only to transportation is not a recommended alternative for the next cost-of-service process and proposed rates beginning in 2021. The foundation for this allocation relied on the 25-year capital planning forecast in the 1996 IRP, which established a preferred resource mix that identified future transportation infrastructure projects that could be avoided or deferred if that option was selected because of demand management programs; that 25-year capital planning period concludes at the end of 2020.

The Board may, however, delay its selection of a rate-design alternative for the next two years if it decides to use the balance of the Water Stewardship Fund at the end of fiscal year (FY) 2019/20 to fund demand management costs for the next biennial budget. The balance of the Water Stewardship Fund at the end of FY 2019/20 is

currently projected to be about \$126 million, which would fund the majority of the biennial budget for demand management. If the demand management program requires additional funding during the biennium budget period, the need for additional funding would be brought back to the Board.

Staff seeks direction for preparation of the proposed biennial budget, rates and charges, and Cost of Service Report to be presented to the Board at its regular February 2020 meeting. The Board may direct staff to incorporate into the proposed documents the use of the Water Stewardship Fund balance, with the specified restrictions on the demand management budget, or it may direct staff to incorporate a rate-design alternative into the proposed documents.

Details

Background

Demand management is an important component of providing a reliable water service across the region. Demand management is an essential element of a diverse resource mix and a common choice by water utilities across the nation. Managing demand is a core utility function of public water providers. Metropolitan's conservation and local water resource development programs comply with the California State Legislature's unique direction to Metropolitan through Senate Bill 60, signed into law in 1999. Metropolitan's demand management programs also support the region's compliance with the requirements of Senate Bill X7-7, passed in 2009, which was enacted to reduce urban per capita water use. Demand management is a powerful tool for providing a diverse and reliable water service across the region because the real dollars spent on demand management expenditures avoid spending even more dollars on infrastructure and resources. The WaterDM Report prepared by Mr. Peter Mayer recognizes the role of demand management within Metropolitan's wholesale water services and assigns demand management costs to certain functions within Metropolitan's operations.

Rate Design Alternatives

The Raftelis Report builds on the functional assignment of demand management costs proposed in the WaterDM Report and proposes four alternatives to recover demand management costs. Three of the alternatives (#1, #2, and #3A) apply the functionalization of demand management costs proposed in Mr. Mayer's work. The fourth (#3B) does not require the functionalization of demand management costs. Mr. Giardina has presented the four rate-design alternatives to the Board in two meetings, and his presentation has also been provided to the member agency managers. The alternatives are once again summarized in this board letter. Alternative #3B, the non-functionalized fixed charge, has been expanded to propose two different metrics for calculation of the fixed charge. Also, the proposed metrics, or billing determinants, have been provided on which the demand management costs could be apportioned to member agencies for each alternative. The alternatives and potential metrics are summarized in **Table 1** below.

Table 1. Hypothetical Demand Management Cost Recovery Alternatives

Cost Recovery Component	Approx % of DM Costs ¹	Billing Determinant	Charge / Rate
Alt 1 - Existing COS Methodology			
T1 Supply	25%	Sales	\$/AF
System Access Rate	75%	All Transactions	\$/AF
Alt 2 - Modified COS Methodology			
T1 Supply	25%	Sales	\$/AF
System Access Rate	50%	All Transactions	\$/AF
System Power Rate	13%	All Transactions	\$/AF
Readiness-to-Serve Charge	10%	Existing RTS	\$/M
Capacity Charge	2%	Existing CC	\$/cfs
Alt 3A - Functionalized Fixed Charge			
Supply Portion	100%	10-yr Avg Sales	Fixed \$
Transportation Portion		10-yr Avg Transactions	
Alt 3B - Non-Functionalized Fixed Charge based on Population			
	100%	Population	Fixed \$
Alt 3B - Non-Functionalized Fixed Charge based on Assessed Valuation			
	100%	Assessed Valuation	Fixed \$

¹ Using a hypothetical Revenue Requirement share; the actual relative shares will be calculated as a part of each cost of service analysis and will differ

The approximate percentages of demand management costs recovered in the alternatives are hypothetical at this point because the actual functionalization of costs is dependent on the prospective cost-of-service analyses and budgeted expenditures. The approximate percentages are provided so member agencies can get a sense of how the alternatives might impact them. Importantly, when the Board approves one of the alternatives, it will approve a methodology, not explicit percentages or budgeted demand management expenditures.

Under each alternative, there would no longer be a volumetric Water Stewardship Rate component in Metropolitan's rate structure.

Table 2 below shows the estimated member agency impacts of the proposed demand management cost recovery alternatives, in thousands of dollars. The analysis is prepared on a hypothetical Demand Management Revenue Requirement of \$100 million. The columns correspond to the alternatives listed in **Table 1** above.

For purposes of computing member agency impacts, staff used a five-year average of total transactions and total sales to smooth the year-to-year variability that may occur, rather than data for one specific year, for Alternatives #1 and #2.

The alternatives presented affect member agencies differently, but generally Alternatives #1, #2, and #3A will result in higher allocations of costs to member agencies that purchase relatively more water from Metropolitan, or that use the transportation system relatively more, than their share of population or assessed valuation.

Table 2: Estimated Member Agency Impacts of Demand Management Cost Recovery Alternatives, Thousands of Dollars

	Current WSR*	Alt #1 Existing COS	Alt #2 Modified COS	Alt #3A Function- alized Fixed Charge	Alt #3B Fixed Charge Population	Alt #3B Fixed Charge AV
Anaheim	\$ 1,059	\$ 918	\$ 954	\$ 1,107	\$ 1,920	\$ 1,578
Beverly Hills	776	672	680	636	230	1,188
Burbank	1,077	933	917	836	570	810
Calleguas MWD	6,848	5,932	6,009	6,115	3,338	3,495
Central Basin MWD	2,938	2,545	2,572	2,679	8,247	5,056
Compton	0	0	11	47	483	158
Eastern MWD	6,912	5,988	6,053	5,551	4,355	2,720
Foothill MWD	605	524	532	511	433	634
Fullerton	514	445	458	499	715	680
Glendale	1,160	1,005	1,025	1,006	979	1,091
Inland Empire	4,155	3,599	3,650	3,652	4,534	3,883
Las Virgenes MWD	1,496	1,296	1,309	1,245	371	850
Long Beach	2,267	1,963	1,986	1,921	2,506	1,724
Los Angeles	18,887	16,360	16,726	16,409	21,258	20,730
MWDOC	15,819	13,703	13,775	13,147	12,447	17,067
Pasadena	1,389	1,203	1,215	1,146	877	1,049
SDCWA	10,463	22,442	21,644	24,182	17,009	17,368
San Fernando	2	1	1	2	129	66
San Marino	69	60	63	51	70	222
Santa Ana	671	581	599	678	1,756	902
Santa Monica	274	238	261	335	495	1,276
Three Valleys MWD	4,685	4,058	4,084	3,820	2,741	2,341
Torrance	1,166	1,010	1,024	973	721	992
Upper San Gabriel	3,041	2,635	2,494	2,040	4,587	3,580
West Basin MWD	8,626	7,472	7,484	7,018	4,301	6,929
Western MWD	5,100	4,417	4,475	4,392	4,931	3,610
Total	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000

* WSR not currently collected on SDCWA Exchange

Alternative #1: Leverage Existing Cost-of-Service Methodology

Alternative #1 leverages Metropolitan's existing cost-of-service methodology. Demand management expenditures are treated like other Operations and Maintenance expenditures, which are allocated to Fixed Commodity in the cost-of-service process. Fixed Commodity costs are distributed to volumetric rates, so demand management costs would be recovered through the Tier 1 Supply Rate and the System Access Rate.

Under Alternative #1, those member agencies that purchase relatively more water or that use the conveyance and distribution system relatively more will pay more of the demand management costs. Alternative #1 utilizes only volumetric rates, so the revenues generated will vary as sales and transaction volumes vary.

Alternative #2: Modify Existing Cost-of-Service Methodology

For Alternative #2, Metropolitan would modify its cost-of-service methodology to acknowledge that in the absence of demand management expenditures, Metropolitan would deliver more water and more expenditures would be required for power and capital financing costs, as well as Operations and Maintenance. Therefore, demand management expenditures should be allocated to Fixed Demand, Fixed Standby, and Variable Commodity as well as Fixed Commodity costs. This results in expanding cost recovery to also include the System Power Rate, the Readiness-to-Serve Charge, and the Capacity Charge, as well as the rates in Alternative #1.

Under Alternative #2, those member agencies that purchase relatively more water or that use the conveyance and distribution system relatively more will pay more of the demand management costs. Alternative #2 primarily utilizes volumetric rates, so that a portion of the revenues generated will vary as sales and transaction volumes vary. Some revenue, estimated at 12 percent of demand management costs, will be recovered through the Readiness-to-Serve Charge and the Capacity Charge and provide a more assured revenue stream.

Alternative #3A: Functionalized Fixed Charge

Demand management costs are largely fixed in nature. The LRP incentives are provided under contractual commitments with terms from 15 to 25 years, and the Board has stated a desire that conservation programs (incentives and messaging) should be funded on a consistent basis, and not ramped up and down.

Under Alternative #3A, Metropolitan would follow its cost-of-service process to functionalize demand management costs to the impacted functions. Those costs could then be aggregated and apportioned to member agencies based on selected metrics, or billing determinants. Under Alternative #3A, the costs are recouped through fixed charges, not volumetric rates. In Tables 1 and 2, costs functionalized as Supply have been apportioned to member agencies based on each member agency's ten-year rolling average of all sales; costs functionalized as transportation-related have been apportioned to member agencies based on each member agency's ten-year rolling average of all transactions. The two amounts are then added to determine each member agency's total fixed charge.

Under Alternative #3A, those member agencies that have purchased relatively more water or that used the conveyance and distribution system relatively more over the last ten years will pay more of the demand management costs. Unlike Alternatives #1 and #2, the charge is fixed and will generate an assured revenue stream.

Alternative #3B: Non-Functionalized Fixed Charge

Alternative #3B recognizes that demand management costs are a necessary and legislatively-directed activity that improves reliability for all water systems in Metropolitan's service area. By providing conservation incentives that reduce the use of local resources and LRP incentives that improve the reliability of local resources, offsetting the need to import water, even water systems without a physical connection to Metropolitan benefit. Therefore, Alternative #3B proposes a fixed charge to member agencies that aligns with the benefits of demand management for all member agencies based on water users in their service areas.

In the two examples for Alternative #3B, demand management costs are aggregated and apportioned to member agencies based first on population and then on assessed valuation. Both metrics provide a measure of the reliance—and potential reliance—for water service on Metropolitan. Other metrics, or a combination of metrics, could be used instead.

Additional Options for Board Consideration

Two additional concepts were discussed at the F&I Committee meeting of November 4, 2019. First, the F&I Committee discussed the possibility of using available funds in the Water Stewardship Fund to provide the Board more time to make a decision regarding rate-design alternatives for demand management costs. Given the projected FY 2019/20 end balance of about \$126 million for the Water Stewardship Fund, the concept suggested by the F&I Committee of delaying a board decision for two years is feasible. Second, the Committee also discussed the possibility of maintaining the status quo, which means collecting the Water Stewardship Rate on all transactions (sales, wheeling, and exchanges). The one exception is that Metropolitan suspended billing and collection of the Water Stewardship Rate on exchange agreement deliveries to the San Diego County Water

Authority in calendar year (CY) 2018-2020, based on board action. Use of the Water Stewardship Rate after CY 2020 is not recommended for Metropolitan given changed planning conditions and circumstances, as discussed below.

