MADERA IRRIGATION DISTRICT

APPLICATION

FOR

U.S. BUREAU OF RECLAMATION

2016 WATER AND ENERGY EFFICIENCY GRANT

Funding Group II

JANUARY 20, 2016

LATERAL 24.2-17.0 PIPELINE IMPROVEMENT PROJECT

EST. 1920

MADERA
IRRIGATION DISTRICT

12152 Road 28 1/4
Madera, CA 93637

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i) Executive Summary

The following is the pertinent information regarding the Applicant:

Date of Application:	January 20, 2016
Name of Applicant:	Madera Irrigation District
City/County:	Madera, Madera County
State:	California

Address and Contact Information:

MADERA IRRIGATION DISTRICT
12152 Road 28 1/4
Madera, CA 93637

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The proposed work to be accomplished with the combined resources of District and the WaterSMART Grant funding is to underground approximately 6,500 feet of the existing Lateral 24.2-17.0 canal into a 36" pipeline. The project goal is to achieve sustainable water savings, improved management of resources through conveyance improvements (compliance with Section III Eligible Projects – **Canal Piping, Irrigation Flow Measurement, SCADA and Automation, and Groundwater Recharge**) that will:

- Convert an existing sandy, open canal to pipeline to reduce seepage loss.
- Install automated meter to maintain constant pipeline hydraulic grade line and reduce spill outside of the District. Automated meter is solar powered (renewable energy) to eliminate extension of electrical service and demands on electrical system (carbon neutral installation).
- Install SCADA telemetry to automated meter to provide remote monitoring and control of pipeline operations to eliminate losses from overflows, over-deliveries at turnouts, and to provide early detection of breaching of banks.
- Install a small recharge pond at the end of the pipeline to capture excess waters and recharge water savings to groundwater.

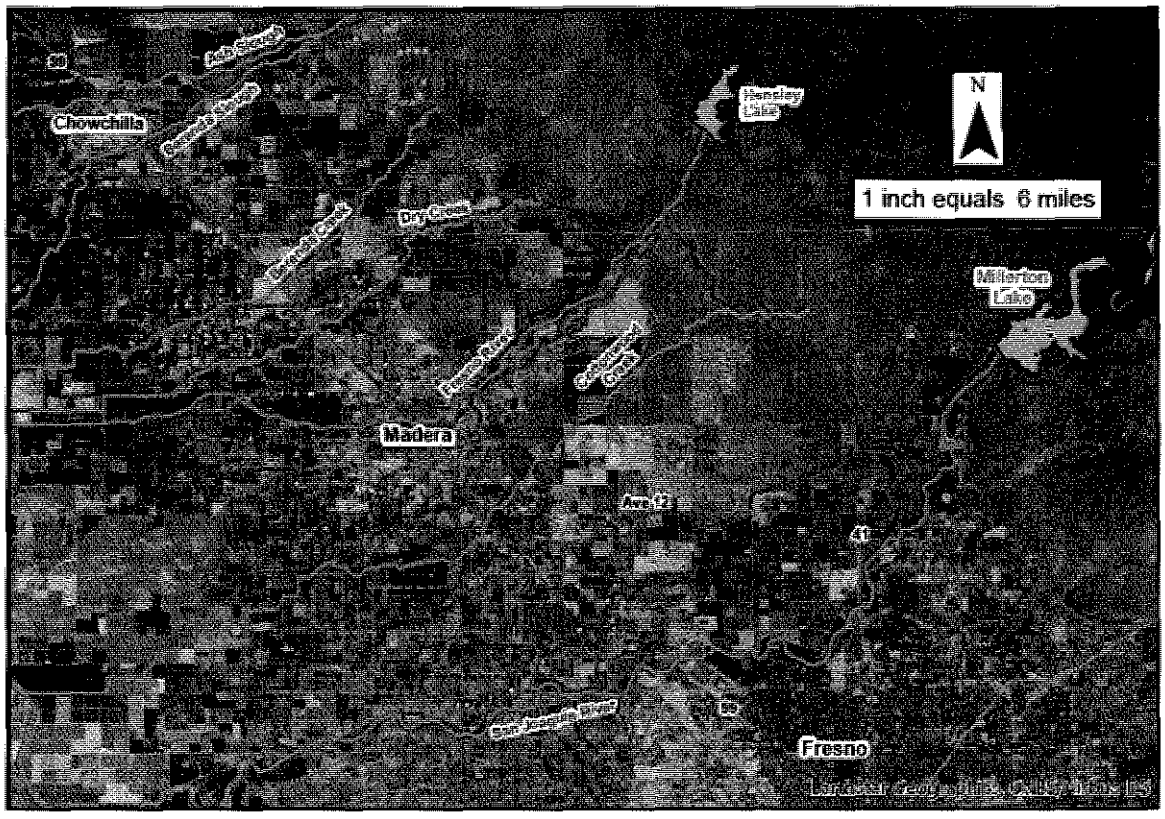
Project will be completed within two years with an estimated closing date of September 2018.

The project is not located on a Federal facility. The project commences at the end of Reclamation's Lateral 24.2-17.0 Pipeline.

ii) Background Data

Map of District and Location of Proposed Improvements.

Vicinity Map: Madera Irrigation District, Madera County, Central California



A more detailed Project Location map is included in Appendix A.

Location – The map above shows the location of the District boundaries (shown in red) in relation to its geographic location within the Central California. The purple and magenta lines designate the District's canals and pipelines. The District is located 18 miles north of the City of Fresno and is bisected by State Highway 99 and State Highway 145. The City of Madera is located within the District boundaries.

Formation - The Madera Irrigation District was formed in 1920 by popular vote of the people residing within the then proposed Madera Irrigation District and comprised 350,000 acres. The Madera Irrigation District operates under rules as set forth by the California Water Code. Under Section Code 20571, irrigation districts are given the right to assess land within their district boundaries. The District sells irrigation water for a fee above and beyond assessments levied on land within the District.
Over the 90-year history of the District, portions where removed or transferred for the formation of other Districts and the District is currently 130,400 acres in size.

Distribution System - The District utilizes 315 miles of canals (225 miles of clay lined and 90 miles of unlined canals) to deliver water to agricultural users. In addition, the District also distributes irrigation waters through 118 miles of pipeline.

Source of Water - Water Supply Contracts – MID has three sources of water; the San Joaquin River, the Fresno River, and pre-1914 rights to Big Creek and Soquel Creek. This water is then stored at either Millerton Lake (Friant Dam) or Hensley Lake (Hidden Dam). MID water is distributed via the Madera Canal and the Fresno River (below Hidden Dam).

From the Hidden Dam of Hensley Lake, the water flows into the district along the Fresno River to deliver other federal and non-federal water rights. The Bureau of Reclamation has recently agreed to store and convey up to 36,000 acre-feet of Madera Irrigation District (MID) non-federal water from 2010 through February 2015. The storage provides greater water management flexibility as compared to operating Hensley Lake for flood control alone which tends to make water available too early in the growing season.

The district calls water off the Madera Canal and Hidden Dam, USBR-owned facilities. On three locations of the Madera Canal, USBR sets the daily flows at the head gates of three conveyances: Lateral 6.2, Dry Creek, and Lateral 32.2. USBR controls the flow into the district from the Fresno River through its operations on the Hidden Dam of Hensley Lake. From the two laterals and two natural channels, the total seasonal surface water volume into the district is roughly broken up evenly in four paths or 25% per channel. Table 1 summarizes Madera Irrigation Districts' annual entitlements.

The District receives water for its customers from several sources as follows:

	AF	Source	Contract #	Contract / Restriction	Expiration
USBR Agricultural Class I	85,000	Federal	175R2891-IRd	Firm as available	None
USBR Agricultural Class II	186,000	Federal	175R2891-IRd	As available subject to obligation	None
Hensley Lake	24,000+	Federal	14-06-200-4020-IRd	Fluctuating annual yield	None
Other Pre-1914	Varies	Prior historic rights		Fluctuation annual yield	None

Land Information

a) Area – The District is 129,180 acres (of which 15,000 acres were annexed as a part of the Hidden Dam contract with the Bureau of Reclamation in 1975) and irrigated land totals 102,178 acres.

b) Topography - gently sloping plain, ranging in elevation from about 370 to 470 feet above sea level along the eastern boundary to 180 to 200 feet along the western boundary.

c) Depth to groundwater in the District is, in the extreme range, anywhere from 10 feet to 350 feet below the ground surface. Ninety percent of Bureau wells and private agricultural wells

within the District fall within the depth range of 100 to 225 depending on geographic location. The historical trend of the Ground Water Table shows it is dropping 5 feet per year.

Water Use - Water use has ranged from a low of 21,250 acre feet in 1977 to a high of 173,979 in 2011. Unused District irrigation water is usually disposed of through discharge into the water bank lands, sold to other districts either in direct transfer or through indirect transfer from waters allocated to the District in the San Luis Reservoir or released into natural creeks and rivers. It should be noted that such sales or disposal are usually a direct result of storm waters or excess availability during periods of low demand for agricultural uses within the District. In addition, drought years yielding below average rainfall and mountain runoff to reservoirs yields reduce availability of water from federal contracts.

Crop Data - District waters are primarily used for crop irrigation purposes. The cropping pattern in the District has changed from row crops in 1968 to one of principally permanent crops at present. High water costs have been one of the factors contributing to the present cropping pattern.

Listed below are the District crops grown in 2014 as listed by the Madera County Agricultural Commissioner:

Crop Type	Crop Name	Acres	Crop Type	Crop Name	Acres
Cereal	Oat	65	Fruit	Pomegranate	259
Cereal	Oat For/Fodder	537	Fruit	Prune	915
Cereal	Sorghum Milo	19	Fruit	Stone Fruit	3
Cereal	Wheat	427	Fruit	Tangerine	9
Cereal	Wheat For/Fodder	891	Fruit	Tangerine Seedless	1,131
Forage	Forage Hay/Silage	313	Fruit	Tomato	601
Forage	Rangeland	248	Fruit	Watermelon	26
Forage	Pastureland	287	Misc. Field Crop	Bean Dried	273
Fruit	Apple	76	Misc. Field Crop	Cotton	41
Fruit	Apricot	20	Nut	Almond	38,937
Fruit	Blueberry	64	Nut	Pecan	26
Fruit	Cherry	551	Nut	Pistachio	8,788
Fruit	Citrus	15	Nut	Walnut	1,136
Fruit	Fig	791	Other Crops	N-Outdoor Transplant	82
Fruit	Grape	4,278	Other Crops	Ot-Palm	88
Fruit	Grape, Raisin	18,897	Other Crops	Research Commodity	93
Fruit	Grape, Wine	17,662	Seed Crop	Alfalfa	839
Fruit	Kiwi	18	Seed Crop	Sudangrass	24
Fruit	Nectarine	149	Vegetable	Carrot	437
Fruit	Olive	298	Vegetable	Corn For/Fodder	1,038
Fruit	Orange	532	Vegetable	Corn, Human Consumption	10
Fruit	Orange, Tangelo	40	Vegetable	Garlic	69
Fruit	Peach	577	Vegetable	Onion	340
Fruit	Pear	44	Vegetable	Potato	18
Fruit	Persimmon	73	Vegetable	Vegetable (Various)	54
Fruit	Plum	71			
				TOTAL:	**102,178**

Irrigation System Types (estimated 2012)

a) Drip / Microspray Irrigation – 75,822 acres (75.2%)
b) Sprinkler - 137 acres (0.1%)
c) Surface – 24,849 acres (24.6)

Past Working Relationship with the Bureau of Reclamation – The District has a long history of participation with Reclamation and coordinates on many levels as follows:

- In 1951 the District entered into a contract for a loan from Reclamation for funding of the distribution system that served approximately ½ of the District lands.
- In 1959 the District entered into second contract for a loan from Reclamation for to construct the remainder of the distribution system. This financing of District improvements was recently paid off and the District is waiting for formal title transfer of the improvements from Reclamation.
- The District receives Class 1 and Class 2 Irrigation waters from Reclamation owned or administered water storage facilities.
- The District is working with Reclamation of Warren Act Contracts, Fresno River Riparian Plan and the Madera Ranch Water Bank.
- The District has received Field Service Grants from Reclamation for GIS and District Mapping including sensors and handheld equipment.
- Reclamation has also funded Meter Replacement grants in 2009, 2010, and 2011 including 2013 WaterSMART for SCADA Improvements.

iii) Technical Project Description

The proposed project will include the following:

- Permitting: National Environmental Policy Act (NEPA), National Historic Preservation Act (NHPA), and Madera County Road Encroachment.
- Topographic survey, pipeline design, and construction staking.
- Preparation and acquisition of pipeline easements.
- Demolition of existing concrete structures, road culverts, and canal banks.
- Underground 6,500' of an existing open canal to 36" diameter pipeline.
- Construct 6 precast reinforced concrete check structures and 8 reinforced concrete manholes with air vents and protection posts.
- Reconnect 8 existing farmer turnouts.
- Reconstruct 1 existing County road crossing.
- Construct reinforced concrete pipeline outlet structure.
- Construct small recharge basin at end of pipeline.
- Construct reinforced concrete basin outlet structure.
- Install solar powered automated slip meter connected to SCADA on basin outlet structure.
- As-built survey of completed construction.

To accomplish the work, the District will contract with USBR for NEPA and *Culturescape* for the NHPA permitting. The District has an excellent working relationship with Madera County Roads Department and will coordinate the necessary encroachment permit, road closure, and asphalt paving. The District will contract with *Alan Mok Engineering* professional land surveyor for the topographic survey, preparation of the easement documents, and the construction staking. The MID Engineering Department will design and prepare the necessary construction drawings and specifications in accordance with USBR standards.

