



*Dedicated to
Satisfying our Community's
Water Needs*

**AGENDA
MESA WATER DISTRICT
BOARD OF DIRECTORS
Thursday, May 2, 2019
1965 Placentia Avenue, Costa Mesa, CA 92627
6:00 p.m. Adjourned Regular Board Meeting**

CALL TO ORDER

PLEDGE OF ALLEGIANCE

PROTOS AWARD PRESENTATION

PUBLIC COMMENTS

Items Not on the Agenda: Members of the public are invited to address the Board regarding items which are not on the agenda. Each speaker is limited to three minutes. The Board will set aside 30 minutes for public comments.

Items on the Agenda: Members of the public may comment on agenda items before action is taken, or after the Board has discussed the item. Each speaker is limited to three minutes. The Board will set aside 60 minutes for public comments.

ITEMS TO BE ADDED, REMOVED, OR REORDERED ON THE AGENDA

At the discretion of the Board, all items appearing on this agenda, whether or not expressly listed as an Action Item, may be deliberated and may be subject to action by the Board.

CONSENT CALENDAR ITEMS:

Approve all matters under the Consent Calendar by one motion unless a Board member, staff, or a member of the public requests a separate action.

1. Approve minutes of regular Board meeting of April 11, 2019.
2. Approve minutes of special Board meeting of April 16, 2019.
3. Approve minutes of special Board meeting of April 22, 2019.
4. Approve minutes of special Board meeting of April 22, 2019.
5. Approve attendance considerations (additions, changes, deletions).
6. Board Schedule:
 - Conferences, Seminars, and Meetings
 - Board Calendar
 - Upcoming Community Outreach Events
7. Designate Badger Meter Equipment and Software as the Mesa Water Standard; implement Option No. 2 with Option 1B as a Pilot Program; re-evaluate the Full Automated Meter Reader (AMR) System Costs and Potential Adoption in 5-Years; perform a Meter Reading Route Optimization Assessment; update Mesa Water's Standard Specifications and Standard Drawings for Water Service for Meter Technology Standardization; bring back to the Board an AMR opt-in plan for non-high users; and convert to an 18-year Meter Replacement Frequency Cycle.
8. Approve funding the Other Post-Employment Benefits Trust with annual \$110,000 contributions over the next five fiscal years for a total of \$545,000.
9. Receive the Quarterly Training Report for January 1, 2019 – March 31, 2019.



ACTION ITEMS:

10. PROCLAMATION HONORING WAYNE S. OSBORNE:

Recommendation: Approve a proclamation honoring Wayne S. Osborne for his dedicated service and commitment to the Municipal Water District of Orange County.

PRESENTATION AND DISCUSSION ITEMS:

None

REPORTS:

11. REPORT OF THE GENERAL MANAGER:
- April Key Indicators Report
 - Other (no enclosure)
12. DIRECTORS' REPORTS AND COMMENTS

INFORMATION ITEMS:

13. DIRECTORS' REPORTS (AB 1234) PER CA GOVERNMENT CODE SECTION 53232.3 (D)
14. OTHER (NO ENCLOSURE)

In compliance with California law and the Americans with Disabilities Act, if you need disability-related modifications or accommodations, including auxiliary aids or services in order to participate in the meeting, or if you need the agenda provided in an alternative format, please contact the District Secretary at (949) 631-1206. Notification 48 hours prior to the meeting will enable Mesa Water District (Mesa Water) to make reasonable arrangements to accommodate your requests.

Members of the public desiring to make verbal comments utilizing a translator to present their comments into English shall be provided reasonable time accommodations that are consistent with California law.

Agenda materials that are public records, which have been distributed to a majority of the Mesa Water Board of Directors (Board), will be available for public inspection at the District Boardroom, 1965 Placentia Avenue, Costa Mesa, CA and on Mesa Water's website at www.MesaWater.org. If materials are distributed to the Board less than 72 hours prior or during the meeting, the materials will be available at the time of the meeting.

ADJOURN TO AN ADJOURNED REGULAR BOARD MEETING SCHEDULED FOR TUESDAY, MAY 28, 2019 AT 3:30 P.M.



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**MINUTES OF THE BOARD OF DIRECTORS
MESA WATER DISTRICT
Thursday, April 11, 2019
1965 Placentia Avenue, Costa Mesa, CA 92627
6:00 p.m. Regular Board Meeting**

CALL TO ORDER

The meeting of the Board of Directors was called to order on April 11, 2019 at 6:06 p.m. by President Dewane at the District Office Boardroom, located at 1965 Placentia Avenue, Costa Mesa, California.

PLEDGE OF ALLEGIANCE

Former Mesa Water Director Ethan Temianka led the Pledge of Allegiance.

Directors Present

Shawn Dewane, President
Marice H. DePasquale, Vice President
Jim Atkinson, Director
Fred R. Bockmiller, P.E., Director
James R. Fisler, Director

Directors Absent

None

Staff Present

Paul E. Shoenberger, P.E., General Manager
Phil Lauri, P.E., Assistant General Manager
Denise Garcia, Administrative Services Manager/
District Secretary
Wendy Duncan, Records Management Specialist/
Assistant District Secretary
Marwan Khalifa, CPA, MBA, Chief Financial Officer/
District Treasurer
Stacie Sheek, Customer Services Manager
Stacy Taylor, External Affairs Manager
Tracy Manning, Water Operations Manager
Karyn Igar, Senior Civil Engineer
Jeff Hoskinson, Partner, Atkinson, Andelson, Loya, Ruud &
Romo

Others Present

Ethan Temianka, Former Mesa Water Director
Erin Cabañero, P.E., Engineer III, Tetra Tech
Laurence Esguerra, P.E., Project Manager, Tetra Tech
Paula Fell, Senior Environmental Planner, Tetra Tech

PUBLIC COMMENTS

President Dewane asked for public comments on items not on the agenda.

There were no comments and President Dewane proceeded with the meeting.

ITEMS TO BE ADDED, REMOVED, OR REORDERED ON THE AGENDA

GM Shoenberger offered there were no items to be added, removed, or reordered on the agenda.

CONSENT CALENDAR ITEMS:

Approve all matters under the Consent Calendar by one motion unless a Board member, staff, or a member of the public requests a separate action.

1. Approve minutes of adjourned regular Board meeting of March 7, 2019.
2. Approve minutes of regular Board meeting of March 14, 2019.
3. Approve minutes of special Board meeting of March 19, 2019.
4. Approve minutes of special Board meeting of March 25, 2019.
5. Approve minutes of special Board meeting of March 25, 2019.
6. Approve attendance considerations (additions, changes, deletions).
7. Board Schedule:
 - Conferences, Seminars, and Meetings
 - Board Calendar
 - Upcoming Community Outreach Events
8. Award a contract to E.J. Meyer Company to provide Construction Services for the OC-44 Pipeline Rehabilitation Project for \$3,133,333 and a 10% contingency for an amount not to exceed \$3,446,666, and authorize execution of the contract.
9. Award a 3-year contract to John Robinson Consulting, Inc. for \$124,800 per year with 2-one year renewable options to provide Plan Check Consulting Services.
10. Approve a contract extension to White Nelson Diehl Evans LLP to perform annual financial audit services for fiscal years ending June 30, 2019 and June 30, 2020.
11. Approve Mesa Water District's positions on active state bills of high priority.

President Dewane asked for comments from the public. There were no comments.

MOTION

Motion by Director Atkinson, second by Vice President DePasquale, to approve Items 1 – 11 of the Consent Calendar. Motion passed 5-0.

ACTION ITEMS:

12. PUBLIC HEARING – MITIGATED NEGATIVE DECLARATION FOR WELLS NO. 12 AND NO. 14 AND PIPELINE PROJECT:

President Dewane announced the Public Hearing was now opened for the purpose of receiving comments regarding the Mitigated Negative Declaration for Wells No. 12 and No. 14 and Pipeline Project.

District Secretary Garcia reported that a public review copy of the draft Initial Study/Mitigated Negative Declaration (MND) was posted on February 20, 2019 at Mesa Water District's office. A notice of intent to adopt the MND was issued on February 20, 2019 and published in the *Orange County Register*, providing notice of the MND, public review period, and the public hearing. Public Notices were posted on March 28, 2019 on Mesa Water District's office kiosk and website, at Costa Mesa City Hall, and at the Adams

Street Post Office in Costa Mesa. Additionally, legal advertisements were published in the *Daily Pilot* on March 28 and April 4, 2019.

President Dewane opened the floor to the Board of Directors. Comments were offered.

President Dewane opened the floor for public comments.

Ms. Garcia reported that the District had received four written comments and no verbal comments regarding the MND for Wells No. 12 and No. 14 and Pipeline Project.

There were no comments from the public.

President Dewane declared the public comments segment closed.

President Dewane opened the floor for discussion by the Board.

Discussion ensued amongst the Board.

MOTION

Motion by Director Atkinson, second by Director Bockmiller, to adopt Resolution No. 1522 Mitigated Negative Declaration for Wells No. 12 and No. 14 and Pipeline Project.

The Board directed staff to amend the District's response to Comment Letter No. 1 and to send the amended response to the commenting agency.

Motion passed 5-0, by the following roll call vote:

AYES: DIRECTORS Atkinson, Bockmiller, Fisler, DePasquale, Dewane
NOES: DIRECTORS None
ABSENT: DIRECTORS None
ABSTAIN: DIRECTORS None

PRESENTATION AND DISCUSSION ITEMS:

None.

REPORTS:

13. REPORT OF THE GENERAL MANAGER:

- March Key Indicators Report
- Other (no enclosure)

14. DIRECTORS' REPORTS AND COMMENTS

INFORMATION ITEMS:

15. DIRECTORS' REPORTS (AB 1234) PER CA GOVERNMENT CODE SECTION 53232.3 (D)

16. OTHER (NO ENCLOSURE)

President Dewane adjourned the meeting at 7:04 p.m. to an adjourned Regular Board Meeting scheduled for Thursday, May 2, 2019 at 6:00 p.m.

Approved:

Shawn Dewane, President

Denise Garcia, District Secretary

Sharon D. Brimer, Recording Secretary

Unapproved



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**MINUTES OF THE BOARD OF DIRECTORS
MESA WATER DISTRICT
Tuesday, April 16, 2019
1965 Placentia Avenue, Costa Mesa, CA 92627
3:30 p.m. Special Board Meeting**

ENGINEERING AND OPERATIONS COMMITTEE MEETING

CALL TO ORDER

The meeting of the Board of Directors was called to order on April 16, 2019 at 3:34 p.m. by Chairman Bockmiller at the District Office Boardroom, located at 1965 Placentia Avenue, Costa Mesa, California.

PLEDGE OF ALLEGIANCE

Water Operations Manager Manning led the Pledge of Allegiance.

Directors Present

Marice H. DePasquale, Vice President
Jim Atkinson, Director
Fred R. Bockmiller, P.E., Director, Chair
James R. Fisler, Director

Directors Absent

Shawn Dewane, President

Staff Present

Paul E. Shoenberger, P.E., General Manager
Phil Lauri, P.E., Assistant General Manager
Wendy Duncan, Records Management Specialist/
Acting District Secretary
Tracy Manning, Water Operations Manager

Others Present

None

PUBLIC COMMENTS

There was no public present.

CONSENT CALENDAR ITEMS:

Director Fisler pulled Item 4 for discussion. There were no objections.

1. Developer Project Status Report
2. Mesa Water and Other Agency Projects Status Report
3. Water Quality Call Report
4. Committee Policy & Resolution Review
5. Water Operations Status Report

MOTION

Motion by Vice President DePasquale, second by Director Atkinson, to approve Items 1, 2, 3 and 5 of the Consent Calendar. Motion passed 4-0-1, with President Dewane absent.

Staff responded to questions from the Board regarding the Committee Policy & Resolution Review.

MOTION

Motion by Director Fisler, second by Director Atkinson, to approve Item 4 of the Consent Calendar. Motion passed 4-0-1, with President Dewane absent.

ACTION ITEMS:

None.

PRESENTATION AND DISCUSSION ITEMS:

6. Meter Technology Assessment

General Manager Shoenberger introduced Assistant General Manager Lauri who provided a presentation that highlighted the following:

- Meter Technology Background
- AMR Technology
- Highest Consumption
- AMR Applications
- Implementation Options & Costs
- Meter Equipment & Automation Standards
- Meter Manufacturing & Software Standardization

MOTION

Motion by Vice President DePasquale, second by Director Bockmiller, to add to the next regular Board meeting Consent Calendar to:

- a. Designate Badger Meter Equipment and Software as the Mesa Water Standard;
- b. Implement Option No. 2 with Option 1B as a Pilot Program;
- c. Re-Evaluate the Full Automated Meter Reader (AMR) System Costs and Potential Adoption in 5-Years;
- d. Perform a Meter Reading Route Optimization Assessment;
- e. Update Mesa Water's Standard Specifications and Standard Drawings for Water Service for Meter Technology Standardization; and
- f. Bring back to the Board an AMR opt-in plan for non-high users.

Motion passed 4-0-1, with President Dewane absent.

MOTION

Motion by Director Bockmiller, second by Vice President DePasquale, to add to the next regular Board meeting Consent Calendar approval to convert to an 18-year Meter Replacement Frequency Cycle. Motion passed 4-0-1, with President Dewane absent.

REPORTS:

- 7. Report of the General Manager
- 8. Directors' Reports and Comments

INFORMATION ITEMS:

- 9. Production Well Costs

The Board meeting was adjourned at 4:57 p.m.

Approved:

Shawn Dewane, President

Denise Garcia, District Secretary



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**MINUTES OF THE BOARD OF DIRECTORS
MESA WATER DISTRICT
Monday, April 22, 2019
1965 Placentia Avenue, Costa Mesa, CA 92627
3:30 p.m. Special Board Meeting**

FINANCE COMMITTEE MEETING

CALL TO ORDER

The meeting of the Board of Directors was called to order on April 22, 2019 at 3:31 p.m. by Chairman Fisler at the District Office Boardroom, located at 1965 Placentia Avenue, Costa Mesa, California.

PLEDGE OF ALLEGIANCE

President Dewane led the Pledge of Allegiance.

Directors Present

Shawn Dewane, President
Marice H. DePasquale, Vice President
Jim Atkinson, Director
Fred R. Bockmiller, P.E., Director
James R. Fisler, Director, Chair

Directors Absent

None

Staff Present

Paul E. Shoenberger, P.E., General Manager
Denise Garcia, Administrative Services Manager/
District Secretary
Wendy Duncan, Records Management Specialist/
Assistant District Secretary
Marwan Khalifa, CPA, MBA, Chief Financial Officer
Stacy Taylor, External Affairs Manager
Celeste Carrillo, Public Affairs Coordinator

Others Present

John Lewis, President, Lewis Consulting Group

PUBLIC COMMENTS

There were no comments on non-agendized topics.

CONSENT CALENDAR ITEMS:

Vice President DePasquale pulled Item 1 for discussion. There were no objections.

1. Accounts Paid Listing
2. Monthly Financial Reports
3. Major Staff Projects
4. Committee Policy & Resolution Review

MOTION

Motion by President Dewane, second by Director Bockmiller, to approve Items 2 – 4 of the Consent Calendar. Motion passed 5-0.

Staff responded to questions from the Board regarding the Accounts Paid Listing.

MOTION

Motion by Vice President DePasquale, second by Director Fisler, to approve Item 1 of the Consent Calendar. Motion passed 5-0.

ACTION ITEMS:

5. Other Post-Employment Benefits Trust Update

MOTION

Motion by President Dewane, second by Director Bockmiller, to add to the next regular Board meeting Consent Calendar approval of funding the Other Post-Employment Benefits Trust with annual \$110,000 contributions over the next five fiscal years for a total of \$545,500. Motion passed 5-0.

PRESENTATION AND DISCUSSION ITEMS:

6. Proposed Fiscal Year 2020 Budget Options

General Manager Shoenberger introduced CFO Khalifa who proceeded with a presentation that highlighted the following:

- Board's Strategic Plan Goals & Financial Targets
- Budget Assumptions
- FY 2020 Proposed Budget
- Debt Service Coverage Ratio & Payments
- Capital Expenses, Replacement & Refurbishment
- FY 2020 Budget Summary
- AAA Limits
- Requirements for AAA Rating
- FY 2020 Proposed AAA Budget Option Lower Limit

Mr. Khalifa responded to questions from the Board and they thanked him for the presentation.

REPORTS:

7. Report of the General Manager
8. Directors' Reports and Comments

The Board directed staff to schedule a Special Board Meeting to allow for full Board participation and discussion of the Proposed Fiscal Year 2020 Budget.

INFORMATION ITEMS:

None.

The Board meeting was adjourned at 4:49 p.m.

Approved:

Shawn Dewane, President

Denise Garcia, District Secretary

Unapproved



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**MINUTES OF THE BOARD OF DIRECTORS
MESA WATER DISTRICT
Monday, April 22, 2019
1965 Placentia Avenue, Costa Mesa, CA 92627
3:30 p.m. Special Board Meeting**

LEGISLATIVE & PUBLIC AFFAIRS COMMITTEE MEETING

CALL TO ORDER

The meeting of the Board of Directors was called to order on April 22, 2019 at 4:54 p.m. by Chairwoman DePasquale at the District Office Boardroom, located at 1965 Placentia Avenue, Costa Mesa, California.

