



2025 Agricultural Water Management Plan

Draft for Public Review

to be considered for adoption in October, 2026

Prepared for the
Byron-Bethany Irrigation District

Prepared in Compliance with
the **Water Code Section §10826**

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List of Acronyms

Abbreviation	Definition
AF	Acre-Feet
AFY	Acre-Feet per Year
AW	Applied Water
AWHC	Available Water Holding Capacity
AWMP	Agricultural Water Management Plan
Banks	Harvey O. Banks Pumping Plant
BBIC	Byron-Bethany Irrigation Company
BBID	Byron-Bethany Irrigation District
Bethany SA	Bethany Service Area (aka Bethany Division)
Board	Byron-Bethany Irrigation District Board of Directors
Byron SA	Byron Service Area (aka Byron Division)
CCWD	Contra Costa Water District
CDEC	California Data Exchange Center
CFS	Cubic Feet per Second
CIMIS	California Irrigation Management Information System
CIP	Capital Improvement Plan
CUP+	Consumptive Use Program Plus
CVP	Central Valley Project
CVP SA	Central Valley Project Service Area (aka Plain View Division)
CVPIA	Central Valley Project Improvement Act
CWC	California Water Code
Delta	Sacramento-San Joaquin River Delta
District	Byron-Bethany Irrigation District
DMC	Delta-Mendota Canal
DWR	California Department of Water Resources
ECC	East Contra Costa
E_r	Effective Precipitation
ET	Evapotranspiration
ET_{AW}	Evapotranspiration of Applied Water
ET_c	Crop Evapotranspiration
EWMP	Efficient Water Management Practice
GM	Byron-Bethany Irrigation District General Manager

Abbreviation	Definition
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
Jones	C.W. Bill Jones Pumping Plant
JPA	Joint Powers Authority
MCL	Maximum Contaminant Level
MHCSD	Mountain House Community Services District
M&I	Municipal and Industrial
Mountain House SA	Mountain House Service Area (aka RWSA 1)
NL	Notification Level
NPDES	National Pollutant Discharge Elimination System
Plain View SA	Plain View Service Area (aka CVP Service Area)
PVWD	Plain View Water District
RWSA 1	Raw Water Service Area 1 (aka Mountain House SA)
RWSA 2	Raw Water Service Area 2 (aka Tracy Hills SA)
SB X7-7	Senate Bill X7-7, the Water Conservation Act of 2009
RF	Recoverable Flows
SA	Service Area
SCADA	Supervisory Control and Data Acquisition
SGMA	Sustainable Groundwater Management Act
SLDMWA	San Luis and Delta-Mendota Water Authority
SMCL	Secondary Maximum Contaminant Level
SWP	State Water Project
SWRCB	California State Water Resources Control Board
TDS	Total Dissolved Solids
Tracy Hills SA	Tracy Hills Service Area (aka RWSA 2)
USBR	United States Bureau of Reclamation
UWMP	Urban Water Management Plan
WC	California Water Code
WMF	Water Management Fraction
WRCC	Western Regional Climate Center
West Side SA	West Side Service Area
WIIN Act	Water Infrastructure Improvements for the Nation Act
WSID	The West Side Irrigation District

1 INTRODUCTION

The Water Conservation Act of 2009 (Senate Bill [SB] X7-7) stipulated that agricultural water suppliers who provide water to 10,000 or more irrigated acres, excluding recycled water, must produce an Agricultural Water Management Plan (AWMP) on or before December 2012 and every five years thereafter. Legislation enacted since 2009 modified the threshold acreage, as well as other AWMP components:

- Senate Bill 1330 (2011): Modified the law to require only those agricultural water suppliers supplying water to over 25,000 irrigated acres (excluding recycled water) to generate AWMPs. Suppliers providing water to 10,000 to 25,000 irrigated acres could forgo Water Code Parts 2.55 (sustainable water use and demand reduction) and 2.8 (agricultural water management planning), unless sufficient funding the State provides sufficient funding.
- Executive Order B-37-16 (2016): Acknowledged the multi-year drought and permanently required the completion of AWMPs by water suppliers providing water to over 10,000 irrigated acres of water.
- Assembly Bill 1668 and Senate Bill 606 (2018): Required preparation of annual water budgets, quantification of water use efficiency from California Department of Water Resources' (DWR) 2012 Report to the Legislature, and a "drought plan" for periods of limited water supplies that describes actions for drought preparedness (i.e., resilience planning) and management and allocations of water supply during drought conditions (i.e., response planning).

The Byron-Bethany Irrigation District ("BBID" or "District") supplies water to 6,233 acres irrigated in 2025 in its Byron and Bethany Service Areas, to 2,147 acres irrigated in 2025 in its Plain View Service Area, and to 3,951 acres irrigated in 2025 in its West Side Service Area. The District has produced an AWMP because its irrigated acreage exceeds 10,000 acres. This AWMP follows the guidelines from DWR's *Guidebook to Assist Agricultural Water Suppliers to Prepare a 2025 Agricultural Water Management Plan*. An AWMP checklist is included in **Appendix A** of this AWMP, providing the components of this AWMP and those component's applicable statutory authority under the California Water Code (WC). This Plan also reports on the implementation status of specific efficient water management practices (EWMPs) required under the SB X7-7.

SB X7-7 also mandates that urban water suppliers serving more than 3,000 acre-feet (AF) of raw water annually for municipal and industrial (M&I) purposes adopt an Urban Water Management Plan (UWMP). BBID also serves M&I customers within and adjacent to its service areas. M&I deliveries are reported in Section 3.4. BBID has chosen to adopt by resolution UWMPs for its M&I customers Mountain House Community Services District (MHCS), now the city of Mountain House which incorporated as a General Law City in 2024, and the city of Tracy. Copies of the BBID resolutions are included in **Appendix G**.

1.1 DESCRIPTION OF PREVIOUS WATER MANAGEMENT ACTIVITIES

BBID has historically recognized water management and planning as essential to continuing to provide its customers with a reliable water supply. The *Byron-Bethany Irrigation District Feasibility Report in Support of P.L. 984 Loan Application for Proposed Improvements to Irrigation System* (Clair A. Hill and Associates, 1964) included a summary of the District's history, geography, general geology, water quality, groundwater and drainage issues, system evaluations, and water requirements. It also described a general plan for improvements, including designs and cost estimates.

Historically, BBID updated water demand projections every 5-10 years. In 1996 the District participated in the *East County Water Supply Management Study* (East County Water Management Association, 1996), which included projections of agricultural and M&I demands within its service area for the following planning periods: 2000, 2010, 2020, 2030, and 2040. The District then updated these projections in 1999 when planning for the annexation of the Tracy Hills Development. In 2002, BBID again updated its water supply and demand evaluation as part of the certification of the East Altamont Energy Center. In 2010, the District further updated the supply and demand evaluation to support its water supply and exchange agreement between BBID and the United States Bureau of Reclamation (USBR) for the Tracy Hills Development located in Tracy. The District adopted the 2020 AWMP in 2025 due to ongoing consolidation efforts with the former West Side Irrigation District, which took several years to conclude. This 2025 AWMP updates the 2020 AWMP with data for the Byron, Bethany, Plain View, and West Side service areas.

1.2 COORDINATION ACTIVITIES

This section discusses the notification and involvement of customers in the AWMP process.

1.2.1 NOTIFICATION OF AGRICULTURAL WATER MANAGEMENT PLAN PREPARATION

Per WC section 10841 BBID notified the cities and counties to which it supplies water that it is preparing an AWMP. These entities include Alameda, Contra Costa, and San Joaquin Counties, and the cities of Tracy and Mountain House.

1.2.2 PUBLIC PARTICIPATION

Table 1-1 summarizes public participation activities BBID performed for this AWMP. **Appendix B** includes documentation on the public noticing of the AWMP preparation and adoption.

Table 1-1: Public Participation Activities

Potential Interested Parties		Notified of Public Meetings	Attended Public Meetings	Copy of Adopted AWMP/Amendment Sent
County of Alameda				
County of Contra Costa				
County of San Joaquin				
City of Tracy				
City of Mountain House				
DWR				
Local Newspaper				
California State Library				
BBID Website				

1.3 AWMP ADOPTION AND SUBMITTAL

This section reviews the adoption and submittal process of the District's 2025 AWMP to DWR.

1.3.1 AWMP ADOPTION

BBID's Board of Directors (Board) adopted the updated AWMP through Resolution No. XX during the October 2026 Board meeting. This meeting comports with the hearing requirements under Water Code Section 10841. A copy of Resolution No. XX is included in **Appendix C**.

1.3.2 AWMP SUBMITTAL

Within 30 days of adoption, BBID will submit electronically to DWR the final AWMP.

1.3.3 AWMP AVAILABILITY

Prior to the adoption hearing, BBID made the draft AWMP available for public review on, [Month XX], 2026. BBID provided notice that the public was able to submit written comments on the proposed AWMP by, [Month XX], 2026, as well as oral comments at the adoption hearing. Within 30 days following adoption, BBID made available the final version of the AWMP on the BBID website. It also provided electronic copies the Counties of Alameda, Contra Costa, and San Joaquin, as well as the cities of Tracy and Mountain House.