In December 2015, the District's Engineering, Operations & Maintenance Departments completed a very similar pipeline project undergrounding 5,900' of the Main I Canal into a 36" pipeline which included easement acquisition, four County road closures, two check structures, 11 manholes, eight turnout reconnections, and inlet structure. The entire project was completed on time and under budget by District staff and construction equipment (construction photos are included in Appendix C).

District staff will construct the proposed pipeline, structures, turnouts, and small recharge basin. The District will contract with *Rubicon Water* for the purchase and installation of the solar powered automated slip meter, and a consultant for SCADA integration into the District's existing SCADA system. By using a solar panel to power the motorized meter and the SCADA radio, the District avoids the expense and time of requiring Pacific Gas & Electric to extend poles and overhead transmission wires to provide electricity.

IV.D.6 Environmental and Cultural Resources Compliance

(1) Will the project impact the surrounding environment (e.g., soil [dust], air, water [quality and quantity], animal habitat)? Please briefly describe all earth-disturbing work and any work that will affect the air, water, or animal habitat in the project area. Please also explain the impacts of such work on the surrounding environment and any steps that could be taken to minimize the impacts.

Air Quality – Mitigation Measures: The construction of the pipeline, structures, turnouts, and small recharge basin will require daily maintenance vehicles and construction equipment activity along the project corridor. For the entire project duration, the MID water truck will be used for dust control to mitigate any impacts to air quality. When possible, vehicles would use the adjacent county roads to reduce unnecessary dust generation. If additional import soil material is required for backfill of the existing canal, the soil will be excavated and transported from the existing USBR Airport Basin located 10 miles from the project location.

Water Quality – No impacts during construction. The post project water quality will be improved because the pipeline will eliminate the sediment erosion from the loose soils that currently comprise the canal. Work will be completed during irrigation "off-season" in dry conditions when the District stops delivering water and prior to the rainy season when storm waters are diverted into the canal system.

Animal Habitat – No impact. Construction activity is consistent with normal maintenance work and will be confined to existing County and canal access roads, and therefore no impact is foreseen to any existing animal habitat. The majority of the access roads are currently used by farm equipment for adjacent lands developed for agricultural uses.

(2) Are you aware of any species listed or proposed to be listed as a Federal threatened or endangered species, or designated critical habitat in the project area? If so, would they be affected by any activities associated with the proposed project?

Yes, the project is within the Madera County region where there are a number of endangered species, such as the Blunt Nosed Leopard Lizard, Tiger Salamander, San Joaquin Kit Fox, Fresno Kangaroo Rat and the perimeter of the territory for the Swainson Hawk. However, lands adjacent to the project are in active agricultural use and therefore not considered as habitat. Since no wetlands are within the project area, it is not anticipated that the Blunt Nosed Leopard Lizard or Tiger Salamander would be present.

(3) Are there wetlands or other surface waters inside the project boundaries that potentially fall under CWA jurisdiction as "waters of the United States?" If so, please describe and estimate any impacts the project may have.

None present.

(4) When was the water delivery system constructed?

The canal system originates back in the late 1800s but the modern delivery system was constructed with Reclamation assistance in 1951 and 1955.

(5) Will the project result in any modification of or effects to, individual features of an irrigation system (e.g., headgates, canals, or flumes)? If so, state when those features were constructed and describe the nature and timing of any extensive alterations or modifications to those features completed previously.

The project will replace existing concrete structures constructed in the 1950's with minor modifications to the gates in the 1970's and 1980's. No known modifications have been completed to the canal gate systems since the aforementioned time.

(6) Are any buildings, structures, or features in the irrigation district listed or eligible for listing on the National Register of Historic Places? A cultural resources specialist at your local Reclamation office or the State Historic Preservation Office can assist in answering this question.

A number of historical structures listed on the National Register of Historic Places with are present within the District Boundaries; however, all of these are within the Madera City limits and far removed from the location of the proposed project.

(7) Are there any known archeological sites in the proposed project area?

Although the project area is within the historical boundaries of the Mono Tribe, no known archaeological sites or features are present in the project area vicinity.

(8) Will the project have a disproportionately high and adverse effect on low income or minority populations?

No. Low income or minority populations will not be affected by this project.

(9) Will the project limit access to and ceremonial use of Indian sacred sites or result in other impacts on tribal lands?

No. The proposed project will not limit access to ceremonial use of Indian sacred sites or result in any other impacts on tribal lands.

(10) Will the project contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species known to occur in the area?

No. The project will not contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species known to occur in the area.

IV.D.7 Required Permits or Approvals

Applicants must state in the application whether any permits or approvals are required and explain the plan for obtaining such permits or approvals. To complete a renewable energy project within the time frame required of this FOA, it is recommended that an applicant has commenced the necessary permitting process prior to applying.

The project will begin at the end of the existing Reclamation Lateral 24.2-17.0 pipeline. The District holds a prescriptive easement for the existing canal.

The proposed project will require a Madera County road encroachment permit for the work adjacent to Road 19, Avenue 15, and reconstruction of the existing Road 18 crossing. No other regulatory agencies have jurisdiction within the project limits.

IV.D.8 Official Resolution

Include an official resolution adopted by the applicant's board of directors or governing body, or for state government entities, an official authorized to commit the applicant to the financial and legal obligations associated with receipt of WaterSMART Grant financial assistance, verifying:

The official resolution by the Board of Directors of the Madera Irrigation District complying with the announcement requirements is in Appendix G.

IV.D.9 Project Budget

The project budget includes: (1) Funding Plan and Letters of Commitment, (2) Budget Proposal, (3) Budget Narrative and (4) Budget Form.

i) Funding Plan and Letters of Commitment

Describe how the non-Reclamation share of project costs will be obtained. Reclamation will use this information in making a determination of financial capability.

The proposed project non-Reclamation cost share shall be funded by Madera Irrigation District capital project (cash) reserves. No third party funding agency or other source is intended to be used for this project.

V.A.1 Evaluation Criterion A: Water Conservation

Subcriterion No. A.1: Quantifiable Water Savings:

Describe the amount of water saved. *For projects that conserve water, please state the estimated amount of water expected to be conserved (in acre-feet per year) as a direct result of this project. Please provide sufficient detail supporting how the estimate was determined, including all supporting calculations. Please be sure to consider the questions associated with your project type (listed below) when determining the estimated water savings, along with the necessary support needed for a full review of your proposal (please note, the following is* ***not*** *an exclusive list of eligible project types. If your proposed project does not align with any of the projects listed below, please be sure to provide support for the estimated project benefits, including all supporting calculations and assumptions made).*

It is estimated that the entire District's water losses are approximately 59,000 to 63,000 acre feet in above average rainfall seasons and 6,000 to 12,000 acre feet in below average rainfall seasons. These losses are attributed to: i) imbalances in channel flows, ii) unanticipated high flows from storm waters that are channeled or piped into the system from the City of Madera requiring "dumping" of excess into the Madera Ranch Water Bank lands (partially completed at this time) or through overflows into creeks and rivers, iii) canal seepage and evaporation, and iv) unforeseen canal breaching caused by ground squirrels burrowing into embankments. In situations where water is lost during irrigation season, it may require upstream releases to compensate for lost volumes from stored allocations behind federal dams. This then, especially in a drier than normal rainfall season and Federal allocations are reduced, releases limited resources earlier than intended by the District.

- *What is the applicant's average annual acre-feet of water supply?*

The District's annual water is approximately 122,500 acre feet.

- *Where is the water that will be conserved currently going (e.g., back to the stream, spilled at the end of the ditch, seeping into the ground, etc.)?*

The water that will be conserved is currently loss to seepage in the sandy canal, through evaporation, and through spills outside the District.

- *Where will the conserved water go?*

Depending on the time of year and related factors (IE: storm water runoff waters), conserved waters will be: i) better utilized within the District; ii) channeled to the water bank lands, or iii) remain behind the dam at the Hidden or Friant Dams until needed.

Please address the following questions according to the type of project you propose for funding.

(1) Canal Lining/Piping: *Canal lining/piping projects can provide water savings when irrigation delivery systems experience significant losses due to canal seepage. Applicants proposing lining/piping projects should*

address the following:

(a) How has the estimated average annual water savings that will result from the project been determined? Please provide all relevant calculations, assumptions, and supporting data.

The most recent 2013 WaterSMART grant installed an automated slip meter connected to SCADA at the head of the Lateral 24.2-17.0 canal. Because of the drought in recent years, the District has not had an irrigation season to measure continuous flows down the canal. Previously, District staff manually operated the canal head gate and verified the approximate flow from a downstream weir and staff gauge. There is no historic record of daily flows down the canal. In the future, the recently installed slip meter at the head will accurately measure the flows to within +/-2% and provide a continuous record of flows in the District's SCADA system.

Over years of data in the District's USBR Water Management Plans, system seepage represents 33% and evaporation represents 1% of inflows. Through ditch tender anecdotal evidence and proof of sandy soils with high percolation rates within the project limits, the quantifiable water savings assume an above average seepage rate of 35%. The District does have records of turnout delivery and canal spill volumes within the project boundary since 1999. The total volume delivered to Turnouts #19 through #26 from 1999-2013 is 22,516 AF, or approximately 1,501 AF per year. The spill from 1999-2013 is 6,777 AF, or approximately 452 AF per year. The average canal inflow per year within the project limits is (1,501+452 AF) / (1 – 0.36) = 3,051 AF. Therefore, on average, the quantifiable water savings from 35% canal seepage is 1,068 AF and 1% canal evaporation is 31 AF. The total average water conserved from the proposed pipeline would be 1,099 AF per year. Refer to Lateral 24.2-17.0 Project Savings Table below:

LATERAL 24.2-17.0 PIPELINE BELOW ROAD 19 WATER USAGE AND PROJECT SAVINGS / YEAR				
YEARS	T.O. #	AC-FT	YEAR	AF SPILL #19
TOTAL AF FROM 1999-2006	335-19	6,849	1999	692
TOTAL AF FROM 1999-2013	335-20	3,389	2000	1,222
TOTAL AF FROM 1999-2013	335-21	1,996	2001	392
NOT USED	335-22	-	2002	437
NOT USED	335-23	-	2003	556
TOTAL AF FROM 1999-2013	335-24	5,729	2004	266
TOTAL AF FROM 1999-2006	335-25	1,104	2005	427
TOTAL AF FROM 1999-2006	335-26	3,449	2006	592
TOTAL USED BELOW RD 19		22,516	2007	223
AVERAGE USED BELOW RD 19 IN 15 YRS		1,501	2008	559
SUM OF AVERAGE T.O. DELIVERY + SPILL		1,953	2009	377
AVERAGE REQUIRED CANAL FLOW		3,051	2010	408
AVERAGE SAVINGS DUE TO SEEPAGE	35%	1,068	2011	310
AVERAGE SAVINGS DUE TO EVAPORATION	1%	31	2012	229
SUBTOTAL AVERAGE SAVINGS IF PIPED		**1,099**	2013	86
AVERAGE SAVINGS DUE TO STABLE FLOWS	1%	15	2014	NO SEASON
AVERAGE SCADA METER ON BASIN OUTLET SAVINGS DUE TO SPILL	95%	429	2015	NO SEASON
AVERAGE GROUNDWATER RECHARGE	1.5 IN/HR	216	TOTAL SPILL	6,777
SUBTOTAL AVERAGE SAVINGS SCADA		**660**	AVERAGE SPILL	452
AVERAGE TOTAL PROJECT SAVINGS/YR		**1,759**		

(b) How have average annual canal seepage losses been determined? Have ponding and/or inflow/outflow tests been conducted to determine seepage rates under varying conditions? If so, please provide detailed descriptions of testing methods and all results. If not, please provide an explanation of the method(s) used to calculate seepage losses. All estimates should be supported with multiple sets of data/measurements from representative sections of canals.

The calculations in (a) above were based upon historic District records system wide. Specific seepage studies on the Lateral 24.2-17.0 canal have not been conducted because constant flow measurement was not previously possible. Because of the drought in recent years, the District has not been able to utilize the new automated slip meter at the canal head. Accurate detailed seepage studies will be possible during the next irrigation season.

(c) What are the expected post-project seepage/leakage losses and how were these estimates determined (e.g., can data specific to the type of material being used in the project be provided)?

The post-project pipeline seepage losses are virtually zero because of the proposed double-gasketed polypropylene triple wall pipe. Additional waterstop gaskets are used in each reinforced concrete collar at structure connections. Evaporation would also be zero. In regard to the proposed structures, concrete, being a porous material, would absorb some moisture, but the amount is negligible.

(d) What are the anticipated annual transit loss reductions in terms of acrefeet per mile for the overall project and for each section of canal included in the project?

The post-project losses are insignificant and essentially 0 AF / mile of pipeline.

(e) How will actual canal loss seepage reductions be verified?

Actual canal loss seepage reductions will be verified through comparison of the pre-project available historic data from the existing turnout meter and recorder records, and the post project turnout meter and automated slip meter continuous flow measurement records in the District's SCADA system.

(f) Include a detailed description of the materials being used.

The proposed pipe material is ADS triple-wall, double-gasketed polypropylene pipe. The pipe joints are rated by the manufacturer up to 15psi of head pressure. The proposed low-head pipeline pressures will not exceed 5 psi.

***(4) SCADA and Automation:** SCADA and Automation components can provide water savings when irrigation delivery system operational efficiency is improved to reduce spills, over-deliveries, and seepage. Applicants proposing municipal metering projects should address the following:*

(a) How have average annual water savings estimates been determined? Please provide all relevant calculations, assumptions, and supporting data.