Directors Present

Shawn Dewane, President
Marice H. DePasquale, Vice President, Chair
Jim Atkinson, Director
Fred R. Bockmiller, P.E., Director
James R. Fislser, Director

Directors Absent

None

Staff Present

Paul E. Shoenberger, General Manager
Denise Garcia, Administrative Services Manager/
District Secretary
Wendy Duncan, Records Management Specialist/
Assistant District Secretary
Stacy Taylor, External Affairs Manager
Celeste Carrillo, Public Affairs Coordinator

Others Present

John Lewis, President, Lewis Consulting Group

PUBLIC COMMENTS

There were no comments on non-agendized topics.

General Manager Shoenberger reordered the agenda to take Item 4 before the Consent Calendar. There were no objections.

Item 4 – Orange County Update

External Affairs Manager Taylor introduced Lewis Consulting Group President John Lewis who proceeded with the Orange County Update.

Mr. Lewis responded to questions from the Board and they thanked him for the update.

CONSENT CALENDAR ITEMS:

1. State Advocacy Update

2. Outreach Update

MOTION

Motion by President Dewane, second by Director Bockmiller, to approve Items 1 – 2 of the Consent Calendar. Motion passed 5-0.

ACTION ITEMS:

3. State Legislation Positions

MOTION

Motion by President Dewane, second by Director Bockmiller, to:

- a. Approve an Oppose Unless Amended position for AB 217 (E. Garcia, D-Coachella) Safe and Affordable Drinking Water Fund.
- b. Adopt Resolution No. 1523 Supporting the Use of State General Fund Dollars, During Times of Surplus, to Improve Water Systems in Disadvantaged Communities, and the Creation of Small System Water Authorities to Absorb, Improve, and Operate Non-Compliant Water Systems.

Motion passed 5-0, by the following roll call vote:

AYES:	DIRECTORS	Atkinson, Bockmiller, Fidler, DePasquale, Dewane
NOES:	DIRECTORS	None
ABSENT:	DIRECTORS	None
ABSTAIN:	DIRECTORS	None

PRESENTATION AND DISCUSSION ITEMS:

4. Orange County Update

This item was taken earlier in the agenda.

REPORTS:

5. Report of the General Manager
6. Directors' Reports and Comments

INFORMATION ITEMS:

None.

The Board meeting was adjourned at 5:34 p.m.

Approved:

Shawn Dewane, President

Denise Garcia, District Secretary

Unapproved



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MEMORANDUM

TO: Board of Directors
FROM: Paul E. Shoenberger, P.E., General Manager
DATE: May 2, 2019
SUBJECT: Attendance at Conferences, Seminars, Meetings, and Events

RECOMMENDATION

In accordance with Ordinance No. 29, adopted February 14, 2019, authorize attendance at conferences, seminars, meetings, and events.

STRATEGIC PLAN

- Goal #1: Provide a safe, abundant, and reliable water supply.
- Goal #2: Practice perpetual infrastructure renewal and improvement.
- Goal #3: Be financially responsible and transparent.
- Goal #4: Increase public awareness about Mesa Water® and about water.
- Goal #5: Attract and retain skilled employees.
- Goal #6: Provide outstanding customer service.
- Goal #7: Actively participate in regional water issues.

PRIOR BOARD ACTION

At its June 14, 2018 meeting, the Board of Directors (Board) approved Fiscal Year 2019 attendance at Conferences, Seminars, Meetings, and Events.

DISCUSSION

During the discussion of this item, if any, the Board may choose to delete any item from the list and/or may choose to add additional conferences, seminars, meetings, or events for approval, subject to available budget or additional appropriation.

FINANCIAL IMPACT

None.

ATTACHMENTS

None.

2019 CONFERENCES, SEMINARS, AND MEETINGS:

May 6 - 10, 2019	
ACWA/JPIA Spring Conference	<i>Atkinson, Bockmiller, DePasquale</i>
Monterey, CA	
May 21 - 22, 2019	
CSDA Legislative Days	
Sacramento, CA	
May 31, 2019	
OC Water Summit	<i>Fisler</i>
Anaheim, CA	
June 9 - 12, 2019	
AWWA ACE19 Conference	<i>Atkinson</i>
Denver, CO	
June 26 - 28, 2019	
South Meets North Tour & Dialog	<i>Atkinson</i>
Auburn, CA	
August 14 - 16, 2019	
Urban Water Institute Annual Conference	<i>Atkinson</i>
San Diego, CA	
September 25 - 28, 2019	
CSDA Annual Conference	
Anaheim, CA	
December 2 - 6, 2019	
ACWA/JPIA Fall Conference	<i>Bockmiller</i>
San Diego, CA	
December 11 - 13, 2019	
Colorado River Water Users Association Conference	
TBD	

May 2019

May 2019							June 2019						
Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa
			1	2	3	4							1
5	6	7	8	9	10	11	2	3	4	5	6	7	8
12	13	14	15	16	17	18	9	10	11	12	13	14	15
19	20	21	22	23	24	25	16	17	18	19	20	21	22
26	27	28	29	30	31		23	24	25	26	27	28	29
							30						

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
Apr 28	29	30	May 1	2	3	4
			Payday 8:30am Jt. MWDOC/MWD Workshop (Conference Room 101) 5:30pm OCWD Board Meeting (OCWD Boardroom)	6:00pm R/S from 5/9 Mesa Water Board Meeting (Boardroom)	7:30am WACO Meeting (MWDOC/OCWD Boardroom)	8:30am Turf Removal and Water Efficient Landscape Workshop (Mesa Water District)
5	6	7	8	9	10	11
	8:30am MWDOC Planning & Operations Committee (Conference Room 101) 1:30pm ACWA/JPIA Board of Directors Meeting (FB) (Monterey)	7:30am ISDOC Executive Committee Meeting (Conference Room 101) 10:00am ACWA Groundwater Committee Meeting (Monterey) 5:45pm Costa Mesa City Council Meeting (Costa Mesa Senior Center, 695 W. 19th Street, Costa Mesa, 92626)	ACWA/JPIA Spring Conference (Monterey, CA) 7:00am CalDesal Board Meeting (Monterey, CA) 8:00am R/S to 5/15 OCWD Water Issues Committee (OCWD Boardroom) 8:15am LAFCO Meeting (Hall of Administration) 8:30am MWDOC Admin & Finance Meeting 11:30am CM Chamber Event (3333) 5:30pm CalDesal Event (Monterey, CA)	4:00pm CM Chamber Board Meeting (TBD) 6:00pm R/S to 5/2 Mesa Water Board Meeting	Pay Period Ends	
12	13	14	15	16	17	18
	5:00pm IRWD Board Meeting (15600 Sand Canyon Avenue, Irvine)	7:30am OCBC Infrastructure Committee Meeting (OCBC Conference Room at 2 Park Plaza, Suite 125 Irvine, 92614) 11:30am Safety Recognition Event (MD, JAI) (Truckport) - Alison Wade	Payday 8:00am R/S from 5/8 OCWD Water Issues Committee (OCWD Boardroom) 8:30am MWDOC Board Meeting (MWDOC Boardroom) 5:30pm R/S to 5/22 OCWD Board Meeting (Conference Room 101)	8:30am MWDOC Executive Committee Meeting (Conference Room 102)	17th Annual Solar Cup (Lake Skinner in the Temecula Valley)	
19	20	21	22	23	24	25
17th Annual Solar Cup (Lake Skinner in the Temecula Valley)	8:30am MWDOC Public Affairs & Legislation Committee (Conference Room 101)	CSDA Legislative Days 7:30am WACO Planning Committee (MWDOC Conference Room 101) 3:30pm Engineering and Operations Committee Meeting (Boardroom) 5:45pm Costa Mesa City Council Meeting (Costa Mesa Senior Center, 695 W. 19th Street, Costa Mesa, 92626)	5:30pm R/S from 5/15 OCWD Board Meeting (OCWD Boardroom)	11th Annual County-Wide 2019 SafetyFest (City of Santa Ana Public Works Yard) 3:30pm R/S from 5/27 Finance/LPAC Meeting (Boardroom)	Pay Period Ends	
26	27	28	29	30	31	Jun 1
	District Holiday 3:30pm R/S to 5/23 Finance/LPAC Meeting 5:00pm R/S to 5/28 IRWD Board Meeting (15600 Sand Canyon Avenue, Irvine)	5:00pm R/S from 5/27 IRWD Board Meeting (15600 Sand Canyon Avenue in Irvine, California)	Payday		7:30am 12th Annual OC Water Summit "WATER Under the Microscope" (JF) (Anaheim, CA)	

June 2019

June 2019							July 2019						
Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa
2	3	4	5	6	7	8	7	8	9	10	11	12	13
9	10	11	12	13	14	15	14	15	16	17	18	19	20
16	17	18	19	20	21	22	21	22	23	24	25	26	27
23	24	25	26	27	28	29	28	29	30	31			
30													

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
May 26	27	28	29	30	31	Jun 1
2	3 8:30am MWDOC Planning & Operations Committee (Conference Room 101)	4 7:30am ISDOC Executive Committee Meeting (Conference Room 101) 12:00pm Executive Committee Meeting (Upstairs Conference Room) 5:45pm Costa Mesa City Council Meeting	5 8:30am Jt. MWDOC/MWD Workshop (MWDOC/OCWD Boardroom) 5:30pm OCWD Board Meeting (OCWD Boardroom)	6	7 Pay Period Ends 7:30am WACO Meeting (MWDOC/OCWD Boardroom)	8
9	10 5:00pm IRWD Board Meeting (15600 Sand Canyon Avenue, Irvine)	11 AWWA ACE19 Conference (Denver, CO)	12 Payday 8:00am OCWD Water Issues Committee (OCWD Boardroom) 8:15am LAFCO Meeting (Hall of Administration) 8:30am MWDOC Admin & Finance 11:30am CM Chamber Event	13 4:00pm CM Chamber Board Meeting (TBD) 6:00pm Mesa Water Board Meeting (Upstairs Conference Room)	14	15
16	17 8:30am MWDOC Public Affairs & Legislation Committee (Conference Room 101)	18 7:30am WACO Planning Committee (MWDOC Conference Room 101) 3:30pm Engineering and Operations Committee Meeting (Upstairs Conference Room) 5:45pm Costa Mesa City Council Meeting	19 8:30am MWDOC Board Meeting (MWDOC Boardroom) 5:30pm OCWD Board Meeting (OCWD Boardroom)	20 8:30am MWDOC Executive Committee Meeting (Conference Room 102) 11:30am OC WaterReuse Meeting (Trabuco Canyon Water District)	21 Pay Period Ends	22
23	24 3:30pm Finance/LPAC Meeting (Upstairs Conference Room) 5:00pm IRWD Board Meeting (15600 Sand Canyon Avenue, Irvine)	25	26 Payday	27 South Meets North (Auburn, CA)	28	29
30	Jul 1	2	3	4	5	6

July 2019

July 2019							August 2019						
Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa
	1	2	3	4	5	6					1	2	3
7	8	9	10	11	12	13	4	5	6	7	8	9	10
14	15	16	17	18	19	20	11	12	13	14	15	16	17
21	22	23	24	25	26	27	18	19	20	21	22	23	24
28	29	30	31				25	26	27	28	29	30	31

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
Jun 30	Jul 1 8:30am MWDOC Planning & Operations Committee (Conference Room.101)	2 7:30am ISDOC Executive Committee Meeting (Conference Room.101) 12:00pm Executive Committee Meeting (Panian Conference Room) 5:45pm Costa Mesa City Council Meeting	3 8:30am Jt. MWDOC/MWD Workshop (MWDOC/OCWD Boardroom) 5:30pm OCWD Board Meeting (OCWD Boardroom)	4 District Holiday	5 Pay Period Ends 7:30am R/S to 7/12 WACO Meeting (MWDOC/OCWD Boardroom)	6
7	8 5:00pm IRWD Board Meeting (15600 Sand Canyon Avenue, Irvine)	9	10 Payday 8:00am OCWD Water Issues Committee (OCWD Boardroom) 8:15am LAFCO Meeting (Hall of Administration 10 Civic Center Plaza Santa Ana, CA 92701) 8:30am MWDOC Admin & Finance Committee (Conference Room.101) 11:30am CM Chamber Event	11 4:00pm CM Chamber Board Meeting (T8D) 6:00pm Mesa Water Board Meeting (Boardroom)	12 7:30am R/S from 7/5 WACO Meeting (MWDOC/OCWD Boardroom)	13
14	15 8:30am MWDOC Public Affairs & Legislation Committee (Conference Room.101)	16 7:30am WACO Planning Committee (MWDOC Conference Room.101) 3:30pm Engineering and Operations Committee Meeting (Boardroom) 5:45pm Costa Mesa City Council Meeting	17 8:30am MWDOC Board Meeting (MWDOC Boardroom) 5:30pm OCWD Board Meeting (OCWD Boardroom)	18 8:30am MWDOC Executive Committee Meeting (Conference Room.102)	19 Pay Period Ends 8:00am City Districts Liaison Committee Meeting (Mesa Water Boardroom)	20
21	22 3:30pm Finance/LPAC Meeting (Boardroom) 5:00pm IRWD Board Meeting (15600 Sand Canyon Avenue, Irvine)	23	24 Payday 8:30am MWDOC/OCWD Jt. Planning (MWDOC/OCWD Boardroom)	25	26	27
28	29	30	31	Aug 1	2	3



MesaWater
DISTRICT®

UPCOMING COMMUNITY OUTREACH EVENTS

Event:	Date & Time:	Location:
<u>Mesa Water Water Efficient Landscape Workshop</u>	Saturday, May 4, 2019 8:30 a.m. to 12:00 p.m.	<u>Mesa Water District Office</u> 1965 Placentia Avenue Costa Mesa, CA 92627
<u>Environmental Nature Center Spring Faire</u>	Sunday, May 19, 2019 10:00 a.m. to 3:00 p.m.	<u>Environmental Nature Center</u> 1601 E. 16th Street Newport Beach, CA 92663
<u>5th Grade Assembly</u>	Tuesday, June 11, 2019 1:00 p.m. to 2:00 p.m.	<u>Adams Elementary School</u> 2850 Clubhouse Road Costa Mesa, CA 92626



*Dedicated to
Satisfying our Community's
Water Needs*

MEMORANDUM

TO: Board of Directors
FROM: Phil Lauri, P.E., Assistant General Manager
DATE: May 2, 2019
SUBJECT: Meter Technology Assessment

RECOMMENDATION

Approve the following:

- a. Designate Badger Meter Equipment and Software as the Mesa Water Standard;
- b. Implement Option No. 2 with Option 1B as a Pilot Program;
- c. Re-Evaluate the Full Automated Meter Reader (AMR) System Costs and Potential Adoption in 5-Years;
- d. Perform a Meter Reading Route Optimization Assessment;
- e. Update Mesa Water's Standard Specifications and Standard Drawings for Water Service for Meter Technology Standardization;
- f. Bring back to the Board an AMR opt-in plan for non-high users; and
- g. Convert to an 18-year Meter Replacement Frequency Cycle.

The Engineering and Operations Committee reviewed this item at its April 16, 2019 meeting and recommends Board approval.

STRATEGIC PLAN

Goal #1: Provide a safe, abundant, and reliable water supply.

Goal #2: Practice perpetual infrastructure renewal and improvement.

PRIOR BOARD ACTION/DISCUSSION

None.

BACKGROUND

Mesa Water has approximately 25,000 water meters ranging in size from 5/8" to 10". The District has a wide array of customers with major segments defined as residential, multi-family, commercial, industrial, and irrigation. 88% of the District's meters are 1" or less in size with 70% of total meters falling into the residential classification. The purpose of the Meter Technology Technical Memorandum (see Attachment A) is to assess the state of meter technology currently used throughout the District, identify current and emerging automated meter technologies, and provide meter program standardization recommendations, costs, and an implementation strategy while ensuring efficient operations and maintenance, maintaining efficient use of its resources, and providing valuable tools to assist both Mesa Water and its customers in water conservation efforts.

DISCUSSION

The District has mainly installed nutating disc style meters with manual encoders (dial style readers) in the small meter class (≤ 2 ") for the last several decades with as many as seven different meter manufacturers. Large meters (> 2 ") consist of disc meters, turbo meters, and



compound meters. The District currently uses the Badger Read Center (BRC) as its meter reading interface with the Cogsdale Customer Service database. A variety of automated meter reading (AMR) technologies have also been installed and evaluated over the past two decades on hard to read meter locations and a small number of high usage customer accounts. The AMR technologies consist of devices that transmit meter encoder dial reads electronically to a remote computer or handheld device through radio frequencies. The AMR technologies consist of Touch Read devices (TR), classic endpoints (CE) with one-way transmission capabilities, and migratable endpoints (ME) with two-way transmission capabilities. The District currently has over 500 plus variations of AMR endpoints in place with various ages and functionalities. Many of the older AMR devices originally installed have started to fail due to degrading battery life.