1.4 AWMP IMPLEMENTATION SCHEDULE

California Code of Regulations, Title 23, §597.1 defines the applicability EWMP implementation (the two critical are water measurement and volumetric pricing of water deliveries) to agricultural water suppliers. An agricultural water supplier providing water to between 10,000 and 25,000 irrigated acres must not implement EWMPs unless sufficient funding is provided specifically for that purpose, as stated under Water Code §10853.

The District provides water to more than 10,000 irrigable acres and is completing the AWMP as required. Additionally, the District serves less than 25,000 irrigated acres and does not receive State funding for EWMP implementation and is not required to measure or volumetrically price water. However, BBID previously implemented 2 critical EWMPs (water measurement and volumetric pricing) and has recently implemented most of the 14 conditional EWMPs, as discussed in Section 7 of this AWMP and the 2020 AWMP. BBID plans to continue to implement feasible EWMPs over the next twenty years.

2 DESCRIPTION OF THE AGRICULTURAL WATER SUPPLIER AND SERVICE AREA

This section provides a description of the BBID service area, including physical and operational characteristics. Effective 2020, through consolidation with the West Side Irrigation District (WSID), BBID's service area increased to include the lands within the former WSID.

2.1 PHYSICAL CHARACTERISTICS

2.1.1 SERVICE AREA DESCRIPTION

BBID is a multi-county special district encompassing 36,000 acres across parts of Alameda, Contra Costa, and San Joaquin Counties. The District serves more than 215 agricultural customers and more than 40,000 M&I customers. BBID utilizes three different surface water sources (described below) to supply water to the following six service areas (SA), as shown in **Figure 2-1** :

- Byron Division (aka Byron SA);
- Bethany Division (aka Bethany SA);
- Raw Water SA 1, (aka Mountain House SA);
- Raw Water SA 2, (aka Tracy Hills SA);
- Central Valley Project SA (aka Plain View SA); and
- West Side SA.

BBID does not rely on or use groundwater as a primary water supply due to its poor quality and permeability of the soils in the Delta upland area. During severe historical droughts, some private landowners within BBID will use groundwater available to them on their properties to keep high value crops alive, but typically must blend with limited surface water availability due to the high salinity levels and other salts found in Delta upland geographic vicinity. In some years, BBID may convey and/or purchase small amounts of groundwater to provide to other growers, adhering to the county ordinances regarding groundwater use.

Pre-1914 Water Rights

In 1919, BBID formed and succeeded to all the works of the old Byron-Bethany Irrigation Company (BBIC), including the pre-1914 appropriative right to 40,000 miner inches of water from Old River, as described in BBIC's Notice of Appropriation. In 1963, DWR completed construction of the new State Water Project (SWP) intake from the Sacramento-San Joaquin River Delta (Delta), and under an agreement between BBID and DWR, BBID's historic point of diversion for their pre-1914 water right was relocated from Italian Slough to the state's intake channel connecting the SWP's Clifton Court Forebay and Harvey O. Banks Pumping Plant. A 2003 Agreement between BBID and DWR updated the 1963 agreement, which recognizes BBID's prior pre-1914 water right. BBID provides water service to four service areas through its pre-1914 water right: Byron SA, Bethany SA, Mountain House SA, and Tracy Hills SA, with the Byron SA and the Bethany SA comprising approximately 24,000 acres.

BBID provides the Mountain House SA with up to 9,813 AF per year (AFY) of M&I water under a water services agreement executed in 1996 by both BBID and the city of Mountain House, which was subsequently amended in 2008.

The Tracy Hills SA, which includes the Tracy Hills development, was created in 2013. BBID provides up to 4,500 AFY of M&I water under a wholesale water agreement between BBID and Tracy. BBID began providing water for M&I uses to the Tracy Hills SA in 2021.

As shown in **Figure 2-1**, BBID's pump stations in the intake channel divert the District's water into canals that convey raw water north to the Byron SA, south to the Bethany SA, and a turnout to the Delta-Mendota Canal (DMC) for conveyance to the Tracy Hills SA. The Mountain House SA is served from a pump station and pipeline that originates at Pump Station 1 South.

USBR Central Valley Project Water

In 2004, Plain View Water District (PVWD) consolidated with BBID, dissolving PVWD and reorganizing PVWD's territory into BBID's Plain View Service Area (PVSA). The PVSA is served through the combination of Central Valley Project (CVP) contract water with USBR and Warren Act (non CVP) contract water comprised of BBID's pre-1914 water subject to contract conditions. The CVP contract entitles BBID to receive up to 20,600 AF of surface water made available at specific locations along the DMC within the PVSA, as depicted in **Figure 2-1**. The place of use for the water provided under this contract is limited to a specific area, comprising 6,300 acres, of which approximately 2,147 were irrigated in 2025.

Additionally, the West Side Irrigation District (WSID) consolidation with BBID in 2021 resulted in BBID receiving WSID's CVP water service contract. The WSID contract was originally for 7,500 AFY, but following an assignment and approved future assignment, the WSID sold 5,000 AF to the city of Tracy (2,500 AF under the assignment and a future 2,500 AF assignment option to the city of Tracy), entitling BBID to receive up to 2,500 AFY of CVP water for use within the West Side SA.

The availability of water to which BBID is entitled to receive under the CVP contracts is constrained by USBR's allocation analysis, which considers hydrology, soil moisture conditions, reservoir carryover storage, regulations, and overall total system capacity. This means that even though BBID has a contractual entitlement to receive up to 20,600 AF in the Plain View SA and up to 2,500 AF in the West Side SA, if the hydrologic conditions do not support allocating to BBID 100% of its entitlement, USBR will allocate a lesser percentage, which since 1992 and the commencement of modern day environmental regulations like the Central Valley Project Improvement Act (CVPIA), USBR's CVP annual water supply allocations average approximately 54%.

In 2020, BBID converted its CVP water service contract with USBR to a "repayment contract," under the Water Infrastructure Improvements for the Nation (WIIN) Act (Pub. L. 114-322, 130 Stat. 1628). This conversion changed the timing by which BBID repays the CVP-related construction costs and ongoing share of operation and maintenance. The maximum water entitlement under the repayment contract, as well as all other material conditions, remained unchanged through the conversion. In 2020, the WSID also converted its CVP water service contract with USBR to a repayment contract under the WIIN Act, which makes 5,000 AF of project water available following the assignment of 2,500 AF to the city of Tracy, with an additional 2,500 AF option to the city of Tracy.

BBID holds Warren Act contracts with USBR entitling BBID, subject to certain conditions, to convey and store non-CVP water in federal facilities when excess capacity exists. Non-CVP water is water BBID diverts under its pre-1914 water right. Through these Warren Act contracts BBID may convey or store non-CVP water in the following CVP facilities, including the DMC, O'Neill Forebay, and San Luis Reservoir. BBID uses the San Luis Reservoir as a water storage banking facility for its Plain View SA.

Post-1914 Water Rights

As discussed in the preceding section, WSID consolidated with BBID in 2021, thereby increasing BBID’s service area to create the West Side SA, comprising 6,589 acres of unincorporated land around the city of Tracy. The consolidation of WSID resulted in BBID acquiring its post-1914 appropriative water right. Under this water right, BBID is entitled to divert up to 27,000 AFY of water between on or about April 1 and October 31 from the Wicklund Cut Main Canal off of Old River for irrigation, domestic, and M&I uses.

2.1.2 TERRAIN AND SOILS

The terrain and soils in BBID offer excellent conditions for agriculture. The western part of the District that is not irrigated has rolling hills with slopes up to a 40% grade.

The soils in the BBID service area are primarily clay and clay loam textured soils. These soils are generally well and moderately well drained and do not have restrictive subsoils. The fine textured soils found in BBID are well suited to irrigation because they have a slow infiltration rate when wet. Areas of the Bethany SA near Clifton Court Forebay are composed of poorly drained loam and sandy loam. However, these soil characteristics are not impactful to agricultural because most water users in this area use water for M&I, rather than agricultural purposes. **Table 2-1** depicts the majority terrain and soil type in each service area and the percentage of the area the soil type covers. **Figure 2-2** depicts a detailed soil map of the service areas.