The average annual water savings estimates have been determined from the spill from 1999-2013 reported as 6,777 AF, or approximately 452 AF per year. Due to high efficiency and accuracy of the proposed slip meter, 95% reduction in spill will yield 429 AF. Refer to Lateral 24.2-17.0 Project Savings Table in (1) (a) above.

(b) Have current operational losses been determined? If water savings are based on a reduction of spills, please provide support for the amount of water currently being lost to spills.

Currently, the canal has a Steven's Type F recorder which measures the spill outside of the District. The proposed SCADA slip meter on the small recharge basin outlet structure would dramatically reduce the canal spill, and more accurately measure any future spill leaving the District. The recharge basin will replenish the groundwater within the District boundaries instead of flowing into the Fresno River. Refer to Lateral 24.2-17.0 Project Savings Table in (1) (a) above for data and calculations.

(c) Will annual farm delivery volumes be reduced by more efficient and timely deliveries? If so, how has this reduction been estimated?

Yes. Though this grant will not be replacing the meters to individual farm delivery turnouts, the system wide water usage trends over time should show more efficient deliveries and that water is being better managed because the proposed automated gates and meters on the main channels will maintain a constant water surface and provide a steady head to each farm delivery turnout. Steady head pressure at each farm gate benefits both the District and the growers. The District benefits because the meters at each turnout will be operating when the pipe is flowing full, which yields the most accurate measurements. The growers benefit because their pumps can operate at a constant speed without fluctuations. When the canal levels are in a constant state of fluctuation due to the changing flows of the creek and river, the grower pumps can draw more water than they need, or run short of water which can cause pump cavitation, internal damage, and additional energy consumption.

During times when the canal levels drop, the length of the grower delivery increases and causes scheduling delays to the next grower in line. In addition, District staff react to low levels in the canal by increasing pump rates on the water supply to meet the grower's needs, which can lead to oversupply and spills as the supply wave passes through the system. The proposed project will eliminate the current system of increasing flows from the pumps and basin to achieve downstream deliveries to multiple growers by visually measuring and constantly monitoring each canal segment and making delayed (due to travel time by the ditch tender) manual gate adjustments to maintain flow rates through the entire system. On an automated and remote metered system, less water is required to flow through the system and the grower gets exactly what he needs, when he needs it.

It could be estimated that approximately 1-2% of delivered water could be saved by balancing canal flows and providing constant head pressure at the farm delivery gates. Excluding drought years, the District's total average delivery is 1,501 AF. 1% savings would yield approximately 15 AF conserved.

(d) Will canal seepage be reduced through improved system management? If so, what is the estimated amount and how was it calculated?

Refer to (1) (a) above

(e) How will actual water savings be verified upon completion of the project?

Refer to (1) (e) above. Also, the pre-project recorder spills will be compared to the post-project slip meter spills to prove 95% efficiency.

(5) ***Groundwater Recharge****: Groundwater recharge can provide savings when surface water storage evaporation is reduced and/or surface runoff is intercepted for recharge. Applicants proposing groundwater recharge projects should address the following:*

The project proposes a small recharge basin at the end of a pipeline. The limited real estate available will limit the overall capacity of the basin. The basin dimensions will be approximately 525' long x 45' wide with an automated slip meter on the basin outlet to maintain upstream water levels and accurately measure any spill out of the basin. Refer to the Project Savings/Year Table in 1(a).

(a) How have average annual water savings estimates been determined? Please provide all relevant calculations, assumptions, and supporting data.

The small basin floor will be approximately 0.4 acres. The existing soils in the canal alignment are very sandy with estimated percolation rates of 1.5 inches per hour. During the irrigation season, 36 inches per day would be percolated over 0.4 acres yielding in 1.2 AF per day of groundwater recharge within the District boundaries, instead of spilling out of the District and ultimately into the Fresno River. In an average 180-day irrigation season, this results in 216 AF of groundwater recharge.

(b) Describe the source of the water to be used for recharge and what percentage of the recharged water is going to be available for use and how it will be used. Describe how this supply of water will offset other supplies.

The source of the water will be from Reclamation contracts on Millerton Lake. Groundwater recharge is critical in the Madera and Chowchilla subbasins because the depth to groundwater has dropped approximately 29 feet in the past 6 years. Madera is identified as a critically overdrafted basin. This project will make a small impact to replenish the groundwater which local growers will use when surface water supplies are not available in dry periods.

(c) If water savings are based on reduced surface water storage evaporation, provide calculations for reduced evaporation losses.

N/A.

(d) If water savings are based on recharge from existing surface runoff, provide calculations quantifying the estimated increased deep percolation amount.

N/A.

(e) How will actual water savings be verified upon completion of the project?

A meter will be installed at the pipeline outlet structure to measure the flows into the basin. The proposed automated slip meter connected to the District's SCADA system will measure any excess flows that may spill out of the basin. More detailed percolation rates will be determined after the season.

Subcriterion No. A.2: Percentage of Total Supply

*Up to **4 additional points** may be allocated based on the percentage of the applicant's total average water supply (i.e., including all facilities managed by the applicant) that will be conserved directly as a result of the project.*

***Provide the percentage of total water supply conserved:** State the applicant's total average annual water supply in acre-feet. Please use the following formula:*

$$\frac{\text{Estimated Amount of Water Conserved}}{\text{Average Annual Water Supply}} = \frac{1{,}759 \text{ AF}}{122{,}500 \text{ AF}} = 1.4\%$$

V.A.2 Evaluation Criterion B: Energy-Water Nexus

*Up to **16 points** may be awarded based on the extent to which the project increases the use of renewable energy or otherwise results in increased energy efficiency.*

Subcriterion No. B.2: Increasing Energy Efficiency in Water Management

*If the project is not implementing a renewable energy component, as described in Subcriterion No. B.1 above, up to **4 points** may be awarded for projects that address energy demands by retrofitting equipment to increase energy efficiency and/or through water conservation improvements that result in reduced pumping or diversions.*

***Describe any energy efficiencies that are expected to result from implementation of the water conservation or water management project** (e.g., reduced pumping).*

- *Please provide sufficient detail supporting the calculation of any energy savings expected to result from water conservation improvements. If quantifiable energy savings are expected to result from water conservation improvements, please provide sufficient details and supporting calculations. If quantifiying energy savings, please state the estimated amount in kilowatt hours per year.*

Better water management will lead to surpluses stored at the reservoir and therefore, an extended irrigation season or resulting in less demand by agricultural operations to use private wells to pump ground water. This would be especially true during water shortage years resulting in lower Federal water allocations to the District.

The number, size and power consumption of private wells within the District on lands supplied with District waters is not known. However, as an example, the water needs to irrigate the 75,000 acres within the District that are irrigated by drip and spray/micro-spray irrigation systems would be considerable and any extension of water deliveries derived from a better managed delivery system would be a substantial savings in utility costs to each grower who must pump water after the irrigation deliveries are terminated for the season.

This project will install one 85W solar powered automated slip meter:

1 panel x 0.085kW x 6 sun hours/day x 265 Madera sun days/year = 135 kWh/yr

- *Please describe the current pumping requirements and the types of pumps (e.g., size) currently being used. How would the proposed project impact the current pumping requirements?*

The exact number and size of pumps on private property used by the growers within the District is not known at this time. When surface water deliveries are terminated by the District, growers pump an average additional 215,000 acre feet of well water.

- *Please indicate whether your energy savings estimate originates from the point of diversion, or whether the estimate is based upon an alternate site of origin.*

The energy savings originate from the point of the automated slip meter. However, the savings would be seen across the District because the conserved water and extended water season would reduce the farmer groundwater pumping.

- *Does the calculation include the energy required to treat the water?*

N/A

- *Will the project result in reduced vehicle miles driven, in turn reducing carbon emissions? Please provide supporting details and calculations. Describe any renewable energy components that will result in minimal energy savings/production (e.g., installing small-scale solar as part of a SCADA system).*

The installation of a remotely managed system results in the reduced employee trips to monitor, manually operate the existing boarded weir structures to manage spill. Currently, the ditch tender must make 2-3 trips per day to perform these operations. The new slip meter will reduce the effort to 1 trip per day for observation and maintenance work. On average, 1.5 less trips per day would result in 15 less miles per day, multiplied by 180 day season, yields or 2,700 vehicle miles per year.

V.A.3 Evaluation Criterion C: Benefits to Endangered Species

*Up to **12 points** may be awarded for projects that will benefit federally- recognized candidate species or up to **12 points** may be awarded for projects expected to accelerate the recovery of threatened or endangered species, or addressing designated critical habitat. Note: proposals for water efficiency projects that simply*

state that a species in the basin will benefit from water savings (i.e., without a commitment to dedicate water savings for instream flows) shall receive minimal consideration under this criterion.

This project provides no benefit to an endangered species.

V.A.4 Evaluation Criterion D: Water Marketing

*Up to **12 points** may be awarded for projects that propose developing a new water market. Note: Water marketing does **not** include an entity selling conserved water to an existing customer. This criterion is intended for the situation where an entity that is conserving water uses water marketing to make the conserved water available to meet other existing water supply needs or uses outside of the entity's geographic service area.*

***Briefly describe any water marketing elements included in the proposed project.** Include the following elements:*

- *Estimated amount of water to be marketed*

Based upon the type of season experienced by the District, either an above average rainfall or below average rainfall season will determine how much water the District has to market. Given that the high range of 30,000 acre feet to low range of 1,440 acre feet of projected surplus allows the District to make decisions as to how to best use its reserves.

A high range season allows the District to place waters in the Madera Ranch Water Bank, sell waters to other irrigation districts and to supply smaller agricultural operations referred to as "subordinate growers" within the current District boundaries that are not holders of immediate rights to water deliveries and are classified as secondary water users.

It is assumed that in low annual rainfall event years, any savings would be best served to extend service to existing primary agricultural operations and prolong the irrigation season as much as possible to reduce the need by individual farms to pump their own irrigation water.

The water marketing therefore depends on the weather as much as how many acre feet can be conserved by this proposed project.

Over the past 15 years, the District has transferred out an average of 9,400 AF per year.

- *A detailed description of the mechanism through which water will be marketed (e.g., individual sale, contribution to an existing market, the creation of a new water market, or construction of a recharge facility)*

The mechanism for marketing of District waters is through:

- Existing agreements Districts based on acre feet of water delivered / received (contribution to an existing market) with adjacent or regional districts such as:

  Gravelly Ford Water District
  Chowchilla Water District

Lower Tule River Irrigation District
North Kern Water Storage District
Tulare irrigation District
Westlands Water District
Wheeler Ridge – Maricopa Water Storage District

- Metered flow to Subordinate Growers (secondary users not entitled to District water – individual sale).
- Diversion to the Madera Ranch Water bank (for future pumped withdrawal and sale)

- *Number of users, types of water use, etc. in the water market*

The number of users varies and is dependent on availability of a surplus (weather dependent). 10% of the waters marketed or reserved for future Water Bank sales are for agricultural users.

- *A description of any legal issues pertaining to water marketing (e.g., restrictions under Reclamation law or contracts, individual project authorities, or State water laws)*

The marketing of surplus waters must take into account any existing agreements for purchase of same, commitments to deposit waters in the Water Bank and potentially any changes to the San Joaquin River restoration agreements that in the future may alter delivery allocations.

- *Estimated duration of the water market*

April through October with occasional flows during the rainy season between November through March.

V.A.5 Evaluation Criterion E: Other Contributions to Water Supply Sustainability

*Up to **14 points** may be awarded for projects expected to contribute to a more sustainable water supply. This criterion is intended to provide an opportunity for the applicant to explain 1) how the project relates to a completed **WaterSMART Basin Study**; 2) how the project could expedite future **on-farm improvements**; and/or 3) how the project will provide **other benefits to water supply sustainability** within the basin. An applicant may receive the **maximum 14 points** under this criterion based on discussion of one or more of these subcriteria.*

Subcriterion E.1: Addressing Adaptation Strategies in a WaterSMART Basin Study

*Up to **14 points** may be awarded for projects that address an adaptation strategy identified **in a compieted WaterSMART Basin Study.***

- *Identify the specific WaterSMART Basin Study where this adaptation strategy was developed. Describe in detail the adaptation strategy that will be implemented through this WaterSMART Grant project and how the proposed WaterSMART Grant project would help implement the adaptation strategy.*

Although not tied to Reclamation funded WaterSMART Basin Study, the District is implementing a water storage program as a participant with a consortium of members in the Madera Ranch

Water Bank project. A recently completed Rapid Appraisal Process by California Polytechnic State University in San Luis Obispo, California illustrates the need for this type of action within the San Joaquin /Fresno River Water Basin.

The adaptation strategy is to provide available surface waters in the Madera Groundwater basin for use in recharging unconfined aquifers. The Madera Ranch project located at a natural low point / depression within the basin is ideal for this purpose. Agricultural operations that have a history of over pumping for agricultural uses are drawing groundwater into the depression from the west which has salinity content not conducive for irrigation waters. In addition, this overuse of the aquifer has caused degradation of groundwater levels throughout the Madera and Chowchilla Subbasins in Madera County.

The full RAP report is available for review at the Madera Irrigation District website: http://www.madera-id.org/index.php/services/engineering-department

- *Describe how the adaptation strategy and proposed WaterSMART Grant project will address the imbalance between water supply and demand identified by the Basin Study.*

The one issue that will contribute to the success of the Water Bank project is the ability of the District to generate surplus flows during both above average and below average rainfall seasons. The RAP report notes that even a 100 acre foot contribution to the Water bank has beneficial values to rebuilding the unconfined aquifer. The WaterSMART Grant will allow the District to achieve steady flows throughout its canal system, manage flows to reduce spill over, lessen severity of canal breaching and surcharging of the system due to manual operation of the Districts gates. The installation of flow measurement devices and SCADA management system will contribute to maximizing conservation efforts. The surplus created from these endeavors will create an allocation for deposit in the Water Bank project.