Delay Decision for Two Years, Using Water Stewardship Fund Balance

As discussed by the F&I Committee, the Water Stewardship Fund balance at the end of FY 2019/20 would be used to fund demand management costs for the FYs 2020/21 and 2021/22 Biennial Budget and no rate or charge would recover demand management costs in CY 2021 or 2022 from any member agency in any transaction. The Water Stewardship Fund balance at the end of FY 2019/20 is currently estimated to be approximately \$126 million, which would fund the majority of the biennial budget for demand management. If the demand management program requires additional funding during the biennium period, the need for additional funding would be brought back to the Board. During this two-year period, the 2020 Update to the Integrated Resources Plan (2020 IRP Update) and a rate refinement process is planned to be undertaken. During these processes, the appropriate level of demand management expenditures to support the 2020 IRP Update would be discussed as would the method to recover those expenditures. The use of the Water Stewardship Fund to cover demand management costs during this two-year period would be limited to:

- Providing incentives under LRP contracts;
- Managing Conservation and Storm Water Capture expenditures against available funds; and
- Considering on a case-by-case basis approving new LRP agreements during this period when a funding mechanism for LRP agreements has not been identified.

Status Quo

The foundation for allocating the Water Stewardship Rate only to transportation is applicable through the end of CY 2020. The support for this allocation relied on the 25-year capital planning forecast in the 1996 IRP, which established a preferred resource mix that identified future transportation infrastructure projects that could be avoided or deferred if that option was selected because of demand management programs; that 25-year capital planning period concludes at the end of CY 2020. Metropolitan's consultants recommend a change beginning in CY 2021 based on updated circumstances, both to the functionalization of costs and the recovery options. Further, absent a new board action, the Board's approval of the suspension of billing and collection of the Water Stewardship Rate on exchange agreement deliveries to the San Diego County Water Authority applies only through the end of CY 2020.

Policy

Metropolitan Water District Act Section 133: Fixing of Water Rates

Metropolitan Water District Act Section 134: Adequacy of Water Rates; Uniformity of Rates

Metropolitan Water District Act Section 134.5: Water Standby or Availability of Service Charge

Metropolitan Water District Administrative Code Section 4301: Cost of Service and Revenue Requirement

Metropolitan Water District Administrative Code Section 4304: Apportionment of Revenues and Setting of Water Rates

Metropolitan Water District Administrative Code Section 4305: Setting of Charges to Raise Fixed Revenue

Metropolitan Water District Administrative Code Section 11104: Delegation of Responsibilities

By Minute Item 51164, dated April 10, 2018, the Board directed staff to undertake a demand management cost allocation study and approved suspension of billing and collection of the Water Stewardship Rate on exchange agreement deliveries to San Diego County Water Authority for Calendar Years 2018-2020

California Environmental Quality Act (CEQA)

CEQA determination for Options #1, 2 & 3:

The proposed action is not defined as a project under CEQA because it involves the creation of government funding mechanisms or other government fiscal activities, which do not involve any commitment to any specific

project which may result in a potentially significant physical impact on the environment (Section 15378(b)(4) of the State CEQA Guidelines). In addition, the proposed action is not defined as a project under CEQA (Public Resources Code Section 21065, State CEQA Guidelines Section 15378) because the proposed action will not cause either a direct physical change in the environment or a reasonably foreseeable indirect physical change in the environment and involves continuing administrative activities, such as general policy and procedure making (Section 15378(b)(2) of the State CEQA Guidelines). Finally, it can be seen with certainty that there is no possibility that the proposed action in question may have a significant effect on the environment, therefore the proposed action is not subject to CEQA (Section 15061(b)(3) of the State CEQA Guidelines).

Board Options

Option #1

Direct staff: (1) to incorporate the use of the 2019/20 fiscal-year-end balance of the Water Stewardship Fund to fund all demand management costs in the proposed FYs 2020/21 and 2021/22 Biennial Budget; and (2) to not incorporate the Water Stewardship Rate, or any other rates or charges to recover demand management costs, with the proposed rates and charges for CYs 2021 and 2022.

Fiscal Impact: The proposed rates and charges for CYs 2021 and 2022 will not recover any revenue for demand management costs in CYs 2021 and 2022. Instead, demand management costs budgeted in the proposed FYs 2020/21 and 2021/22 Biennial Budget will be funded with funds available in the Water Stewardship Fund; if the demand management program requires additional funding during the biennium period, the need for additional funding would be brought back to the Board.

Business Analysis: Would enable Metropolitan to provide funding for ongoing demand management programs for the next biennial budget.

Option #2

Direct staff to incorporate Alternative #3A in the preparation of the proposed Biennial Budget and Cost of Service Report for FYs 2020/21 and 2021/22 and the proposed rates and charges effective January 1, 2021 and January 1, 2022, to be presented to the Board in February 2020.

Fiscal Impact: The proposed rates and charges for CYs 2021 and 2022 will recover the revenue requirement as set forth by the General Manager in the proposed FYs 2020/21 and 2021/2022 Biennial Budget; Alternative #3A is a fixed charge that will improve revenue stability.

Business Analysis: Would enable Metropolitan to provide funding for ongoing and future demand management programs that help reduce urban per capita water use with an assured revenue stream.

Option #3


Direct staff to incorporate a rate design alternative, other than Alternative #3A, in the preparation of the proposed Biennial Budget and Cost of Service Report for FYs 2020/21 and 2021/22 and the proposed rates and charges effective January 1, 2021 and January 1, 2022, to be presented to the Board in February 2020.

Fiscal Impact: The proposed rates and charges for CYs 2021 and 2022 will recover the revenue requirement as set forth by the General Manager in the proposed FYs 2020/21 and 2021/22 Biennial Budget.

Business Analysis: Would enable Metropolitan to provide funding for ongoing and future demand management programs that help reduce urban per capita water use.

Staff Recommendation

Option #1



Katano Kasaine
Assistant General Manager/
Chief Financial Officer

12/4/2019
Date



Jeffrey Nightlinger
General Manager

12/4/2019
Date

Attachment 1 – “Demand Management Cost Recovery Alternatives Report” by Rick Giardina, Executive Vice President, Raftelis

Attachment 2 – Resume, Rick Giardina, Executive Vice President, Raftelis

Ref# cfo12668687

THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

Demand Management Cost Recovery Alternatives Report

December 2019



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November 25, 2019

Arnout Van den Berg
Rates, Charges, and Financial Planning Manager
The Metropolitan Water District of Southern California
700 N. Alameda Street
Los Angeles, CA 90012-2944

Subject: Demand Management Cost Recovery Alternatives Report

Dear Mr. Van den Berg:

On behalf of Raftelis, I am pleased to provide our report detailing the Demand Management Cost Recovery Alternatives for consideration by the Board of the Metropolitan Water District of Southern California. This report documents our development of alternative rate and charge approaches for the recovery of Demand Management costs. These alternatives are in some respects consistent with the current Metropolitan cost of service methodology but also offer alternatives that are different from the current cost of service methodology while still being consistent with industry guidelines.

It has been a pleasure to work with you and others at Metropolitan on this project and we look forward to future opportunities. Please direct any questions regarding this report to me at: 303.305.1136 or by email: rgiardina@raftelis.com.

Sincerely,



Richard D. Giardina, CPA
Executive Vice President

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Table of Contents

1. THE PURPOSE OF THIS REPORT	1
2. THE WATER STEWARDSHIP RATE AND DEMAND MANAGEMENT COST RECOVERY	1
3. THE SYSTEMWIDE BENEFITS OF DEMAND MANAGEMENT PROGRAMS.....	1
4. COST RECOVERY ALTERNATIVES TO THE WSR	2
5. FUNCTIONAL ASSIGNMENT OF DEMAND MANAGEMENT COSTS	5
6. COST RECOVERY ALTERNATIVES.....	6
7. CONCLUSION	13

List of Tables

Table 1: Functional Allocation of Metropolitan System Costs and Rate and Charge Elements	3
Table 2: Hypothetical Functionalized Cost Allocation and Cost Recovery of Demand Management Costs (\$000's)	6
Table 3: Alternative #1 Existing COS Allocation of Demand Management Costs	8
Table 4: Alternative #2 Modified COS Allocation of Demand Management Costs	9
Table 5: Alternative #3A Functionalized Fixed Charge Allocation of Demand Management Costs	11

List of Figures

Figure 1: Alternative #1 Existing COS Methodology	7
Figure 2: Alternative #2 Modified COS Methodology	9
Figure 3: Alternative #3A Functionalized Fixed Charge	10
Figure 4: Alternative #3B Non-Functionalized Fixed Charge	12

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1. The Purpose of this Report

In April of 2018 the Board of the Metropolitan Water District of Southern California (Metropolitan or MWD) directed staff to determine the most appropriate method for the allocation and recovery of demand management costs. This analysis is being completed in two phases. The first phase is designed to determine the most appropriate method for assigning demand management costs to Metropolitan's system functions. The second phase is designed to incorporate the phase one recommendations into the cost-of-service process and develop demand management cost recovery mechanisms, whether through Metropolitan's existing rate and charge structure or alternative cost recovery mechanisms.

The first phase of the analysis associated with the functionalization of demand management costs was completed by the consulting firm of Water Demand Management (WaterDM)¹. Raftelis was retained to complete the second phase of the analysis which focuses on demand management cost recovery mechanisms. This Demand Management Cost Recovery Alternatives Report (Report) summarizes our thoughts on the proposed functionalization approach developed in phase one and our phase two alternative cost recovery mechanisms.

2. The Water Stewardship Rate and Demand Management Cost Recovery

Metropolitan's demand management activities include the Conservation program, Local Resources Program, and the Future Supply Actions program. Historically the cost of these programs, which are referred to as Demand Management (DM), have been recovered via the Water Stewardship Rate (WSR).² The WSR is a volumetric rate collected on each acre-foot (AF) of water transported on Metropolitan's regional conveyance and distribution system. The only exception is for San Diego County Water Authority (SDCWA) exchange deliveries for the years 2018 to 2020; during this period the WSR billing and collection was suspended by the Board.

Metropolitan's support for Demand Management was documented in its 1996 Integrated Water Resources Plan (IRP) when water conservation and local resources programs were recognized as an "essential element" in the water resource portfolios considered at the time. The 25-year capital planning horizon used in the 1996 IRP concludes at the end of 2020. This provides an opportunity and a need to review the continued appropriateness of the WSR as the demand management cost recovery mechanism.

3. The Systemwide Benefits of Demand Management Programs

From the perspective of Metropolitan, Demand Management has provided a broad systemwide benefit that accrues to all member agencies in the form of reduced demands for imported water supplies and resulting

¹ *Functional Assignment of Metropolitan's Demand Management Costs*, July 26, 2019, WaterDM.