Table 2-1: BBID Terrain and Soil Type

Service Area	Majority Soil Type & Description	Percent of Area
Pre-1914		
Byron	CbA: Capay clay, wet, 0 percent slopes, MLRA 17	19.9%
Bethany	RdA: Rincon clay loam, 0 to 3 percent slopes	50.1%
Mountain House	252: Stomar clay loam, 0 to 2 percent slopes	47.6%
Tracy Hills	123: Carbona clay loam, 2 to 8 percent slopes	60.8%
CVP		
Plain View	118: Capay clay, 0 to 2 percent slopes, MLRA 17	57.2%
Post-1914		
West Side	118: Capay clay, 0 to 2 percent slopes, MLRA 17	56.8%

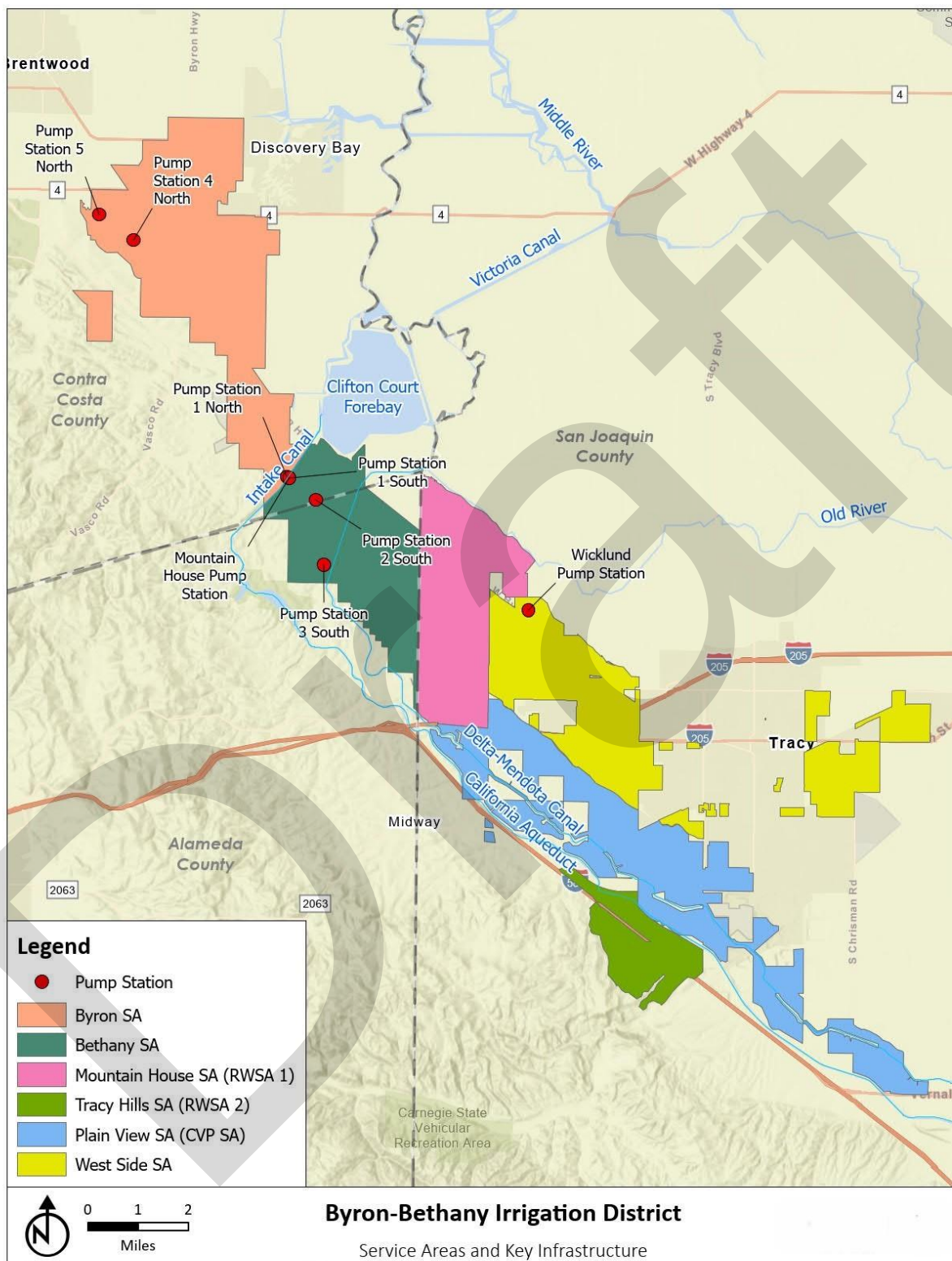


Figure 2-1: BBID Service Area & Infrastructure Map

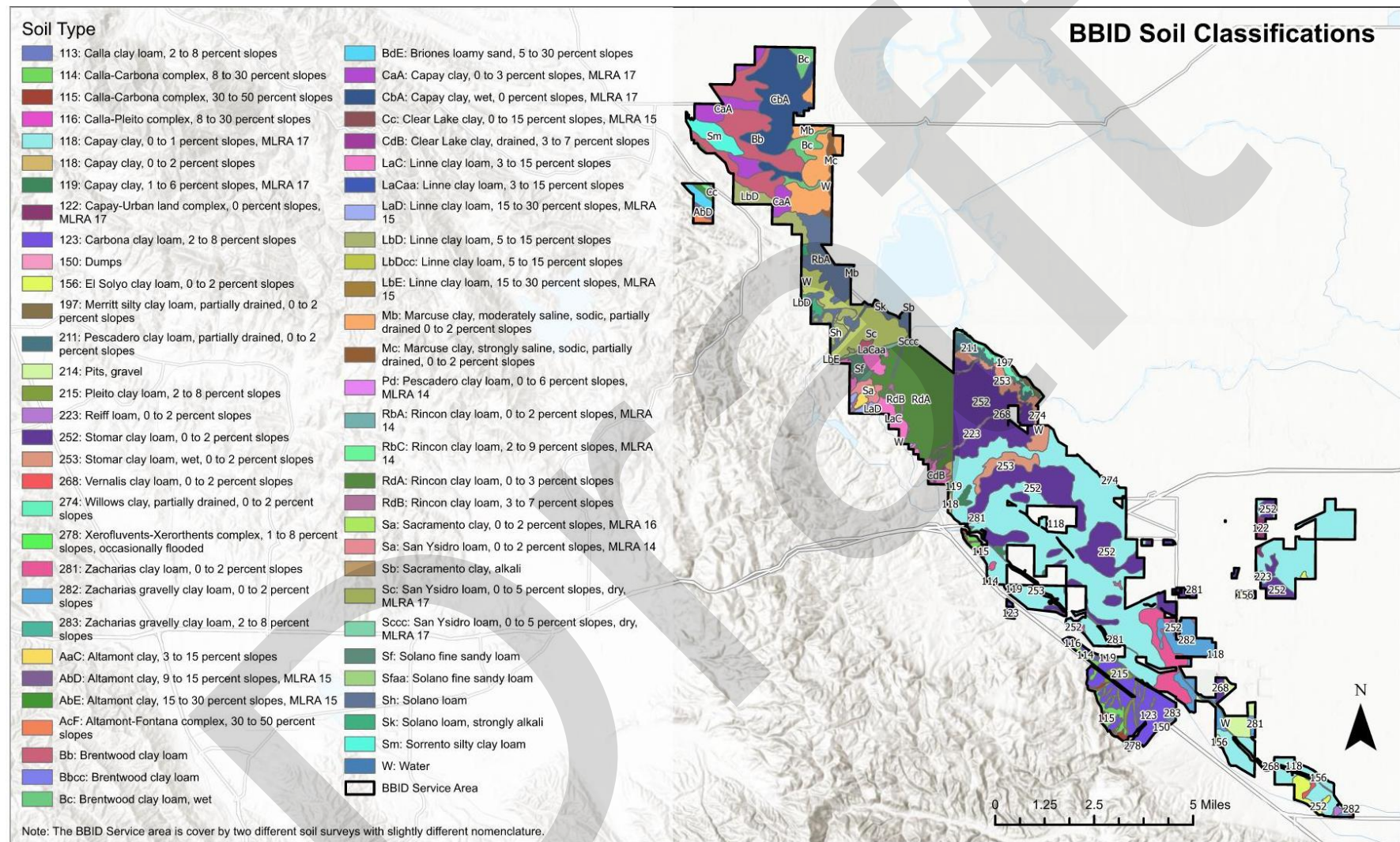


Figure 2-2: Soils Map

2.1.3 CLIMATE

The climate across BBID is uniform, with minimal effects of microclimates. The District sees hot, dry summers and cool, moist winters. Most precipitation falls from November to March, and most evapotranspiration demand occurs from May to August. **Table 2-2** shows monthly and annual average temperature, precipitation, and evapotranspiration from 2021 to 2025. The data was sourced from California Irrigation Management Information System (CIMIS) station 47 near Brentwood, California, which is 2 miles northwest of the BBID northern boundary.

Table 2-2: Monthly and Yearly Average Climate

Month	Average Max Temperature (°F)	Average Min Temperature (°F)	Average Temperature (°F)	Average Precipitation (in)	Average ETo (in)
January	61.4	38.9	48.7	1.8	1.5
February	64.4	40.1	51.4	1.4	2.4
March	67.6	42.8	54.8	1.3	4.0
April	75.7	45.7	60.6	0.4	6.0
May	82.5	50.8	66.7	0.3	7.9
June	89.7	54.4	72.0	0.1	8.2
July	95.1	57.0	75.4	0.2	8.4
August	94.8	57.6	75.7	0.1	7.8
September	90.4	56.1	72.7	0.2	6.0
October	81.4	50.4	64.9	0.8	4.2
November	67.2	42.3	53.6	1.0	2.0
December	57.5	40.4	48.0	3.2	0.9
Yearly Average/ Total	77.3	48.0	62.0	10.9	59.2

2.2 OPERATIONAL CHARACTERISTICS

2.2.1 OPERATING RULES AND REGULATIONS

This section discusses BBID's operating rules and regulations. The complete document of *Rules and Regulations of the Byron-Bethany Irrigation District – Governing the Distribution of Water* (Rules and Regulations) is included in **Appendix D**.

2.2.1.1 WATER USE AND AVAILABILITY

The irrigation season is generally from mid-March through mid-November. BBID makes water available to growers during the irrigation season, provided there is sufficient supply under the applicable right or contract under which BBID provides that grower water. Water must be used continuously by irrigators throughout the period of the run. If water is inefficiently or improperly used, the General Manager (GM) is entitled to refuse delivery of water until the cause of waste or inefficient or improper use is removed.