Standardizing meter technology is an important step with the ever growing requirement for information by a variety of stakeholders (e.g., customers, regulatory agencies, District staff, etc.). Standardization allows for efficient and accurate meter reading, data management, and equipment maintenance. The District currently reads 60 of its 61 meter routes manually once every two months with two Field Customer Service Representatives. The one other route is read monthly. The average meter reading rate is 1 minute and 10 seconds per meter with a minimum read time of 0.2 minutes per meter (full AMR Route 953) and a maximum of 10 minutes per meter. Routes are read by both walking and driving methodologies. The recent 2015-2016 State of California Drought restrictions mandated that the District reduce its total usage by 25%. The District's existing AMR technology was a key component to the success of achieving the 25% target reduction and allowed the District to work with its higher use customers to identify areas where reductions could be made using AMR data profiling. However, what was recognized during this conservation mandate period was that many of the District's top users were not setup with AMR technologies, making data profiling and conservation management a difficult challenge.

Evaluation of recent AMR technologies have determined that the AMR industry continues to advance in terms of functionality, sophistication, life-cycle, accuracy, reliability and costs. The three main AMR technologies are the ME, automated metering infrastructure (AMI), and cellular endpoint technology. AMI requires an owner to invest in a dedicated fixed antenna and local data collector network. Cellular endpoint technology allows owners to use existing cellular phone infrastructure to connect directly to meter endpoints to transmit meter data to a web based hosted system. Both ME and cellular endpoint technologies are expandable to an AMI based system if desired. From a cost perspective, an AMI based system requires a large capital investment (e.g., ~\$12M for a Mesa Water size system) for a dedicated backbone antenna system similar to a radio-based SCADA system. Thus, a cellular endpoint or ME based system or combination thereof appears to be the most cost efficient and practical approach for a water agency similar in size to Mesa Water.

Other challenges with the current meter reading system includes the following:

- Confined space requirements for access to meters located in deep vaults;
- Meters in hard to read locations (e.g., HOA gated communities, parking lanes, etc.);
- BRC software is at end-of-life and not compatible with Windows 10;
- Existing AMR register compatibility with meter reading devices; and
- Meter reading approach for newer live-work high density developments.



While AMR technologies provide efficiency in meter reading solutions, there is a financial tradeoff to the amount of AMR technology that would be financially beneficial to implement. Analysis of the District's consumption reveals that approximately 50% of usage comes from 5% of its customers. This equates to 1,530 meters with 60% of those meters in the 1.5" and 2" meter sizes. Equipping these Top 50% consumption meters with cellular technology would provide the District's highest users with real-time conservation management tools to proactively manage their consumption and would allow the District to collect monthly revenue without having to read the meters among the many other benefits (e.g., leak detection potential, etc.).

The following three options have been considered to implement limited cellular/AMR technology within the District's meter system:

Option 1 – Route 600 Update: This option replaces all 212 aging Route 600 meters, registers, and CEs. This would upgrade the end-of-life existing AMR technology and continue to use the BRC until it is no longer supported by Badger. Option 1 cost is approximately \$368,000.

Option 1B – Route 600 Update with ME and Cellular Endpoints: This option replaces 107 of the 212 Route 600 meters with cellular endpoints and the other meters with MEs. This option also requires that the Badger Beacon web-based system be implemented to communicate with the cellular endpoints. Option 1B could function as a pilot program for a future Option 2 (see below). Option 1B is approximately \$415,000

Option 2 – Highest Usage Accounts and Hard to Read Locations: This option implements cellular endpoints across all 1,530 meters and 58 routes representing the District's Top 50% usage to give real-time data management tools to both the District and its highest use customers. This option will also implement the Beacon software solution to communicate with the cellular endpoints. Option 2 is approximately \$1,100,000.

Option 3 – Highest Usage Accounts and Complete AMR: In addition to the Option 2 approach, the remaining District meters will be replaced with MEs over a defined near-term period (1-8 years) to allow for efficient meter reading solutions (e.g., driving routes only) long-term. This approach would save approximately 1 full-time staff person when fully implemented. The cost to implement both Options 2 and 3 is approximately \$9,300,000.

Assessment of the aforementioned options demonstrates that the most cost effective long-term solution is Option 2. Option 2 provides a balance of equipping the District's highest users with AMR technology that provides long-term benefits to both the District and the customer. Option 2 also provides the much needed software upgrade to the Beacon system. Recent small and large meter testing from the annual Water Loss Audit Program analysis has determined that the meter replacement frequency can be moved from 15 to 18 years without impacting the meter accuracy per the American Water Works Association (AWWA) Meter M6 Manual. The District spends approximately \$344,000 per year in replacing small and large meters. Thus, deferring regular meter replacements for the next three years will provide the necessary capital funds to fully implement Option 2 with minimal impact to the District's capital budget.

Meter standardization is also critical to efficiently maintaining and reading the District's meters. Standardization of one meter, register, and AMR technology is important to achieve equipment



compatibility, reliability, accuracy, and maintenance. The District has had long-term success with Badger meter and recommends standardizing around their equipment and software system. Provisions to ensure competitive pricing will be implemented that use a regional consumer price index or State of California negotiated contract pricing.

Staff recommends that the Board approve the following:

- a. Designate Badger Meter Equipment and Software as the Mesa Water Standard;
- b. Implement Option No. 2 with Option 1B as a Pilot Program;
- c. Re-Evaluate the Full Automated Meter Reader (AMR) System Costs and Potential Adoption in 5-Years;
- d. Perform a Meter Reading Route Optimization Assessment;
- e. Update Mesa Water's Standard Specifications and Standard Drawings for Water Service for Meter Technology Standardization;
- f. Bring back to the Board an AMR opt-in plan for non-high users; and
- g. Convert to an 18-year Meter Replacement Frequency Cycle.

FINANCIAL IMPACT

In Fiscal Year 2019, no funds were budgeted for Meter Technology Assessment. In Fiscal Years 2020, 2021, and 2022 funds from the Small and Large Meter Program will be used to facilitate the Meter Technology Program.

ATTACHMENTS

Attachment A: Meter Technology Technical Memorandum

Meter Technology Technical Memorandum

Contributing Mesa Water Departments

Engineering

Operations

Customer Service

April 4, 2019

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Executive Summary

Mesa Water District (District) is a county water district that serves approximately 17,000 acre-feet per year (AFY) to approximately 110,000 people throughout the City of Costa Mesa, portion of City of Newport Beach, and John Wayne Airport. The purpose of this Meter Technology Memorandum is to assess the state of meter technology currently used throughout the District, identify current and emerging automated meter technologies, provide meter program standardization recommendations, costs, and an implementation strategy.

The District serves 100 percent of its water demands from seven main production groundwater wells, three reservoirs with a storage capacity of approximately 31 million gallons, 316 miles of pipeline, and approximately 25,000 water meters ranging in size from 5/8" to 10". The District has a wide array of users with major segments defined as residential, multi-family, commercial, industrial, and irrigation. 88% of the District's meters are 1" or less in size with 70% of total meters falling into the residential classification.

The District has mainly installed nutating disc style meters with manual encoders (dial style readers) in the small meter class (≤ 2 ") for the last several decades with as many as seven different meter manufacturers. Large meters (> 2 ") consist of disc meters, turbo meters, and compound meters. The District currently uses the Badger Read Center (BRC) as its meter reading interface with the Cogsdales Customer Service database. A variety of automated meter reading (AMR) technologies have also been installed and evaluated over the past two decades on hard to read meter locations and a small number of high usage customer accounts. The AMR technologies consist of devices that transmit meter encoder dial reads electronically to a remote computer or handheld device through radio frequencies. The AMR technologies consist of Touch Read devices (TR), classic endpoints (CE) with one-way transmission capabilities, and migratable endpoints (ME) with two-way transmission capabilities. The District currently has over 500 plus variations of AMR endpoints in place with various ages and functionalities. Many of the older AMR devices originally installed have started to fail due to degrading battery life.

Standardizing meter technology is an important step with the ever growing requirement for information by a variety of stakeholders (e.g., Customers, regulatory, District staff, etc.). Standardization allows for efficient and accurate meter reading, data management, and equipment maintenance. The District currently reads 60 of its 61 meter routes manually once every two months with two meter reading staff. The one other route is read monthly. The average meter reading rate is 1 minute and 10 seconds per meter with a minimum read time of 0.2 minutes per meter (full AMR Route 953) and a maximum of 10 minutes per meter. Routes are read by both walking and driving methodologies. The recent 2015-2016 State of California Drought restrictions mandated that the District reduce its total usage by 25%. The District's existing AMR technology was a key component to the success of achieving the 25% target reduction and to allow the District to work with its higher use customers to identify areas where reductions could be made using AMR data profiling. However, what was recognized during this conservation mandate period was that many of the District's top users were not setup with AMR technologies making data profiling and conservation management a difficult challenge.

Evaluation of recent AMR technologies have determined that the AMR industry continues to advance in terms of functionality, sophistication, life-cycle, accuracy, reliability and costs. The three main AMR technologies are the ME, automated metering infrastructure (AMI), and cellular endpoint technology. AMI requires an owner to invest in a dedicated fixed antenna and local data collector network. Cellular endpoint technology allows owners to use existing cellular phone infrastructure to connect directly to meter endpoints to transmit meter data to a web based hosted system. Both ME and cellular endpoint technologies are expandable to an AMI based system if desired. From a cost perspective, an AMI based system requires a large capital investment (e.g., ~\$12M for a Mesa Water size system) for a dedicated backbone antenna system similar to a radio based SCADA system. Thus, a cellular endpoint or ME based system or combination thereof appears to be the most cost efficient and practical approach for a water agency similar in size to the District.

Other challenges with the current meter reading system includes the following:

- Confined space requirements for access to meters located in deep vaults;
- Meters in hard to read locations (e.g., HOA gated communities, parking lanes, etc.);
- BRC software is at end-of-life and not compatible with Windows 10;
- Existing AMR register compatibility with meter reading devices; and
- Meter reading approach for newer live-work high density developments

While AMR technologies provide efficiency in meter reading solutions, there is a financial tradeoff to the amount of AMR technology that an agency would financially be beneficial to implement. Analysis of the District's consumption reveals that approximately 50% of usage comes from 5% of its customers. This equates to 1,530 meters with 60% of those meters in the 1.5" and 2" meter sizes. Equipping these Top 50% consumption meters with cellular technology would provide the District's highest users with real-time conservation management tools to proactively manage their consumption and would allow the District to collect monthly revenue without having to read the meters among the many other benefits (e.g., Leak detection potential, etc.). The following three options have been considered to implement limited cellular/AMR technology within the District's meter system:

Option 1 – Route 600 Update: This option replaces all 212 aging Route 600 meters, registers, and MEs. This would upgrade the end-of-life existing AMR technology and continue to use the BRC until it is no longer supported by Badger. Option 1 cost is approximately \$368,000.

Option 1B – Route 600 Update with ME and Cellular Endpoints: This option replaces 107 of the 212 Route 600 meters with cellular endpoints and the other meters with MEs. This option also requires that the Badger Beacon web based system be implemented to communicate with the cellular endpoints. Option 1B could function as a pilot program for a future Option 2 (see below). Option 1B is approximately \$415,000

Option 2 – Highest Usage Accounts and Hard to Read Locations: This option implements cellular endpoints across all 1,530 meters and 58 routes representing the District’s Top 50% usage to give real-time data management tools to both the District and its customers. This option will also implement the Beacon software solution to communicate with the cellular endpoints. Option 2 is approximately \$1,100,000.

Option 3 – Highest Usage Accounts and Complete AMR: In addition to the Option 2 approach, the remaining District meters will be replaced with MEs over a defined near-term period (1-8 years) to allow for efficient meter reading solutions (e.g., Driving routes only) long-term. This approach would save approximately 1 full-time staff person when fully implemented. The cost to implement both Options 2 and 3 is approximately \$9,300,000.

Assessment of the aforementioned options demonstrates that the most cost effective long-term solution is Option 2. Option 2 provides a balance of equipping the District’s highest users with AMR technology that provides long-term benefits to both the District and the customer. Option 2 also provides the much needed software upgrade to the Beacon system. Recent small and large meter testing from the annual Water Loss Audit Program analysis has determined that the meter replacement frequency can be moved from 15 to 18 years without impacting the meter accuracy per the American Water Works Association (AWWA) Meter M6 Manual. The District spends approximately \$344,000 per year in replacing small and large meters. Thus, deferring regular meter replacements for the next three years will provide the necessary capital funds to fully implement Option 2 with minimal impact to the District’s capital budget.

Meter standardization is also critical to efficiently maintaining and reading the District’s meters. Standardization of one meter, register, and AMR technology is important to achieve equipment compatibility, reliability, accuracy, and maintenance. The District has had long-term success with Badger meter and recommends standardizing around their equipment and software system. Provisions to ensure competitive pricing will be implemented. Thus, the following recommendations are provided:

1. Use Badger Meter Equipment and Software as Mesa Water Standard
2. Implement Option No. 2
3. Re-Evaluate Full System AMR System Adoption in 5-Years
4. Perform Meter Route Optimization Assessment
5. Update Mesa Water Standard Plans and Specifications for Water Service

Section 1: Introduction

Mesa Water owns and maintains approximately 25,000 potable water meters ranging in size from 5/8” to 10”. These meters are used to primarily serve single-family and multi-family residences along with varying commercial, industrial, fire protection, irrigation, and institutional uses. The purpose of this technical memo is to:

1. Assess current industry meter, register and endpoint technologies;
2. Determine a standardized meter and register replacement technology for:

- New Residential Developments
 - Commercial Developments
 - Irrigation Uses
 - Highest Usage Customers
3. Identify high usage customers and hard to read locations across all service accounts
 4. Assess and standardize meter reading device technologies
 5. Identify required software platforms to support meter reading activities
 6. Determine software integration requirements
 7. Develop a plan to update Route 600 failing register technologies
 8. Develop a program implementation approach and cost

Section 2: Existing Meter Technology

A. Meter Characteristics

Mesa Water uses a variety of different meter types based on the application. Meter types include nutating disc, turbo, and compound technologies. Nutating disc meter technology is mostly used in the residential small meter class (5/8” to 2”). Turbo meters are mainly used for consistent large flow applications (e.g., Hotels, irrigation, etc.). Compound meters are used for varying flow applications (e.g., Hospitals, apartment complexes, etc.) and will usually contain a turbine meter for the large flow component and a displacement meter for the low-end flow component.

Mesa Water has a wide array of service meter sizes and customer types. The following is a breakdown of the meter use by size and consumption:

Table 1 – Meter Size & Consumption

Meter Size (inches)	No. of Meters	% by Size	Average Annual Consumption (HCF)	% by Consumption	Average Age (Years)
0.62	17196	68.8%	2,077,788	31.8%	11.1
0.75	2178	8.7%	405,866	6.2%	10.3
1	2668	10.7%	562,354	8.6%	8.6
1.5	958	3.8%	688,448	10.5%	9.9
2	1265	5.1%	1,791,725	27.4%	10.0
3	77	0.3%	256,390	3.9%	14.8
4	156	0.6%	299,958	4.6%	16.4
6	292	1.2%	192,216	2.9%	15.6
8	172	0.7%	263,008	4.0%	16.9
10	20	0.1%	65	0.0%	14.0
	24,982	100.0%	6,537,819	100.0%	10.8

Approximately 88% of the District’s meters are 1” and less in size. This meter group represents approximately 47% of the District’s annual average consumption (based on 5-year average). The District classifies its meter types into the following primary and secondary categories:

Table 2 – Meter Classifications

Primary Meter Classification		Secondary Meter Classification	
S	Single-Family Residential	D	Domestic
T	Multi-Family Residential (Single Unit)	I	Irrigation
M	Multi-Family Residential (Multi-Unit)	F	Fire lines
C	Commercial	B	Domestic with Irrigation
I	Industrial	J	Domestic with Fire
G	Government Agency	A	All (Domestic, Irrigation, & Fire)
A	Agriculture	X	Abandoned
H	Hydrant/Construction		
X	Abandoned		

Table 2 defines how the District classifies its consumption across varying usage categories. The Primary classification identifies the main category of usage followed by a secondary identification. For example, a classification of SD indicates that the meter is a Single-Family Residential Domestic meter type and all usage from these meter types can be aggregated into this category. Table 3 provides a breakdown of the number of meters by size and primary meter classification.