² Examples of Demand Management costs recovered via the WSR include conservation incentives for high efficiency fixtures and turf removal and Local Resources Programs related to recycled water, groundwater recharge and recovery, and desalination.

avoided and deferred costs for the regional conveyance and distribution system and an increase in available capacity on that system. For this reason, Metropolitan structured the WSR as a volumetric rate on transported water. The following excerpt, taken directly from Metropolitan's most recent cost of service study, summarizes Metropolitan's underlying rationale for this cost recovery approach.³

"Investments in conservation, recycling, and groundwater recovery reduce and defer system capacity expansion and maintenance costs; create available space in Metropolitan's networked conveyance system to be used to complete water transfers; decrease the region's overall dependence on imported water supplies from environmentally sensitive areas like the Bay-Delta; and increase the overall level of water supply reliability in Southern California. Because conservation measures and local resource investments reduce the overall level of dependence on the imported water system, more capacity is available in existing facilities for a longer period of time. The space in the system made available by conservation and recycling is open to all system users. The deferral and reduction of facility expansion costs made possible by investments in conservation, recycling and groundwater recovery benefit all users of conveyance and distribution capacity in the same proportion through a lower uniform System Access Rate. Similar to the public benefit charges implemented in the electric and natural gas industries in California after "open access" (customer choice of supplier) was implemented, the regional and statewide benefits of demand management are assessed to all users of the Metropolitan system, regardless of the source of the imported water supply."

The above excerpt highlights an important point that underlies the Raftelis cost recovery alternatives as discussed in this Report: Demand Management offers broad benefits which accrue to all member agencies. As a key example, in the most recent cost of service study, Demand Management was found to decrease demand and was:

"...estimated to defer the need for projects between four and twenty-five years at a savings of approximately \$2.9 billion in 2017 dollars. The programs also free up capacity in Metropolitan's system to convey both Metropolitan water, and water from other non-MWD sources."⁴

When considering the WaterDM findings regarding the impacted functional categories and the conclusion of the IRP 25-year capital planning horizon at the end of 2020, it is appropriate, if not necessary, to now consider other cost recovery alternatives that are, on a going-forward basis, better aligned with the impacted functional categories and the systemwide benefits resulting from Demand Management investments. For these reasons, the current Water Stewardship Rate is assumed to be eliminated under all four of the alternatives discussed in this Report.

4. Cost Recovery Alternatives to the WSR

In this Report, Demand Management cost recovery alternatives are identified and discussed. In crafting these alternatives care was taken to create options that conform to general industry guidelines and standards. The primary and authoritative reference source for such guidelines is the seventh edition of the American Water Works Association publication, *Manual of Water Supply Practices M1, Principles of Water Rates, Fees, and Charges*

³ Page 76 of the February 2018 Metropolitan document entitled "Fiscal Years 2018/19 and 2019/20 Cost of Service Report for Proposed Water Rates and Charges."

⁴ Page 46 of the February 2018 Metropolitan document entitled "Fiscal Years 2018/19 and 2019/20 Cost of Service Report for Proposed Water Rates and Charges."

(MI). The MI and the cost of service (COS) approaches, principles, etc. it espouses, has a focus on utilities providing retail service and many of those principles have applicability to wholesale utilities like Metropolitan. At the same time within the MI it is understood, if not encouraged, that each utility should use these concepts to inform and develop rates and charges reflective of the unique circumstances in which the utility operates and Metropolitan's COS approach reflects this point of view. The alternatives presented in this Report conform to the guidelines and principles articulated in the MI.

In general, a starting point in the development of cost of service based rates and charges is the assignment of costs to the functional categories they are incurred to serve. For example, the costs incurred to purchase new water supplies are generally assigned to the Source of Supply function. To appropriately assign the costs to the functions they are incurred to serve, Metropolitan's cost of service process assigns operational and capital costs to the functional categories and subcategories shown in Table 1. The Demand Management revenue requirement could be recovered using all or a portion of Metropolitan's existing rate and charge elements (except the Water Stewardship Rate) as shown in Table 1 or through a new rate or charge element as discussed in section 6 of this Report.

Table 1: Functional Allocation of Metropolitan System Costs and Rate and Charge Elements

System Function	System Sub-Functions	Rate and Charge Elements Used for Functional Cost Recovery
Supply	<ul style="list-style-type: none"> State Water Project, Colorado River Aqueduct, Other Supply 	<ul style="list-style-type: none"> Tier 1 Supply Rate
Conveyance and Aqueduct	<ul style="list-style-type: none"> State Water Project, Colorado River Aqueduct, State Water Project Power, Colorado River Aqueduct Power, Other Conveyance 	<ul style="list-style-type: none"> System Access Rate System Power Rate Readiness-to-Serve Charge
Storage	<ul style="list-style-type: none"> Emergency, Drought, Regulatory 	<ul style="list-style-type: none"> Tier 1 Supply Rate System Access Rate Capacity Charge Readiness-to-Serve Charge
Treatment	<ul style="list-style-type: none"> Jensen, Weymouth, Mills, Diemer, Skinner 	<ul style="list-style-type: none"> Treatment Surcharge
Distribution	----	<ul style="list-style-type: none"> System Access Rate Capacity Charge Readiness-to-Serve Charge
Demand Management	----	<ul style="list-style-type: none"> Water Stewardship Rate
Hydroelectric	----	<ul style="list-style-type: none"> Hydroelectric revenue is netted against distribution costs
Administrative and General	----	<ul style="list-style-type: none"> Allocated to all other functions

Related to the topic of functionalization is a finding of the WaterDM report that, going forward, the systemwide benefits of importing less water are applicable across many of Metropolitan's primary system functions⁵. WaterDM concludes that Demand Management investments produce systemwide benefits and multi-functional cost reductions. Reductions in imported water supplies result in the beneficial deferral or avoidance of capital expenditures and/or operations and maintenance expenses (O&M) related to the following system/cost of service functions: Source of Supply, Conveyance and Aqueduct, Storage and Distribution.

⁵ Pages 25 and 26, *Functional Assignment of Metropolitan's Demand Management Costs*, July 26, 2019, WaterDM.

WaterDM also concluded that there are currently two system functions that do not benefit from Demand Management expenditures⁶. The first is the Treatment function. Metropolitan is in the unique situation of having an excess of unused water treatment capacity. Reductions in treated water purchases on the part of member agencies compounds this issue. As a result, the Treatment function does not currently receive a benefit from Demand Management. Per WaterDM, water conservation and producing new local supplies could potentially reduce hydroelectric generation which is not considered a positive impact. Consequently, the Hydroelectric function was excluded from the functional assignment of Demand Management revenue requirements.

In the Metropolitan COS process, Administrative and General is effectively a system function. However, Administrative and General supports all functions and it is spread across all functions, including the impacted functions identified by WaterDM, through the Metropolitan COS process. For this reason, it is not a separately impacted function for purposes of functionalizing Demand Management revenue requirements.

Related to the WaterDM functionalization findings, Metropolitan is encouraged to, in the future, periodically review and re-evaluate the impacted functions resulting from Demand Management investments; such a future review may yield different results.

Raftelis agrees with the conceptual and technical approach used by WaterDM to arrive at the conclusions regarding the impacted Metropolitan COS functions. We support this approach and conclusions due to the systemwide benefits resulting from Demand Management expenditures and investments.

Raftelis has developed four alternatives to the existing WSR (see section 6 of this Report). Three of these alternatives involve allocating the annual Demand Management revenue requirement to the impacted functions as previously discussed in this Report and in the WaterDM report. The fourth option does not require functionalization of the Demand Management revenue requirements and is designed to recover some portion of these revenue requirements from all Metropolitan member agencies.

The recovery of Demand Management revenue requirements from all member agencies is the goal or driving force behind the fourth option (referred to in this Report as Alternative #3B). This alternative is reflective of the fact that all member agencies benefit from Demand Management investments. However, under the first three alternatives it is possible that a member agency could avoid or not share in the costs related to these investments from which they benefit.

Under the fourth alternative it is not necessary to functionalize the Demand Management revenue requirement; it is only necessary to "spread" the revenue requirement in a reasonable and rational manner to reflect the benefit derived by all member agencies and this is the approach used for Alternative #3B and discussed in section 6 of this Report.

There are distinct differences in the four alternatives in terms of the recovery of costs from the member agencies. As previously noted, the fundamental differences in the alternatives relates to whether a member agency can avoid sharing in the Demand Management costs incurred to produce the systemwide benefits accruing to all member agencies. Under the first three alternatives this is possible (in varying degrees) but under the fourth it is not. The fourth alternative most effectively achieves this important cost-benefit nexus.

⁶ Pages 25 and 26, *Functional Assignment of Metropolitan's Demand Management Costs*, July 26, 2019, WaterDM.

5. Functional Assignment of Demand Management Costs

In advance of our work on the development of a conceptually sound cost recovery alternative to the WSR, WaterDM investigated methods of functionalizing Demand Management costs. In its report WaterDM explained why the capital planning forecast in the 1996 IRP study will no longer be applicable beginning in 2021 given the end of the forecast period and changed circumstances. The WaterDM report laid the groundwork for a new approach to the recovery of Demand Management costs. Below is an excerpt from the WaterDM report discussing the need to move beyond the 1996 IRP⁷.

“Much has changed over the years since the 1996 IRP was completed. Metropolitan’s 2015 IRP Update presents an evolving utility focused on adaptive management and with a different perspective on the future than it had 1996. The 2015 IRP Update makes it clear that “climate change may prove to be the most significant challenge to water supply in Southern California” along with other challenges such as supply uncertainty. In 1996, Metropolitan was just starting down the road of implementing demand management and identified specific infrastructure projects that could be avoided over the next 25 years. By 2015, Metropolitan has document approximately 5.4 million AF of water savings and local production from its demand management programs and billions in avoided transportation infrastructure. Going forward Metropolitan’s additional future demands are expected to be met in part by additional demand management investment as a result.

As the 1996 IRP forecast window ends in 2020, it is an appropriate time to update the functional assignment of demand management. WaterDM’s project to update the functional assignment approach was initiated in 2018.”

WaterDM went on to identify the impacted functional categories and outlined a process to determine the avoided cost benefits by using the annual revenue requirement for each major system function as presented in Metropolitan’s cost of service study (see section 4 of this Report). This approach recognizes that an appropriate proxy for these avoided cost benefits are the actual expenditures that Metropolitan must make today in order to fund its required capital infrastructure investments and operations and maintenance expenses.

This approach to quantifying and functionalizing avoided cost benefits can be consistently repeated using a standardized process during each biennial cost of service study process. The first step in this process is to calculate Metropolitan’s projected revenue requirement for each system function. The second step in the process is to allocate the Demand Management revenue requirement to those functions that receive avoided cost benefits from water conservation and local resource projects. Table 2 is a hypothetical illustration of this approach based on a Demand Management revenue requirement of approximately \$100 million (M).

⁷ Page 17, *Functional Assignment of Metropolitan’s Demand Management Costs*, July 26, 2019, WaterDM.