- *Identify the applicant's level of involvement in the Basin Study (e.g., cost- share partner, participating stakeholder, etc.).*

The implementation of the WaterSMART grant project will contribute to efforts set forth in the Madera Integrated Water Management Plan (IRWMP). This State of California required planning document requires cooperation between all water uses including agricultural, urban and environmental entities to achieve basin wide conservation and management programs. This is especially true in areas that have a depleted aquifer system due to historic over-drafting. The IRWMP sets forth goals and policies to achieve performance based results. This project is in line with those goals and policies through the Districts efforts to implement conservation efforts and contributions to restore the ground water levels.

- *Describe whether the project will result in further collaboration among Basin Study partners.*

The implementation of the WaterSMART grant project will further collaboration amongst the participating agencies of Madera Regional Water Management Group. The Group meets monthly to discuss current projects, grant funding opportunities, and regional projects that promote affordable surface water and groundwater supplies. As neighboring Districts have done, the

successful water conservation projects are shared with the Group to promote awareness and further collaboration on regional projects.

Subcriterion E.2: Expediting Future On-Farm Irrigation Improvements

*Up to **14 points** may be awarded for projects that describe in detail how they will directly expedite future **on-farm irrigation improvements**, including future on- farm improvements that may be eligible for NRCS funding.*

If the proposed projects will help expedite future on-farm improvements, please address the following:

- Include a detailed listing of the fields and acreage that may be improved in the future.

There are 102,178 irrigated acres within the District. The proposed project would benefit all farms within the District because of the water savings and improved operational supply benefits. All District growers will be able to review and learn from the District's water saving benefits of undergrounding sandy ditches into pipelines.

- *Describe in detail the on-farm improvements that can be made as a result of this project. Include discussion of any planned or ongoing efforts by farmers/ranchers that receive water from the applicant.*

The automation of canal head gates together with the SCADA system provides the base platform for future expansion of automated farm delivery gates. Though the existing turnouts are currently metered, future automated farm delivery gates would allow remote control, alarms, online ordering, automatic rescheduling, and improved on-farm management with precise irrigation flows. Growers are always seeking new technologies and researched methodologies to improve the crop yield per acre-foot of purchased water.

- *Provide a detailed explanation of how the proposed WaterSMART Grant project would help to expedite such on-farm efficiency improvements.*

The proposed project would expedite on-farm efficiency improvements by providing the necessary canal automation and SCADA system management infrastructure. The project proposes a small recharge basin and automated solar powered slip meter connected to SCADA to retain pipeline spills. Through District outreach and grower education, farmers can see the benefits of solar powered devices and automated gates to improve on-farm irrigation operations.

- *Fully describe the on-farm water conservation or water use efficiency benefits that would result from the enabled on-farm component of this project. Estimate the potential on-farm water savings that could result in acre-feet per year. Include support or backup documentation for any calculations or assumptions.*

The are no on-farm components of this project.

- *Projects that include significant on-farm irrigation improvements should demonstrate*

the eligibility, commitment, and number or percentage of farmers/ranchers who plan to participate in any available NRCS funding programs. Applicants should provide letters of intent from farmers/ ranchers in the affected project areas.

The District is unaware of NRCS funding applications at this time.

- *Describe the extent to which this project complements an existing NRCS- funded project or a project that either has been submitted or will be submitted to NRCS for funding.*

There District is unaware of NRCS funding applications at this time.

Subcriterion E.3: Other Water Supply Sustainability Benefits

*Up **14 points** may be awarded for projects that include **other benefits** to water supply sustainability.*

Projects may receive up to 14 points under this sub-criterion by thoroughly explaining additional project benefits, not already described above. Please provide sufficient explanation of the additional expected project benefits and their significance. Additional project benefits may include, but are not limited to, the following:

- *Will the project make water available to alleviate water supply shortages resulting from drought?* Yes.
    - *Explain in detail the existing or recent drought conditions in the project area. Describe the impacts that are occurring now or are expected to occur as a result of drought conditions.*

The Governor's recent proclamation regarding the statewide drought brought a heightened awareness to the groundwater depletion and aquifer overdraft in Madera County. The Madera and Chowchilla Subbasins were designated as critically overdrafted high priority basins. Local groundwater elevations have fallen approximately five feet per year for the last five years. Hundreds of residential wells have run dry and west side communities have been without water for extended periods of time requiring FEMA relief.

- *Describe the severity and duration of drought conditions in the project area.*

The drought conditions have persisted for more than four years. This is best seen in the drastic decline of the District's available water supply in recent years.

2011	396,517 AF
2012	103,551 AF
2013	104,416 AF
2014	15,978 AF
2015	9,764 AF

- *Describe how the water source that is the focus of this project (river, aquifer, or other source of supply) is impacted by drought.*

The District's Class I water supply from Friant has been 0% allocation since 2014. Because of the statewide drought, Exchange Contractors senior rights and river restoration programs on the San Joaquin River, there has been very limited water supply in recent years. The drought has also depleted District's supply reservoirs.

- *Provide a detailed explanation of how the proposed WaterSMART Grant project will improve the reliability of water supplies during times of drought.*

During the drought years, growers must rely on groundwater pumping to sustain their current crops and farming operations. The proposed WaterSMART grant project will conserve the precious water supplies and replenish the groundwater aquifer with the excess water supplies that occur during the irrigation and flood seasons.

- *Will the project make water available to address a specific concern? For example:*

  - *Will the project directly address a heightened competition for finite water supplies and over-allocation (e.g., population growth)?*

Yes. Water resources in the Central San Joaquin valley are a finite supply. The construction of the pipeline and installation of the automated slip meter connected to the District's SCADA system will result in water savings to the Madera Irrigation District growers, which in turn creates more water availability to downstream users. If the individual growers or District determines an excess from their allocations and opts to market the savings, the availability of irrigation waters is extended to others within the State suffering from population growth, aquifer overdraft, etc. This project will allow for better utilization of these limited water resources.

  - *Describe how the water source that is the focus of this project (river, aquifer, or other source of supply) is impacted by climate variation.*

The Hidden Dam at Hensley Lake and Friant Dam at Millerton lake are mainly served by snowmelt and therefore, have different and more frequent peaks, thus reducing the District's supply and increasing the need for water conservation efforts like this project.

  - *Will the project help to address an issue that could potentially result in an interruption to the water supply if unresolved?*

The San Joaquin River Restoration Settlement which implements the San Joaquin River Restoration project reduced allocations to all water users. All users of Friant Dam waters have had to adjust to this reallocation. As stated above, this project will allow for better utilization of these limited water resources.

- *Will the project make additional water available for Indian tribes?*

No. Tribal lands are not present in the vicinity of the District.

- *Will the project make water available for rural or economically disadvantaged communities?*

Yes. Better management of water resources equates to meeting demand for water that is in short supply and increasingly reduced by allocations to different interests not only in the water basin, but in the San Joaquin Valley. Better management also means meeting grower needs without excessive waste in doing so, such as over-supplying growers in an unbalanced water distribution system. What is not wasted here is used elsewhere.

The installation of the automated gates and SCADA management system may result in a net water savings to the Madera Irrigation District growers which in turn creates more water availability to the disadvantage City and County of Madera.

- *Does the project promote and encourage collaboration among parties?*

Yes. Through the District's media channels (i.e., newsletter, website, Facebook, Twitter, annual Growers' meeting, etc.), the project will gain attention, promote and encourage collaboration among local water districts, cities, and counties.

- *Is there widespread support for the project?*

Yes. This project implements the goals and policies of the Integrated Water Management Plan adopted by the water districts, City and County of Madera. Each participant in the Plan must implement conservation measures and this project addresses the District's role in the IRWMP. Adjacent Water Districts (i.e., Chowchilla, Gravelly Ford, etc.) will monitor the construction and are very interested in exploring similar projects. Letters of support are located in Appendix F.

- *What is the significance of the collaboration/support?*

Water loss is a critical issue in the adjacent districts and a project that results in savings and better management is widely supported. A drought year is devastating to all districts and their member agricultural users. The ability to maintain a resource during droughts and to bank waters during abundance is beneficial to everyone.

- *Will the project help to prevent a water-related crisis or conflict?*

The majority of the discussion in the previous sections has dealt with water limitations within the Madera Water Basin. Of equal importance are operation issues that lead to extensive losses of irrigation water. Breaching of channels and overtopping can contribute to significant loses, especially if the discovery is delayed due to time of day or other factors.

The ability to have a system that can "sense" a change in spill and maintain hydraulic grade levels within the pipeline thereby removing the probability of overtopping, will contribute greatly to water savings, especially in drought years.

- *Is there frequently tension or litigation over water in the basin?*

Yes. As evidenced over the last decade with the San Joaquin River Restoration Settlement, competing interests, be it environmental or agricultural, continue to litigate over a finite resource.

- *Is the possibility of future water conservation improvements by other water users enhanced by completion of this project?*

Yes. Adjacent Water Districts will monitor the installation and operation and are very interested in exploring similar projects.

- *Will the project increase awareness of water and/or energy conservation and efficiency efforts?*

- *Will the project serve as an example of water and/or energy conservation and efficiency within a community?*

Yes, within the agricultural community. This project will demonstrate the viability of installing a pipeline and SCADA automation to minimize water losses.

- *Will the project increase the capability of future water conservation or energy efficiency efforts for use by others?*

Yes. Adjacent Water Districts will monitor the installation and operation and are very interested in exploring similar projects.

- *Does the project integrate water and energy components?*

Yes. The project incorporates physical improvements to the water delivery system and incorporates small scale solar installation to power the automated slip meter and the SCADA control system that manages it.

V.A.6 Evaluation Criterion F: Implementation and Results

Up to 10 points may be awarded for these subcriteria.

Subcriterion No. F.1: Project Planning

Points may be awarded for proposals with planning efforts that provide support for the proposed project.

Does the project have a Water Conservation Plan, System Optimization Review (SOR), and/or district or geographic area drought contingency plans in place? Does the project relate/have a nexus to an adaptation strategy developed as part of a WaterSMART Basin Study)? *Please self-certify, or provide copies of these plans where appropriate to verify that such a plan is in place.*

Provide the following information regarding project planning:

(1) Identify any district-wide, or system-wide, planning that provides support for the proposed project. This could include a Water Conservation Plan, SOR, Basin Study, drought contingency plan, or other planning efforts done to determine the priority of this project in relation to other potential projects.

As required by the State of California, Madera County has adopted a county-wide Integrated Regional Water Management Plan (IRWMP) which was approved by the State of California on June 6, 2011. This document sets forth the goals and policies for water management and conservation between all consumers whether urban or agricultural.

The goals and policies include increased use of reclaimed waters, implementation of advanced water management and delivery methods, reduction of irrigation water needs, and water basin recharge.

The Madera Irrigation District certifies that it is a member of the Regional Water Management Group. The document can be viewed at http://www.madera-county.com/index.php/forms-and-documents/category/167-the-integrated-regional-water-management-plan-irwmp

(2) Describe how the project conforms to and meets the goals of any applicable planning efforts, and identify any aspect of the project that implements a feature of an existing water plan(s).

The proposed project achieves or implements several goals of the IRWMP as follows:

- Sustainable management plan for water resources.
- Reduction in District water needs.
- Ability of the growers to implement alternative irrigation methods due to efficient and accurate water supply.
- Water savings can be used for water recharge.

Subcriterion No. F.2: Readiness to Proceed

Points may be awarded based upon the extent to which the proposed project is capable of proceeding upon entering into a financial assistance agreement.

Describe the implementation plan of the proposed project. Please include an estimated project schedule that shows the stages and duration of the proposed work, including major tasks, milestones, and dates. ***(Please note, under no circumstances may an applicant begin any ground-disturbing activities—including grading, clearing, and other preliminary activities—on a project before environmental compliance is complete and Reclamation explicitly authorizes work to proceed).***

This proposed project involves:

- Permitting: National Environmental Policy Act (NEPA), National Historic Preservation Act (NHPA), and Madera County Road Encroachment.
- Topographic survey, pipeline design, and construction staking.
- Preparation and acquisition of pipeline easements.
- Demolition of existing concrete structures, road culverts, and canal banks.
- Underground 6,500' of an existing open canal to 36" diameter pipeline.
- Construct 6 precast reinforced concrete check structures and 8 reinforced concrete manholes with air vents and protection posts.
- Reconnect 8 existing farmer turnouts.
- Reconstruct 1 existing County road crossing.
- Construct reinforced concrete pipeline outlet structure.
- Construct small 3 acre-feet (AF) recharge basin at end of pipeline.
- Construct reinforced concrete basin outlet structure.
- Install solar powered automated slip meter connected to SCADA on basin outlet structure.
- As-built survey of completed construction.

The following schedule shows the sequence and timing of the proposed work. Work can proceed as soon as permits are obtain and the irrigation "off-season" arrives. The challenge with pipeline projects are unknown weather conditions and the start of the irrigation season. Since the construction timeline is 16 weeks, approximately 4 months, it is difficult to determine whether the project will be constructed in the spring or fall of 2017. In order to avoid potential schedule delays due permitting and easement acquisition, the proposed construction will start after the 2017 irrigation season as shown below.

Item	Start Date	End Date
MID Administer grant	10/1/2016	9/30/2018
Task 1: NEPA, NHPA, and County permitting	10/1/2016	1/31/2017
Task 2: Survey	10/1/2016	12/31/2016
Task 3: Easement Acquisition	1/1/2017	3/31/2017
MID Design, Inspection, & As-built Survey	1/1/2017	3/31/2018
MID Construction, Materials, & Equipment	9/1/2017	3/31/2018
Task 4: QA/QC Material and Compaction Testing	9/1/2017	3/31/2018
Task 5: Rubicon Water Slip Meter & SCADA	1/1/2018	9/30/2018

Please explain any permits that will be required, along with the process for obtaining such permits. Identify and describe any engineering or design work performed specifically in support of the proposed project.