Table 3 – Primary Meter Classification

Meter Size (Inches)	No. of Meters by Primary Classification							
	S	T	M	C	I	G	A	X
0.62	12,246	2,762	953	1,034	65	34	0	101
0.75	1,104	232	503	281	29	12	0	17
1.00	837	243	845	551	77	73	0	42
1.50	16	47	336	437	45	53	0	24
2.00	30	72	454	498	49	118	0	44
3.00	0	1	32	17	0	23	1	3
4.00	1	4	28	89	6	23	0	5
6.00	4	7	15	199	33	24	0	9
8.00	0	0	2	115	26	20	0	9
	14238	3368	3168	3233	330	388	1	254

B. Meter Manufacturers

The District has used a varying array of meter manufacturers for the past several decades. These manufacturers include Badger, Hershey, Neptune, Metron, Precision, Rockwell, and Sensus. Since 2000, the District has mainly installed Badger, Sensus, and Neptune meters. With the implementation of the District’s customer service database (Cogsdale) in 1999, tracking of the meter manufacturer was not a standard attribute that was tracked. Thus, the number of meters by manufacturer is mostly unknown without doing a detailed field meter verification.

C. Meter Register and End Point Technologies

Various types of register technologies have been used in the District's meter system over the past several decades. Historically, all meters had a manual read register that had a six or eight digit dial register/encoder, similar to the odometer on a car. The manual read register has been a trident technology and is still widely used by Mesa Water and many water agencies throughout the world. The term register and encoder are used synonymously. The register is defined as the combination of the inter-gear workings and dial indicator. The encoder portion is more specifically referred to as the electronic equipment portion of the register that transfers the number of disc rotations into an actual number of measured water units on a manual dial read. Figure 1 shows a typical manual register/encoder.



Figure 1 – Manual Register

Like many industrial sectors, technological innovation has spread into the utility sector with the adaptation of electronic methods to ease the meter reading function and provide higher levels of efficiency. Several other utility sectors (e.g., Power, gas, etc.) have already converted large portions of their service areas to these electronic formats using electronic register technologies. Automatic register technologies have progressed over many years and continue to advance in their sophistication, capabilities, and of course costs.

Mesa Water has selectively evaluated and implemented a small array of these various automatic register technologies and endpoints over the years to bring efficiencies to meter routes that are difficult to read or were classified as high usage accounts. A meter endpoint is the device that transmits the encoder dial read via a radio wave signal to a remote reading device. The various automatic meter-reading products evaluated on a small scale have included the Sensus Touch Read (TR), the Badger Automated Meter Reading (AMR) Classic Endpoints (CE), and the Badger AMR Migratable Endpoints (ME). The following is a brief description of each type and their functionality:

1. **Sensus Touch Read:** The TR was one of the first commercially available electronic registers that universally fit all manufacturers' meters. The TR reads the manual dial position by measuring a magnetic flux signal, which is then translated into a numerical reading. The TR has traditionally been read using a hand-held wand that uploads the read data into a portable computer. Figures 2 and 3 show a typical TR register and reading.



Figure 2 – Touch Read Register



Figure 3 –Touch Read Meter Reading

2. **Badger CE/ME:** The Badger CE is a one-way radio communication register. The register broadcasts via radio frequencies every four seconds and is collected by a mobile collection device. The CE queries the encoder continuously and also has the ability to profile usage patterns. The encoder is wired to the CE which is positioned just below the opening in a meter box/vault lid to provide adequate line of sight for radio wave transmission. Mesa Water use computer-mounted devices in its service trucks to drive routes 600 and 953 equipped with CE/ME registers and collect meter data reads. Badger estimates battery life to last approximately 20 years depending on environmental factors, transmitting usage, and other external factors.

While the Badger ME looks similar to the CE it contains two-way communication capability. This can be helpful to change setup protocols (e.g., How often data is collected, etc.). Also, the ME can transmit profile usage

wirelessly whereas the CE must be physically accessed to connect to the handheld computer to download profile data. Figure 4 shows a typical CE/ME register and endpoint device.



Figure 4 – Badger CE/ME Register & Endpoint

Register Challenges: The challenge associated with each register type varies based on the technology available when it was installed. The challenges with each are as follows:

1. Sensus TR:

- Shortened battery life
- Batteries are not replaceable
- Installations require(d) difficult wiring and mounting protocols
- Requires manual reading when batteries fail
- Physical access for manual entry requires confined space protocols

The Sensus TRs were mainly installed along Route 600 over twenty years ago. The model of TRs originally installed began to fail due to low battery life and these models were no longer available due to compatibility issues with the TR reading device. Many of these TRs were converted to a universal CE at the time of battery failure of these systems. At present the older universal CEs batteries are now failing after several years of use and these registers and endpoints need to be replaced with a newer state of technology and longer life battery system.

2. Badger CE

- Inability to upload data wirelessly
- Requires physical access to the vault to get usage profile data
- Requires physical access to the vault to perform a manual read for failed battery
- Batteries cannot be replaced without replacing the register endpoint

3. Badger ME

- Battery life of 20 years is uncertain

- Requires physical access to the vault to perform a manual read for failed battery
- Batteries cannot be replaced without replacing the register endpoint

D. Meter Replacement Cycle

There are numerous factors in determining how frequent to replace a meter. These factors include the meter type, size, and years of service. These parameters are outlined as the standard guidelines in American Water Works Association (AWWA) M6 Meter Manual. Other parameters to consider outlined by the AWWA M6 includes the average distribution system pressure in which the meter has been operating within and the volumetric usage that has passed the meter over its life-cycle.

Small Meter Replacement: For several years the District tested and repaired its small meters in-house following the AWWA M6 process. Meter testing and repair was initially used to determine the replacement frequency and to maintain the District's small meter assets. However, as the cost of small manual read meters continued to decline over the years, the cost to repair meters exceeded the cost of just replacing them on a regular life-cycle frequency. Meters routinely slow-down (e.g., Under register) over time, thus, reducing the amount of revenue the District would collect for a unit of water sold. The AWWA M6 guidelines indicate that meters at three flow ranges (e.g., Low, medium, and high) shall be 98.5% to 101.5% accurate for all three flow ranges. If a meter tests outside of this range the District's revenue loss will be magnified as the accuracy declines to justify the cost to replace the meter. Thus, accurate meters and standardized meter replacement program are critical to ensure accurate customer billing and revenue streams.

Early meter testing determined that a meter replacement life cycle of ten years for all small meter classifications (e.g., 5/8" to 2") was sufficient to maintain accurate metering functionality within the standards of the AWWA M6. This was a standard for many years at the District. As meter technology has advanced so has the long-term meter accuracy. In 2012 the District adopted a 15-year replacement cycle for its small meter classifications as it was determined that meters were still registering accurately after 15 years of average usage. Recent small meter testing performed through the annual Water Loss Audit has determined that the average small meter life cycle has experienced no significant degradation in accuracy of the five hundred plus small meters tested that were approximately 15 years of age. The District's water loss Consultant has recommended that the meter replacement frequency should be moved to 18 years based on the meter testing data. Small meter testing will be conducted on meters older than 15 years to refine this recommendation to ensure no deviations from the AWWA M6 accuracy range.

Large Meter Replacements: The large meter program replacement is more complex as meters 3" and larger are costly to replace and most large meters can be calibrated and repaired in the field by qualified meter technicians. The District has a total of 717 large meters (e.g. > 3"). 235 of the 717 large meters are large domestic or combined domestic/fire line meters that are annually tested and calibrated. The remaining 585

meters are fire line tattletale meters (5/8" or 1" meters) on 3" to 8" fire service lines that do not actually have a large meter but has the tattletale meter in parallel to monitor if unauthorized flow is being registered. The average age of the 235 large meters is 16.0 years old.

Over the past decade only 3 large domestic meters have been replaced. Replacements are required if:

- Meter could not be repaired because parts were not available
- Cost of repair exceeded a new meter
- Repaired meter could not be calibrated and tested to AWWA M6 accuracy

E. Meter Box Types & Sizes

The District has traditionally used concrete meter boxes over the past several decades as the standard for both its small and large meter (where applicable) installations. Meter boxes are fabricated by a variety of manufacturers and are based on an industry wide standard shape and size to accommodate the standard AWWA meter lay lengths. The following sections detail the District's meter box standards.

Small Meter Installations: The District uses standard composite meter boxes that vary on the size of meter to be installed. Mesa Water's Standard Specifications and Drawings for Construction of Water Facilities govern the installation of meter boxes and meters. The following are the three typical size meter boxes that are used per Standard Drawing No. 3:

Meter Box No.	Meter Size	Box Size
4	0.62" & 0.75"	12"W x 20"L x 12"D
5	1"	13"W x 24"L x 12"D
6	1.5" & 2"	17"W x 30"L x 12"D

Meter lay lengths are standardized amongst meter manufacturers per AWWA specifications and fit properly within the meter boxes for small meter installations to accommodate meter reading, maintenance, and installation of endpoint devices. Figure 5 shows a typical installation of a small meter and ME/CE device.



Figure 5 – Small Meter Installation w/CE Device

Large Meter Installations: Meters 3” and larger are installed above ground along with the applicable backflow assembly device per the District’s Standard Drawing No. 22 as the larger meters will service domestic, fire, irrigation or combination thereof. The District had an older standard that allowed 3” and larger meter installations to be installed in an underground vault depending on the site conditions. This standard has been discontinued due to the challenge associated with confined space entry, meter maintenance, and meter reading difficulties (for deep vaults) but existing vaults are currently found along Route 600. Refer to Section 3.C for discussions of meter vault challenges.

Figure 6 shows an above ground large meter and endpoint installation using a special harness adaptor to host the endpoint attachment.



Figure 6 – Large Meter Installation w/CE/ME Device

Meter installations for small and large meter installations are standardized around AWWA standards and are accommodating to new meter reading technology being proposed by manufacturers. Minor challenges with CE/MEs, cellular endpoints, and AMI endpoints continue to be line of sight and proximity obstructions associated with transmission through concrete and metal lids. Less obstructions exist with the composite materials associated with the newer small meter box standard. Most meter box manufacturers fabricate special meter box lids now that allow for the placement of the endpoint within the box that has a cutout for the endpoint placement flush with the meter box lid. Large meter vaults with metal lids require modification for placement of the endpoint just below a cutout on the meter vault lid. This can present a challenge if the meter lids are located in parking lanes.

The District’s meter readers experience a high rate of first time read success on Route 953 where the entire route is equipped with MEs (See Section 4D for discussion of meter reading methods with MEs). On occasion re-reads are required if the ME is unable to effectively transmit the read as the meter reader drives by.

Findings:

- 2.1 69% of the District’s meters are 5/8”
- 2.2 47% of consumption is from meters 1” and smaller
- 2.3 Seven meter manufacturers have been used throughout the District

- 2.4 Meter manufacturers are not tracked in the Cogsdale database
- 2.5 AMR technology use is not standardized throughout the District
- 2.6 Existing Sensus TR and Universal CE batteries are failing requiring manual reading
- 2.7 Recent small meter program testing demonstrates that meter accuracy is maintained up to an average of 18 years
- 2.8 Small meter replacements are based on a 15 year replacement cycle
- 2.9 Large meter replacements are based on the inability to repair or recalibrate
- 2.10 The District uses industry standard composite meter boxes accommodating of future AMR and Cellular technologies

Section 3: Customer Consumption

A. Demands

The District’s annual demands have declined over the past several years mainly due to focus on conservation efforts. This has been especially noticeable as population growth has increased, demands have steadily decreased over the past decade. The District’s annual average demand in fiscal year 2018 was 17,314 acre-feet per year. Approximately 43% of total usage is used by meters 2” and larger (Refer to Table 1) and approximately 33% of consumption coming from the 5/8” meter classification which represents approximately 68% of the total number of meters (17,196) in the system.

Figure 7 shows the District’s total usage versus the number of total meters in the distribution system. Analysis of this graph demonstrates that approximately 50% of the District’s consumption is attributed to 1,530 meters.

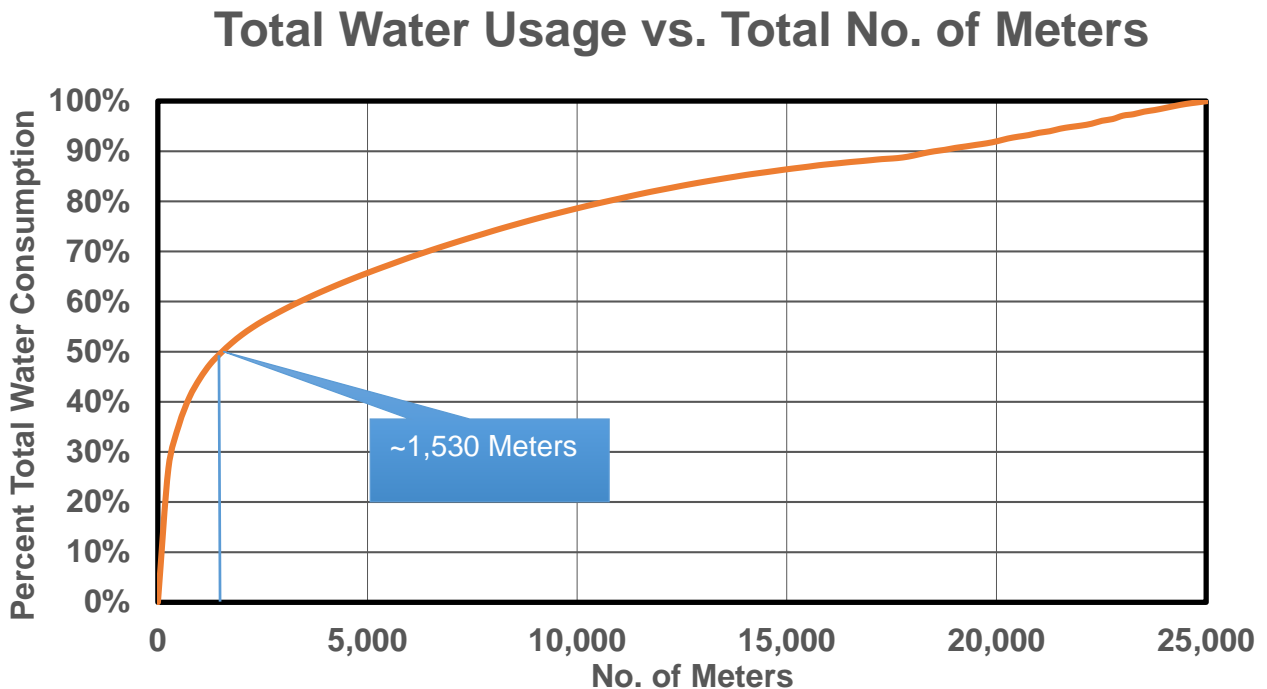


Figure 7 – Mesa Water® Cumulative Consumption

Table 4 shows the breakdown of the top 50% of consumption by meter size:

Table 4
Top 50% Usage

Meter Size (Inches)	No. of Meters	% by Meters	Usage (HCF)	% by Usage
0.625	69	4.5%	60,397	1.8%
0.75	115	7.5%	94,229	2.9%
1	275	18.0%	214,925	6.6%
1.5	363	23.7%	485,935	14.9%
2	620	40.5%	1,473,710	45.0%
3	44	2.9%	239,265	7.3%
4	28	1.8%	289,776	8.9%
6	9	0.6%	155,411	4.7%
8	7	0.5%	258,185	7.9%
	1,530	100%	3,271,834	100%

B. High Usage Customers

The top 50% usage is mostly represented by meters 2 inches and greater. Many of the higher usage customers are part of meter Route 600 which was developed several years ago by the District to account for higher frequency meter reading and revenue collection. Route 600 has 212 accounts associated with it. Route 600 mainly contains commercial, institutional, and industrial (CII) users. Route 600 also has progressively included the addition of fire line services over the years at the request of customers to have their domestic and fire line accounts read and billed in the same monthly cycle.

The benefit of Route 600 was originally setup to help both the District's customers in managing their monthly expenditures and the District to collect a steady revenue stream on its highest users. During the 2015/2016 statewide drought mandate the District re-evaluated its largest consumers and worked with customers to reduce consumption to help meet the District's target usage reduction of 25%. This effort included reading and providing monthly updates on consumption to the Top 250 users, shutting-off all irrigation meters, and public outreach to remind customers of the state's drought restrictions. Analysis of the Top 250 users revealed that only 37.5% of the Top 250 at that time were associated with Route 600. It was also recognized that it was time intensive to read the Top 250 as many of the route's meters had to be read manually as many of the Top 250 did not have CE or ME registers. Many of the CII customers during the drought expressed their interest in having technology that allowed them to monitor their usage and then respond accordingly based on seasonal demand and current conservation requirements.

C. Hard to Read Locations

For the past many decades the District has allowed large meter installations to be located in underground vaults. This standard was allowed to accommodate development requirements for both aesthetics and functional placement for deeper

water mains. This standard was adopted many decades ago before confined space entry requirements were established. The placement of meters in vaults present the following challenges:

1. Manual meter reading
2. Maintenance
3. Repairs
4. Meter testing
5. Confined space entry requirements

Many of the District's larger meters are located in deep vaults that possess one or all of the aforementioned challenges. Figures 8 and 9 show an example of a deep vault with either a TR or a converted CE register.



Figure 8 –TR Meter Vault



Figure 9 – Converted TR Universal CE Meter Vault

In an effort to alleviate the manual meter reading and confined space entry issues, Route 600 was originally equipped with the Universal TR technology. This was effective for many years and simplified the meter reading issues. As technology

advanced and portions of Route 600 TR batteries failed some of these meters were converted to CE and ME register technologies.