Table 2: Hypothetical Functionalized Cost Allocation and Cost Recovery of Demand Management Costs (\$000's)

Function Receiving Benefit from Demand Management	Revenue Requirement <i>Before</i> Allocation of Demand Management Costs	% of Revenue Requirement <i>Before</i> Allocation of Demand Management Costs	Allocated Demand Management Revenue Requirement	Revenue Requirement <i>After</i> Allocation of Demand Management Costs	% of Revenue Requirement <i>After</i> Allocation of Demand Management Costs	Alternative #1, Alternative #2 and Alternative #3A Cost Recovery Mechanisms (1)
Supply	\$240,000	20%	\$20,000	\$260,000	20%	Existing Rate and Charge Elements Used for Each Function
Conveyance and Aqueduct	600,000	51%	51,000	651,000	51%	
Storage	140,000	12%	12,000	152,000	12%	
Distribution	<u>200,000</u>	<u>17%</u>	<u>17,000</u>	<u>217,000</u>	<u>17%</u>	
Subtotal	1,180,000	100%	100,000	1,280,000	100%	
Demand Management	<u>100,000</u>		<u>(100,000)</u>	<u>0</u>		
Total	\$1,280,000		\$0	\$1,280,000		

(1) Functionalization would not be necessary under Alternative #3B.

Raftelis finds that the cost functionalization approach, or methodology, shown in Table 2 is consistent with industry standard cost of service practices as discussed in the *MI*. We hold this position because the avoided cost benefits provided by Demand Management expenditures are used to directly assign the annual Demand Management revenue requirement to the specific system functions that receive the benefits. We find this recommended cost functionalization approach to be reasonable, rational and fully transparent.

It should be noted that historically Metropolitan recovers its revenue requirements through a cost of service process that allocates functional costs into the following categories: Fixed Demand, Fixed Commodity, Fixed Standby, and Variable Commodity. Under the above discussed methodology, Demand Management costs are functionalized and effectively “move through” this very same process in ultimately arriving at the various rates and charges used by Metropolitan to recover the functionalized revenue requirement. As previously noted, and discussed again in section 6 of this Report, functionalization would not be necessary under Alternative #3B.

6. Cost Recovery Alternatives

The four alternatives recommended for consideration are titled below and described in the balance of this Report:

Alternative #1 – Existing COS Methodology

Alternative #2 – Modified COS Methodology

Alternative #3 – Demand Management Fixed Charge which includes two fixed charge options:

#3A – Functionalized Fixed Charge

#3B – Non-Functionalized Fixed Charge

Alternatives #1, #2, and #3A are all based on annual Demand Management revenue requirements being functionalized in a manner consistent with the findings of WaterDM. For Alternative #3B functionalization was not needed as this alternative makes use of broader metrics for recovering Demand Management costs reflective of the benefit provided to all member agencies. Alternative #3B is designed to reflect the regional or system-wide benefits resulting from Demand Management expenditures and the service commitment and reliance (and potential reliance) by member agencies on Metropolitan.

ALTERNATIVE #1 – EXISTING COST OF SERVICE METHODOLOGY

Description:

Under this alternative the Demand Management revenue requirement would be functionalized and recovered under two existing volumetric rates: the Tier 1 Supply (T1 Supply) and System Access Rates.

Figure 1 provides a graphical representation of Alternative #1. Table 3 is an example of how, under Alternative #1, Demand Management costs would be allocated for recovery via the Tier 1 Supply Rate and the System Access Rate using a hypothetical revenue requirement.

The intent of Alternative #1 is to not make any changes to the current COS methodology. Consistent with the current Metropolitan COS methodology, Demand Management costs would be allocated to Fixed Commodity (average system demands) and as such would only be recovered via these two volumetric rates: Tier Supply and System Access Rates. Therefore, Demand Management costs would not be recovered through Metropolitan's fixed charges or the System Power Rate.

Recovery of Demand Management costs through the Tier 1 Supply Rate and the System Access Rate is consistent with the current cost of service methodology in that Demand Management costs would be allocated and recouped like other fixed O&M costs. Given the alignment with the current COS methodology, this is an alternative that can be repeated consistently via Metropolitan's biennial COS process with minimal administrative burden.

Figure 1: Alternative #1 Existing COS Methodology

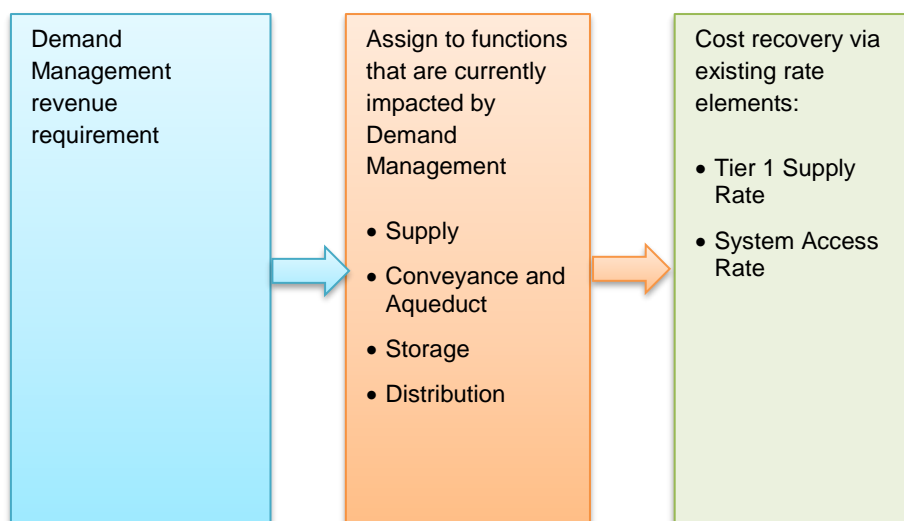


Table 3: Alternative #1 Existing COS Allocation of Demand Management Costs

	Cost Recovery Component	Approx. % of DM Costs (1)	Charge / Rate
Alt #1	T1 Supply	25%	\$/AF
	System Access Rate	75%	\$/AF

(1) Using hypothetical revenue requirement share; the actual relative shares will be calculated as a part of each cost of service analysis and will be different.

Another observation regarding this alternative is the fact that Demand Management costs/investments provide benefit to average, peak and standby demands, but by using only the Tier 1 Supply Rate and the System Access Rate, these costs are only recouped based on average system demands. The next alternative addresses this issue.

ALTERNATIVE #2 – MODIFIED COST OF SERVICE METHODOLOGY

Description:

Under this alternative, the Demand Management revenue requirement would be functionalized and recovered under the following, existing volumetric rates and charges: the Tier 1 Supply Rate, System Access Rate, System Power Rate, Readiness-to-Serve Charge and the Capacity Charge. As explained above, Alternative #1 limited the recovery of Demand Management costs to only rates associated with Fixed Commodity (average demands). However, the benefits of Demand Management investments cut across the entirety of the demands placed on the system: average, peak, emergency and standby. Alternative #2 would modify the existing COS in this respect by recovering Demand Management costs from all rates and charges associated with the impacted functions.

Figure 2 provides a graphical representation of Alternative #2 and Table 4 is an example of how Demand Management costs would be allocated for recovery via the existing rates and charges associated with the impacted functions and listed in Figure 2 using a hypothetical revenue requirement.

Recouping Demand Management costs via all the existing rates and charges associated with the impacted functions listed in Figure 2, results in better alignment of the recovery of these costs with the benefits derived via the expenditure of these costs, namely, savings related to average, peak and standby demands; not just average demands.

Figure 2: Alternative #2 Modified COS Methodology

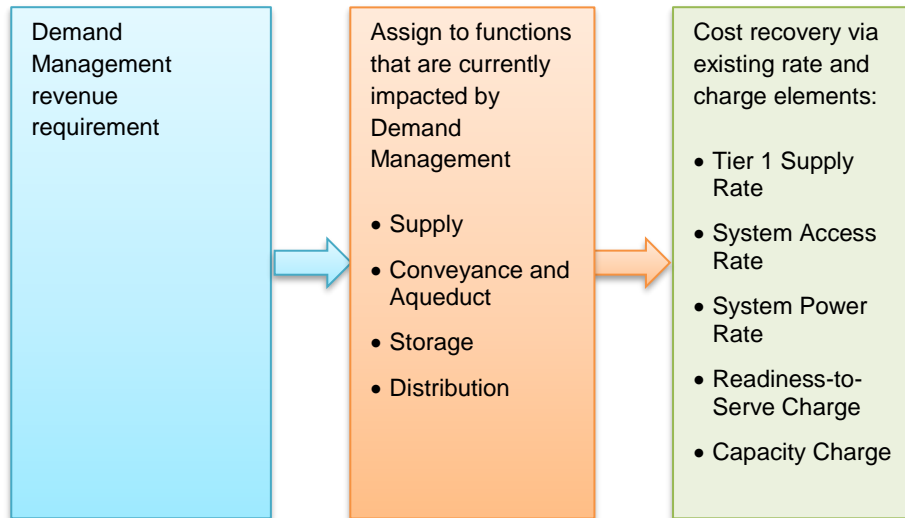


Table 4: Alternative #2 Modified COS Allocation of Demand Management Costs

	Cost Recovery Component	Approx. % of DM Costs (1)	Charge / Rate
Alt #2	T1 Supply	25%	\$/AF
	System Access Rate	50%	\$/AF
	System Power Rate	13%	\$/AF
	Readiness-to-Serve Charge	10%	\$/M
	Capacity Charge	2%	\$/cfs

(1) Using hypothetical revenue requirement share; the actual relative shares will be calculated as a part of each cost of service analysis and will be different.

ALTERNATIVE #3: DEMAND MANAGEMENT FIXED CHARGE

Description:

Two fixed charge alternatives have been developed for consideration. Under either alternative, the benefit a member agency derives from Metropolitan's Demand Management investments would be recovered through a fixed charge based on each member agency's share of the selected metric. Considerations related to a fixed charge methodology include:

- Provides member agencies with an explicitly identified annual lump sum cost for their share of Demand Management costs.
- Demand Management costs are largely fixed in nature and this approach generates an assured revenue stream.

Alternative #3A Functionalized Fixed Charge

Under Alternative #3A Demand Management costs would again be functionalized in the manner previously described and illustrated for Alternatives #1 and #2. However, the next step would follow a different approach in order to create a fixed charge. Instead of recovering the allocated Demand Management costs via Metropolitan's existing rate and, in the case of Alternative #2, charge elements, Demand Management costs would be assigned to each impacted function and then allocated between Supply and Transportation. These costs would then form the basis of the fixed charge as illustrated in Figure 3, Table 5, and the example following Table 5.

Figure 3: Alternative #3A Functionalized Fixed Charge

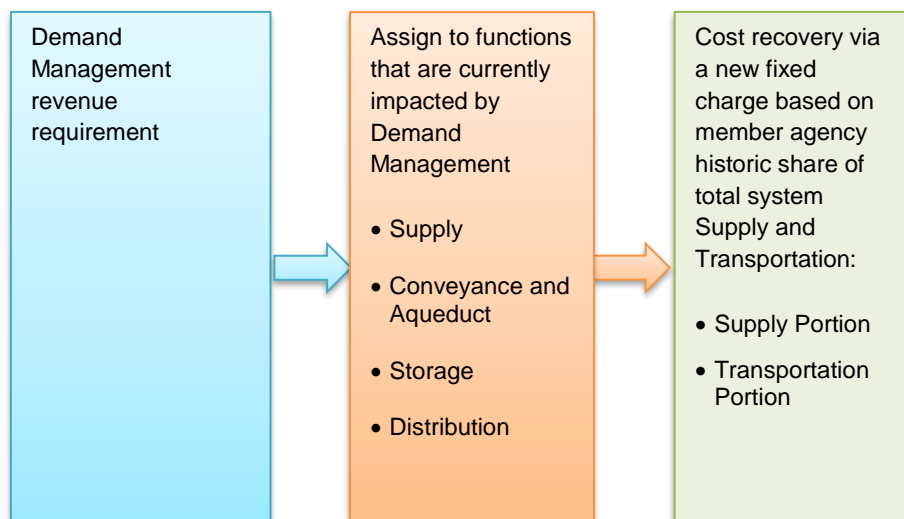


Table 5: Alternative #3A Functionalized Fixed Charge Allocation of Demand Management Costs

Function	% Rev Req	Supply Portion \$M	Transportation Portion \$M	Total \$M
Supply	20%	\$20		\$20
Conveyance and Aqueduct	51%		\$51	51
Storage - Emergency	4%		4	4
Storage - Drought	7%	7		7
Storage - Regulatory	1%		1	1
Distribution	17%		17	17
Total	100%	\$27	\$73	\$100

(1) Using hypothetical revenue requirement share; the actual relative shares will be calculated as a part of each cost of service analysis and will be different.