The project will require NEPA, NHPA, and Madera County Encroachment Permits. District staff will work with their designated representatives from Reclamation to secure the NEPA permit. The District will contract with *Culturescape* for the NHPA reports. The District will obtain the necessary

Madera County Encroachment Permit; the District routinely works with the County Roads Department and permitting is typically completed within a 2-week timeline.

Subcriterion No. F.3: Performance Measures

Points may be awarded based on the description and development of performance measures to quantify actual project benefits upon completion of the project.

Provide a brief summary describing the performance measure that will be used to quantify actual benefits upon completion of the project (e.g., water saved, marketed, or better managed, or energy saved). For more information calculating performance measure, see Section VIII.A.1. FY2016 WaterSMART Water and Energy Efficiency Grants: Performance Measures.

Note: All WaterSMART Grant applicants are required to propose a "performance measure" (a method of quantifying the actual benefits of their project once it is completed). A provision will be included in all assistance agreements with WaterSMART Grant recipients describing the performance measure, and requiring the recipient to quantify the actual project benefits in their final report to Reclamation upon completion of the project. If information regarding project benefits is not available immediately upon completion of the project, the financial assistance agreement may be modified to remain open until such information is available and until a Final Report is submitted. Quantifying project benefits is an important means to determine the relative effectiveness of various water management efforts, as well as the overall effectiveness of WaterSMART Grants.

The performance measures for the project will include the following:

a) Pipeline: Actual canal loss seepage reductions will be verified through comparison of the pre-project available historic data from the existing turnout meter and recorder records, and the post project turnout meter and automated slip meter continuous flow measurement records in the District's SCADA system.

b) SCADA: The pre-project recorder spills will be compared to the actual post-project slip meter spills to prove 95% efficiency.

c) Groundwater Recharge: A meter will be installed at the pipeline outlet structure to measure the flows into the basin. The proposed automated slip meter connected to the District's SCADA system will measure any excess flows that may spill out of the basin. Detailed percolation rates will be possible to determine after the first season.

Subcriterion No. F.4: Reasonableness of Costs

Points may be awarded based on the reasonableness of the cost for the benefits gained.

Please include information related to the total project cost, annual acre-feet conserved, energy capacity, or other project benefits and the expected life of the improvement(s).

For all projects involving physical improvements, specify the expected life of the improvement in number of years and provide support for the expectation (e.g., manufacturer's guarantee, industry accepted life-expectancy, description of corrosion mitigation for ferrous pipe and fittings, etc.). Failure to provide this information may result in a reduced score for this section.

The total project cost is $1,184,500 for estimated average annual water savings of 1,759 AF and energy savings 135 kWh. The industry accepted life-expectancy of the polypropylene pipe material and reinforced concrete pipe is 50+ years. Rubicon Water developed the following life expectancy for each component:

Component	Expected Lifespan
Gate panels and frames	30 years
Radio	15 years
Ultrasonic Level Sensors	15 years
Batteries	5 years
Gearboxes	25 years
Motors	25 years
SDB's	15 years
Moscad-M RTU	15 years
Solar Panel	15 years
LCD Screen	15 years
Keypad	15 years

Over the 30 year lifespan, the cost of 1AF conserved is $22.45. This is money well invested considering a typical irrigation water sale price of $100/AF. Manufacturer data sheets are provided in the Appendix E.

V.A.7 Evaluation Criterion G: Additional Non-Federal Funding

*Up to **4 points** may be awarded to proposals that provide non-Federal funding in excess of 50 percent of the project costs. State the percentage of non-Federal funding provided.*

$$\frac{\textit{Non-Federal Funding}}{\textit{Total Project Cost}} = \frac{\text{MID Contribution \$603,600}}{\text{Total Project Cost \$1,184,500}} = 51\%$$

No additional Non-Federal funding beyond the District's funds are provided to this project.

V.A.8 Evaluation Criterion H: Connection to Reclamation Project Activities

*Up to **4 points** may be awarded if the proposed project is in a basin with connections to Reclamation project activities. No points will be awarded for proposals without connection to a Reclamation project or Reclamation activity.*

(1) How is the proposed project connected to Reclamation project activities?

The District has participated with Reclamation on the following projects and activities:

- The primary connection to Reclamation activities is through contracted water deliveries. In 1939, the District contracted with Reclamation for water deliveries in exchange for certain properties and interests in water filings. This agreement was modified in 1950 and in 1959.

- In 1975, the District contracted with Reclamation for the Hidden Dam project where Reclamation required the District to acquire 15,000 additional acres in exchange for water from this dam.

- The District is a participant in the San Joaquin River Restoration Settlement wherein Reclamation must provide waters from the Friant Dam to the San Joaquin River to restore historic fisheries.

(2) Does the applicant receive Reclamation project water?

Yes, under the following contracts with deliveries from the Friant and Hidden Dams:

	AF	Source	Contract #	Contract / Restriction	Expiration
USBR Agricultural Class I	85,000	Federal	175R2891-IRd	Firm as available	None
USBR Agricultural Class II	186,000	Federal	175R2891-IRd	As available subject to obligation	None
Hensley Lake	24,000+	Federal	14-06-200-4020-IRd	Fluctuating annual yield	None

(3) Is the project on Reclamation project lands or involving Reclamation facilities?

The project is not on Reclamation project lands. Reclamation's easement and Lateral 24.2-17.0 pipeline terminates at Road 19. The proposed project will commence at Road 19 and extend the 36" pipeline approximately 6,500 lineal feet by undergrounding the existing canal.

(4) Is the project in the same basin as a Reclamation project or activity?

The Madera Water Basin, in which the District and the Project are located, includes the San Joaquin and Fresno Rivers which are under the jurisdiction of Reclamation.

(5) Will the proposed work contribute water to a basin where a Reclamation project is located?

Yes. The development of the Madera Ranch Water Bank is an effort by the District and its partners to restore the ground water to a basin that has historically been over drafted by agricultural and urban uses. Portions of the surface waters provided through the Reclamation water delivery contracts and conserved under the Project will be used to replenish ground water.

(6) Will the project help Reclamation meet trust responsibilities to Tribes?

No direct impacts known.

APPENDICES

Appendix A — Project Location Map

Appendix B — Existing Site Photos

Appendix C — Representative Photos of Proposed Improvements

Appendix D — Consultant Proposals

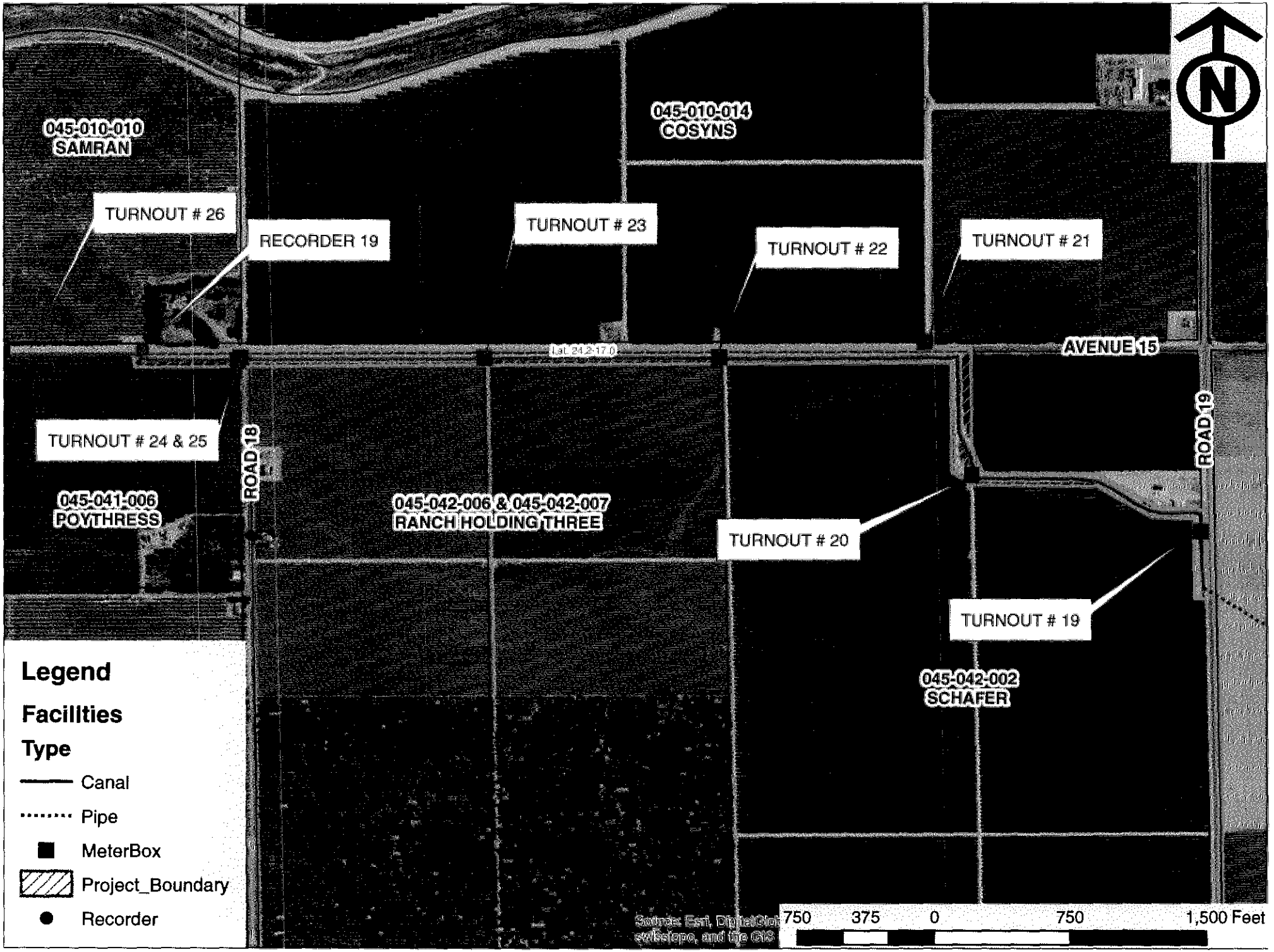
Appendix E — Rubicon Water Slipmeter Data Sheet

Appendix F — Letters of Support for the Project

Appendix G — Board Resolution

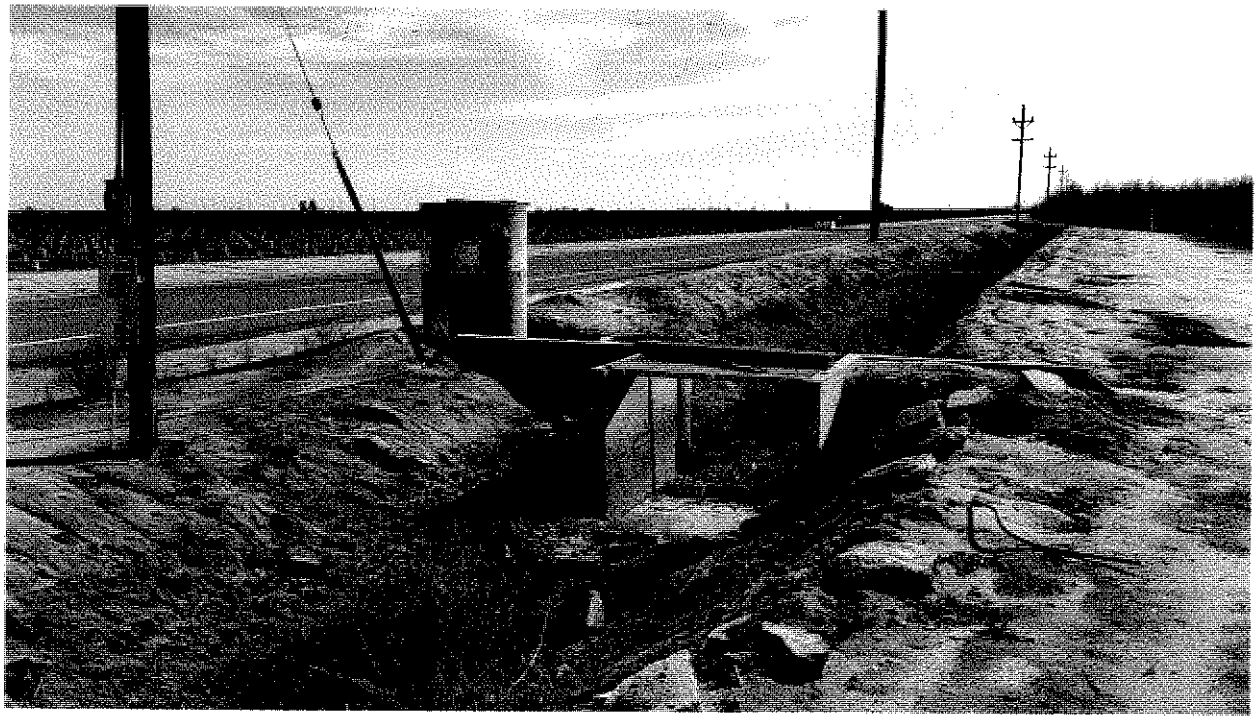
Appendix A — Project Location Map

LATERAL 24.2-17.0 PIPELINE PROJECT



Appendix B — Existing Site Photos

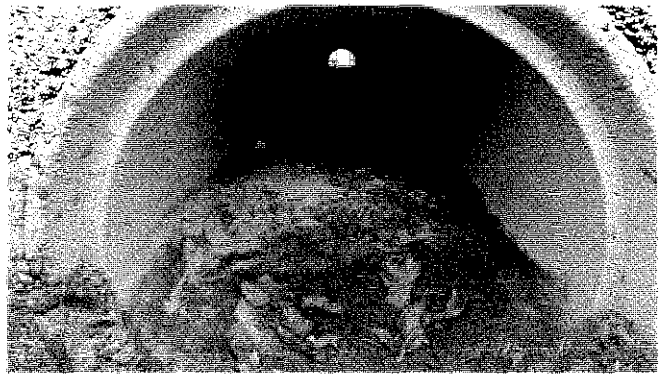
Existing check structure and turnout on Road 19. Roadside puddles and none in sandy canal.