2.2.1.2 LEAD TIME FOR WATER ORDERS AND WATER SHUT-OFF

In the Byron SA, the Bethany SA and the West Side SA, customers must provide the Water Conservation/Schedule Coordinator with at least a 24-hour notice for all water deliveries, delivery changes, and shut-off of deliveries.

In the Plain View SA, customers must provide a 24-hour notice for water delivery and shut-off. BBID encourages flexible shut-off times, to the extent they can be accommodated by the CVP's DMC water operators.

2.2.1.3 POLICIES FOR RETURN FLOWS AND/OR DRAINAGE LEAVING THE SERVICE AREA

BBID identified specific policies associated with agricultural return flows to District facilities. Return flow policies differ based on service area and are summarized below and explained in more detail in the Rules and Regulations.

Byron SA, Bethany SA, and West Side SA

All water introduced into District facilities (e.g., return flow, tail water, and seepage water) is considered District water and is subject to re-diversion and use by BBID. All such water intercepted and used by customers requires payment to BBID at the rate established by BBID. All return flows from water provided by BBID become the property of the District again when such flows enter a District lateral or surface drainage system, leaves the boundaries of a customer's property, or percolates into the District's sub-surface drainage system or other District facilities.

All customers who drain their surface run-off into District facilities must install sumps, in accordance with the District's Sump Standards and Requirements. No water, including tailwater, can be placed into the District's irrigation or drainage system without prior approval of the GM.

Adequate safeguards are established to prevent entry of trash, silt, herbicides, pesticides, fertilizers, etc., into the District's system. For example, the District requires the use of polyacrylamide to stabilize soil against erosion for furrow irrigation. Any damage, injury or legal action which may result from poor quality tailwater, including injury to third parties, is the responsibility of the discharger. The District may require reasonable periodic testing of tailwater discharged into the District's system at the expense of the discharger.

Plain View SA

If applicable, control and disposition of tailwater drainage flow from all CVP water deliveries is the customer's responsibility. There is no permitted recirculation of water within the Plain View SA.

Mountain House SA and Tracy Hills SA

There are no return flow policies for the Mountain House SA and the Tracy Hills SA because water delivered to these service areas is for M&I uses only, and no return flows occur.

2.2.1.4 RESTRICTIONS ON DELIVERIES

When the demand for water deliveries exceeds the ability of the District's system or the available water supply for a specific service area, the GM may prorate water according to the limits of the system. The GM establishes crop priorities, which are then subject to revision or approval of the Board. These cropping priorities are established in the manner most likely to minimize overall detriment to crops that may result from the District's inability to serve water in the order requested. Additional information regarding the District's response during times of water shortage can be found in the drought response plan below in Section 2.2.4.1.2

During periods of critical supply, the District may not be able to provide water delivery on time. If the customer has not received water within five days of the date requested and reasonably expects permanent damage may result to the crop from such a delay in delivery of water, the customer shall file a written factual statement with the GM. The GM will immediately review this statement with a committee of three Directors from the Board, who will collectively determine (in their complete and sole discretion) if crop priorities should and can be modified. It is understood that the capacity of the District's system is limited by demands or outages, which may result in delays up to, or exceeding, five days.

2.2.2 WATER DELIVERY MEASUREMENTS OR CALCULATIONS

BBID is committed to the accurate measurement of all customer deliveries as a basis for sound water management and appropriate billing to its customers. Per the BBID Rules and Regulations, the District uses the units of cubic feet per second (cfs) to measure delivery flow rates and AF in volumetric measurement for charging their customers.

BBID purchases, installs, and maintains meters for each of its 315 customer turnouts, which serve 110 agricultural customers and 12 M&I customers within the Byron SA, the Bethany SA, and the Plain View SA. For these service areas, BBID uses McCrometer strap-on electronic meters and in-line propeller meters and inspects the meters annually. BBID sends meters to the McCrometer factory for calibration on a regular rotating basis. Factory specifications for the most common meter model used in the service area (McCrometer Strap-On Electronic Low-Pressure Meter) are included in **Appendix E**, along with the most recent certification for factory inspection and calibration.

Not every turnout in the West Side SA is currently equipped with a flowmeter, and most of the meters in the West Side SA are privately owned. Manual water measurement is performed for those turnouts that are not equipped with meters. The District is planning to conduct an assessment of all West Side SA turnouts to determine the feasibility of meter installation, or an alternative compliance measure.

BBID installed new water meters at the Wicklund Cut Main Canal pump station and continues to rely on privately owned meters at the grower-parcel level within the West Side SA. The District is auditing existing slide gates and evaluating the feasibility of retrofitting them with new meters. GPS data collected during the audit is used to update the District's GIS, which feeds BBID's new water accounting system (STORM).

2.2.3 WATER RATE SCHEDULES AND BILLING

The Board establishes water rates annually prior to the start of the irrigation season. Water rates vary depending upon service area, but are levied on a per acre-foot basis. All payments for delivered water are due 30 days after completion of the irrigation event.

In 2016, the District commissioned a rate study, which informed a subsequent increase in water rates. The 2017 Water Rate Charge Resolution is included in **Appendix F**. Current water rates by service area are presented in **Table 2-3** below and comport with the limitations of the 2016 rate study.

Table 2-3: BBID Current Water Rates

Rate Type	Service Area	Conditions	Rate
Agricultural Water Rate	Byron Bethany	Minimum charge of one acre-foot per turn on	\$65.00 per acre-foot
Agricultural Water Rate	West Side	Minimum charge of one acre-foot per turn on	\$85.00 per acre-foot
Industrial Raw Water Rate	Byron	For sand-mining purposes and wetlands mitigation	\$100.00 per acre-foot
Annual Flat Rate Water Service Charge (Interruptible)	Byron Bethany	Based on 2 acres or less	\$120.00 per year
Construction Water	District Wide		\$15.00 per load (3,500 gallons)
Water Availability / Stand-by Charge	Byron Bethany		\$8.00 per acre
Category 1 O&M Charge	Plain View		\$5.15 per acre
Category 2 O&M Charge	Plain View		\$66.00 per acre
Category 3 O&M Charge	Plain View		\$145.00 per acre
Applicable Rates & Charges of the USBR and San Luis & Delta-Mendota Water Authority	Plain View	Including the Authority membership assessment	Per acre-foot water charge

The District conducted a cost-of-service evaluation for the city of Tracy and the city of Mountain House in March 2023 to understand the cost and associated fees for delivering raw water to the customers. The District routinely updates its water rates based on cost-of-service evaluations, which includes industrial water users, such as the Mariposa Energy Project, which is a M&I user in Bethany SA.

2.2.4 DROUGHT PLAN AND WATER SHORTAGE ALLOCATION POLICIES

BBID recognizes that there may be times when the available water supplies are insufficient to meet the demands of its customers, especially given that the rights supporting those supplies are not the same in terms of reliability. Despite this, BBID is committed to providing reliable water supply and water-related services in an environmentally sound and cost-effective manner. In support of these commitments, the District is working to diversify its water supply portfolio through developing access to surface water storage facilities, conjunctive use opportunities, and identifying potential water transfer partners, as well as through the development of a Drought Plan and water shortage allocation policies in compliance with updated AWMP requirements.

Per the BBID Rules and Regulations, the District can initiate water rationing under conditions where the anticipated demand for water deliveries either exceeds the ability of the District's system, or the supply of water available under the applicable water right. Under these conditions, the GM has the authority and discretion to prorate water within the supply limitations of the system. Prior to prorating water deliveries, the GM will work directly with customers to determine the minimum water demand needed to keep their crops alive, which includes setting the general cropping preference (with approval of the Board) in the manner most likely to minimize overall detriment that may result from a water shortage.

2.2.4.1.1 DROUGHT RESILIENCE PLANNING

1) Determination of water supply availability and drought severity

Monitoring is a core aspect of BBID's Drought Plan. BBID regularly monitors water supply availability data to inform operational decisions. These data include hydrologic conditions of the Delta, CVP allocations, and any state regulatory actions which may impact allocations or water rights.

2) Potential vulnerability to drought

BBID has historically had access to sufficient water supplies due to their water rights and physical location in the Delta. Despite this, the District's potential vulnerability to drought may be impacted by a variety of factors, including future hydrologic conditions, outflow requirements from the Delta, availability of CVP allocations, and other potential regulatory actions by the State Water Resources Control Board (SWRCB). Potential vulnerabilities for each of the District's surface water supply sources, based on right, are summarized below.

Pre-1914 Water Rights

BBID's pre-1914 water right is the most senior water right held by the District, and as such, is the most reliable surface water right held by the district. The District actively monitors regulatory and hydrologic developments affecting its water right portfolio.

WIIN Act Contract with USBR

As detailed previously, BBID acquired PVWD's CVP water service contract in 2004, and, in 2020, converted this water service contract to a WIIN Act Repayment Contract. Under the terms of the Repayment Contract, BBID is entitled to receive up to 20,600 AFY of CVP water. Of this contractual entitlement, 19,800 AFY is south of Delta agricultural water and 800 AFY is south of Delta M&I water. Additionally, following the consolidation of the WSID in 2021, BBID holds the WSID WIIN Act contract with USBR which entitles BBID to 2,500 AFY of CVP water, for use in the West Side SA.