The Supply and Transportation Portions of Demand Management costs would be allocated to member agencies based on a measure of sales and of all transactions. For example: historic water deliveries – over a pre-determined historic period: a long-term, multi-year, rolling average of sales and of all transactions. What follows is an example of how functionalized Demand Management costs would be allocated to a member agency under Alternative #3A based on the hypothetical example shown in Table 5.

Member Agency A: for the historic period, had 5% of total Supply Portion and 4% of total Transportation Portion

Supply Portion of Demand Management Costs:
5% of \$27M = \$1.35M

Transportation Portion of Demand Management Costs:
4% of \$73M = \$2.92M

Member Agency A:
Total Demand Management
Annual Fixed Charge \$4.27M

Based on the selected metric/allocation approach, the potential exists for member agencies to not be allocated any Demand Management costs even though they may demand services at any time and have received benefit from Metropolitan's Demand Management investments. Alternative #3B is an option to address this issue.

Alternative #3B Non-Functionalized Fixed Charge

Under Alternative #3B it would not be necessary to functionalize Demand Management costs – see Figure 4 for a graphic illustration of this alternative. All Demand Management costs would be recouped based on the selected metric. This metric would be reflective of the fact that Metropolitan's annual expenditures for Demand Management are a necessary and legislated expense for the provision of water service across the

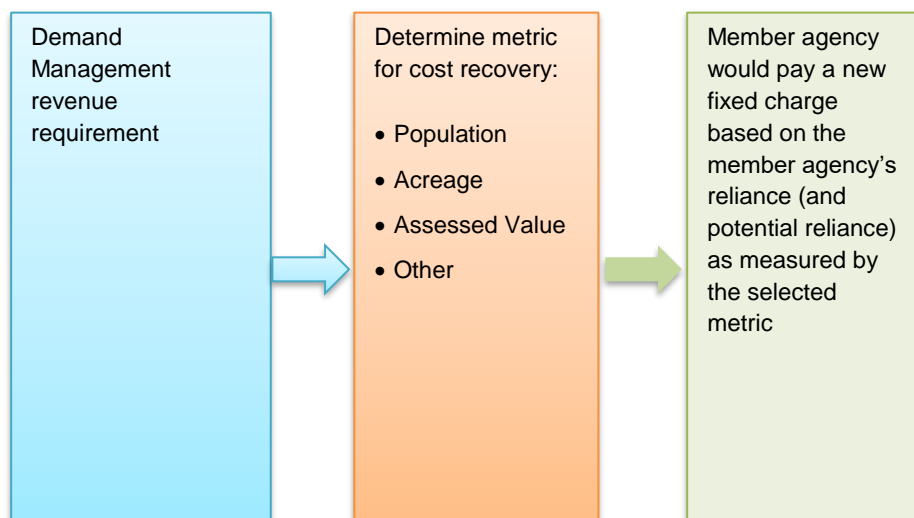
region and a member agency's reliance (and potential reliance) on Metropolitan. Demand Management investments benefit all member agencies as noted below:

- reduce and avoid future capital and other costs
- increase reliability
- reduce the region's reliance on imported water supplies
- decrease burden on infrastructure
- free up conveyance capacity

Coupled with the reality that the preponderance of Demand Management costs are fixed, it makes sense to consider an approach where all member agencies would be subject to, contribute to, the recovery of these costs. For this alternative the selected metric would be one that is indicative of the regional benefits provided by Demand Management and the member agency's reliance (and potential reliance) versus historic demands on the system. Under this alternative use of a member agency's population, acreage or assessed value in place of a historic measure such as water sales would eliminate the potential for member agencies to not be allocated any Demand Management costs even though they may request services at any time and have received benefit from Metropolitan's Demand Management investments.

Use of a broad-based metric such as a member agency's population, acreage or assessed value, precludes the need to functionalize the Demand Management revenue requirement. Under this alternative it is only necessary to allocate the revenue requirement to each member agency based on the indicated metric (see example at the end of this section). The fundamental or underlying tenant of this alternative is that, as previously noted, all member agencies benefit from the Demand Management investments made by Metropolitan regardless of whether a member agency and those in the service area participates in the Demand Management programs, by the development or conservation of local supplies anywhere in the service area. Inherent in this benefit is Metropolitan's ongoing service commitment to each member agency so regardless of how costs may be functionalized, each and every member agency derives benefit. With or without functionalization, the fundamental COS cost-benefit nexus is achieved and therefore this alternative conforms to and meets industry guidelines and practices.

Figure 4: Alternative #3B Non-Functionalized Fixed Charge



The following example illustrates how Demand Management costs would be allocated to a member agency under Alternative #3B based on the hypothetical example shown in Table 5; based on the “Total \$M” \$100 million of Demand Management costs (again, the functionalization of Demand Management costs shown in Table 5 for Alternative #3A, would not be necessary under Alternative #3B).

Member Agency A: has 5% of the selected metric, e.g., population, acreage, assessed valuation, etc.

Member Agency A:
Total Demand Management
Annual Fixed Charge: 5% of \$100M = \$5.0M

This fixed amount (\$/year) would be paid by member agencies based on the member agency’s share of population, acreage, assessed valuation, etc., or a combination thereof.

7. Conclusion

The four alternatives discussed in this Report are all reasonable. These alternatives for recouping Demand Management costs can be consistently repeated using a standardized process during each biennial cost of service study process.

Some are consistent with the current Metropolitan cost of service methodology but some also offer alternatives that are different from the current cost of service methodology. Alternative #1 is a variable approach while Alternative #2 incorporates both variable and fixed elements of the current Metropolitan rate and charge structure. Alternatives #3A and #3B are fixed charge options. The first three alternatives incorporate the functionalization as recommended in the WaterDM report. For Alternative #3B functionalization was not needed as this alternative makes use of broader metrics for recovering Demand Management costs reflective of the benefit provided to all member agencies.

All alternatives are consistent with industry guidelines and standards. It would be a policy decision of the Metropolitan Board to determine which alternative is most appropriate for Metropolitan.

RICHARD D. GIARDINA

EXECUTIVE VICE PRESIDENT

Raftelis Financial Consultants, Inc.

Mr. Giardina is an Executive Vice President with Raftelis Financial Consultants, Inc. and while serving in a national role, also leads the Rocky Mountain region business practice. His extensive managerial and financial experience spanning over 40 years, includes hundreds of financial studies serving both the private and public sector. His experience covers technical areas and industries such as local government fee development, utility cost of service and rate structure studies, litigation support, economic feasibility analyses, privatization feasibility and implementation studies, impact fee studies, management and operational audits, reviews of policies and procedures and operating practices, mergers and acquisitions, valuation services, and rate filing and reporting. He has also served as an arbitrator for several wholesale rate disputes.

As a member of several industry associations, he has also developed industry guidelines regarding financial and ratemaking practices. In particular, as a long-standing member of the American Water Works Association (AWWA) Rates and Charges Committee (chair of the Committee from 2014-2017), he chaired one group that prepared the first edition of the Small System Rate Manual (M54) and chaired another group that re-wrote the Water Utility Capital Financing Manual. He also chaired the re-write of M1 – Principles of Water Rates, Fees, and Charges (the Sixth Edition was published in June of 2012) and as chair of the Rates & Charges Committee he oversaw the production of the Seventh Edition of M1 (published in January of 2017). He is currently vice-chair of the AWWA Management and Leadership Division.

He was also a contributing author to the Water Environment Federation (WEF) Finances and Charges Manual. Mr. Giardina also organized and led WEF-sponsored seminars in 2010 and 2011 titled "Weathering the Storm: Is This the Right Time for You to Form a Stormwater Utility?"; a seminar on the opportunities and challenges surrounding the creation of a stormwater utility.

YEARS OF EXPERIENCE

- 42 years

EDUCATION

- BA Business Administration Western State College of Colorado 1978

LICENSES AND CERTIFICATIONS

- Certified Public Accountant - Colorado
- Series 50 Municipal Advisor Representative

SPECIAL RECOGNITION

- Management and Leadership Division, American Water Works Association, Vice Chair, 2017 to present
- Appointed to the EPA Environmental Financial Advisory Board, 2011 to 2017
- American Water Works Association, Rates and Charges Committee, 1999 to present, Vice Chair 2011 to 2014 and Chair 2014 to 2017
- Water Rates Summit, Invited Expert, Alliance for Water Efficiency (AWE), The Johnson Foundation, August 2012 and April 2014
- Financing and Charges Task Force, Water Environment Federation, 2005 to 2011
- Utility Management Conference, AWWA-WEF, past co-chair and organizing committee, 2005 to 2010
- Water For People, Annual Fund Raising Event, Organizing Committee, 2006 to 2012
- Conference President, National Impact Fee Roundtable (now known as the Growth and Infrastructure Consortium), 2005
- Board Member, East Cherry Creek Valley Water & Sanitation District, 2001 to 2002

PROFESSIONAL MEMBERSHIPS

- American Institute of Certified Public Accountants
- American Water Works Association
- Government Financial Officers Association
- Water Environment Federation

PROFESSIONAL HISTORY

- Raftelis Financial Consultants, Inc., 1993 to 1995, 2013 to present
- Malcolm Pirnie-Arcadis-US, 2004 to 2013
- Rick Giardina & Associates, Inc. 1995 to 2004
- Ernst & Young 1984 to 1993
- Stone & Webster, Inc. 1981 to 1984
- State of Colorado Public Utilities Commission 1978 to 1981

In 2011, he was appointed to the EPA Environmental Financial Advisory Board serving two terms through June of 2017. The EFAB provides ideas and advice to EPA's Administrator and program offices on ways to lower the costs of and increase investments in environmental and public health protection. EFAB's work focuses on:

- Lowering the cost of environmental protection;
- Removing financial and programmatic barriers that raise costs;
- Increasing public and private contribution in environmental facilities and services; and
- Building state and local financial ability to meet environmental laws.