Existing check structure and turnout on Avenue 15. Roadside puddles and none in sandy canal.

Existing breach through canal bank. Roadside puddles and none in sandy canal.

Existing culvert crossing Avenue 15 filled with sediment from unstable, sandy canal soils.

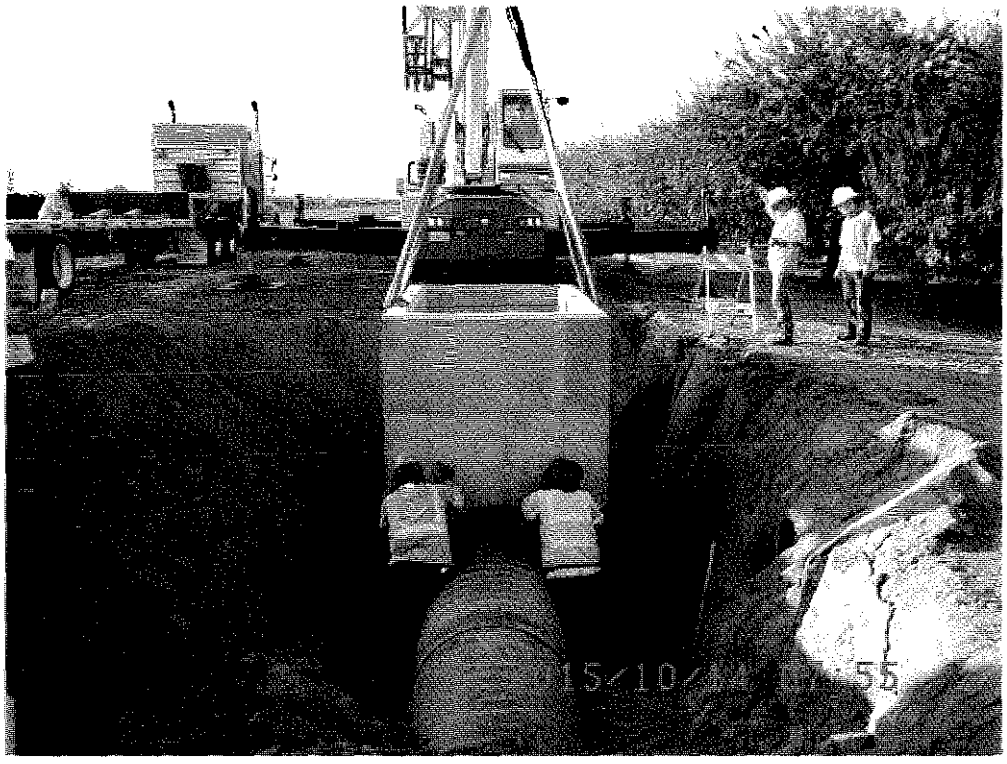


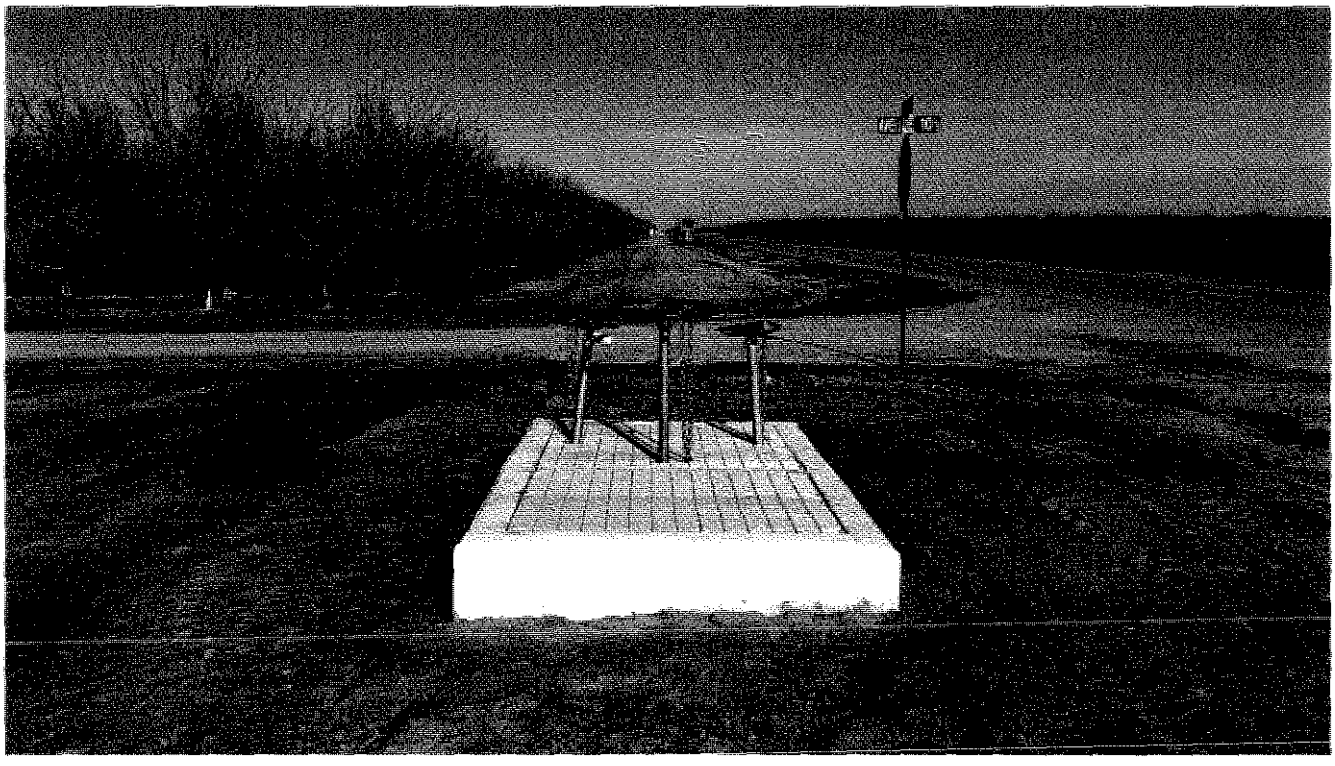
Appendix C — Representative Photos of Proposed Improvements

MID completed undergrounding 5,900' of Main I Canal into 36" pipeline in December 2015.

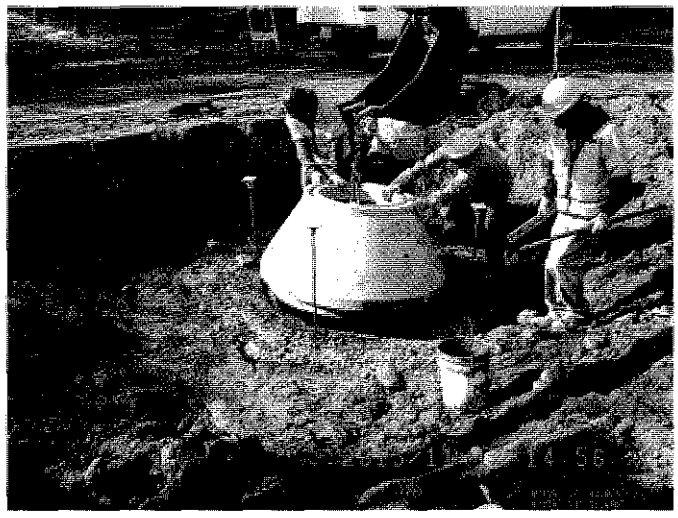
Examples of MID construction of undergrounding existing canal into 36" pipeline.

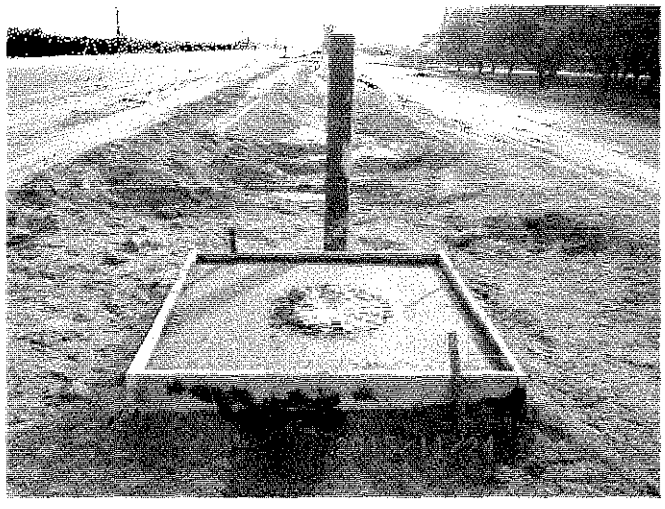
Example of MID installation of precast concrete check structure.





Examples of MID construction of reinforced concrete manholes with air vents and bollards.





Example of MID construction of reinforced concrete outlet structure.

Example of new Automated Slip Meter connected to SCADA system

Appendix D — Consultant Proposals

1) *Culturescape* – National Historic Preservation Act (NHPA)

2) *Alan Mok Engineering* – Topographic Survey, Easement Documents, Construction Staking

3) *Rubicon Water* – Slipmeter

People and space over time
CULTURESCAPE

Client: Madera Irrigation District
Contact: Sean M. Smith, PE, MBA District Engineer
Address: 12152 Road 28 1/4, Madera, CA 93637
Telephone Number: (559) 673-3514) Mobile: (559) 715-2550
Fax: (559) 673-0564

Purpose: Cultural Resources Survey and Report for Construction of a 6,500' Pipeline

Service Provider: Culturescape: Cultural Resource Management
Address 6182 Carter Rd. Mariposa, California, 95338
Telephone Number: 209 966-3327
E-mail Address: mck@sierratel.com
Nature: Private Consulting

Sean,

Thank you for your consideration of Culturescape for your cultural management needs on your upcoming proposal

1.0 Culturescape (the Company) proposes to provide services consisting of:

1.1) an archaeological records search, to determine if sites have been located within the project area or in close proximity (.50 miles) to proposed facilities, a review and report of findings for construction of a 6,500' Pipeline from Road 19 west along Avenue 15 in Madera, CA.

1.2) Implement a methodology that considers the historical context of elements within the APE and introduce research questions for archaeological, historical, and ethnographic themes. This will include the methodology to identify and record surface and sub-surface features and the criteria for evaluation of discovered resources with regard to the eligibility of discovered resources for inclusion into the National Register. This will include acquisition of any necessary permits to conduct the work.

1.3) Survey for historic and prehistoric sites at one location, approximately 6,500' in length within the Madera Irrigation System in Madera County, California. We assume that any landowner permission, gate keys or combinations that may be necessary to enter the project areas will be provided.

1.4) Record sites within the project area with the basic recordation to meet the Secretary of the Interior \ Standards and Guidelines for Archaeology and Historic Preservation. Archaeological Resource Management Reports (ARMR): Recommended Contents and Format. Any sites located will be given a fixed location using a Trimble JUNO Global Positioning System (GPS) unit for accurate plotting and digital camera for photo documentation. Documentation for sites will be completed on forms compatible to the Department of Parks and Recreation DPR523 and will include securing Primary number and Trinomial as appropriate

through the Southern San Joaquin Valley Information Center.

1.5) Documentation and delivery of such to client. These reports will include Primary Record forms, photographs, maps, reports and recommendation for mitigation of Cultural resources that may be affected, including negative archaeological findings.

1.51) The submission of documentation to the client will include:
A. two hard copies and one CD or DVD.

B. Digital data including GIS shape files, photos and maps on a CD or DVD.

C. Revised and Final Inventory Report that includes revision of draft comments and submission of three hard copies and one electronic version to Reclamation.

D. Submission of final report draft to the Southern San Joaquin Valley Information Center.

With all archaeological survey, the possibility of discovery of sites may exist, or that are more complex; occupation sites, such as village sites, would require additional labor to document and would require a modification to the contract to record the sites, describe them in the technical document, and provide recommendations. It is assumed that the work will be completed under a cost plus percentage fee type of contract. Alternatively, if fewer resources are identified, or if the survey proceeds at a faster rate than anticipated, a cost savings will be realized. Based on the assumptions listed above, we estimate the cost of the study to be approximately $2,500.00

In the above pricing, the following items/features are included with every SlipMeter™:

- The SlipMeter is a precision flow meter that measures partial-full flow and mounts directly to a headwall or in a channel with no straight pipe requirements.
- The SlipMeter comes equipped with an internal and external frame c/w stainless steel anchors, Hilti capsules and SIKA sealant.
- Each meter comes equipped with a separate standalone control pedestal which includes a display and keypad, solar panel power system and a 16 ft mast for mounting of communication antenna; RTUs, radio and antenna by others;
- The SlipMeter comes complete with an integrated power supply comprising an 85W solar panel, a solar regulator, and a 48Ah 12 volt deep cycling battery pack. Note, the batteries must be removed from the meter and charged if the gates are not installed within four weeks of delivery;

Services during meter commissioning include:

- Visits by a Rubicon certified Field Technician will involve installation of external frame and will involve supervision of meter installation, field wiring of control pedestal to meter, commissioning and training in the operation and maintenance of the meter.