The actual availability of CVP water depends on hydrologic conditions and varies year to year. CVP allocations to the District for the 2021–2025 reporting period are summarized in **Table 4-1**.

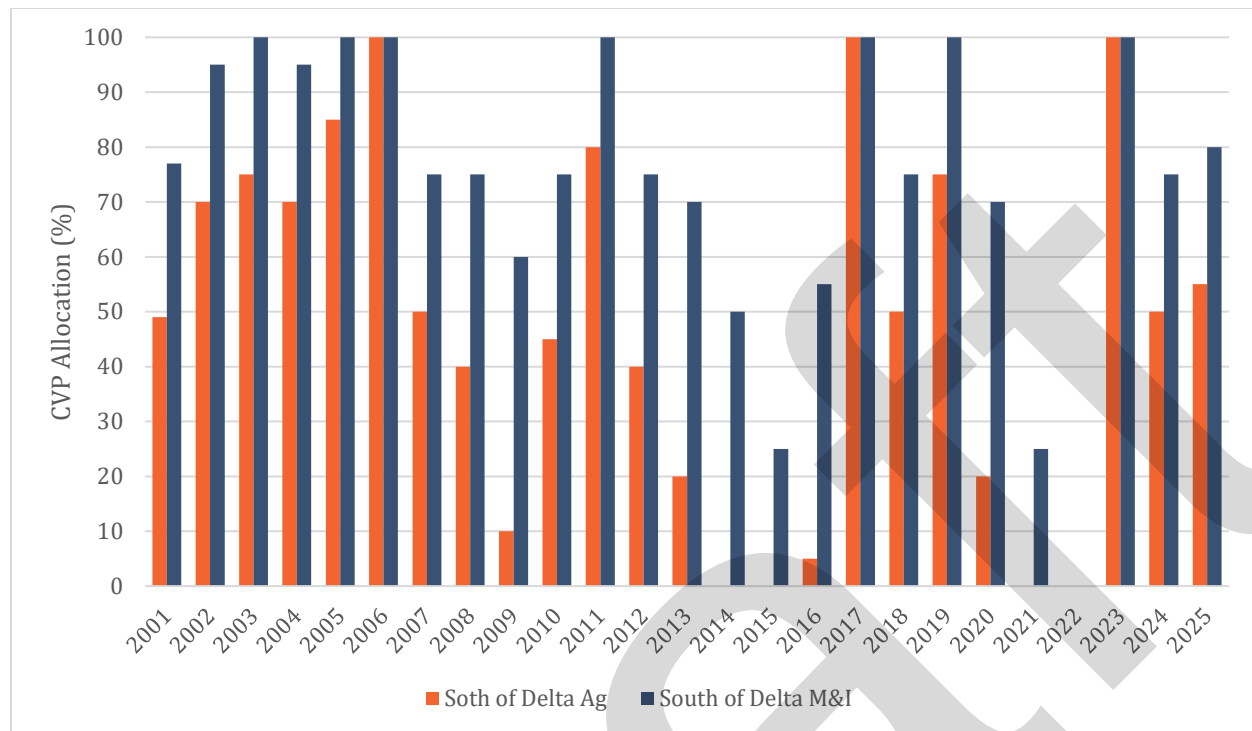


Figure 2-3: Historical Annual Maximum CVP Allocation for South of Delta

Post-1914 Water Rights

The District holds the former WSID post-1914 appropriative right in the form of a water right license. This right entitles BBID to divert up to 27,000 AFY from Old River. The District manages diversions under the license consistent with the conditions of the license and applicable hydrologic conditions.

Groundwater

The District does not rely on groundwater as a source of water supply due primarily to its poor water quality, but also to poor production from wells. However, landowners can choose to rely on privately owned groundwater wells in times of low allocations. This pumping depends upon the conditions of the groundwater basin, including groundwater quality issues, making this source the least reliable source of water and is generally only used to supplement surface water supplies when needed.

3) Drought resilience planning opportunities and constraints

BBID prioritized drought resilience planning opportunities, including implementing new technology, acquiring additional water sources, and other actions to improve resilience in times of drought. The District works with its customers, agricultural and M&I alike, as well as regional partners to foster the beneficial use of its water supplies in a responsible manner.

(A) The availability of new technology or information.

Incorporating new technology is a priority for BBID, as utilizing these resources results in minimized spills, better service provided to customers, and more efficient use of diverted water. BBID implemented infrastructure upgrades, including the installation of a Supervisory Control and Data Acquisition (SCADA) system and control structure automation projects, resulting in more efficient operation of the system. The District supported customers to convert flood irrigation to drip irrigation systems, resulting in water

conservation. About 62% of customers in the Byron SA and the Bethany SA use micro-irrigation as of 2025. About 80% of the irrigated lands in the Plain View SA had micro-irrigation in 2025. In the West Side SA, about 40% of agricultural customers utilize micro-irrigation. These conversions have mostly been done in the years since 2000 and accelerated after 2015.

The District is in the process of evaluating installation of flowmeters for the West Side SA, as only about 75% of agricultural customers in the West Side SA have flowmeters, and most are privately owned. The remaining 25% of agricultural customers' usage is manually measured based on measurements of gate openings and head loss through the gates. BBID plans to inventory all customer meters and determine the existence and condition of the meters.

(B) The ability of the agricultural water supplier to obtain or use additional water supplies during drought conditions.

BBID is planning several new projects to enhance system flexibility and further diversify its water supply portfolio. The District has proposed a construction and operation agreement for an intertie between the Byron SA Canal 45 and the Contra Costa Water District (CCWD) Old River pipeline to facilitate water transfers with CCWD and/or storage of BBID's pre-1914 water (pending approval) in the Los Vaqueros Reservoir. Such stored water can then later be withdrawn and used in the northern portion of the Byron SA. The District is exploring conveyance, storage, and transfer opportunities with regional water agencies to enhance system flexibility and supply reliability for its service areas. Specific opportunities are evaluated as they arise and are subject to Board review. The additional storage would have increased water supply reliability for the "partners" to the project and facilitate development of supplies for environmental water management and improve water quality in the Delta. As a partner in the Los Vaqueros Expansion Joint Powers Authority (JPA), BBID was evaluating reserving 10,000 AF of storage capacity. BBID is also participating through the San Luis & Delta-Mendota Water Authority (SLDMWA) and its partners to increase San Luis Reservoir storage by 130,000 AF, with BBID reserving 1,059 AF of storage for its customers. Lastly, the District continues engaging with regional water agencies regarding possible water transfers and regional water supply agreements. Most of the agreements with regional agencies are short-term agreements.

(C) A description of other actions planned for implementation to improve drought resilience.

Other actions BBID has taken to improve drought resiliency include participation in groundwater sustainability activities. As a Groundwater Sustainability Agency (GSA), BBID works cooperatively with two groundwater subbasins: (1) Tracy Subbasin; and (2) East Contra Costa (ECC) Subbasin. BBID participates through the GSAs and other project partners to investigate conjunctive use opportunities and aquifer storage recharge groundwater wells to increase water supply reliability for BBID and its partners.

2.2.4.1.2 DROUGHT RESPONSE PLANNING

1) Water shortage declaration, water shortage allocations, and response actions implementation

After reviewing supply availability and anticipated demand, BBID will make a water shortage declaration if the demand exceeds the available supply. To do this, the District meets with the agricultural customers to understand the minimum water quantities needed before initiating water rationing per the BBID Rules and Regulations. During the 2020-2022 drought, BBID's drought response actions taken during consisted

of four main criteria: supply augmentation, demand reduction, operational actions, and others. Each is discussed below in greater detail.

Supply augmentation actions are important during drought periods to supplement water supply and minimize the effect of the drought on the District's customers. Supply augmentation during drought periods consists of the following actions:

- Purchasing privately pumped water from growers;
- Actively pursuing short-term water transfers to keep high value crops alive;
- Collaboratively working with the SLDMWA and other CVP contractors on the DMC Pump Back Projects to deliver water stored in the San Luis Reservoir to users upstream of the reservoir on the DMC;
- Utilizing the A&E groundwater well (a private well) to supplement supply in the Plain View SA; and

Demand reduction is another important aspect of drought response planning. Ensuring water is used efficiently and not wastefully is always a priority of the District that is heightened during drought. As the holder of the District's water rights, BBID is also bound by the constitutional prohibition of waste and unreasonable use of water. Accordingly, during the 2020-2022 drought, BBID took the following demand reduction actions: (1) reduce agricultural and M&I water deliveries to minimum levels; (2) reduce "construction water" deliveries; and (3) monitor wasteful run-off from agricultural fields to minimize any wasteful runoff.

Operational actions, similar to demand reduction, are important to reevaluate during times of drought, to ensure that water is not wasted. Like demand reduction, while operational actions are always a priority, they are particularly important when there is less water available. During the drought periods, BBID optimizes system operations by rapidly implementing additional technology, such as gate control through its SCADA/Telemetry system, improving District and grower communication, and assisting growers rapidly migrate toward drip irrigation to facilitate reduced water usage (i.e., less drop per crop) and reduce system spills.

Other actions taken by the District in response to drought were as follows:

- Holding additional public outreach meetings for growers and the general public regarding the severity of conditions and promoting water conservation;
- Holding educational meetings to provide tips to growers regarding farming with reduced supplies;
- Developing and disseminating informational newsletters and/or website content regarding drought conditions and the District's response.