Portions of other meter routes were also equipped with CE and ME register technologies for hard to read locations. Many of the hard to read locations are above ground but with restricted access. Typical examples of these types of installations are as follows:

1. Gated communities
2. John Wayne Airport
3. Vaults in parking lanes/Streets

While the District has done good work identifying and automating its meter reading functionality in much of the larger users and hard to read locations over the past decades, the technology has been sporadically implemented with no specific criteria and does not have a uniform register platform across all of its largest customers. Additionally, many of the original TRs that were converted to the Universal CEs now are experiencing failing batteries requiring extensive effort to read these locations manually.

Findings:

- 3.1 Top 50% of consumption is achieved with 1,530 meters
- 3.2 45% of the Top 50% of consumption is in the 2" meter size
- 3.3 37.5% of the 2015 drought Top 250 were from Route 600
- 3.4 Top usage customers will change based on conservation policies
- 3.5 No District standard exists to define a hard to read or hard to access meter

Section 4: Mesa Water Meter Routes

A. Meter Reading Background

The District has a total of 25,024 meters allocated across 61 routes. 60 of the meter routes are read on a bi-monthly frequency and are identified as being on the 800 series (read in even months) or the 900 series (read in odd months) routes. A summary of the routes and the associated register technology is as follows:

Table 5 – Meter Route and Register Type

Meter Route	No. of Meters	Read Frequency	Register Type				
			Manual	TR	TR/CE	CE	ME
9XX	11,868	Bi-Monthly	11,582	0	0	12	274
8XX	12,841	Bi-Monthly	12,837	0	0	2	2
600	212	Monthly	26	10	89	82	5
200	42	Monthly	42	0	0	0	0
199	42	Monthly	31	6	0	5	0
Other	19		19	0	0	0	0
Total	25,024		24,537	16	89	101	281

Table 5 – Meter Route and Register Type

As previously indicated Route 600 contains a large portion of the District’s automated meter reading technology (~38%). However, Route 953 has 274 MEs (~56%) and 12 CEs. Route 953 is read bi-monthly and was originally established as a driving route for larger commercial and irrigation meters that required meter readers to drive across the District’s service area and get in and out of their vehicles to read a meter and drive to the next meter. Route 953 was retrofitted in 2009 with 274 MEs to reduce the amount of time required to read the route.

Routes 810, 834, 852, and 901 contain the remaining assortment of automated meter reading technology. Over the past four years, AMR technology has been sporadically implemented on the newer high-density live/work developments being constructed throughout the service area. Discussions with the meter reading staff has determined that the AMRs are being integrated to streamline the meter reading process within the developments. Focusing on the Top 50% users in regards to implementing AMR technology could provide a cost effective approach to managing the District’s demands, meter reading challenges, and providing meaningful information to high usage customers through automation. Two parameters to evaluate the aforementioned criteria consists of analyzing cumulative consumption and the cumulative number of accounts to determine where the optimal management point exists. The following tables show each of these criteria sorted by these respective criteria:

Table 6 – Top 50% Users (By Usage)

Sorted by % Highest Usage								
Route No.	No. of Top 50% Accts (by Usage)	Total No. of Route Accts.	% Top 50% Accounts (By Usage)	Cumulative Top 50% Accts ¹	Total Route Usage (HCF)	Top 50% Usage ¹	Top 50% Cumulative Usage ¹	% Total Cumulative Usage ²
600	107	212	7.0%	7.0%	718,018	21.9%	21.9%	11.0%
199	27	42	1.8%	8.8%	460,167	14.1%	36.0%	18.0%
911	90	331	5.9%	14.6%	183,975	5.6%	41.6%	20.8%
921	82	337	5.4%	20.0%	166,954	5.1%	46.7%	23.4%
828	62	337	4.1%	24.1%	142,000	4.3%	51.1%	25.5%
935	91	630	5.9%	30.0%	136,593	4.2%	55.3%	27.6%
927	87	430	5.7%	35.7%	131,959	4.0%	59.3%	29.6%
901	48	427	3.1%	38.8%	109,968	3.4%	62.6%	31.3%
838	74	429	4.8%	43.7%	105,012	3.2%	65.9%	32.9%
953	38	265	2.5%	46.1%	90,127	2.8%	68.6%	34.3%
854	60	470	3.9%	50.1%	78,542	2.4%	71.0%	35.5%
11	766	3,910		50.1%	2,323,316		71.0%	35.5%

Notes:

1. Based on 1,530 total meters and 3,271,834 HCF for the Top 50% usage (Average year from 2013-2017 customer billing data)
2. Based on total usage of 6,543,380 HCF usage (Average year from 2013-2017 customer billing data)

Table 7 – Top 50% Users (By Accounts)

Sorted by % Highest No. of Accounts								
Route No.	No. of Top 50% Accts (By Accts)	Total No. of Route Accts.	% Top 50% Accounts (By Accts)	Cumulative Accounts ¹	Total Route Usage (HCF)	Top 50% Usage (By Accts)	Top 50% Cumulative Usage ¹ (By Accts)	% Total Cumulative Usage ² (By Accts)
600	107	212	7.0%	7.0%	718,018	21.9%	21.9%	11.0%
935	91	630	5.9%	12.9%	136,593	4.2%	26.1%	13.1%
911	90	331	5.9%	18.8%	183,975	5.6%	31.7%	15.9%
927	87	430	5.7%	24.5%	131,959	4.0%	35.8%	17.9%
921	82	337	5.4%	29.9%	166,954	5.1%	40.9%	20.4%
838	74	429	4.8%	34.7%	105,012	3.2%	44.1%	22.0%
828	62	337	4.1%	38.8%	142,000	4.3%	48.4%	24.2%
854	60	470	3.9%	42.7%	78,542	2.4%	50.8%	25.4%
846	59	430	3.9%	46.5%	73,527	2.2%	53.1%	26.5%
907	58	529	3.8%	50.3%	43,181	1.3%	54.4%	27.2%
10	770	4,135		50.3%	1,779,762		54.4%	27.2%

Notes:

1. Based on 1,530 total meters and 3,271,834 HCF for the Top 50% usage (Average year from 2013-2017 customer billing data)
2. Based on total usage of 6,543,380 HCF usage (Average year from 2013-2017 customer billing data)

Evaluating the aforementioned results demonstrates the following observations:

- 51% of Top 50% cumulative usage and 25.5% of Total Cumulative Usage is achieved through 24.1% of cumulative accounts (368) over 5 routes (600, 199, 911, 921, and 828)
- 71% of Top 50% Cumulative Usage and 35.5% of Total Cumulative Usage is achieved through 50% of cumulative accounts (766) over 11 routes
- Approximately 770 accounts out of 4,000 total accounts represent 3.1% of total accounts and the Top 27.2% of consumption across 10 meter routes

While 1,530 meter accounts make up the Top 50% of consumption across 58 routes throughout the District, the aforementioned observations demonstrate that the highest usage is fairly linear (e.g., 770 meters is approximately 27.2% of total consumption versus 1,530 meters is 50% of total consumption) should a more targeted highest user group be desired. Table 7 also demonstrates that if the Top 27.2% of consumption were targeted as the highest users (by accounts), only 10 routes would be affected as opposed to 58 routes to achieve the Top 50% of highest usage. Similarly, Table 6 demonstrates that if the Top 25.5% of consumption were targeted as the highest users (by usage), only 5 routes would be affected as opposed to the 58 routes to achieve the Top 50% of highest usage.

B. Meter Reading Methodologies

The District's meter routes have a combination of reading formats. The formats consist of the following:

- **Walking Routes:** Requires meter readers to manually walk a predefined meter route and read each meter and input a numerical value into their handheld Badger Trimble device. Some walking routes have had MEs installed where new developments have been integrated into the existing route alignment. Routes that still contain both CE and ME endpoints require the meter readers to carry both the Badger Trimble device (ME equipped device) and the Northrup Grumman meter reading device (CE equipped device) as each unit is separately equipped with a CE transceiver or ME transceiver. The meter readers can also use the meter reading laptop to read these devices as the laptop is equipped with both CE and ME transceiver antennas. Badger's new Trimble 7 Ranger Meter Reading handheld device contains both ME and CE transceivers removing the need to carry multiple devices.
- **Driving Routes:** Driving routes have a combination of AMR CEs/MEs technology integrated with the manual read meters. Many of the driving routes still require a meter reader to drive to the location, get out of their vehicle, and manually read and enter the numerical value. Meter readers currently use the badger laptop to read routes 600 and 953 as these routes mostly consists of CE and ME endpoints. Route 953 is an example of this type of route that was converted in 2013 with ME registers. This conversion allowed meter reading time to be reduced from approximately 8 hours to 1 hour.

Driving verses walking routes should be a core metric in evaluating how much AMR technology the District may want to adopt and the cost associated with implementing such technology. Factors to consider in this evaluation include:

- Time savings in labor associated with driving verses walking against the AMR and cellular endpoint capital cost investment
- Increased customer service level or field maintenance work that could be recognized from time savings of driving verses walking routes
- Non-tangible safety benefit of meter reading injuries associated with the numerous miles walked
- Need to and/or ability to obtain relatively instantaneous meter data
- Accuracy of meter reading recognized from AMR technology verses manual reads

Other factors to consider in this evaluation pertain to how many meters should be and can be read on a single route. Originally 61 meter routes were established because this was accommodating to the manual meter reading process. This is no longer an obstacle with AMR technology. The number of meter reading routes could be substantially reduced with the following benefits:

- All retail meters could be read and billed within a few days at a specific time of month
- Billing could be done monthly on all or a portion of accounts with AMR technology

Specifics regarding meter reading metrics/statistics are covered in the following section.

C. Meter Route Alignments

The District's meter routes were established many years ago and have not varied in terms of alignment over the past several decades and have not been evaluated for efficiencies. Many of the routes were established as the City of Costa Mesa grew in both residential and commercial expansions. The original goal was to have a meter route only large enough to allow manual reading in half-day increments to allow for timely input, billing statement preparations, re-read of high anomaly reads, and perform any routine maintenance (e.g., Removal of excess dirt, replacement of broken lids, etc.) recognized in the meter reading process. Attachment A provides an overview of the District's sixty-one meter routes.

Development of AMR technology has drastically reshaped how routes can and should be read. The core issues arise at how much capital investment is required for the economic and non-tangible benefits that result from such an investment and redefining meter routes. Since the District's meter routes have not been evaluated for many years there are potentially large efficiencies that can be gained by studying this using the District's Geographical Information System (GIS) to assist with this. Benefits to evaluate and potentially redefine the District's meter routes are as follows:

- Provide efficiencies in drive time
- Provide safety in how vehicles traverse service area (e.g., Minimize left hand turns)
- Group meter routes by account types or locations (e.g., Hard to read locations)
- Streamline Cogsdale system meter reading process time

D. Meter Reading Statistics

The District's retail water meters have historically been read by two meter readers. Table 8 represents the 2017 meter reading data and statistics (excluding drive time to route locations) performed by two of the District's seasoned employees. Routes 199 and the 8XX and 9XX category routes are read bi-monthly. Route 600 is read monthly. It should be noted that driving routes include manual reads with sporadic AMR technology embedded.

Table 8 – 2017 Bi-Monthly Meter Reading Data

2017 Meter Read Data (Bi-Monthly)										
Meter Route	Route Type	No. of Routes	Total No. Meters	Avg. Meters/Route	Min. No. Meters/Route	Max. No. Meters/Route	Read Time (Hrs)	Avg. Read Time/Meter (Min/Meter)	Min Read Time/Meter (Min/Meter)	Max Read Time/Meter (Min/Meter)
199	Drive	1	44	44	44	44	4.3	5.8	5.8	5.8
200	Drive	1	42	42	42	42	7.1	10.1	10.1	10.1
600	Drive	1	216	216	216	216	5.4	1.5	1.5	1.5
8XX	Walk	17	6,883	405	250	572	80.9	0.7	0.6	0.9
8XX	Drive	3	899	300	241	342	14.5	1.0	0.7	1.2
8XX	Drive/Walk	11	4,777	434	349	595	160.0	2.0	0.6	1.0
8XX	Walk	14	6,270	448	252	551	76.4	0.7	0.7	0.6
9XX	Drive	6	2,238	373	271	430	59.4	1.6	0.2	1.2
9XX	Drive/Walk	7	3,223	460	374	628	42.4	0.8	0.6	1.0
Total		61	24,592	403	42	628	450	1.10	0.2	10.1
953	Drive	1	271	271	271	271	1.0	0.2	0.2	0.2

The average meter reading time across all meter routes is 1.10 minutes per meter. Average meter reading times for driving routes versus walking routes for the 8XX and 9XX routes are 1.0 versus 0.7 minutes per meter and 1.6 versus 0.7 minutes per meter, respectively. It appears counter intuitive that driving routes take more time on average than walking routes. However, upon closer evaluation and as previously mentioned, the driving routes are in areas where meters are spaced too far apart to walk between each location and it requires the meter reader to drive, get out of their vehicle, read the meter, and then drive to the next location. Thus, there is additional time required in reading these routes.

Route 953 was converted to a full AMR driving route. Evaluation of the meter metrics from this route demonstrate that meter reading takes approximately 0.2 minutes per meter or a total of 1 hour for the entire route which contains 271 meters. Should the District wish to convert a portion or all of its meters to an AMR technology, this is an excellent example of how the meter reading program could be streamlined. It should be noted that what is not included in these statistics are the distances of how long each route is. Route 953 does happen to span across much of the District's northern service area and is thus a conservative example as a base analysis for potential AMR implementation approaches.

Using Route 953 as a standard and assuming that not all routes are created equal in terms of access, AMR limits (e.g., Signal strength for meters off a driving path, etc.), geographic meter location, and other external factors provides the ability to look at potential labor savings for meter reading events. Table 9 provides an incremental time basis from 0.2 minutes per meter to 1.1 minutes per meter to read all the District's meters if AMR technology was used.

Table 9 – AMR Technology Meter Reading Time

Bi-Monthly Meter Reading Time for 24,592 Meters										
Mins/Meter	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1	1.1
Hours	82.0	123.0	163.9	204.9	245.9	286.9	327.9	368.9	409.9	450.9
Days	9.1	13.7	18.2	22.8	27.3	31.9	36.4	41.0	45.5	50.1

Table 9 demonstrates that if AMR technology (MEs) was uniformly integrated at every meter in the District it would take approximately 9.1 days to read all the meters with one employee or 4.5 days with two employees reading concurrently. This would be compared to approximately 50 days over the same bi-monthly time period it currently takes two employees to read all of the District’s meters in the current configuration.

Further analysis would have to be conducted to determine that actual integrated AMR meter reading rate, however, Table 9 demonstrates the span of meter reading rate. A higher meter reading rate would result in less staff time saved. The best case scenario of 0.2 minutes per meter would result in an annual staff time savings of approximately 1.2 full time equivalent (FTE) staff. Using a more conservative approach of 0.4 minutes per meter would result in a staff time savings of approximately 1.0 FTE. The following assumptions should be noted for this example and evaluated in more detail if this approach is further considered by the District:

- Full AMR ME implementation
- Based on Route 953 drive length
- Doesn’t include Cogsdale system processing
- Assumes 0.2 to 0.4 minutes per meter read
- Does not include time for reread/drive time of meters that do not transmit
- Does not allow for eyes on meter boxes for tampering or maintenance activities

Findings:

- 4.1 There are 61 meter reading routes containing 25,024 meters
- 4.2 71% of Top 50% Cumulative Usage is achieved through 50% of Cumulative Usage accounts (766) over 11 routes
- 4.3 Meter routes were established several decades ago and could benefit in efficiencies from re-evaluation
- 4.4 Average meter reading time across all District routes is 1.10 minutes per meter
- 4.5 Average meter reading time of 0.2 to 0.4 minutes per meter could be recognized with implementation of AMR across all District meters
- 4.6 Average meter reading time of 0.4 minutes per meter could result in a 1.0 FTE savings in labor

Section 5: New Meter & Register Technology

A. Existing Meter Technologies

Meter technology has slowly progressed over the past several years. Meter types vary by application. Typical meters found in the water industry include the following:

- Displacement or Positive Displacement
- Non-Displacement
- Differential Pressure
- Electronic
- Compound

In regards to retail meter applications the displacement meter (nutating disc) comprises the majority of American retail water systems for small and medium size meters. The nutating disc meter is highly accurate across a wide range of residential flows. Other meter technologies are continuing to develop (e.g., Electronic, etc.). Magnetic and ultrasonic flow meters have traditionally been used in larger production facilities but have been incrementally appearing in the domestic meter market for the past decade. The magnetic/ultrasonic flow meters have yet to gain a mainstream position in the retail water meter market mainly due to concerns about battery life, long-term accuracy, and the lack of an AWWA standard such as the AWWA M6 manual that governs displacement meters. As such, the nutating disc meter will remain the standard for the small to medium size meters for the foreseeable future as it is the most cost effective and reliable.