Exclusions:

- Civil works structures to fit above items.
- Supply and operation of crane for install of meter.
- RTU, Radio and antenna.

Payment Terms

Payments are to be made as follows:

- Net 30 days.
- Spare parts will be invoiced 100% when shipped.
- In the event that frames and meter/gate hardware are shipped separately, payment is to be made as follows:
    - 30% of the total price within 30 days of shipment of frames.
    - 70% of the total price within 30 days of the delivery of the meter/gate hardware.

All payments are to be made by check to Rubicon Systems America Inc.

Warranty

Rubicon Water warrants the hardware offered in this quotation to be free of defects in material and workmanship for a period of twelve months from the date of commissioning.

Warranty on spare parts is twelve months from delivery.

Rubicon Water Standard Terms of Sale applies to this Quotation and is appended to the end of this quotation.

Delivery

All hardware will be delivered by road transport to customer worksite, whereupon immediate unloading will be the responsibility of customer. Rubicon will not be responsible for any damage that may occur at customer worksite

Primary Frames will be delivered to customer worksite within 6-8 weeks of receipt of a Purchase Order.

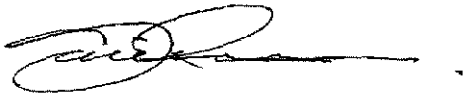
It is anticipated that the Meters/Gates and associated hardware will be delivered to customer within 16-18 weeks of receipt of a Purchase Order but will be confirmed by email once the order has been received.

The Next Step:
To accept this quotation and begin the procurement process, please sign here and return:

Customer:

Authorized Signature _____ Date _____

Authorized By:



General Manager

Appendix E — Rubicon Water Slipmeter Data Sheet

SlipMeter™

RUBICON™

Data Sheet

Overview

The SlipMeter is a combined flow meter and control gate designed to automate irrigator service points. Accurate flow measurement, precise flow control, power supply and radio telecommunications are fully integrated in a single device.

Rubicon's unique acoustic array flow measurement technology provides an accurate 3D representation of the velocity profile in the meter box. The SlipMeter accurately measures flows even in turbulent conditions. Instantaneous flow rate and total volume passed are recorded, providing a precise account of water usage.

It features a local LCD display which provides irrigators with the ability to control the service point and view instantaneous flow rate, volume of current delivery, and total flow volume for the season.

The SlipMeter can be managed and monitored on-site or operated remotely when connected to a SCADA network such as Rubicon's SCADAConnect® system.

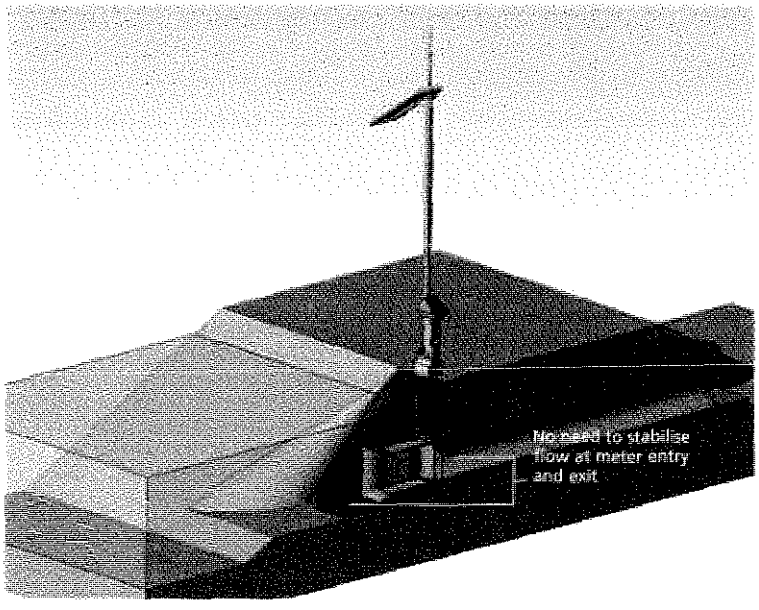
The SlipMeter automatically controls the flow of water by varying the gate position based on a desired set-point or on irrigation demand as shown in the table.

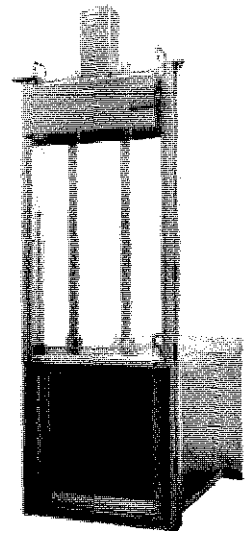
Control objective		Gate action
Local	Position	Moves to a desired set-point and stays there
	Flow	Maintains a constant flow regardless of channel levels

A TCC® product

The SlipMeter is one of the products making up a modular family of precision hardware and software called TCC (Total Channel Control®). TCC is an advanced technology set designed to improve the management and productivity of water in open channel distribution. Unlike traditional infrastructure, TCC products can interact and work together to help managers improve:

- the availability of water
- service and equity to users
- management and control
- health and safety for channel operators



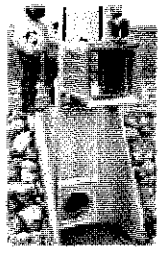


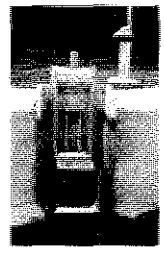
Features

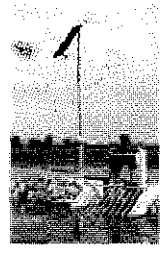
- Acoustic array flow measurement technology provides proven measurement accuracy in real world open channel flow conditions
- Ultrasonic water level measurement
- Local display software in multiple languages
- Solar-charged battery system or mains power
- SCADA ready communication system – can be integrated to many SCADA platforms
- Robust high duty cycle operation and long life
- Flow measurement accuracy is not affected by obstructions, turbulence or silt
- Independently verified flow measurement accuracy of ±2.5%*
- Standard sizes include 600, 750, 900 and 1200mm
- Very low power consumption compared to magnetic flow measurement

Ideal solution for...

- Measuring and controlling flow in farm service points
- Channel-to-pipe applications especially when large conduits are used
- Applications affected by turbulence
- Lowering civil costs because there's no need to stabilise flow at entry and exit
- Service points requiring very low head loss and/or high accuracy







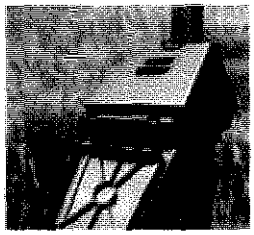
SlipMeter™

Data Sheet

Local control pedestal

Each SlipMeter installation includes a robust pedestal that provides power and control to the gate and is a secure, weather proof housing for electronic components and batteries.

The pedestal also serves as a local user interface. A keypad and LCD display are located under the lockable pedestal lid, allowing farmers to monitor, or operators to control and troubleshoot on-site.

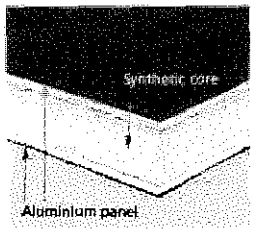


Local user interface

High strength construction

FormiPanel™ is Rubicon's high strength construction method that uses techniques adopted from the aerospace and marine industries.

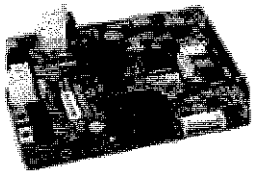
The gate panel and meter assembly is made from a laminate construction that utilises high strength industrial adhesives to bond structural grade aluminium extrusions and skin plates to a synthetic core material. The result is strong, lightweight, and corrosion resistant.



FormiPanel construction

Gate control technology

CableDrive™ is Rubicon's actuation system designed to provide precision gate position accuracy and repeatability in harsh environments. The drive is a wire-rope (cable) and drum mechanism that provides positive drive in both the raise and lower directions. It is designed for high duty cycle operation and provides precise gate positioning to within ±0.5mm. The drive is managed by Rubicon's SolarDrive® technology – a purpose built integrated circuit board that manages gate positioning, solar power regulation, battery charge, fusing and the pedestal user interface.



SolarDrive electronics

Low maintenance

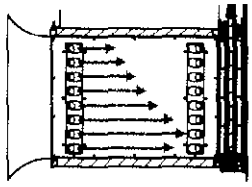
The SlipMeter's modular design allows it to be maintained in the field with minimal tools, training, and easily replaceable parts.

- Level sensors are easily removed during in-field servicing
- Seals can be replaced
- On-site diagnostics built into the software
- Service can be done by local Rubicon field technicians or authorised/trained independent local integrators

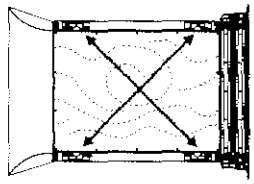
Sonaray® flow measurement technology

Rubicon's SlipMeter employs Sonaray acoustic array technology. The acoustic array principle maps the velocity profile by using multiple transecting paths to provide an accurate 3D representation of the velocity distribution within the meter box.

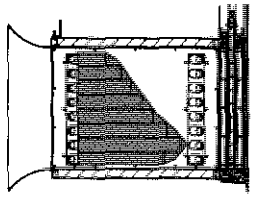
This technique measures across the entire velocity field within the meter box and is unaffected by swirl, or other non-uniform velocity distributions caused by garbage or other debris.



Eight horizontal planes sample the velocity distribution passing through the meter (side view)



Each measurement plane implements crossed-path transit time acoustics to sample the entire velocity field in that plane (plan view of measurement plane)



The horizontal velocity distributions are then integrated vertically to construct the three dimensional flow velocity distribution (side view)

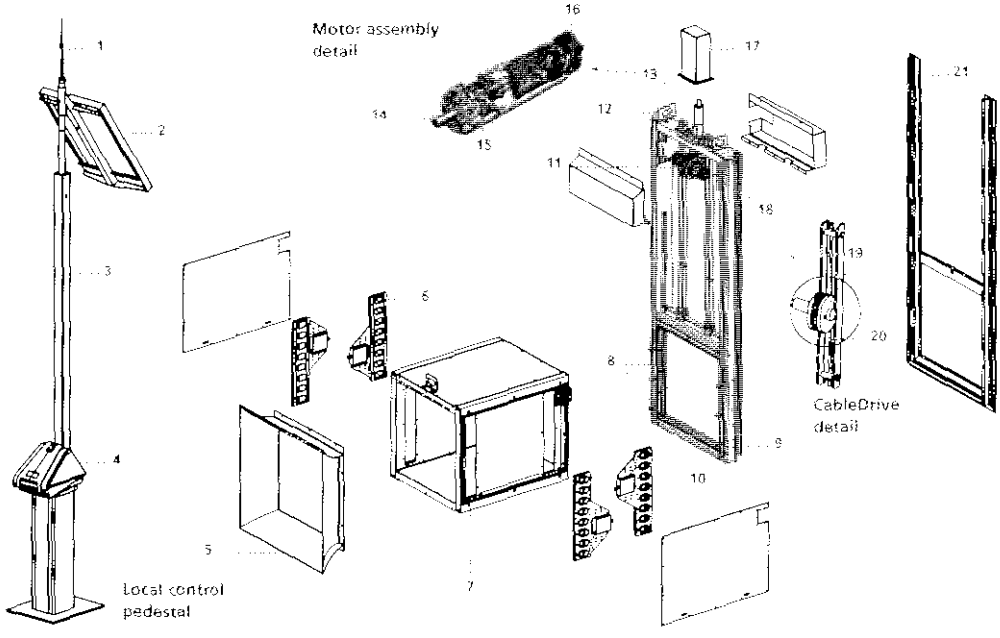
SlipMeter™ components

Control pedestal

1 Antenna
2 Solar panel
3 Hinged mast
4 Secure controller housing with LCD display

Meter/control unit

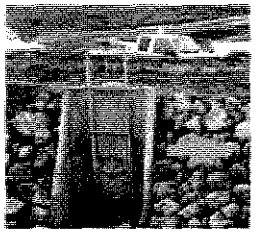
5 Entry flare
6 Sonaray sensors
7 Meter box
8 Gate seals
9 Internal frame (one side houses the ultrasonic level sensors)
10 Gate panel
11 Output drive assembly (gear box)
12 Lifting hooks
13 Motor and encoder
14 Motor drive shaft
15 Planetary gear box
16 Encoder
17 Motor cover
18 CableDrive assembly
19 Cable drum
20 Cable guide
21 External frame



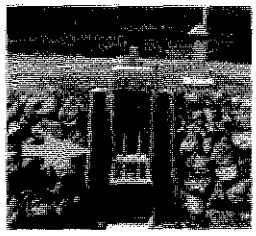
Easy to install

Rubicon's SlipMeters are designed to mount to existing headwall structures as well as purpose built emplacements significantly reducing costs associated with civil work.

- Installed and operational in two days during irrigation or off-season
- Factory calibrated and pre-configured



Remove existing manual gate and...



replace with face mounted SlipMeter™

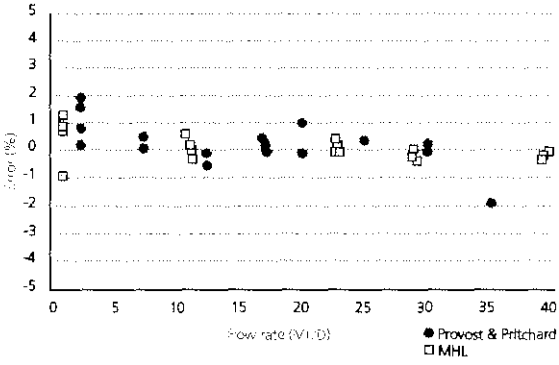
Independently tested flow measurement accuracy

The SlipMeter's flow measurement accuracy has been independently verified under a wide range of conditions in the laboratory and in the field.