The actions described above in response to drought conditions achieve satisfactory outcomes to mitigate the negative impacts resulting from drought and enhance the District's ability to improve practices to overcome future drought obstacles.

2) Methods and procedures for triggering and enforcing shortage response actions

BBID publishes its Rules and Regulations on its website, and they include information about the District's shortage response actions. BBID also provides a copy of the Rules and Regulations to all irrigation customers. During drought, BBID engages in the following activities to ensure the water resources of the District are distributed and used efficiently and equitably:

- Bulletin release to public to inform about drought conditions;
- Reminder letters to irrigation customers about rules and regulations regarding irrigation water distribution;
- Increased enforcement of water regulations to prevent unauthorized use;
- Investigation of all unauthorized uses of water;
- Investigation of all unauthorized encroachments;
- Increased water theft penalties;
- Implementation of several extraordinary operational measures to manage limited water supplies and augmented water supply.

3) Monitoring and evaluation of the effectiveness of the drought plan

BBID prioritizes continuous monitoring to understand and evaluate the effectiveness of their drought plan. While monitoring is always a priority, it is especially necessary during times of drought for effective water management. The District continuously monitors hydrological conditions, water supply, deliveries, and operational efficiency. Additionally, BBID plans to conduct retrospective timeline analysis of past drought declarations and actions implemented, to learn from past decisions and droughts. Staff input on the performance of past implemented actions is also considered.

4) Communication protocols and procedures

BBID is proactive in communicating with its customers regarding water supply. The District understands that communication, both internally and externally, is a necessary and important step in drought resilience protocol. Internal communication with growers and the general public within the District includes the following actions:

- Hold additional public outreach meetings for growers and the general public;
- Hold educational meetings to help growers work with reduced supplies;
- Develop informational newsletters or website content regarding drought conditions and the District's response;
- Inform the public about the severity of conditions and promote water conservation.

External communication consists of outreach with neighboring cities and counties, and state, federal, and other government entities. The external groups BBID would coordinate with, and the goals of coordination are as follows:

- City of Tracy for Tracy Hills Service Area M&I delivery and recycled water reuse;
- City of Mountain House: Mountain House SA M&I delivery;
- SLDMWA: water transfer;
- CCWD: water transfer;
- Delta Watermaster: Delta water operations and diversion;
- USBR: CVP allocation;
- SWRCB: potential state regulatory action.

5) Potential financial impacts of drought and proposed district management measures

Drought conditions could impact District finance. BBID may need additional labor during drought to fine tune district operations, including internal and external coordination with growers and public agency partners. The District also faces increased costs due to higher priced water in the form of water transfers, as well as increased energy costs and associated maintenance costs. Water sale revenue may also decline due to water conservation efforts. To overcome these impacts, BBID may consider the following actions:

- Impose a water surcharge for the extra cost induced from the transferred water to the growers. The water transfer contract will be negotiated, and there will be coordination and agreement with the growers.
- Utilize funds from reallocated deferred capital improvements and/or planned financial reserves to support District operations.
- Defer the implementation of capital improvement plan (CIP) projects until after drought when the hydrologic and financial conditions have sufficiently recovered.

3 DESCRIPTION OF QUANTITY OF WATER USES

Section 3 describes the quantity of water used for agricultural, environmental, recreational, M&I and groundwater recharge use. BBID primarily supplies water to agricultural users in addition to a handful of M&I users. Currently, BBID does not supply water for environmental purposes, recreational use, or groundwater recharge.

Water uses and demands are reported on a calendar year basis for 2021 to 2025 to include a complete irrigation season. The same time period was used to calculate the water budget in Section 5. According to the California Data Exchange Center (CDEC), the years 2021 to 2025 cover a wide range of water year types ranging from dry to wet.

3.1 AGRICULTURAL WATER USE

The total agricultural water demand is estimated by crop evapotranspiration (ET_c) which combines water evaporation from the soil surface and transpiration through the crops. The ET_c used in this water budget analysis was quantified using the Consumptive Use Program Plus Model (CUP+) for each crop.

The CUP+ model was used to support BBID water budget calculations and was developed by DWR to help water suppliers quantify the efficiency of agricultural water use. CUP+ is an Excel application that estimates soil water balance to estimate ET_c , effective precipitation (E_r), and evapotranspiration of applied water (ET_{AW}) for crops. ET_{AW} is a seasonal estimate of the irrigation water requirement for evapotranspiration of a crop minus any water supplied by effective rainfall and effective seepage (DWR, 2012).

The CUP+ model requires the users to input information, including weather data, crop type, irrigation start and end date, available water holding capacity (AWHC), maximum soil depth, maximum root depth, and allowable depletion of plant available water in the effective root zone, to generate output. The weather data for this analysis was retrieved from CIMIS Station 47, which is located near Brentwood, California, and it includes daily solar radiation, maximum and minimum temperature, dew point temperature, and wind speed. Irrigation starting and ending dates are set to reflect the farmer's irrigation period for their crops. The AWHC is determined based on the soil texture of the irrigated land. As discussed in Section 2.1.2, BBID soil is primarily made of clay and clay loam. The maximum soil depth is assumed to be approximately 4 feet (PSSAC, 2022). The maximum root depth and allowable depletion is referenced from the crop information found from the Division of Agriculture and Natural Resources, University of California.

3.1.1 PRE-1914 WATER RIGHTS

Agricultural demand within the BBID area served by pre-1914 water rights is attributed to the Byron SA and the Bethany SA, in which 6,232 out of the 11,370 potentially irrigable acres are actively irrigated. **Table 3-1** shows that almonds have made up the majority of the acreage from 2021 to 2025. The District summarizes crop types and acreage from the growers' annual water applications. Changes to the cropping and weather patterns cause the calculated water demand to vary each year.

Table 3-1: Byron SA & Bethany SA Agricultural Crop and Water Demand Data

Crop Type	2021		2022		2023		2024		2025	
	Acres	ET _c Demand (AF)	Acres	ET _c Demand (AF)	Acres	ET _c Demand (AF)	Acres	ET _c Demand (AF)	Acres	ET _c Demand (AF)
Alfalfa	260	1,364	230	1,215	212	960	184	895	185	855
Almonds (1st Leaf)	843	1,285	352	529	19	26	18	26	2	3
Almonds (2-3 Leaf)	0	0	843	2,558	1,195	3,191	371	1,065	37	101
Almonds	1,198	5,421	1,198	5,361	1,198	4,686	2,041	8,644	2,393	9,647
Apricots	18	78	18	78	18	68	18	73	18	70
Beans	219	343	0	0	0	0	45	69	0	0
Cherries	339	1,502	350	1,533	340	1,301	417	1,730	456	1,800
Corn	586	1,057	1,066	1,894	1,001	1,719	991	1,752	935	1,559
Garlic	64	148	0	0	0	0	0	0	0	0
Grapes	209	645	204	621	187	501	165	487	169	466
Misc. Fruit Trees	239	1,056	239	1,045	234	896	234	970	234	923
Mulberry	70	288	70	290	76	281	76	309	75	284
Olives	155	660	155	661	166	611	166	655	160	599
Pasture	185	926	179	900	93	399	183	851	78	345
Peaches	69	287	69	284	66	239	66	261	66	247
Pumpkins	6	19	0	0	0	0	30	87	30	85
Strawberries	3	5	3	5	5	8	10	18	13	23
Sudan/Forage	26	40	200	305	174	259	144	214	174	251
Tomatoes	1,135	2,903	723	1,864	905	2,150	921	2,370	956	2,263
Walnuts	401	1,664	401	1,673	218	810	204	833	204	768
Wheat	0	0	45	68	91	136	46	69	46	67
Total	6,024	19,690	6,344	20,883	6,196	18,242	6,329	21,379	6,232	20,354

The crop mix in the Byron SA and Bethany SA has shifted toward permanent crops (e.g., almonds and orchards) over the AWMP reporting period, as reflected in **Table 3-1**.

Actual water deliveries to the Byron SA and the Bethany SA differ from the estimated consumptive use values in **Table 3-1** but show a similar pattern (highest deliveries in 2021 and 2022). **Table 3-2** shows the surface water and groundwater deliveries within the two service areas from 2021 to 2025.

Table 3-2: Byron SA & Bethany SA Agricultural Water Use

Source	2021 (AF)	2022 (AF)	2023 (AF)	2024 (AF)	2025 (AF)
Surface Water (pre-1914 Rights)	15,034	14,796	8,427	14,000	14,437
BBID Groundwater	37	141	0	0	0
Private Pumping Estimate	3,421	3,544	7,651	5,006	4,441
Total	18,492	18,481	16,078	19,005	18,878

Private groundwater pumping in the pre-1914 service area is estimated and assumed to bring the total agricultural use (pre-1914 diversion minus M&I uses) to the level of estimated agricultural consumptive use for the year, when considering the effective precipitation. The incorporation of effective precipitation is why the total water use in **Table 3-2** do not equal the total consumptive use estimates provided in **Table 3-1**. It should be noted that the estimated pumping volumes are generally not consistent with the District’s understanding of groundwater use within the District. The District will continue to evaluate private pumping into the future.