The District also uses compound meters for applications where there is a wide variation in large and small flows with varying usage patterns. Such an example would be a manufacturing business that uses large quantities of water for processing purposes. In such an event a large meter (3 inches and larger) will be used to capture the high end flows. Large meters often use turbo meters that are more accurate at high flows than the conventional displacement meters. However, large meters are not as accurate at capturing the low-end of the flow range for uses such as restrooms, irrigation, or other more minor uses. To accurately capture this low-end flow range an additional 1" meter is put either in serial or parallel with the large meter. This meter type is called a compound meter. Compound meter use and accuracy is provided for in the AWWA M6 Manual.

Displacement meters comprise over 97% of the District's retail meter installations.

B. Proposed Meter Technologies

Meter technology advancement is relatively slow in comparison to other industry evolutions. The heart of the meter measuring mechanics has not drastically changed over the past several years. Water industry meters are manufactured, certified, and governed per the AWWA standards. While there are advancements in the electronic retail water meter market (e.g., Ultrasonic, magnetic, etc.) this technology has not been widely adopted by water retailers within the United States mainly due to the uncertainties regarding battery life, long-term accuracy, and lack of a standard of such meters. Additionally, the electronic meters have traditionally been more expensive making them less competitive. Thus, in the small to medium size meter ranges it appears that the nutating disc meter will remain the standard for several years to come in the United States water retail market. However, meter manufacturers are

pushing on making ultrasonic and magnetic meters the standard over the next 15 to 20 years as these meters do not have moving parts associated with them and are thought to have a longer useful life cycle and overall lower cost of operation.

The large meter retail standard will also continue to be turbine meters as these are more cost effective. The District uses magnetic flow meters at its production facilities and these meters are highly accurate and reliable. However, magnetic meters typically have a larger capital outlay than a turbine meter and require a dedicated power source that most retail customers are unwilling to invest in. Additionally, magnetic flow meters are unable to be calibrated in the field, whereas turbine meters can often be repaired, flow-tested, and calibrated in place. Thus, most retail agencies use and will continue to use turbine type meters for their large meter programs and high usage customer applications.

C. Proposed Register Technologies

Section 2 above describes the various technologies and basic functionalities used by the District today. The following is an overview of the trending register technologies:

AMR: The most basic AMR system provides one-way communication via radio read technology either by touch-read or drive-by reading. The ME register is the basis for an AMR type system. The following are the general characteristics of an AMR system:

- Reads as frequently as every 15 minutes or more
- Accurate bills in a timely fashion
- Improved work efficiency and safety
- Specialized reports
- Tamper and reverse-flow alarms
- Data collection and analysis capability
- Leak detection capability

The AMR system can be a stepping stone to a larger advanced metering infrastructure (AMI) system.

AMI: The AMI system provides two-way communication via a dedicated fixed antenna network system. The ME register is the basis for an AMI type system. The AMI has multiple components that require a localized data collector that transmits local collected meter data to a server via a larger regional antenna system. The AMI system is similar to the District's radio based SCADA system where each production facility transmits and receives data in five second intervals. The AMI system would require a more extensive antenna infrastructure system than the District's SCADA system as there would be approximately 25,000 meters to collect data from that would have line of sight radio transmission challenges. The following are the general characteristics of an AMI system:

- Reads as frequently as programmed
- Electronic meter reading (No meter reading staff required)

- Customer web access for consumption history
- Two-way communication for turn-ons and turn-offs
- Detailed billing down to gallon metric
- Real-time diagnostics and maintenance reports
- Data collection and analysis capability
- Leak detection capability

Cellular Endpoints: Cellular endpoint technology is a relatively newer technology that uses the existing cellular communications network to transmit meter data. Cellular technology is a great alternative to an AMI system as it doesn't require the extensive owner dedicated AMI antenna network system and local data collectors. The Cellular endpoint system uses the commercial cellular antenna network (i.e., AT&T, Verizon, etc.) The cellular endpoint registers do require a monthly subscription fee (\$0.81-\$0.89/month) for each account and maintains similar functionality of the ME register technology.

D. Register Technologies Benefits/Challenges

Table 10 provides an overview of the aforementioned register technologies advantages and disadvantages associated with implementing such systems:

Table 10 – Register Types Benefits/Challenges

Register Type	Advantages	Disadvantages
1. AMR	<ul style="list-style-type: none"> A. Two-way communication B. Faster & more accurate meter reading capability C. Radio read transmission D. Wireless data profiling E. Reduces vault confined entry 	<ul style="list-style-type: none"> A. Costlier equipment than manual read B. Non-replaceable battery module C. Needs line of site to vehicle collection path
2. AMI	<ul style="list-style-type: none"> A. Two-way programmable communication B. No staff required for meter reading C. Wireless data profiling D. Leak Detection capability E. Reduces vault confined entry F. Customer access availability G. Real-time data querying 	<ul style="list-style-type: none"> A. Costlier equipment than manual read B. Costlier than cellular or ME system C. Requires dedicated local data collectors D. Requires fixed antenna system E. Non-replaceable battery module F. Increase in customer service calls for customer data viewing
3. Cellular	<ul style="list-style-type: none"> A. Two-way communication potential B. Real-time meter reading (no staff time required) C. Real-time data querying D. Leak detection capability 	<ul style="list-style-type: none"> A. Costlier equipment than manual read B. Requires monthly cellular fee C. Non-replaceable battery module D. Need proximity to cell tower system

	E. Reduces vault confined entry F. Customer access availability G. Uses existing cellular antenna system H. Similar endpoint design to ME	
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Each system has its specific advantages and is best suited to a particular type of meter reading format dependent upon the control, information, and capital investment the agency desires and is willing to commit to. Commitment to any of the aforementioned systems requires careful cost evaluation, implementation, and phasing.

E. Meter and Register Technology Costs

There are three major cost components to each of the aforementioned meter technology systems. These cost elements include the meter body/register, endpoint, and installation labor. Other ancillary cost components include software, software setup and integration, handheld reading devices, laptops, subscription cellular service fees, and supporting infrastructure costs (for AMI systems). For cost analysis purposes, the following costs will be used for alternative comparisons:

Table 11 – Meter and Endpoint Cost

Meter Size (Inches)	Cost¹
0.62	\$133
0.75	\$163
1.00	\$214
1.50	\$438
2.00 (Disc)	\$613
2.00 (Turbo)	\$982
3.00 (Turbo)	\$1,232
4.00 (Turbo)	\$1,789
6.00 (Turbo)	\$3,289
8.00 (Turbo)	\$3,654
Endpoint Type	Cost²
ME	\$96
Cellular	\$120

Notes:

1. Costs are for meter body & encoder only.
2. Costs are for endpoint only.

The installation labor costs basis will come from the District’s computerized maintenance management system (CMMS) with the assumption that any installed system will be performed by District staff. These costs are used in subsequent analyses in Section 6.

The cost of an AMI based system has been estimated at approximately \$11M to \$12M based on rough order of magnitude cost estimate provided by meter vendors. The major benefit to an AMI system is from the ability to reduce and manage water loss

within a distribution system. Given that the District's water loss is at an unprecedented 3.9% the cost of an AMI does not appear warranted. Thus, implementation of an AMI system is not recommended given the limited benefits for the District and has been eliminated from further consideration in this analysis.

F. Software Integration Requirements

Existing Software/Hardware: The District currently uses the Cogsdale customer service system as its asset inventory and meter information and billing system for existing and new metered accounts. The systems work in conjunction with the Badger Orion Read Center software system that works through Citrix.

The District's meter readers have used the Northrup Grumman handheld hardware with the Orion Reading System (ORS) to collect reads from the older CE registers most of which are located along Route 600. This also requires a laptop with the meter reading software to be installed in the meter readers' truck to receive the transmitted data as the meter reader drives by.

The meter readers also carry with them the Badger handheld (Trimble) to read the newer Badger ME registers. The introduction of the Trimble system created complexity in the meter reading process, downloading and management of the meter reading data, and overall ease of use. However, the manual meter reading data is now mostly collected with the Trimble unit, which is a more efficient unit to read meters with than the Northrup Grumman. However, both handhelds have to be carried on each route because CE registers have been randomly installed along each route. An immediate efficiency is to replace all existing CEs and TRs registers so the Northrup Grumman can be eliminated and the Trimble unit can be used as the only meter reading standard moving forward.

Proposed Hardware/Software: The concept of standardizing around one meter manufacturer and register technology not only simplifies the meter reading, data management, and billing processes significantly, it also minimizes the software integration issues that are experienced with multiple register endpoint manufacturers not being compatible with the current or future software platform.

The Badger Read Center (BRC) has been a long time standard for Badger. The BRC is used as the interface between the meter reading devices to download meter read data to the Cogsdale database system. However, Badger has indicated that they will not be writing software patches for the necessary upgrades of the BRC software to be compatible with the Windows 10 Operating System. Thus, BRC will be unsupported within the next few years similar to when Microsoft quit supporting Windows XP. Therefore, a future migration to a new software platform will be required. Should the District choose not to upgrade its current register technology beyond its current configuration of CE and ME registers, the BRC will continue to function and accommodate the meter reading process for the near-term. However, Badger will ultimately quit supporting the BRC system over the long-term and the District will need

to be prepared to have a migration solution and plan in place to make the necessary transition to a more current software platform.

Badger recently introduced the Beacon Software System (Beacon). Beacon is a web based hosted system that functions similar to the BRC where meter-reading data is downloaded to the Cogsdale database system through Beacon. The main differences however are that Beacon will allow customers the ability to view real-time consumption data through a viewer portal and allow District staff to provide real-time programming functionality and communications to meters equipped with Cellular or AMI technologies. An added benefit is that manual meter reading data can be imported, stored, and viewed by customers as data is downloaded. Many of the other meter registers currently in the District's system are believed to work with the Beacon system much like they work with the BRC system.

Other meter manufacturers have emerging web based hosted software solutions that also claim to be compatible with the District's Cogsdale database system. These systems have been evaluated at a high level and make similar claims as the Badger system in regards to capabilities, compatibility, and costs. However, the District has the most specific experience with Badger software platforms and have a large amount of installed Badger meters. Thus, considering the Beacon system as the long-term software platform solution appears to make the most cost-effective and practical approach.

Challenges: The challenges associated with any new software platform is in the compatibility with the older register technology currently embedded within the system. As such, the older TRs and converted Universal CEs would need to be changed to a meter/register type (ME or Cellular) compatible with the Beacon system.

Additionally, setup and configuration would be required with the Cogsdale database. This would require both Cogsdale and Badger to work together to develop the interface code necessary to have both systems communicate and accept the meter reading data from the new system. Fortunately, this has been done for other water agencies that also use Cogsdale as their customer service database and have adopted Beacon as their meter reading software platform. Thus, there is a good integration experience basis to allow for a relatively smooth transition.

Costs: The Beacon software system does not have an annual software licensing fee. However, non-AMI or non-Cellular accounts (ME and manual) hosted by the Beacon system cost \$0.04 to \$0.08 per month per account. AMI and Cellular based accounts have no monthly fee other than the monthly cellular service amount for those devices. The Beacon system also requires updated meter reading software to be installed on each meter readers laptop or tablet which has an annual licensing fee of \$2,000 per year per device. For example, 23,500 hosted AMR or manual read accounts hosted on the Beacon system would cost approximately \$11,000 per year.

Findings:

- 5.1 Small meter standard will continue to be the nutating disc for the next 10-15 years;
- 5.2 Large meter standard will continue to be the turbo meter with compound meters for varying flow applications;
- 5.3 Allowing multiple meter and register manufacturers to be installed across the distribution system provides challenges associated with efficient maintenance, inventory management, software integration and compatibility, and meter reading work-flow processes;
- 5.4 ME registers provide the most efficient meter reading and data management platform for non real-time data collection;
- 5.5 Cellular registers provide the most cost efficient meter reading and data management platform for real-time data collection;
- 5.6 AMI registers continue to have high implementation cost and are impractical with minimal benefit;
- 5.7 Cellular technology is approximately 25% more costly than ME technology;
- 5.8 Cellular technology should be considered for customers who would benefit from real-time data collection to minimize the monthly subscription fee impacts;
- 5.9 The District's existing BRC system will not be compatible with Windows 10 Operating System and will require a new meter reading software platform; and
- 5.10 Beacon is a web-based hosted system that is compatible with existing and future meter register technologies

Section 6: Implementation Options

The challenge of implementing any level of AMR technology is to ensure that value is provided to the District while maintaining the objectives discussed in Section 1. There are multiple scenarios to consider for the possible implementation of AMR along with manual read technology. Possible implementation strategies and options are as follows:

Option No. 1 – Route 600 Update: This Option would target replacement of the malfunctioning end of life Universal CEs and TR along Route 600 only with newer Badger MEs. The benefits and challenges of this Option are as follows:

Benefits:

1. Immediately updates outdated meter register technology;
2. Provides more efficient meter reading along Route 600;
3. Minimizes confined space entry to read meters;
4. Minimal capital program budget commitment; and
5. Removes redundant meter reading device requirement;

Challenges:

1. Does not address end of life BRC software platform;
2. No real-time water conservation data feedback availability;

This option makes the following assumptions:

- New meters, registers, and MEs will be installed at all 212 meter locations;
- No updated software platform will be provided;
- All meters/registers will be upgraded simultaneously;
- Existing meter routes will continue to be read manually and changed per the regular small meter frequency replacement requirement; and
- Meter reading routes will not be reconfigured at this time

The cost to implement an AMR Only upgrade to Route 600 is as follows:

Table 12

Route 600 Upgrade (AMR Only)										
Meter Size (Inches)	0.62	0.75	1	1.5	2	3	4	6	8	Total
Total Meters	6	8	4	8	40	55	39	30	22	212
Unit Costs	\$ 133	\$ 163	\$ 214	\$ 438	\$ 613	\$ 1,232	\$ 1,789	\$ 3,289	\$ 3,654	\$ 11,525
Meter/Register ¹	\$ 133	\$ 163	\$ 214	\$ 438	\$ 613	\$ 1,232	\$ 1,789	\$ 3,289	\$ 3,654	\$ 11,525
Capital Cost	\$ 844	\$1,365	\$ 887	\$3,565	\$ 28,735	\$ 73,555	\$73,881	\$101,831	\$ 82,706	\$367,368
Meter & Register	\$ 798	\$1,304	\$ 856	\$3,504	\$ 24,520	\$ 67,760	\$69,771	\$ 98,670	\$ 80,388	\$347,571
Installation Labor ²	\$ 46	\$ 61	\$ 31	\$ 61	\$ 4,215	\$ 5,795	\$ 4,110	\$ 3,161	\$ 2,318	\$ 19,797
Total										\$367,368
Notes:										
1. Based on December 2018 pricing										
2. Based on CMMS FY2018 ADP and labor costs										

While this Option does address the Route 600 end of life replacement of the Universal CEs and TRs it does not provide for a path forward to address Mesa Water’s end of life BRC software update. It also does not provide the District’s highest use customers with any level of water conservation management tools when future State of California water conservation mandates are required.

An alternative approach to Option 1 is Option 1B, which is to install 107 cellular endpoints within Route 600 and MEs on the remaining meters. Since these 107 meters are part of the Top 50% Consumption of highest users, Option 1B would provide an opportunity to setup a pilot program that provides real-time water conservation management tools, establishes the necessary software upgrade setup and configuration, and installation and operational experience. The cost to implement Option 1B is as follows:

Table 13

Route 600 Upgrade (AMR & Cellular Endpoint High Use)										
Meter Size (Inches)	0.62	0.75	1	1.5	2	3	4	6	8	Total
Total Meters	6	8	4	8	40	55	39	30	22	212
High Use	3	4	1	4	19	39	23	8	6	107
Regular Use	3	4	3	4	21	16	16	22	16	105
Unit Costs	\$ 253	\$ 283	\$ 334	\$ 558	\$ 733	\$ 1,352	\$ 1,909	\$ 3,409	\$ 3,774	\$ 12,605
Meter/Register ¹	\$ 133	\$ 163	\$ 214	\$ 438	\$ 613	\$ 1,232	\$ 1,789	\$ 3,289	\$ 3,654	\$ 11,525
Cellular Endpoint	\$ 120	\$ 120	\$ 120	\$ 120	\$ 120	\$ 120	\$ 120	\$ 120	\$ 120	\$ 1,080
Capital Cost	\$ 1,204	\$ 1,845	\$ 1,007	\$ 4,045	\$ 31,015	\$ 78,235	\$ 76,641	\$102,791	\$ 83,426	\$ 380,208
Meter & Register	\$ 798	\$ 1,304	\$ 856	\$ 3,504	\$ 24,520	\$ 67,760	\$ 69,771	\$ 98,670	\$ 80,388	\$ 347,571
Cellular Endpoint	\$ 360	\$ 480	\$ 120	\$ 480	\$ 2,280	\$ 4,680	\$ 2,760	\$ 960	\$ 720	\$ 12,840
Installation Labor ²	\$ 46	\$ 61	\$ 31	\$ 61	\$ 4,215	\$ 5,795	\$ 4,110	\$ 3,161	\$ 2,318	\$ 19,797
Software Setup	\$30,000									\$ 30,000
Cogsdale Integration ³										\$10,000
Badger Integration Report Customization ⁴										\$10,000
Training ⁵										\$ 4,000
Annual Cell Service ^{6,7}										\$ 1,143
Total										\$ 415,351

Notes:
 1. Based on December 2018 pricing
 2. Based on CMMS FY2018 ADP and labor costs
 3. Assumed fixed costs based on dialogue with Badger. Need to confirm actual price w/Cogsdale vendor
 4. Cost will depend on the level of detail and number of requested reports beyond the standard available system reports
 5. Covers costs for two (2) 8 hour training sessions.
 6. Monthly cell costs is \$0.89/month/service. Cost could be as low as \$0.81/month/service w/more units placed in service.
 7. Long term monthly cell service costs price guarantee can be negotiated up front to ensure minimal cost increases.