- Provost & Pritchard engineers in California conducted in-situ testing in a customer service point configuration under calm, turbulent, and extreme turbulent conditions
- Manly Hydraulics Laboratory in Sydney, Australia conducted laboratory tests under wave disturbance, upstream disturbance and submerged conditions
- Testing has demonstrated compliance with AS4747

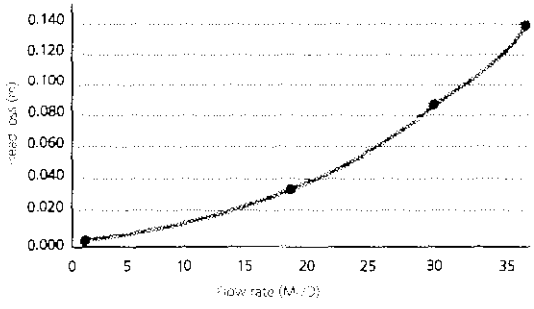
SlipMeter measurement accuracy

(600mm SlipMeter measured under normal operating conditions relative to ABB Magmaster)



SlipMeter head loss

(600mm SlipMeter measured at Manly Hydraulics Laboratory)



SlipMeter™ specifications

General	
Minimum flow rate	600mm wide gate: 1ML/d; 750mm wide gate: 1.56ML/d; 900mm wide gate: 2.25ML/d; 1200mm wide gate: 4ML/d
Data interface	Local display (4 line LCD with keypad), Modbus serial, data radio
Unit of measure	User definable (metric/Imperial (US))
Data tags	140+ available for integration into SCADA systems
Data storage	All volumetric usage is accumulated and backed up internally in nonvolatile memory. Historical data can be uploaded through the Modbus interface, a local data logger or from the SCADA host database.
Not full alarm	Alarm indicates when meter box is not full
Control	Local or remote via SCADA
Electronics	SolarDrive® power management and control technology housed in the local control pedestal. Each unit passes a 12hr heat pre-stress and 100% functional test.
Typical weight	600mm wide gate ≈ 195kg; 750mm wide gate ≈ 215kg; 900mm wide gate ≈ 290kg; 1200mm wide gate ≈ 340kg
Motor	12V DC
Gate position	256 count magnetic encoder
Seal performance	<0.02 litres/min per lineal metre of seal (better than the American and European standards AWWA C513 & DIN 19569)
Actuation options	12V DC powered (solar); AC powered; Manual with hand-crank or car battery
Flow measurement	
Technique	Cross-path acoustic transit-time
Transit time measurement resolution	100 picoseconds
Measurement frequency	100 milliseconds (configurable)
Accuracy	±2.5% *Accuracy of 600mm SlipMeter verified by Manly Hydraulics Laboratory, April 2011 and Provost & Pritchard, November 2011
Velocity measurement range	Accuracy listed above is achieved at flow velocities greater than 25mm per second
Sensor quantity	32 individual acoustic sensors, arranged in four cartridges, across 8 planes of measurement
Calibration method	Factory pre-calibrated. Ultrasonic level sensors are also internally self-calibrated
Material	
Frames	Extruded marine grade aluminium (6351-T5)
Gate panels	Composite laminate construction using marine grade 5083-H321 aluminium sheet bonded to RTM Styrofoam on 6351-T5 aluminium extrusion
Hardware	304, 316 stainless steel
Shafts	304, 316, 431 stainless steel
Seals	EDPM rubber (Durometer 70 (Shore A))
Wear strip	PVC
Pressure rating	Refer to the Dimensions and Maximum Water Level table on page 4
Water level sensor	Anodized 6063-T6 grade aluminium and copolymer acetyl plastic with 316 grade stainless-steel fittings and gold-plated connectors
Power	
Power supply	12V DC self-contained battery charged from solar panel or AC mains power
Solar panel	85W monocrystalline
Batteries	(2) or (3) 12V 28 ampere-hour sealed gel led acid with temperature sensor (~5yr life, ~5 day operation)
Communications	
Protocols	Modbus, analog/digital outputs
Data communications	DNP3, MDLC, Modbus
Environmental	
Operating temp	14°F to 140°F (-10°C to 60°C)
Operating humidity	0% to 100%
Water temperature	33.8°F to 122°F (1°C to 50°C)

Specifications subject to change

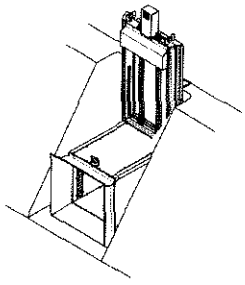
Dimensions and maximum water levels

	A	B	C	D	E	F
	mm	mm	mm	mm	mm	
SM-F.600.600.1500.4	600	1500	862	2088	971	5
SM-F.600.600.1800.4	600	1800	862	2415	971	6
SM-F.600.600.2400.4	600	2400	862	3015	971	8
SM-F.600.600.3000.4	600	3000	862	3615	971	9
SM-F.750.750.1800.4	750	1800	1012	2465	1151	6
SM-F.750.750.2400.4	750	2400	1012	3065	1151	8
SM-F.750.750.3000.4	750	3000	1012	3665	1151	10
SM-F.900.900.1800.4	900	1800	1162	2565	1301	6
SM-F.900.900.2400.4	900	2400	1162	3065	1301	8
SM-F.900.900.3000.4	900	3000	1162	3665	1301	9
SM-F.1200.1200.2400.4	1200	2400	1462	3165	1601	8
SM-F.1200.1200.3000.4	1200	3000	1462	3665	1601	10

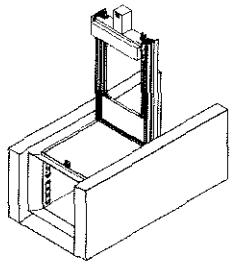
Contact Rubicon for complete mechanical dimensions or additional gate sizes. Consultation with a Rubicon engineer or agent is recommended prior to gate sizing.

A Gate size
B Maximum check height (upstream water depth); also referred to as pressure rating
C Frame width
D Overall gate height
E Box length
F Minimum number of anchors per side

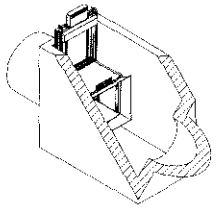
Mounting options



Headwall

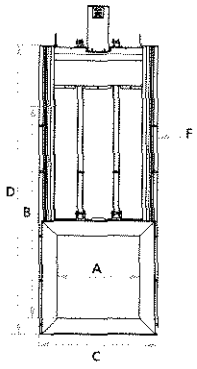


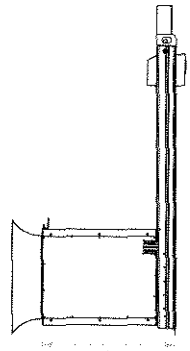
Sidewalls

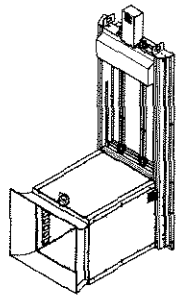


Control box

Front and side views







About Rubicon Water

Rubicon Water delivers advanced technology that optimises gravity-fed irrigation, providing unprecedented levels of operational efficiency and control, increasing water availability and improving farmers' lives.

Founded in 1995, Rubicon have more than 15,000 gates installed in TCC systems in 10 countries.

RUBICON™
www.rubiconwater.com

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Victoria 3123
Australia

Tel: +61 3 9832 3000
Fax: +61 3 9832 3030
Email: enquiry@rubiconwater.com

DS-SM.0613-AU

Appendix F — Letters of Support for the Project

December 16, 2015

Madera Irrigation District
Attn: Thomas Greci, General Manager
12152 Road 28 ¼
Madera, CA 93637

Re: 2016 WaterSMART Grant Application R16-FOA-DO-004

The City has a history of supporting worthwhile efforts such as this that seek to conserve one of our most precious natural resources. To that end, I support the Madera Irrigation District's application to obtain the WaterSMART: Water and Efficiency Grant from the U.S. Department of the Interior Bureau of Reclamation. It represents a noteworthy and effective example of MID's commitment to water conservation.

The District's efforts to conserve our limited water resources and improve our local agriculture are commendable. I would encourage the Bureau of Reclamation to consider this funding request and provide financial support. Recent drought years have been hard on local farms and families. Anything that can be done to conserve irrigation water is a high priority.

Sincerely,

Keith Helmuth, P.E.
City Engineer

Engineering
205 W. Fourth Street • Madera, CA 93637 • TEL (559) 661-5418 • FAX (559) 675-6605
www.madera-ca.gov

GRAVELLY FORD WATER DISTRICT

18811 Road 27· Madera, CA 93638 (559)·474·1000 Fax: (559) 673· 1086

December 14, 2015

Madera Irrigation District
Attn: Thomas Greci, General Manager
12152 Road 28 ¼
Madera, CA 93637

Re: 2016 WaterSMART Grant Application R16-FOA-DO-004

The Gravelly Ford Water District supports the Madera Irrigation District's application to obtain the 2016 WaterSMART: Water and Efficiency Grant from the U.S. Department of the Interior - Policy and Administration, Bureau of Reclamation.

Madera's efforts to conserve our basins limited water resources is critical to the overall wellbeing of the entire urban and agricultural area of Madera. We encourage the Bureau of Reclamation to consider this funding request and provide financial support for such an important and necessary project for the Madera ground water basin. Recent drought years have had a significant impact on local farms and families, as well as the City of Madera. Anything that can be done to assist in the conservation of irrigation water is of high priority and will be of benefit to the entire Madera Irrigation District area, as well as adjacent neighbors. We urge you to give the utmost consideration to Madera's request for such a worthwhile grant application.

Sincerely,

Don Roberts, P.E.
Manager
Gravelly Ford Water District

COUNTY OF MADERA
PUBLIC WORKS DEPARTMENT

AHMAD M. ALKHAYYAT
INTERIM DIRECTOR

200 West 4th Street
Madera, CA 93637
Main Line - (559) 675-7811
Special Districts - (559) 675-7820
Fairmead Landfill - (559) 665-1310

January 13, 2016

Madera Irrigation District
Attn: Thomas Greci, General Manager
12152 Road 28 ¼
Madera, CA 93637

Re: 2016 WaterSMART Grant Application R16-FOA-DO-004

Madera County supports the Madera Irrigation District's (MID) application to obtain the 2016 WaterSMART: Water and Efficiency Grant from the U.S. Department of the Interior – Policy and Administration, Bureau of Reclamation.

The drought has been very detrimental to agencies, farmers, and residents throughout Madera County. MID's efforts to conserve the County's limited water resources and improve our local agriculture are highly regarded. We encourage the Bureau of Reclamation to consider this funding request and provide financial support for such an important project for the Madera groundwater subbasin.

Sincerely,

Ahmad Alkhayyat, P.E.
Interim Public Works Director

Appendix G — Board Resolution

JANUARY 12, 2016
RESOLUTION NO. 2016-05

RESOLUTION OF THE BOARD OF DIRECTORS, MADERA IRRIGATION DISTRICT IN SUPPORT OF ITS PROPOSAL FOR FUNDING UNDER THE WATERSMART: WATER & EFFICIENCY GRANTS FOR THE CONSTRUCTION OF A PIPELINE TO UNDERGROUND AN EXISTING CANAL

RESOLVED by the Board of Directors ("Directors") of the Madera Irrigation District ("District"), at a special meeting duly called and held on January 12, 2016, at the business office of the District, 12152 Road 28 1/4, Madera, California 93637 as follows:

WHEREAS, the U.S. Department of the Interior Bureau of Reclamation ("Reclamation") is requesting proposals for water use efficiency activities from the WaterSMART: Water Efficiency Grants for FY 2016; and

WHEREAS, the District is submitting a grant proposal to Reclamation under Funding Opportunity No. R16-FOA-DO-004 WaterSMART: Water and Efficiency Grant for the construction of a pipeline to underground an existing canal; and

WHEREAS, the pipeline will be constructed within existing District rights-of-way, and will simply replace existing canals with piping;

NOW, THEREFORE, BE IT RESOLVED, that the Board of Directors of the Madera Irrigation District supports the grant proposal for the construction of a pipeline to underground an existing canal.

BE IT FURTHER RESOLVED, that the Board of Directors hereby delegates the legal authority to General Manager Thomas Greci to negotiate with Reclamation, and enter into a final agreement with Reclamation, subject to the approval of General Counsel, to allow the District to receive the requested WaterSMART grant.

BE IT FURTHER RESOLVED, that the Board of Directors finds the District is capable of providing the amount of funding and/or in-kind contributions specified in the funding plan, and agreeable to providing such funding and in-kind contributions as a condition of receiving the requested WaterSMART grant.

BE IT FURTHER RESOLVED, that if selected for funding, the Board of Directors declares that the District will work with Reclamation to meet established grant deadlines.

THE FOREGOING RESOLUTION WAS DULY AND REGULARLY ADOPTED by the Madera Irrigation District Board of Directors, at a special meeting of the Board held on the 12th day of January, 2016, by the following vote:

AYES:	Directors Davis, Erickson, Loquaci, Cosyns, and Janzen
NOES:	None
ABSENT:	None
ABSTAIN:	Director Loquaci and Director Cosyns

Carl Janzen, President

ATTEST:
Richard Cosyns, Vice President

CERTIFICATE OF SECRETARY

The undersigned Secretary of the Board of the Madera Irrigation District hereby certifies that the foregoing is a full, true and correct copy of Resolution No. 2016-05 adopted January 12, 2016.

Andrea Kwock Sandoval, Secretary

MADERA IRRIGATION DISTRICT
ORGANIZED
JAN. 12 1920