BBID relies primarily on its pre-1914 right from the Sacramento-San Joaquin Delta (Delta) at milepost (MP) 1.83 of the intake channel to the Harvey O. Banks Pumping Plant under a settlement agreement with the California Department of Water Resources (DWR) to meet agricultural and M&I water demand in the Byron SA and the Bethany SA. During years when BBID cannot meet all demand using surface water, BBID has purchased groundwater from growers as a supplemental water source, albeit groundwater quality is poor and must be blended to meet crop water demands without jeopardizing the health of the crop. 2021 and 2022 were classified as a critically dry year per the San Joaquin index, and the total water uses exceeds those of the prior years with a higher reliance on groundwater.

BBID typically delivers water to agricultural customers from March to November, but the water delivery schedule might vary depending on the hydrological conditions of that year.

3.1.2 CENTRAL VALLEY PROJECT WATER

Within the Plain View SA, approximately 2,147 out of 4,696 irrigable acres are actively irrigated. **Table 3-3** summarizes the crop acreage and estimated evapotranspiration within the Plain View SA, as obtained from the growers’ water application by the District. The primary crops grown include almonds and grapes.

Table 3-3: Plain View SA Agricultural Crop and Water Demand Data

Crop Type	2021		2022		2023		2024		2025	
	Acres	ET _c Demand (AF)	Acres	ET _c Demand (AF)	Acres	ET _c Demand (AF)	Acres	ET _c Demand (AF)	Acres	ET _c Demand (AF)
Almonds (1st Leaf)	646	984	117	176	0	0	0	0	0	0
Almonds (2-3 Leaf)	386	1,185	646	1,960	763	2,037	117	336	0	0
Almonds	879	3,978	1,265	5,661	1,198	4,686	1,842	7,801	1,959	7,897
Cherries	66	299	66	296	66	258	66	280	66	266
Fallow	3,313	0	3,795	0	2,637	0	2,556	0	2,556	0
Grapes	115	355	115	351	115	309	115	340	115	317
Total	4,373	4,631	5,241	6,307	4,016	5,253	4,579	8,421	4,696	8,481

Table 3-4 provides the actual agricultural water use within the Plain View SA from 2021 to 2025, which generally follow the consumptive use estimate trends provided in **Table 3-3**. The District relies on CVP supplies, while private pumpers augment surface water with groundwater. As the District does not keep records of the quantity of privately pumped water, the values in the table are estimates.

Table 3-4: Plain View SA Agricultural Water Use

Source	2021 (AF)	2022 (AF)	2023 (AF)	2024 (AF)	2025 (AF)
Surface Water (CVP)	3,870	2,675	2,860	3,740	3,342
BBID Groundwater	302	355	0	596	38
Private Pumping Estimate	399	2,722	1,878	3,347	4,876
Total	4,571	5,752	4,738	7,683	8,256

Actual water use in **Table 3-4** does not directly equal the consumptive use estimates in **Table 3-3** due to effective precipitation. It should be noted that the estimated pumping volumes are generally not consistent with the District's understanding of groundwater use within the District. The District will continue to evaluate private pumping into the future.

3.1.3 POST-1914 RIGHTS WATER

Within the West Side SA, approximately 3,951 out of 6,200 irrigable acres are actively irrigated. **Table 3-5** summarizes the crop acreage and estimated evapotranspiration within the West Side SA, as obtained from the growers' water application by the District. The primary crop grown is almonds.

Table 3-5: West Side SA Agricultural Crop and Water Demand Data

Crop Type	2021		2022		2023		2024		2025	
	Acres	ET _c Demand (AF)	Acres	ET _c Demand (AF)	Acres	ET _c Demand (AF)	Acres	ET _c Demand (AF)	Acres	ET _c Demand (AF)
Alfalfa	317	1,668	368	1,942	423	1,909	385	1,873	385	1,775
Almonds (1st Leaf)	0	0	80	120	52	71	254	365	0	0
Almonds (2-3 Leaf)	0	0	0	0	80	214	132	379	306	831
Almonds	2,705	12,240	2,705	12,103	2,705	10,579	2,705	11,454	2,768	11,157
Beans	147	231	0	0	0	0	33	51	33	50
Corn	0	0	0	0	297	510	1	2	1	2
Cucumbers	0	0	0	0	45	52	45	59	45	58
Garden/Fruit Stand	42	135	42	135	42	114	42	123	42	120
Garlic	0	0	0	0	297	696	297	698	0	0
Parsley	0	0	50	159	50	135	0	0	0	0
Pasture	132	658	52	259	52	222	73	339	73	321
Sudan/Forage	0	0	12	18	12	18	0	0	0	0
Tomatoes	0	0	147	380	147	350	147	379	147	349
Walnuts	31	128	31	129	31	115	31	127	31	117
Wheat	245	368	120	182	225	335	417	620	120	173
Total	3,619	15,429	3,607	15,428	4,457	15,322	4,562	16,467	3,951	14,952

Table 3-6 provides the actual agricultural water use within the West Side SA from 2021 to 2025, which generally follow the consumptive use estimate trends provided in **Table 3-5**. Surface water is delivered to the West Side SA is delivered through a post-1914 appropriative right, while private pumpers augment

surface water with groundwater. The West Side ID CVP contract has been transferred out of the service area and not used by District growers. As the District does not keep records of the quantity of privately pumped water, the values in the table are estimates.

Table 3-6: West Side SA Agricultural Water Use

Source	2021 (AF)	2022 (AF)	2023 (AF)	2024 (AF)	2025 (AF)
Surface Water (post-1914 Rights)	10,167	10,683	9,698	10,625	9,550
Private Pumping Estimate	4,301	1,866	1,961	2,584	3,984
Total	14,468	12,549	11,659	13,209	13,534

Actual water deliveries to the West Side SA differ from the estimated values in **Table 3-5** as the estimated consumptive use in **Table 3-5** does not consider effective precipitation. The deliveries in **Table 3-6** are based on measured diversions under the District's post-1914 water rights. Pumping estimates are calculated by assuming that the remaining demand based on annual crop patterns, that is not met by surface water, is met by private groundwater pumping. It should be noted that the estimated pumping volumes are generally not consistent with the District's understanding of groundwater use within the District. The District will continue to evaluate private pumping into the future.

3.2 ENVIRONMENTAL WATER USE

BBID does not provide water for environmental uses.

3.3 RECREATIONAL WATER USE

BBID does not provide water for recreational water uses.

3.4 MUNICIPAL AND INDUSTRIAL USE

3.4.1 PRE-1914 RIGHTS WATER

M&I demands served by the District's pre-1914 water rights include several users in the Byron SA and the Bethany SA, as well as the cities of Mountain House and Tracy. The Byron SA and the Bethany SA listed in **Table 3-7** serve industrial customers, Mountain House CSD, and construction sites. The city of Mountain House in the Mountain House SA has a right up to 9,813 AFY but used over 5,000 AFY in 2025.

Table 3-7: Byron SA & Mountain House SA pre-1914 Rights Water M&I Water Uses

M&I Entity	2021 (AF)	2022 (AF)	2023 (AF)	2024 (AF)	2025 (AF)
G3 Enterprises	219	175	221	35	192
Mariposa Energy, LLC	17	19	19	22	8
MHCSD (RWSA1)	5,176	4,945	4,502	5,046	5,073
Construction	41	32	20	23	24
Tracy Hills	475	1,000	750	900	1,300
Total	5,928	6,171	5,513	6,025	6,597

As depicted in **Table 3-7**, M&I water uses within the pre-1914 water rights region of BBID increased in recent years due to the rapid development of area served by the city of Mountain House, which is expected to continue as rapid urbanization continues in the Tracy and Mountain House area.

3.4.2 CENTRAL VALLEY PROJECT WATER

The Plain View SA served seven M&I and construction customers from 2021 to 2025 as listed in **Table 3-8**. The primary M&I water users include Musco Family Olive, Prologis, and Safeway.

Table 3-8: Plain View SA CVP Water M&I Water Uses

M&I Entity	2021 (AF)	2022 (AF)	2023 (AF)	2024 (AF)	2025 (AF)
Baselite Concrete	12	12	12	9	11
Independent Construction	0	356	0	0	0
MRP San Joaquin Energy	34	37	35	41	64
Musco Family Olive	716	588	607	671	598
Owens Brockway Glass	0	0	0	27	60
Prologis	270	332	311	327	300
Safeway	270	332	311	327	300
Stephen & Jamie Wesely	9	1	6	5	6
Total	1,311	1,657	1,282	1,407	1,339

3.4.3 POST-1914 RIGHTS WATER

The West Side SA serves one M&I and construction customers from 2021 to 2025 as listed in **Table 3-9**.

Table 3-9: West Side SA post-1914 Rights Water M&I Water Uses

M&I Entity	2021 (AF)	2022 (AF)	2023 (AF)	2024 (AF)	2025 (AF)
Toll Brothers	N/A	N/A	8	0	0
Construction	N/A	N/A	1	20	93
Total	N/A	N/A	9	20	93

3.5 GROUNDWATER RECHARGE USE

BBID does not provide water for direct groundwater recharge uses but is working through various partner agencies examining south of Delta conjunctive use projects.

3.6 TRANSFERS AND EXCHANGE USE

BBID made transfers out of the District in 2023, 2024, and 2025. BBID growers have installed more groundwater wells and increasingly rely on groundwater (or allow BBID to purchase groundwater (instead of transfers) when surface water is not available. These transfer volumes are reported in **Section 5.3 Water Uses (Outflows)**.