Option 1B is approximately \$58,000 more than Option 1 and it provides the foundation to incrementally expand to Options 2 or 3 in the appropriate time frame if this is the approach Mesa Water wanted to pursue.

It has been recommended by Mesa Water’s Water Loss Program consultant to move the small and large meter replacement frequency from 15 years to 18 years. This proposed program change would allow the use of the small and large meter program funds for the next 3 years to use for the options discussed herein. The fiscal year 2019 combined small and large program meter replacement budget is \$344,000. This would equate to a payback of 1.07 years and 1.21 years for Options 1 and 1B, respectively.

Option No. 2 - Highest Usage Accounts & Hard to Read Location Only: This approach targets the top usage accounts throughout the District. This approach would implement cellular technology to target the top 5% of the District’s users and would include routes that contain larger irrigation and commercial accounts.

This option will require a targeted program implementation of 1,530 meters across 58 of the existing 61 meter routes. However, 50% of the meters for the Top 50% Consumption exist on the 11 routes shown in Table 13.

Table 13 – Meter Routes for 50% of Top 50% Consumption

Route No.	Top 50% Users by Size & Route									Total
	Meter Size									
	0.62	0.75	1	1.5	2	3	4	6	8	
600	3	4	1	4	19	39	23	8	6	107
935	0	2	1	7	81	0	0	0	0	91
911	2	6	19	22	41	0	0	0	0	90
927	1	1	3	49	33	0	0	0	0	87
921	4	2	9	19	48	0	0	0	0	82
838	5	2	35	11	21	0	0	0	0	74
828	0	0	4	15	43	0	0	0	0	62
854	4	3	6	27	20	0	0	0	0	60
846	5	5	24	12	13	0	0	0	0	59
907	0	24	32	1	1	0	0	0	0	58
858	5	21	22	6	3	0	0	0	0	57

This option would also eliminate the failing Universal CEs along Route 600. Most other routes have 10 or fewer meters on the Top 50% Consumption route. The benefits and challenges of this option are as follows:

Benefits:

1. Provides real-time consumption to Mesa Water’s largest water consuming customers;
2. Allows proactive water conservation management by customers during time of drought mandate reductions;
3. Meter reading is performed automatically through a hosted connection;
4. Provides direct monthly billing of water consumption;
5. Provides direct monthly revenue of largest customer accounts;
6. Assists customers in identifying leaks within their system to avoid water loss;
7. Minimizes District employee access requirements for hard to read meter locations;
8. Simplifies meter reading process and eliminates requirements for using two separate meter reading devices; and
9. Updates end of life meter reading software platform.

Challenges:

1. Requires moderate capital investment;
2. Requires new software platform setup and integration;
3. Requires running two parallel software platforms if manual read meter data is not hosted on Beacon system;

4. Requires monthly costs to host manual read accounts in Beacon system;
5. Requires employee training and work-flow process setup.

This option makes the following assumptions:

- New meters, registers, and cellular endpoints will be installed at all 1,530 meter locations;
- Affected Route 953 meters will only have a register change out to cellular endpoints for its 38 affected meters;
- 105 Route 600 meters will need to have new AMR registers installed to eliminate the other challenges discussed in the aforementioned sections;
- Full conversion of all 1,530 high usage meters will occur simultaneously;
- Requires approximately 0.8 FTE Mesa Water staff labor to install all 1,530 meters, registers, and cellular endpoints;
- Implementation of Badger Beacon hosted software solution and supporting hardware for high usage accounts;
- Existing meter routes will continue to be read manually and changed per the revised 18-year small meter frequency replacement requirement; and
- Meter reading routes will not be reconfigured at this time

The following is a high level cost summary of what would be required to implement such a program:

Table 14

Top 50% Consumption - Cellular Enpoint Implementation Costs										
Meter Size (Inches)	0.62	0.75	1	1.5	2	3	4	6	8	Total
Total Meters	69	115	275	363	620	44	28	9	7	1,530
Unit Costs	\$ 253	\$ 283	\$ 334	\$ 558	\$ 733	\$ 1,352	\$ 1,909	\$ 3,409	\$ 3,774	\$ 12,605
Meter/Register ¹	\$ 133	\$ 163	\$ 214	\$ 438	\$ 613	\$ 1,232	\$ 1,789	\$ 3,289	\$ 3,654	\$ 11,525
Cellular Endpoint	\$ 120	\$ 120	\$ 120	\$ 120	\$ 120	\$ 120	\$ 120	\$ 120	\$ 120	\$ 1,080
Capital Cost	\$ 17,983	\$ 33,422	\$ 93,947	\$ 205,322	\$ 519,791	\$ 64,124	\$ 56,402	\$ 31,629	\$ 27,156	\$ 1,049,777
Meter & Register	\$ 9,177	\$ 18,745	\$ 58,850	\$ 158,994	\$ 380,060	\$ 54,208	\$ 50,092	\$ 29,601	\$ 25,578	\$ 785,305
Cellular Endpoint	\$ 8,280	\$ 13,800	\$ 33,000	\$ 43,560	\$ 74,400	\$ 5,280	\$ 3,360	\$ 1,080	\$ 840	\$ 183,600
Installation Labor ²	\$ 526	\$ 877	\$ 2,097	\$ 2,768	\$ 65,331	\$ 4,636	\$ 2,950	\$ 948	\$ 738	\$ 80,872
Software Setup										\$ 30,000
Cogsdale Integration ³										\$10,000
Badger Integration										\$10,000
Report Customization ⁴										\$10,000
Training⁵										\$ 4,000
Annual Cell Service^{6,7}										\$ 16,340
Total										\$ 1,100,118
Notes:										
1. Based on December 2018 pricing										
2. Based on CMMS FY2018 ADP and labor costs										
3. Assumed fixed costs based on dialogue with Badger. Need to confirm actual price w/Cogsdale vendor										
4. Cost will depend on the level of detail and number of requested reports beyond the standard available system reports										
5. Covers costs for two (2) 8 hour training sessions.										
6. Monthly cell costs is \$0.89/month/service. Cost could be as low as \$0.81/month/service w/more units placed in service.										
7. Long term monthly cell service costs price guarantee can be negotiated up front to ensure minimal cost increases.										

This approach would be implemented using District staff with onsite Badger training. The largest number of meters are in the 2" meter class followed by the 1.5" and 1" meters. Software setup will require both Cogsdale and Badger system support to work together to help configure the Badger Beacon software. The capital investment costs is approximately \$1.05 million. Setup and configuration costs is approximately \$34,000. Recurring costs is approximately \$16,340 per year for the cellular service. Routine maintenance will be facilitated by District staff.

To cover the capital implementation cost, the typical District fiscal year 2019 Routine Capital Small Meter Replacement Program is scheduled to replace 1,459 small meters at a total cost of \$344,000 per year. One approach to implementing Option No. 2 would be to defer the FY2020, FY2021, and FY2022 Routine Small and Large Meter Replacements and to focus on the Top 50% Consumption Program upgrade. This would equate to a payback of 3.2 years. Using the FY2019 replacement schedule over FYs 2020 through FY2022 would allow the approximate \$1,032,000 to be used for this Top 50% Consumption Program upgrade without substantially impacting the capital improvement program.

Option No. 3 – High Usage Accounts & Complete AMR: This approach would include implementation of the cellular technology outlined in Option No. 2 of the high usage routes and hard to read locations and would replace all the manual read meters with an AMR technology comprehensively over a period of five to seven years. The benefits and challenges of this Option in addition to those listed in Option No. 2 above are as follows:

Benefits:

1. Minimizes meter reading time by approximately 1.0 FTE;
2. Provides highly accurate meter reads and eliminates errors in manual meter reading process;
3. Historical meter reading data can be collected during drought mandate periods to assist customers in achieving water reduction mandates;
4. Eliminates manual meter process and potential staff injuries from entering and exiting vehicles and potential injuries from walking routes;

Challenges:

1. Large capital investment required;
2. Potential for technology time-lapse if implementation is spanned across to many years;

This option makes the following assumptions:

- New meters, registers, and cellular endpoints will be installed at all 1,530 meter locations;
- Affected Route 953 meters will only have a register change out to cellular endpoints for its 38 affected meters;
- All other 23,432 existing meters will be changed to Badger meters and registers with MEs;

- Implementation of Badger meter/register/MEs can occur over a 1-8 year period;
- Full conversion of all 1,530 high usage meters will occur simultaneously;
- Implementation of Badger Beacon hosted software solution and supporting hardware for high usage accounts;
- AMR meters will be hosted in the new Beacon hosted system;
- Meter Reading Routes will not be reconfigured at this time

This approach allows for a phased implementation in both capital expenditure and available resources to install and setup the AMR technology. This also allows a progressive approach in regards to the meter replacement program so not all meters are due for replacement in one year. The following is the cost to fully-implement AMR technology across the District's other 23,452 meters:

Table 15

Comprehensive AMR Implementation										
Meter Size (Inches)	0.62	0.75	1	1.5	2	3	4	6	8	Total
Total Meters	17127	2063	2393	595	645	33	128	283	165	23,432
Unit Costs	\$ 229	\$ 259	\$ 310	\$ 534	\$ 709	\$ 1,328	\$ 1,885	\$ 3,385	\$ 3,750	\$ 12,389
Meter/Register ¹	\$ 133	\$ 163	\$ 214	\$ 438	\$ 613	\$ 1,232	\$ 1,789	\$ 3,289	\$ 3,654	\$ 11,525
Migratable Endpoints	\$ 96	\$ 96	\$ 96	\$ 96	\$ 96	\$ 96	\$ 96	\$ 96	\$ 96	
Capital Cost	\$ 4,052,702	\$550,050	\$760,080	\$322,268	\$525,270	\$47,301	\$254,768	\$987,775	\$636,136	\$8,136,351
Meter & Register	\$ 2,277,891	\$336,269	\$512,102	\$260,610	\$395,385	\$40,656	\$228,992	\$930,787	\$602,910	\$5,585,602
Migratable Endpoint	\$ 1,644,192	\$198,048	\$229,728	\$ 57,120	\$ 61,920	\$ 3,168	\$ 12,288	\$ 27,168	\$ 15,840	\$2,249,472
Installation Labor ²	\$ 130,619	\$ 15,733	\$ 18,250	\$ 4,538	\$ 67,965	\$ 3,477	\$ 13,488	\$ 29,820	\$ 17,386	\$ 301,277
Software Setup	Included as Part of Option No. 1									
Hosted Service³	\$19,683									\$ 19,683
Total										\$8,156,033
Notes:										
1. Based on December 2018 pricing										
2. Based on CMMS FY2018 ADP and labor costs										
3. \$0.07/month/meter for hosted service on BRC										

This Option could be implemented over a 1 year, 5 year, or 8 year period. The Cost of a one-year implementation is \$8.1M. The challenge of a one-year implementation is of course the capital investment required to implement this within one year and all future meter replacements would be necessary at one point in time approximately 18 to 20 years from the initial installation. The benefit of a one-year implementation is that it is completed immediately and the District recognizes the benefits of the AMR technology outlined above and no technology gap potentially exists from taking too long to implement such a program.

The Cost of an 8-year implementation would be approximately \$1M per year for the next 8 years. Approximately 8 routes per year would need to be converted to keep pace with

the 8-year implementation schedule. The challenge of this approach is the potential for a technology gap to occur where newer technology is phased in and integration and compatibility could become more difficult. The benefits of this approach are the per year capital reduction commitment and it phases the 18-20 year meter replacement cycle in future years.

The total cost for implementing Options 2 and 3 together is approximately \$9.3M with a payback of 27 years using the \$344,000 fiscal year 2019 small and large meter replacement budget.

Findings:

- 6.1 Option 1 provides the minimum updates to Route 600 with minimal capital investment; and
- 6.2 Option 1B establishes a pilot program that would provide the foundation for expansion to Option 2 and Option 3 if desired.
- 6.3 Mesa Water's existing BRC is at the end-of-life and will need eventual replacement regardless of Options 1, 2, or 3 implementation;
- 6.4 Option 2 provides immediate benefits to Mesa Water's highest use customers for real-time consumption data management;
- 6.5 Option 2 provides Mesa Water with meter reading efficiency of its largest users and hard to read locations;
- 6.6 Option 2 has a moderate capital investment;
- 6.7 Option 3 implementation recognizes approximately a 1.0 FTE in labor savings;
- 6.8 Option 3 brings provides high accuracy reads throughout the District's meter reading process;
- 6.9 Option 3 provides partial real-time data management coupled with a passive water data management system for future water conservation mandate efforts;
- 6.10 Option 3 is a large capital investment that will need consideration of phasing implementation over a 1 to 8 year period;

Section 7: Proposed Standards

New meter installations or meter replacements will benefit greatly having a standardized approach. A standardization approach needs to consider a standard meter manufacturer, property use, types of registers specific to the account type and function, meter reading process, consumption history, and supporting software platform. The following are proposed standards for managing Mesa Water's new meter installations and meter replacement program:

A. Meter Standard

Mesa Water's proposed meter standard will be based on the Badger meter body for all meter types. This standard is being proposed because Mesa Water has a successful history with the Badger product and has implemented many of these meters over the past several decades. Badger has over 100 plus years of manufacturing experience

and has been at the forefront of meter technology development. Thus, it is proposed that Badger meter be used solely as Mesa Water’s standard.

To ensure that the District continues to get competitive pricing, Badger Meter has agreed to establish a long-term pricing structure the ties price increases to a national consumer price index. Mesa Water can also elect to solicit competitive bids at 5-year intervals to ensure competitiveness is being maintained.

B. Register Standard

Mesa Water’s proposed register standard will be based on the Badger technology for manual meters, AMR and cellular endpoints. For the same reasons indicated in Section A herein, the Badger system is being recommended and Badger has developed state of the art register and encoder technologies that are highly accurate and comply with the AWWA M6 manual. The proposed register standard will be based on a manual read 8-digit high resolution encoder (HR-E). This standard encoder will allow for integration of any future AMR/AMI endpoint if Mesa Water desired to migrate to that solution long-term.

C. Automation Standard

The District is made up of an assortment of property uses. These uses include residential, multi-family, commercial, industrial, and institutional uses. As such, meters and register technology that serve these use types requires specific functionality that accommodates both the customer and supports Mesa Water’s meter reading process. The following is the proposed standards for how new meter installations and meter replacements will be facilitated for each of the following use types:

Table 16 – Meter/Register/Endpoint Standardization

Meter Use	Meter Style	Register	Endpoint
1. Residential ¹	Nutating Disc	8-Digit HR-E	None
2. Multi-Unit Residential ^{2/3}	Nutating Disc	8-Digit HR-E	ME
3. High Density	Master Meter	8-Digit HR-E	Cellular
4. Irrigation (<2”)	Nutating Disc	8-Digit HR-E	Cellular
4b. Irrigation (>2”)	Turbo	8-Digit HR-E	Cellular
5. Fire Lines	5/8” Tattletale	8-Digit HR-E	ME
6. Commercial ⁴	<3” Nutating Disc >3” Combo Meter	8-Digit HR-E	ME ⁵
7. High-Use ⁵	<3” Nutating Disc >3” Combo Meter	8-Digit HR-E	Cellular
8. Hard to Access ⁶	Varies	8-Digit HR-E	Cellular

Notes:

1. Single-family detached home
2. Single-family detached or attached townhomes with thrity or more units with meters located in front of home and within a development community.
3. Single-family homes within a development community with meters located within the public right-of-way in a meter bank shall not be equipped with MEs.
4. Meter size varies based on fixture unit count. Combo meters shall be designed for low and high flow usage patterns based on proposed architectural drawings and plumbing plans.
5. Meters are considered high use when average monthly flows are greater than 65 HCF/month (1"), 100 HCF/month (1.5"), 200 HCF/month (2"), 450 HCF/month (3"), 850 HCF/month (4"), 1,400 HCF/month (6"), and 3,000 HCF/month (8") shall be equipped with a cellular endpoint.
6. Hard to access locations shall be determined by the Meter Reading Group and submitted to the Plan Checker for integration into the approved plans.

The proposed standards are intended to be implemented as part of the Mesa Water plan checking process regardless of which meter implementation option is determined to be the best course of action.