Litigation / Rate Case Experience

- Mr. Giardina has filed testimony and is currently scheduled to provide expert witness testimony in PUC Docket No. 49189, SOAH Docket No. 473-19-6297.WS in support of Austin Water in a matter brought by four of its wholesale customers. The wholesale customers have raised numerous concerns including the allocation of costs between water, wastewater and recycled operations, financial plan preparation, revenue requirements, cost of service and rate design. His testimony will address issues around industry practices and the equitable assignment of costs between retail and wholesale customer groups.
- Mr. Giardina prepared an expert report and provided expert witness testimony in support of the Fort Collins-Loveland Water District and the South Fort Collins Sanitation District in Case Number: 2015CV030658 in District Court, Larimer County, Colorado in an action brought by a developer regarding water and wastewater Plant Investment Fees and Impact fees. His report and testimony addressed issues around industry practices in the determination and assessment of Plant Investment Fees and Impact Fees.
- Mr. Giardina provided expert testimony in PUC Docket No. 42857, SOAH Docket No. 473-14-5138 in support of Austin Water in a matter brought by four of its wholesale customers. The wholesale customers raised numerous concerns including the allocation of costs between water, wastewater and recycled operations, financial plan preparation, revenue requirements, cost of service and rate design. His testimony addressed issues around industry practices and the equitable assignment of costs between retail and wholesale customer groups.
- Mr. Giardina prepared an expert report and provided expert witness testimony in support of the City of Westlake, Ohio in Case No. CV-12-782910 in the State of Ohio, County of Cuyahoga, against the City of Cleveland, Ohio. Consistent with the terms of its agreement, Westlake discontinued receiving wholesale water service from Cleveland and in turn Cleveland sought to recover "stranded costs" from Westlake. Mr. Giardina prepared an expert report and provided expert testimony at trial refuting Cleveland's claims on the grounds that among other things, Cleveland had been fully compensated for all investment costs and no monies were due as a result of Westlake's decision to exercise its contract rights to no longer be a Cleveland wholesale water customer. He used Cleveland's own rate study and cost of service methodology to illustrate his conclusions including how under Cleveland's utility approach to defining revenue requirements and determining rates, Cleveland's claims were without merit.
- Mr. Giardina served as an expert witness in support of the El Paso Water Utilities, Public Service Board (EPWU) in a lawsuit brought by the El Paso Apartment Users Association challenging the newly implemented EPWU stormwater user fees. In addition to preparing pre-filed testimony, being deposed and providing expert witness testimony at trial, Mr. Giardina assisted legal counsel for the EPWU in the deposition of the Association's expert witness. The issues addressed by Mr. Giardina included the determination of billing units, financial plan preparation, revenue requirements, cost of service and rate design. The Court ruled in favor of the EPWU on all counts.
- For the City of Chandler, Arizona Mr. Giardina served as Project Director in completing an outside city cost of service study. For a number of years the City had charged outside city water customers at twice the

inside City rates. The rate differential was repealed when outside city customers sought to litigate this policy. The City retained Mr. Giardina to complete a cost of service study and recommend, if warranted, an outside rate differential. The approach used included the identification of assets serving strictly outside customers and development of an allocation methodology for common facilities. The City's cash revenue requirements were converted to the utility basis for the purposes of determining the cost of outside service. Included in the cost of service was a return component based on the net rate base serving outside customers. Results of this analysis indicated that a differential was justified. The precise differential varied from 1.80 to 2.01 times inside city rates based on a variety of factors including the assignment or allocation of utility assets and the inclusion of contributed property. An automated rate model was delivered to the City and staff training was completed.

- In a wholesale rate dispute between Bay City (as the supplier) and Bay County (and other municipal customers) Mr. Giardina was selected and served as the independent, third arbitrator. The rate consultant for each party served on the arbitration panel with Mr. Giardina. As the independent arbitrator Mr. Giardina presided over the hearing and drafted the arbitration decision (with input and comment from the other panel members).
- Mr. Giardina was retained to participate on a three-member arbitration panel in a wholesale rate dispute between the cities of Kalamazoo and Portage, Michigan, in an attempt to avoid litigation. The panel received testimony, reviewed briefs and related materials and led a consensus building process culminating in a settlement agreement.
- Mr. Giardina was retained to participate on a three-member arbitration panel in a capital recovery fee dispute between the cities of Holland and Zeeland, Michigan. The panel received testimony, reviewed briefs and related documents and rendered a written, binding opinion.
- Mr. Giardina provided consulting services to legal counsel of a homeowner's association regarding water rates charged by a large municipally-owned water utility. At issue was the association's designated customer classification and the rates charged for service. The association was served through a single master meter and was responsible for the initial investment and all on-going costs associated with all facilities on their side of the metering point. This included meter reading and billing (under the association's rate structure) activities for their own retail customers. Mr. Giardina completed a comprehensive review of the utility's rate ordinance regarding customer class designations. He also evaluated a utility-prepared analysis on the cost of serving the association. His recommendations included the re-classification of the association from residential to a special "non-retail" service category or the utility's wholesale class and a rate for service reflective of the cost incurred by the utility and the service provided by the association.
- Mr. Giardina provided litigation support on a contract rate dispute for one of the largest cities in the United States. For this case, the city was in litigation with ten wastewater contracting agencies (wholesale customers) who disagreed with the manner in which their rates were calculated and implemented. Mr. Giardina assisted this west coast city in evaluating the appropriateness of using settlement amounts for general fund purposes. This included a comprehensive analysis of the city charter and code, EPA and state wastewater grant and user charge regulations, bond ordinances and covenants and governmental accounting and reporting literature.
- Mr. Giardina conducted an outside city cost of service study for the City of Prescott, Arizona. In anticipation of litigation the City retained Mr. Giardina to complete a cost of service study and recommend, if warranted, an outside rate differential. The approach used included the identification of assets serving strictly outside customers and development of an allocation methodology for common facilities. The City's cash revenue requirements were converted to the utility basis for the purpose of determining the cost of outside service. Included in the cost of service was a return component based on the net rate base serving outside customers.

- Mr. Giardina served as Project Manager on an engagement to provide litigation support services in a lawsuit involving the recovery of closure and post-closure costs associated with a California landfill and transfer station. Mr. Giardina was retained by counsel for the plaintiff, the landfill and transfer owner, to provide expert witness testimony relating to the process used to establish rates for the owner and to also estimate damages resulting from the regulator's disallowance of closure and post-closure costs. Mr. Giardina also assisted in the depositions of the defendant's experts and assisted plaintiff's counsel on the development of closure and post-closure litigation strategies.
- Mr. Giardina served as Project Manager on an engagement for the Colorado Ute Water District to evaluate (as part of a law suit between the District and the City of Grand Junction) the financial impact if the City were to assume utility service to approximately 20% of the District's service territory. He also assisted legal counsel in preparing deposition questions and trial material.
- Mr. Giardina served as an expert witness in Colorado Water Court. Mr. Giardina was retained to evaluate the feasibility of a proposed water supply project. The evaluation included a comprehensive review of work completed by witnesses for the defendant, and the development of independent technical analysis relating to the project feasibility. He assisted legal counsel in deposing other experts and was deposed by defendants outside counsel.
- Mr. Giardina served as an expert witness on an engagement to provide litigation support services to the City of Thornton, Colorado. Suit was filed in Adams County District Court against the City asserting that the City violated its agreement with outside City water and sewer customers calling for non-discriminatory rates. Mr. Giardina assisted the City's outside legal counsel in preparing requests for discovery and deposition of plaintiff's witnesses and the development and presentation of expert testimony. A key issue in this case was the cost justification and the evaluation of legal precedents and industry practices regarding the development of outside city rates for utility services.
- Mr. Giardina provided litigation support services in an engineering and construction lawsuit involving a major southeastern water utility and claims regarding failure or potential failure of a large diameter transmission pipeline. Mr. Giardina was retained by counsel to provide analysis and evaluation of data for the purpose of assessing damage claims asserted by the plaintiff.
- Mr. Giardina served as Project Manager to provide litigation support regarding a suit involving Alpine Cascade Corporation et. al. v. Pagosa Area Water and Sanitation District, Case No. 97CV15, Archuleta County District Court. Mr. Giardina will review and analyze the financial records of the Pagosa Area District and other related tasks. One of the primary issues that will be addressed is whether the District's purported "enterprise" is being operated as a self-supporting business.
- For the City of Edmonton, Alberta, Mr. Giardina was retained to provide financial and cost allocation consulting services to the City in a wholesale customer rate dispute before the Alberta Public Utilities Board. Mr. Giardina provided independent advice to the City of Edmonton regarding a broad range of rate-related issues including cost of service determination, cost allocation and rate design. He also assisted the City in the review and preparation of testimony (direct and rebuttal).
- Mr. Giardina was retained to evaluate damage claims as part of a law suit regarding a contaminated water treatment plant site. His focus was on the damages, as asserted by the plaintiff, which resulted from the "inability" of the plaintiff to refinance outstanding long-term debt. Additionally, RGA assisted legal counsel and other experts in the evaluation and analysis of finance and rate-related issues.
- Mr. Giardina served as Project Manager on a number of litigation support engagements. Responsibilities have included the development of microcomputer models for use in calculating damage claims and extensive research relating to cost and management accounting issues and preparation of testimony.
- Financial Analyst for the Colorado Public Utilities Commission. While employed by the PUC, Mr. Giardina presented expert testimony in a number of rate and cost allocation proceedings before the Commission. Areas of coverage included revenue requirement determination in general and specifically

numerous accounting and financial issues relating to rate base, cost of capital and the cost of service. As a member of the PUC staff he conducted a number of rate-related audits focusing on cost analysis and cost allocation procedures. These audits then became the basis for development of expert testimony and preparation for cross-examination.

Sample of Other Relevant Experience

City and County of Denver (CO)

This project was the first ever bond issue (\$30.7 million) for the City of Denver's (City) Wastewater Management Division and, as such, required the development of a number of "bond-related" documents in addition to the financial feasibility plan. The engagement was completed in two phases:

- Reviewed the City's ordinances and regulatory materials concerning the storm drainage utility, including the Denver revised municipal code, wastewater policies and procedures related to the assessment and collection of storm drainage fees within the City. The storm drainage capital projects 6-year and long-term needs were reviewed and the costs of services for maintaining and operating the storm drainage utility, including assessing the current and projected financial requirements of operating the utility and the planned capital projects was assessed.
- Prepared a plan of finance, including projections of storm drainage fees which supported completion of the planned capital projects.

Seattle Water Department (WA)

Mr. Giardina served as Project Manager on an engagement to assist the Seattle Water Department in conducting a comprehensive water cost of service and rate study and another rate study a couple of years later. The base-extra capacity cost allocation approach was used for this study. The Department provides retail service to in-city residents and wholesale service to 29 purveyor customers. Issues examined in this study included marginal cost pricing; seasonal rate development; rate of return; and inside/outside rate differentials. He provided consulting services and direction to the Department on each of these issues.

Metropolitan Water District of Southern California (CA)

In 2007-2009, Mr. Giardina facilitated a series of workshops with management, member agencies and stakeholders to assess the economic, political and technical feasibility of a growth-related infrastructure charge. He led workshops to inform participants of the prevailing industry standards for adhering to cost of service principles and navigating California's complex legal environment.

Again, in 2011, he led the Long Range Financial Planning process with a focus on better aligning fixed costs with fixed revenue sources in addition to evaluating a number of financial-related issues. He facilitated and provided technical input as a variety of rate and financial planning alternatives were considered.

Mr. Giardina developed alternatives to the current MWD 100% variable rate methodology for treated water service. He led Raftelis' efforts to frame and develop a number of fixed charge alternatives considering the basis or rationale for historic investments in treatment capacity and the demand characteristics of the MWD Member Agencies, i.e., average, peaking and standby demands.

He has continued (2016- 2017) to work with Metropolitan on a variety of cost of service topics and provided support in regard to the on-going rate litigation with the San Diego County Water Authority.

City of Austin Water Utility (TX)

Mr. Giardina served as Project Director under the Water and Wastewater Cost of Service Rate Study contract for the City of Austin Water Utility (AWU). The project included cost of service and rate studies for the water and wastewater utilities and development of cost of service and rate models. He supervised the preparation several issue papers to educate Public Involvement Committee (PIC) about issues relating to cost of service methodologies and rate design and presented issue paper topics to PIC and the AWU Executive Committee.

Mr. Giardina also served as Project Director for a Revenue Stability Fee Study. He provided expertise relating to revenue stability efforts among water and wastewater utilities throughout the country. In addition, he researched and presented information regarding options for improving utility revenue stability to AWU staff and appointed Joint Subcommittee on AWU's Financial Plan. He assisted in the formulation of the recommendations ultimately adopted by the City including a revenue stability fee structure and associated policies.

City of San Diego (CA)

Mr. Giardina served as Project Director for a Bond Feasibility Study for the City of San Diego Municipal Water and Wastewater Department (MWWD). Mr. Giardina conducted a financial analysis to determine if current rates and proposed future rates could reasonably be expected to provide the revenues necessary to support all costs of the MWWD and City systems, including capital expenditures, O&M expenses, debt payments, debt coverage requirements, and financial reserve requirements.

Additionally, Mr. Giardina served as Project Director for a project for the City's on-going training initiative. Specifically, he led managers and staff of the Utility Department through a comprehensive financial planning and rate study program. He conducted sessions with the groups during which the fundamental concepts and approaches to financial planning, cost of service and rate design were presented.

He also served as the Project Director for a multi-phased study to assess the feasibility of implementing an individualized or water budget rate methodology.

City Council of Salt Lake City (UT)

Mr. Giardina led the Council through a process of identifying and ranking water rate or pricing objectives. This effort resulted in the adoption of a seasonal rate approach (the existing method was a uniform rate). On the basis of the most recent rate study, the City has adopted a combination fixed-block rate for its residential accounts and a customer-specific block approach for nonresidential accounts. This approach was the result of a comprehensive evaluation of rate options using a 20-member citizen committee.

He also assisted the City Council in developing financial policies and leading a discussion regarding pay-as-you-go versus debt financing for capital projects, and in providing a detailed analysis of a bonding proposal. The work included General Fund activities as well as water, sewer, and storm drainage operations. Mr. Giardina analyzed such issues as alternative financing vehicles (including impact fees) and customer/taxpayer impact analyses. He completed a rate alternative workshop with the City Council which led to the implementation of a seasonal (replacing a uniform) water rate structure. Mr. Giardina developed alternative strength-based sewer rate methodology and assisted the Utility in implementation of both user rates and impact fees.

City of Phoenix (AZ)

Mr. Giardina was retained by the City of Phoenix (City) Water Services Department to develop a long-range financial planning model of the City's water and wastewater utilities. The models, to be used by Department Management and the Natural Resources subcommittee of the City Council, had the capability to examine alternative funding sources

for the capital improvement program and project results of operations in overall cash flows. The financial parameters of the City were incorporated into the model so that such indicators could be readily reviewed to ensure that debt service coverage requirements were met or that the use of debt to fund capital projects did not exceed target levels.

As part of an on-going contract with the Department, he converted this model for use with the wastewater utility. The wastewater financial planning model was enhanced so that the revenue requirement can be projected by customer class. The primary reason for this enhancement was to provide the Department with the ability to analyze the impact that anticipated upgrades to the City's two wastewater treatment plants would have on various customer classes. These upgrades were necessary in order to comply with anticipated NPDES permit requirements.

City of Tucson (AZ)

Mr. Giardina served as Project Manager in providing rate and financial services for Tucson Water under a multi-year contract for services, including cost allocation and alternative rate design considerations. Specifically, he assisted the City in analyzing the rate blocks for its inclining block water rate structure and customer class designations. He developed new impact fees and provided recommendations on revenue projections and financial modeling.

City of Reno (NV)

Mr. Giardina served as Project Officer on this comprehensive wastewater rate study. He directed the consulting team in developing a financial model that was used to evaluate revenue sufficiency, determine the cost of providing wastewater service including charges for excess-strength discharges, and determine equitable connection fees based on the cost of expansion. Our interactive approach facilitated the development of a rate structure that was legally defensible, and met the City's goals related to rate defensibility and equitably paying for growth. Unanimous consensus was reached in all forums and the project ended with a unanimous vote by the City Council to adopt all recommendations.

City of Santa Fe (NM)

Mr. Giardina served as Technical Advisor on a project to conduct a financial feasibility study. He evaluated the financial implications of City acquisition of the privately-owned water company. Project objectives included: (1) developing operational costs and revenues; (2) analyzing integration and start-up costs; (3) developing a financial plan for acquiring the water company; (4) determining capital improvement funding requirements; (5) computing a probable range of values for the water company; and (6) quantifying the rate impacts of acquisition on existing customers.

El Paso Water Utilities Public Service Board (TX)

Mr. Giardina served as Project Officer to assist the City of El Paso in identifying and assessing potential organizational and institutional arrangements for the management and funding of stormwater-related activities; and recommend the preferred structure for providing stormwater management and prepare an implementation plan. Subsequently, Mr. Giardina assisted the utility in the creation of the stormwater utility, development of staffing plan and organization structure, preparation of financial plan, rate design and customer billing data base all culminating with the issuance of stormwater bills 18 months after beginning the initial feasibility effort.

Mr. Giardina also served as Project Director for a water and sewer rate and financial planning study for the City of El Paso Water Utilities Public Service Board. He evaluated a number of pricing alternatives including the board's inverted residential block structure and excess use approach for nonresidential customers. Mr. Giardina projected demand reductions based on price elasticity estimates so that, when considered within the spectrum of a comprehensive water conservation program, per capita usage would decrease from 200 to 160 gallons per day by the

year 2000. He also developed excess strength sewer surcharges as well as permit fees for significant industrial users and other permitted accounts.

Honolulu Board of Water Supply (HI)

Mr. Giardina served as Project Director on an engagement to conduct a comprehensive rate and financial planning study for the Honolulu Board of Water Supply. He developed several alternative rate methodologies that addressed the pricing objectives of the community. These included the development of impact fees by functional area (e.g., supply, treatment). A major interest to the client was the consideration of a conservation pricing structure which included an increasing unit charge for increasing amounts of water consumed.

In addition, we completed a study for the Board to examine the relationship between impact fees, user charges and conservation pricing and develop a recommended rate and financial plan. This was completed with the development and use of an automated rate, financial planning, and customer impact model.

Puerto Rico Aqueduct & Sewer Authority (PUERTO RICO)

Mr. Giardina served as Technical Advisor for the review of financial forecasts in support of planned capital financing for the Puerto Rico Aqueduct & Sewer Authority (Authority) multi-year capital needs in support of new money and refunding bond issues, and for completing a comprehensive rate study. Mr. Giardina represented the Authority in meetings and presentations with rating agencies and insurance companies for their first public issue in over a decade. The financial forecast and additional work completed included a comprehensive assessment of efficiency initiatives, resulting increases in revenues and/or decreases in expenditures. This effort proved to be critical in building credibility with the rating agencies as the Authority sought to raise capital through a series of bond issues.

City of Winnipeg (Canada)

Mr. Giardina served as Project Director for an organizational and financial management study for the City of Winnipeg Waterworks, Waste & Disposal Department to evaluate the potential for creating a stormwater utility and establishing a means of financing both capital and operations and maintenance costs.

City of San Jose (CA)

Mr. Giardina also served as Project Director on a study to develop pricing methodologies and rate structures for non-residential water users. He evaluated the range of options available for recovering the cost of providing water service to non-residential customers. The evaluation entailed a conceptual assessment of alternative user charge approaches based on demand characteristics.

Mr. Giardina served as Project Director to conduct a customer class cost of service study using a conservation rate approach, and developed impact fees to recover costs associated with major facilities required to serve new development in the City's service area. He developed a methodology for determining amounts to be transferred annually to the City's General Fund. He also developed a microcomputer rate and financial planning model in order to project rates over a five-year time frame. Public input on both the user charges and impact fees were considered when developing the final study recommendations.

Publications / Presentations

- Giardina, R.D., Teodoro, M., Reid, C., LaFrance, D., "Water Utilities Issues Forum – Affordability," panel discussion at the Annual Conference and Exposition of the American Water Works Association, June 14, 2018.

- Giardina, R.D., Cramer, C., “How Much Does It Cost To Build Here,” presented at the Growth and Infrastructure Consortium Annual Conference, Denver, CO, October 13, 2016.
- Giardina, R.D., Gaur, S., Kiger, M.H., Ziebertz, W., “Committee Report: Ripples From the San Juan Capistrano Decision,” Journal – American Water Works Association, September 2016, Volume 108, Number 9.
- Giardina, R. D., “What’s In Your Rates?,” presented at the Colorado Water Congress, 2016 Summer Conference, Steamboat Springs, CO, August 24, 2016.
- Giardina, R.D., Ash, T., “Constructing Successful Rates: The Art and Science of Revenue and Efficiency,” presented at the 5th Annual WaterWise Pre-Conference Workshop, Denver, CO October 24, 2013.
- Giardina, R.D., Ash, T., Mayer, P., “Constructing Successful Rates,” presented at the WaterSmart Innovations Annual Conference, Las Vegas, NV, October 4, 2013.
- Giardina, R.D., Burr-Rosenthal, Kyrsten, “Considering Water Budget Rates? One City’s Approach,” presented at the 2013 CA-NV AWWA Spring Conference, Las Vegas, NV, March 27, 2013.
- Corssmit, C.W., Editor, and contributing editors, reviewers, and technical editors: Hildebrand, M., Giardina, R.D., Malesky, C.F., Matthews, P.L., Mastracchio, J.M., "Water Rates, Fees, and the Legal Environment," American Water Works Association (AWWA), 2nd Edition, 2010. ISBN 978-1-58321-796-2.
- Giardina, R.D., “Is This the Right Time for You to Form a Stormwater Utility?,” presented at a Seminar on Weathering the Storm: Is This the Right Time for You to Form a Stormwater Utility? sponsored by the Water Environment Federation (WEF), Alexandria VA, May 18, 2010. This seminar was also presented in 2011. See also <http://www.wef.org/blogs/blog.aspx?id=7312&blogid=17296>
- Giardina, R.D., "Financial Viability - Can Budget or Individualized Water Rates Work for You?," presented at the Utility Management Conference sponsored jointly by the American Water Works Association and Water Environment Federation (AWWA/WEF), San Francisco CA, February 21-24, 2010.
- Giardina, R.D., "Attaining Sustainable Business Performance Finance - Water Budget Based Rates," presented at a Meeting of the Association of Metropolitan Water Agencies (AMWA), New Orleans LA, October 20, 2008.
- Jackson, D.E., Giardina, R.D., "Financing Options for Drinking Water CIP Projects," presented at a Seminar sponsored by the Arizona Water and Pollution Control Association (AWPCA) on Treatment Technologies for Compliance with the Stage 2 Disinfection Byproducts Rule, Phoenix AZ, February 16, 2006.
- Giardina, R.D., “Impact Fee with a Defined Short-Term Build-Out Horizon,” presented at the National Impact Fee Roundtable, Naples FL, October 22, 2004.
- Giardina, R.D., “Calculating Impact Fees: Methods,” presented at the American Planning Association State Conference, Vail CO, September 24, 2004.
- Giardina, R.D., "Funding Local Government Services," presented at the 97th Annual Convention of the Utah League of Cities and Towns, Salt Lake City UT, September 15, 2004.
- Giardina, R.D., "Understanding Water Issues in Arizona," presented at the Government Finance Officers Association Summer Training Program, Tucson AZ, August 20, 2004.
- Giardina, R.D., “Impact Fees: A Vote of Confidence for Economic Growth?,” published in Colorado Government Finance Officers Association (GFOA) Footnotes, December 2003, the Arizona GFOA Newsletter, January 2004, and the Illinois Government Finance Leader, Spring 2004.
- Giardina, R.D., “Impact Fee Basics / Impact Fees with a Defined Short-Term Build-Out Horizon,” presented at the National Impact Fee Roundtable, San Diego CA, October 16, 2003.
- Giardina, R.D., "Local Government Utilities Establishing Rates for Service," presented at Arizona State University, Phoenix AZ, September 23, 2003.