Section 7: Recommendations & Implementation Strategy

A. Recommendations

- 1. Use Badger Meter Equipment and Software as Mesa Water Standard:** Mesa Water should consider standardizing around the Badger Meter platform as outlined in the aforementioned sections. Badger meter has been in the business of manufacturing meters and registers for over one hundred plus years and manufactures a highly accurate meter. Mesa Water has numerous badger meters, registers, and MEs already in place within its distribution system and Mesa Water has used the Badger Read Center meter reading software platform for many years and is familiar with the nomenclature and work-flow process that are used in the proposed web-hosted Beacon system.
- 2. Implement Option No. 2:** Implementation of Option No. 2 provides the most balanced approach of meter reading and reporting automation with consideration of capital cost expenditures. This approach automates approximately 5% of District's largest users and provides real-time data management tools to be used in future state mandated water conservation efforts. Option No. 2 focuses on the most relevant and cost effective customer segments and uses a proven cellular technology that does not require a customer owned extensive antenna array that the AMI system requires.

Option No. 2 will also achieve the critical update to the Beacon web hosted meter reading software.

- 3. Re-Evaluate Full System AMR System Adoption in 5-Years:** The District should re-evaluate the long-term conversion of its meter reading system again in five years to a full AMR system. Re-evaluation should reassess the state of register and meter technologies, the market trend, and cost of implementation. Should the District desire to move forward with full AMR implementation at that time the web-

hosted Beacon software that will be implemented in Option No. 2 will provide the required foundation for implementation and deployment. It is expected that costs will continue to decrease in the MEs as the product becomes more mainstream in water agencies systems.

4. Perform Meter Route Optimization Assessment: Mesa Water's meter routes should be evaluated for meter reading efficiencies. Meter routes were progressively laid out over several years as Mesa Water's service area was built-out. It appears that a meter route optimization has never been performed. A meter reading route optimization assessment should include at a minimum the following criteria:

- No of meters read on each route;
- Types of meters read on each route;
- Traffic analysis to eliminate dangerous reading conditions for field staff;
- Time to read routes for given technology;
- Recommendations on how to reduce meter reading time and increase safety;
- Driving routes verses drive/walking routes;
- Recommendations where AMR could reduce meter reading time and increase safety;

This assessment should be performed concurrent with implementation of Option No. 2 so route definitions can be reconfigured for the cellular endpoint accounts.

5. Update Mesa Water Standard Plans and Specifications for Water Service: The District's Standard Plans and Specifications for Water Service should be updated to include the standards for meter and register technology proposed in Section 7.C herein. These standards will assist in standardizing Mesa Water's meter replacements and new meter installations in the long-term to ensure uniformity, efficiency of repair, maintenance, and replacements, and meter reading efforts.

B. Implementation Approach: The following is the proposed sequence of implementation:

1. Obtain cost proposal from Badger to upgrade and configure Beacon system
2. Obtain cost proposal from Cogsdale to develop configuration interface;
3. Establish schedule for software configuration for Badger and Cogsdale systems;
4. Develop customer and Mesa Water user interfaces to view meter data;
5. Procure replacement meters, registers, and cellular endpoints for Option No. 2;
6. Install Route 600 meters, registers, and endpoints as pilot test;
7. Integrate and test Route 600 meters w/new software platform and interfaces;
8. Installation of meters, registers, and cellular endpoints in remaining meter routes;
9. Integrate and test remaining meter size installations w/new software platform and interfaces;

C. Schedule: The proposed schedule for implementation of the sequence defined in Section B herein is as follows:

Figure 8 – Option No. 2 Implementation Schedule

Program Task	High User Cellular Endpoint Implementation											
	FY2020											
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
1. Badger Cost Proposal	█											
2. Cogsdale Cost Proposal	█											
3. Software Configuration Schedule		█										
4. Develop User Interfaces			█	█	█							
5. Meter/Register/Endpoint Procurement			█									
6. Install 2" Meter Test Pilot				█	█							
7. Integrate and Test Route 600 Meter Pilot w/Software						█						
8. Install Remaining Meters/Registers/Endpoints							█	█	█	█	█	█
9. Integrate and Test Remaining Meters/Registers							█	█	█	█	█	█

D. Program Costs: Mesa Water’s meter testing program has determined that the life-cycle replacement frequency for the small and large meter programs should move from 15 years to 18 years. This change will largely offset the cost for implementation of Option No. 2 as the funds that would have been used for the next 3 years of the small and large meter capital replacement program can be used to implement Option No. 2. An additional \$186,000 (or \$62,000 per year for the next three years) will be necessary in the small and large meter replacement program to fully fund implementation of Option No. 2 in the next fiscal year. Long-term Badger meter costs for standardized equipment, long-term monthly cellular service costs (for cellular endpoints), and the web-hosted non-AMR/AMI accounts will be negotiated up front to ensure competitive pricing. Any cost increases will be tied to a regional consumer price index.



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MEMORANDUM

TO: Board of Directors
FROM: Marwan Khalifa, CPA, MBA, Chief Financial Officer
DATE: May 2, 2019
SUBJECT: Other Post-Employment Benefits Trust Update

RECOMMENDATION

Approve funding the Other Post-Employment Benefits Trust with annual \$110,000 contributions over the next five fiscal years for a total of \$545,500.

The Finance Committee reviewed this item at its April 22, 2019 meeting and recommends Board approval.

STRATEGIC PLAN

Goal #3: Be financially responsible and transparent.

PRIOR BOARD ACTION/DISCUSSION

At its April 10, 2014 meeting, the Board of Directors (Board) approved the selection of Public Agency Retirement Services (PARS) as a third party Other Post-Employment Benefits (OPEB) Trust provider and funded the trust with annual \$250,000 contributions over four years.

At its June 16, 2014 meeting, the Finance Committee directed staff to invest \$150,000 by June 30, 2014 into the OPEB Trust and the remaining \$100,000 within the succeeding three months.

At its July 10, 2014 meeting, the Board approved an investment strategy of Capital Appreciation and selection of an Active Portfolio Management Strategy for Mesa Water's OPEB Trust.

At its April 17, 2017 meeting, the Finance Committee received an update on the OPEB Trust performance and Pension Stabilization Fund.

At its June 8, 2017 meeting, the Board adopted Resolution No. 1499 Adoption of the Public Agencies Post-Employment Benefits Trust Administered by PARS; Appointed the District Treasurer as Mesa Water's Plan Administrator; Authorized the Plan Administrator to execute an Agreement for Administrative Services and other documents necessary to implement and administer the Public Agencies Post-Employment Benefits Trust (Program); and Authorized the Plan Administrator to move assets currently in the Public Agencies Post-Retirement Health Care Plan Trust to the OPEB Account established in the name of the Mesa Water District under the Public Agencies Post-Employment Benefits Trust.

At its February 21, 2019 meeting, the Finance Committee received a presentation on the OPEB Trust Pension Stabilization Fund performance.

DISCUSSION

The OPEB trust to pre-fund Other Post-Employment Benefits was established in June 2014. At the direction of the Board, Mesa Water established an OPEB Trust in order to set aside the funds



necessary to pay for future OPEB liability payments. This decision has significantly reduced the District's OPEB liability:

- Since it was established, the District has funded the OPEB Trust with \$1,000,000 over four fiscal years;
- This investment has seen compounded returns over three years of 24.3% or approximately 8.1% per year; and
- These funds have grown through the investment in the Capital Appreciation HighMark Plus investment account to \$1,270,374 as of March 31, 2019 (see Attachment A).

The total OPEB liability as of June 30, 2018 is \$1,815,878, resulting in a Net OPEB Liability of \$545,504 as of March 31, 2019. This liability number is expected to change annually when valued by an actuary. Best practice recommends that special districts, cities and other agencies should not fund pension and OPEB liabilities in excess of 100%.

In order to fully fund the OPEB liability, staff recommends that the Board approve funding the Other Post-Employment Benefits Trust with annual \$110,000 contributions over the next five fiscal years for a total of \$545,500.

FINANCIAL IMPACT

In Fiscal Years 2020 through 2024, \$110,000 will be included in each of the proposed budgets which will increase potential investment returns for long-term reductions in the District's OPEB expense and OPEB liability.

ATTACHMENTS

Attachment A: PARS OPEB Contributions and Earnings Detail

PARS OPEB CONTRIBUTIONS AND EARNINGS DETAIL

PARS OPEB TRUST

Date	Beginning Balance	Contributions	Disbursements	Investment Gain (Loss)	PARS Expenses	Ending Balance	1 Year Return	
							PARS ¹	CALPERS ²
6/30/2014	-	150,000	-	0	-	150,000	N/A	18.40%
6/30/2015	150,000	350,000	-	14,385	(4,359)	510,025	5.66%	2.40%
6/30/2016	510,025	250,000	-	(3,104)	(5,072)	751,849	-1.70%	0.60%
6/30/2017	751,849	250,000	-	135,762	(6,367)	1,131,243	15.56%	11.20%
6/30/2018	1,131,243	-	-	113,337	(6,991)	1,237,589	10.05%	8.60%
3/31/2019	1,237,589	-	-	37,466	(4,681)	1,270,374	N/A	N/A
		1,000,000	-	297,845	(27,471)			

¹ Source: PARS Statements, return stated net of PARS expenses.

² Source: CALPERS Website, return stated net of expenses.



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MEMORANDUM

TO: Board of Directors
FROM: Syndie Ly, Human Resources Manager
DATE: May 2, 2019
SUBJECT: Quarterly Training Report

RECOMMENDATION

Receive the Quarterly Training Report for January 1, 2019 – March 31, 2019.

STRATEGIC PLAN

Goal #5: Attract and retain skilled employees.

DISCUSSION

As part of the Board of Directors (Board's) adopted 2019 Strategic Plan Goal #5 – Attract and retain skilled employees, Objective B is to Build Employee Skills, specifically the following:

- Fully train a minimum of two employees in key processes to ensure accountability and sustainability
- Develop and implement an operational and institutional knowledge transfer plan
- Provide employee training

Outcome 3 of Strategic Plan Goal #5 calls for quarterly training reports to the Board.

Attached is the Quarterly Training Report for January 1, 2019 to March 31, 2019. In addition to the training listed on the report, staff also conducts safety training for all employees and Monday Morning Tailgate Talks for Water Operations, Engineering and Customer Services field staff.

The Tailgate Talks for this quarter included the following topics:

- Don't Get in a Bind with a Backhoe
- Asbestos Quiz
- Ammonia Safety
- Elevated Surfaces and Fall Protection Video
- Spill Prevention, Control and Countermeasure (SPCC) Training Reminders
- Mesa Water Accident Reporting
- Powerful Protection from Personal Protective Equipment (PPE)
- Lockout/Tagout
- Power Tools
- Forklift Quiz
- Trenching Don't Dig Yourself in to Trouble
- Forklift Safety

The Safety Training program included the following topics:

- Forklift Operator
- New Hire Safety Orientation
- Driver Safety Training
- Tools to Diffuse Confrontational Behavior



Below is the required continuing education hours needed, over a three-year period, for each Distribution and Treatment Certification Renewal held by staff:

Distribution and Treatment Certification Renewals – Required Continuing Education Hours (within the last three years)				
Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
12 hours	16 hours	24 hours	36 Hours	36 hours

FINANCIAL IMPACT

The cost for the training is budgeted each fiscal year, per department or in the overall safety budget.

ATTACHMENTS

Attachment A: Quarterly Training Report for January 1, 2019 to March 31, 2019



FY19 Quarterly Training Report

3rd Quarter January 1, 2019 - March 31, 2019

Postion	Department	Date of Training	Type of Training	Organization
Field Customer Service Representative I & II	Customer Services	1/8/2019	Forklift Training	EROM
Customer Services Manager Customer Service Representative II	Customer Services	1/8/2019 & 2/12/2019 & 3/19/22019	Elite Customer Service	Moran Consulting
Senior Operator	Operations	1/21 - 25/2019	Cross Connection Specialist Course	CA-NV AWWA
Water Quality and Compliance Supervisor	Operations	2/14/2019	Maximizing Supervisory Skills for the First Line Supervisor	Liebert Cassidy Whitmore
Department Assistant	Public/External Affairs	2/21/2019	Public Information Officer PIO Support Staff, Emergency Preparedness	Orange County Sanitation District
Operator II	Operations	3/5 - 3/7/2019	Membrane Operator I	SWMOA
Water Operations Supervisor	Operations	3/28/2019	Coaching and Teambuilding Skills for Managers and Supervisors	Skill Path



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MEMORANDUM

TO: Board of Directors
FROM: Denise Garcia, Administrative Services Manager
DATE: May 2, 2019
SUBJECT: Proclamation Honoring Wayne S. Osborne

RECOMMENDATION

Approve a proclamation honoring Wayne S. Osborne for his dedicated service and commitment to the Municipal Water District of Orange County.

STRATEGIC PLAN

Goal #7: Actively participate in regional water issues.

PRIOR BOARD ACTION/DISCUSSION

None.

DISCUSSION

Director Wayne S. Osborne of the Municipal Water District of Orange County (MWDOC) has announced his retirement from the Board of Directors. Director Osborne is a long-time public servant who served on the MWDOC Board for the past eight years. He served as Board President in 2016 and 2017.

He was appointed to the MWDOC Board of Directors to fill the vacancy left by Director Ed Royce Sr. who retired in 2012.

Director Osborne represented MWDOC Division 3, which includes the cities of Cypress, Fountain Valley, Los Alamitos, Stanton, Westminster, portions of Garden Grove, and unincorporated Orange County.

Throughout his career, Director Osborne always demonstrated the highest level of integrity in decision-making, and in his commitment to serve the Orange County water community.

Director Osborne also had a long career of public service working 33 years as the Director of Public Works and City Engineer for the City of Fountain Valley. During that time, he developed the City's water supply master plan, implemented long-term capital improvement programs for water supply, and oversaw the maintenance of all public works facilities, including water and wastewater systems. He was also instrumental in obtaining grant funding for the construction of two wells and other key water infrastructure.

Director Osborne is a member of several water industry organizations, including the American Water Works Association, and the Orange County Water Association of which he is Past President. He was also active in the American Public Works Association.



FINANCIAL IMPACT

None.

ATTACHMENTS

Attachment A: Draft Proclamation

A Day of Celebration to Honor the Career of Wayne S. Osborne

Whereas, Wayne S. Osborne is retiring from the Municipal Water District of Orange County (MWDOC) Board of Directors after eight years of service to the District. He served as Board President in 2016 and 2017; and

Whereas, Director Osborne represented MWDOC Division 3, which includes the cities of Cypress, Fountain Valley, Los Alamitos, Stanton, Westminster, portions of Garden Grove, and unincorporated Orange County; and

Whereas, throughout his career, Director Osborne always demonstrated the highest level of integrity in decision-making, and in his commitment to serve the Orange County water community; and

Whereas, Director Osborne also had a long career of public service working 33 years as the Director of Public Works and City Engineer for the City of Fountain Valley. During that time, he developed the City's water supply master plan, implemented long-term capital improvement programs for water supply, and oversaw the maintenance of all public works facilities, including water and wastewater systems. He was also instrumental in obtaining grant funding for the construction of two wells and other key water infrastructure; and

Whereas, Director Osborne is a member of several water industry organizations, including the American Water Works Association, and the Orange County Water Association of which he is Past President. He was also active in the American Public Works Association; and

NOW THEREFORE, BE IT RESOLVED that the Board of Directors of Mesa Water District hereby recognizes and honors you for your dedicated service and commitment to the Municipal Water District of Orange County and wishes you the best as you begin your retirement.

Shawn Dewane, President

Marice H. DePasquale, Vice President

May 2, 2019

Jim Atkinson, Director

Fred R. Bockmiller, P.E., Director

James R. Fisler, Director

REPORTS:

11. REPORT OF THE GENERAL MANAGER:

- April Key Indicators Report
- Other (no enclosure)

Support materials for this item will be handed out at the meeting.

REPORTS:

12. DIRECTORS' REPORTS AND COMMENTS

**DIRECTORS' REPORTS (AB 1234) PER CA GOVERNMENT
CODE SECTION 53232.3 (d)**

In accordance with CA Government Code 53232.3 (d), the following report identifies the meetings for which Mesa Water Directors received expense reimbursement.

Jim Atkinson Meetings Attended

Reimbursement Date:	Description, Date
N/A	

Fred R. Bockmiller, P.E. Meetings Attended

Reimbursement Date:	Description, Date
N/A	

Marice H. DePasquale Meetings Attended

Reimbursement Date:	Description, Date
04/03/19	Meeting w/ Mesa Water Director, 3/26

Shawn Dewane Meetings Attended

Reimbursement Date:	Description, Date
04/01/19	Meeting w/ Mesa Water Director, 3/15
04/01/19	Meeting w/ General Manager and M. Wilson, 3/21
04/23/19	Meeting w/ Mesa Water Director, 4/8
04/23/19	Meeting w/ Mesa Water Director, 4/11

James R. Fisler Meetings Attended

Reimbursement Date:	Description, Date
04/18/19	Costa Mesa Chamber Event, 4/10

There are no support materials for this item.