- Giardina, R.D., "Selecting a Water Rate Structure through Public Involvement," presented at the Annual Conference of the American Water Works Association, Intermountain Section, Jackson Hole WY, September 17, 2003.
- Giardina, R.D., "Ratemaking 101," presented at the Government Finance Officers Association of Arizona, Summer Training, Flagstaff AZ, August 22, 2003.
- Giardina, R.D., "Impact Fees," presented at the Colorado Government Finance Officers Association, Metro Coalition, Golden CO, May 9, 2003.
- Giardina, R.D., "Impact Fees – A Primer," presented at a Conference of the Colorado River Finance Officers Association, Parker AZ, February 4, 2003.
- Giardina, R.D., "Impact Fees and Economic Development," presented at the Annual Conference of the Colorado Government Finance Officers Association, Vail CO, November 20, 2002.
- Giardina, R.D., "Case Study: City of Chandler, Arizona, Utility System Development Charges," presented at the National Impact Fee Roundtable, Phoenix AZ, October 24, 2002.
- Giardina, R.D., "Using Impact Fees to Fund Streets and Roads," presented at the Utah League of Cities and Towns 2001 City Streets and County Road School Convention, St. George UT, April 25, 2001.
- Giardina, R.D., "Addressing Capital Needs," presented at the Utah League of Cities and Towns Mid-Year Conference 2001, St. George UT, April 5, 2001.
- Giardina, R.D., "Fine Tuning Your Rate Structure Using a Citizen Committee," presented at the Annual Conference and Exposition of the American Water Works Association, Denver CO, June 14, 2000.
- Giardina, R.D., "Impact Fees without Getting in Trouble," presented at the Annual Convention of the Utah League of Cities and Towns, St. George UT, April 13, 2000.
- Giardina, R.D., "Impact Fees for Small Communities," presented at the Annual Convention of the Utah League of Cities and Towns, Salt Lake City UT, September 16, 1999.
- Giardina, R.D., "Trends in Privatization," presented at a Conference of the Water Environment Association of Utah, St. George UT, April 24, 1998.
- Giardina, R.D., "Isn't Competition Wonderful?," presented at the Joint Technical Advisory Committee (JTAC) of the American Water Works Association, Rocky Mountain Section and the Rocky Mountain Water Environment Association, Denver CO, February 26, 1998.
- Giardina, R.D., "Strategies and Approaches for the Development of Utility Impact Fees," presented at the Annual Conference of the Rural Water Association of Utah, Park City UT, August 25, 1998; and the Joint Annual Winter Conference of the Water Environment Association of Utah/American Water Works Association, Intermountain Section, Salt Lake City UT, January 21, 1998.
- Giardina, R.D., "Private Sector Competition - What Is It? Who Does It? and Can It Help You?," Workshop presented at the 1997 Joint Annual Conference of the American Water Works Association, Rocky Mountain Section and the Rocky Mountain Water Environment Association, Ruidoso NM, September 14, 1997.
- Giardina, R.D., "Impact Fees as a Capital Financing Approach," presented at a Conference of the Rocky Mountain Water Environment Association, Denver CO, January 30, 1997.
- Giardina, R.D., "Conservation Pricing: Meeting Your Conservation Objectives," presented at the Joint Annual Conference of the American Water Works Association, Rocky Mountain Section and the Rocky Mountain Water Pollution Control Association, Sheridan WY, September 10, 1995; and the Annual Conference of the American Water Works Association, Kansas Section, Wichita KS, September 25, 1996.
- Giardina, R.D., "Turnkey vs. Conventional Approach to Biosolids Facility Construction," presented at the 10th Annual Residuals and Biosolids Management Conference: 10 Years of Progress and a Look Toward the Future, Denver CO, August 20, 1996.

- Giardina, R.D., Ambrose, R.D., Olstein, M., "Private-Sector Financing," Chapter 15, *Manual of Water Supply Practices, M47 - Construction Contract Administration*, 1996. American Water Works Association.
- Giardina, R.D., "Contract Operations," Chapter 15, *Operation of Municipal Wastewater Treatment Plants, Manual of Practice-MOP 11*, Fifth Edition, 1996. Water Environment Federation.
- Giardina, R.D., "Selecting an Appropriate Contract Operator," presented at the 1995 WEF/AWWA Joint Management Conference of the Water Environment Federation/American Water Works Association, Tulsa OK, February 13, 1995.
- Giardina, R.D., "Wastewater Reuse Capital Funding and Cost Recovery Approaches," presented at the Rocky Mountain Sections of the American Water Works Association and Water Pollution Control Association, Crested Butte CO, September 14, 1994; and the Annual Conference and Exposition of the Water Environment Association of Utah, St. George UT, April 20, 1995.
- Giardina, R.D., "Private Sector Financing of Public Facilities – When and Why It May Be Appropriate," presented at the Annual Conference of the American Water Works Association, New York NY, June 21, 1994; and Joint Annual Conference of the American Water Works Association, Rocky Mountain Section/Rocky Mountain Water Environment Federation, Steamboat Springs CO, September 10, 1996.
- Giardina, R.D., "Use of Innovative Pricing Strategies in a Conservation or Demand Management Program," presented at the 67th Annual Conference of the Arizona Water and Pollution Control Association, Prescott AZ, May 6, 1994.
- Giardina, R.D., "Funding Environmental Compliance – One City's Approach," presented at the Annual Conference of the Rocky Mountain Water Pollution Control Association, Denver CO, January 28, 1994.
- Giardina, R.D., "Conservation Pricing – Trends and Examples," presented at the CONSERV 93 Conference and Exposition on The New Water Agenda, Las Vegas NV, December 14, 1993.
- Giardina, R.D., Simpson, S.L., "A Case Study of the Impact of Conservation Measures on Water Use in Boulder, Colorado," presented at the Joint Annual Conference of the Rocky Mountain Sections of the American Water Works Association and Water Environment Federation, Conservation Workshop, Albuquerque NM, September 19, 1993.
- Giardina, R.D., "Creating Water Resources through Conservation Pricing," presented at the Western Water Conference of the National Water Resources Association, Durango CO, August 6, 1993.
- Giardina, R.D., Archuleta, E.G., "A Case Study of the Impact of Conservation Measures on Water Use in El Paso, Texas," presented at the Annual Conference and Exposition of the American Water Works Association, San Antonio TX, June 9, 1993.
- Giardina, R.D., "Trends in Water Rates," presented at the Annual Conference of the American Water Works Association, Pacific Northwest Section, Seattle WA, May 7, 1993.
- Giardina, R.D., Blundon, E.G., "Environmental Impact Fees," presented at the Annual Customer Service Workshop sponsored by the American Water Works Association, Seattle WA, March 29, 1993.
- Giardina, R.D., "Privatization and Other Innovative Approaches to Financing Wastewater Facilities," presented at the Annual Conference of the Nevada Water Pollution Control Association, Las Vegas NV, March 12, 1993.
- Giardina, R.D., "Guidelines to the Pricing of Municipal Water Service," presented at the First National Water Conference, sponsored by the Canadian Water and Wastewater Association, Winnipeg MB, February 5-6, 1993.
- Giardina, R.D., "Rates and the Public – Alternative Rate Approaches," presented at a Workshop sponsored by the American Water Works Association, Rocky Mountain Section, Denver CO, November 4, 1992.
- Giardina, R.D., "Results of the 1992 National Water and Wastewater Rate Survey," presented at the 44th Annual Conference of the Western Canada Water and Wastewater Association, Calgary AB, October 15,

1992; and the 13th Annual Western Utility Seminar, sponsored by the Water Committee of the National Association of Regulatory Utility Commissioners, Redondo Beach CA, April 28, 1993.

- Giardina, R.D., "Economic Feasibility of Waste Minimization: Assessing All Costs, Including 'Hidden Costs' and Indirect Benefits," presented at the Annual Meeting of the Colorado GEM Network, Denver CO, March 17, 1992.
- Giardina, R.D., "State of the Art in Rate Setting: Results of the 1990 Water and Wastewater Rate Survey," presented at the Annual Conference of the Canadian Water and Wastewater Association, Montréal QC, November 4, 1991.
- Giardina, R.D., "Impact of Rates on Water Conservation," presented at Waterscapes'91, an international conference on water management for a sustainable environment, Saskatoon SK, June 2-8, 1991.
- Giardina, R.D., Birch, D., "Stormwater Management – A Technical and Financial Case Study," presented at the Symposium on Urban Hydrology of the American Water Resources Association, Denver CO, November 8, 1990.
- Giardina, R.D., "Financing Environmental Site Cleanup Liabilities," presented at the Annual Conference of the Colorado Hazardous Waste Management Society, Denver CO, October 18, 1990.
- Giardina, R.D., "Rate Making with Conservation in Mind: Results of the 1990 National Water Rate Survey," presented at the CONSERV 90 Conference and Exposition on Water Supply Solutions for the 1990s, Phoenix AZ, August 14, 1990.
- Giardina, R.D., "Water Marketing – A Case Study," presented at the Profiting from Water Seminar, Santa Monica CA, May 11, 1989.
- Giardina, R.D., "Landfill Development – the Planning and Management Process," presented at the American Bar Association's Solid Waste Integrated Management Workshop, San Francisco CA, March 1989.
- Giardina, R.D., "Developing an Equitable Water Rate Structure," published in the American Water Works Association's monthly *Opflow*, February 1989.
- Giardina, R.D., "Alternative Techniques for Financing Water and Wastewater Capital Expansions," presented at the Joint Annual Conference of the American Water Works Association and Water Pollution Control Association, Rocky Mountain Sections, Snowmass CO, September 14-17, 1988.
- Giardina, R.D., "Excess Deferred Income Taxes Under the New Tax Law," *Public Utilities Fortnightly*, January 8, 1987.
- Giardina, R.D., "Trends in Capital Financing for Environmental Facilities," presented at the 1987 Annual Conference of the Missouri Water Pollution Control Association and the 1987 Annual Conference of the Rocky Mountain WPCA Clean Water Conference.