4 QUANTITY AND QUALITY OF WATER RESOURCES

This section describes the sources of water available to BBID.

4.1 WATER SUPPLY QUANTITY

BBID primarily relies on surface water, though has witnessed groundwater pumping in dry years. The District has some transfers and can utilize recycled water from the city of Tracy as an option, as needed, but does not currently use any.

4.1.1 SURFACE WATER SUPPLY

BBID surface water rights include pre-1914 rights water to the Delta, two separate CVP allocations (20,600 AFY from the 2004 consolidation of PVWD and 2,500 AFY from the 2021 consolidation of WSID), and post-1914 rights to Old River (also acquired from the WSID consolidation in 2021.) The 2021 to 2025 total water supply for both agricultural and M&I BBID service areas are shown in **Table 4-1**.

Table 4-1: BBID Surface Water Diversions

	2021 (AF)	2022 (AF)	2023 (AF)	2024 (AF)	2025 (AF)
Pre-1914 Rights	20,962	20,966	13,939	20,025	21,034
CVP	5,181	4,332	4,142	5,147	4,681
Post-1914 Rights	10,167	10,683	9,707	10,645	9,643
Total	36,310	35,982	27,788	35,817	35,358

BBID's diversions under the pre-1914 right are higher than the deliveries shown in **Table 3-2** and **Table 3-7** due to the reported losses in the pre-1914 canal system, which is discussed in Section 5.3. Diversions from the CVP have averaged just under 5,200 AFY, below the 20,600 AFY allocation obtained from the former PVWD and the 2,500 AFY allocation obtained from WSID. This difference reflects that large areas have been fallowed, converted to urban uses served by the city of Tracy, or now depend on groundwater pumping.

4.1.2 GROUNDWATER SUPPLY

BBID can augment the shortage in surface water supplies throughout the growing season by paying growers to pump groundwater into the canals to supply water to customers downstream. Due to the poor groundwater quality in the area, groundwater must be blended to ensure no crop damage during irrigation. The quantity of the water pumped depends on the hydrological conditions and the crop water demand. **Table 4-2** summarizes the groundwater pumped for BBID for 2021 to 2025 and does not include private pumping.

Table 4-2: BBID Groundwater Supplies

	2021 (AF)	2022 (AF)	2023 (AF)	2024 (AF)	2025 (AF)
Byron SA & Bethany SA	37	141	0	0	0
Plain View SA	302	355	0	596	38
West Side SA	N/A	N/A	0	0	0
Total	339	496	0	596	38

Groundwater pumping in the BBID service area is supplied from either the ECC Subbasin or the Tracy Subbasin. In March 2017, the Board voted to become a GSA for a portion of the Tracy Subbasin to comply with the Sustainable Groundwater Management Act (SGMA). BBID worked jointly with the other GSAs to prepare a GSP for the Tracy Subbasin. The Tracy Subbasin GSP was adopted in November 2021. In May 2017, BBID became a GSA for the ECC Subbasin and worked collaboratively with seven other agencies within the subbasin to prepare a GSP. The ECC Subbasin GSP was adopted in October 2021.

The goal of these two GSPs is to sustainably manage the groundwater basins and avoid undesired results in the future; BBID currently predicts no limit to groundwater sources in either basin, other than water quality constraints.

4.1.3 OTHER WATER SUPPLIES

BBID did not make any water transfers into the District from 2021 to 2025. BBID did not utilize recycled water.

4.2 WATER SUPPLY QUALITY

Historically BBID's water purchases have been reliably high-quality supplies. This section summarizes the recent water quality parameters for BBID's water supply.

4.2.1 SURFACE WATER SUPPLY

Pre-1914 Water Rights

BBID diverts pre-1914 water from the Delta from the Harvey O. Banks Pumping Plant (Banks) intake channel. The CDEC hosts publicly available data for water quality at the Banks pumping plant; data from two adjacent stations were assumed to represent water quality at the BBID intake. **Table 4-3** shows the average, minimum and maximum water quality values.

Table 4-3: Banks Pumping Plant Water Quality, 2021 to 2025

Characteristic	Units	Average	Minimum	Maximum
Electric Conductivity	uS/cm	439	86	1,832
pH	pH	7.9	7.4	8.8
Turbidity	NTU	10.9	1.8	93.9

USBR CVP Water Rights

BBID diverts water for the Plain View SA from the DMC near the C.W. Bill Jones Pumping Plant (Jones). CDEC data at the Jones plant (station TRP) is assumed to be similar to the BBID CVP diversion and is shown in **Table 4-4**.

Table 4-4: Jones Pumping Plant Water Quality, 2024 to 2025

Characteristic	Units	Average	Minimum	Maximum
Electric Conductivity	uS/cm	280	142	438
Turbidity	NTU	13.3	6.8	34.5

Post-1914 Old River Rights

BBID diverts water from the CVP as well as Old River to supply the West Side SA. CDEC station ORM (Old River Upstream of Mountain House Creek) was used to report water quality in **Table 4-5**. Station ORM is northwest of Tracy, just upstream of the BBID intake on Old River.

Table 4-5: Old River Water Quality, 2021 to 2025

Characteristic	Units	Average	Minimum	Maximum
Electric Conductivity	uS/cm	566	106	1,104
pH	pH	7.6	6.7	8.2
Turbidity	NTU	6.9	1.0	21.8

The water quality is worse (higher EC) in Old River than downstream at the Jones Pumping Plant. This is consistent with sampling sites further upstream on Old River (for example, TWA) having higher EC values that flows coming out of the Delta (ORI). Point-source agricultural and wastewater discharges, as well as groundwater effluence along the Old River may lead to higher EC values than found in the high water volumes of the Delta.

4.2.2 GROUNDWATER SUPPLY

Groundwater within BBID has historically been of poor quality, which explains why surface water is and has been the primary water supply for agricultural irrigation, and now M&I due to rapid urbanization in the area.

BBID groundwater quality is monitored under the ECC Subbasin GSP and the Tracy Subbasin GSP. **Table 4-6** shows the water quality for the key constituents measured for the ECC Subbasin. It indicates that the total dissolved solids (TDS) and chloride concentrations in ECC Subbasin groundwater exceed or are near the recommended Secondary Maximum Contaminant Level (SMCL) of 500 mg/L and 250 mg/L, respectively, in most wells. Nitrate is observed in some shallow zones of the subbasin (i.e., Brentwood) with concentration exceeding the Maximum Contaminant Level (MCL) of 10 mg/L that may be linked to historical agricultural influences in the area. Arsenic concentrations are generally lower than the MCL of 10 ug/L subbasin wide.

Table 4-6: ECC Subbasin Groundwater Quality for Key Constituents

Constituents	Units	Date Range	Concentration		
			Average	Minimum	Maximum
TDS	mg/L	1957-2019	1,098	86	20,400
Chloride	mg/L	1957-2019	231	11	4,900
Nitrate	mg/L	1957-2019	4.7	ND ^a	1,400
Arsenic	ug/L	1957-2019	8	ND	750

^a ND – indicates analytical result has not been detected at or above the reporting limit.

Table 4-7 provides a list of key constituents monitored for the Tracy Subbasin, and it includes the date range the analyzes being measured, the minimum and maximum concentrations, the reporting MCL or Notification Level (NL), and the number of wells exceeding the MCL or NL. Overall, a high portion of wells exceeds or is near the recommended SMCL for TDS and chloride. Boron is present in the non-Delta areas and in the northern portion of the Delta area.

Table 4-7: Tracy Subbasin Groundwater Quality for Key Constituents

Constituents	Units	Date Range	MCL or NL	Number of Wells Analyzed	Number of Wells Exceeded MCL or NL	Concentration	
						Minimum	Maximum
Arsenic	ug/L	1959-2020	10	195	32	<2.0 ^c	54
Boron	mg/L	1945-2019	1 ^a	584	227	<0.1	10
Chloride	mg/L	1945-2020	250 ^b	664	210	1.1	2,400
Iron	ug/L	1953-2020	300	206	34	<0.03	25,700
Manganese	ug/L	1950-2020	50	190	67	<0.01	17,600
Nitrate as Nitrogen	mg/L	1947-2020	10	537	21	<0.02	81
TDS	mg/L	1944-2020	500 ^b	376	269	82	4,500
Sulfate	mg/L	1944-2020	250 ^b	465	122	0.2	1,420
1,2,3TCP	ug/L	1984-2020	0.005	126	25	<0.001	0.500

^a It indicates the analyze does not have an established MCL but has a NL.

^b The recommended SMCL is provided in the table.

^c < indicates analytical result has not been detected at or above the reporting limit.

4.2.3 OTHER WATER SUPPLIES

BBID had no other water supplies available to it during this reporting period.

4.2.4 SOURCE WATER QUALITY MONITORING PRACTICES

Due to rapid aquatic weed growth during peak summer months in BBID's canals, BBID applies aquatic herbicides under permit requirements and under strict conditions to ensure meters, gates, and weir structures are operational and free of aquatic vegetation. The District complies with all permit conditions to include monitoring of surface water quality in conjunction with an aquatic pesticide monitoring

program, which typically occurs from April to September. BBID controls its application of herbicides (i.e., acrolein and endothall) under the Statewide General National Pollutant Discharge Elimination System (NPDES) Permit for aquatic pesticides. Before the application of weed control herbicide into the supply canal, the District collects samples from the canal to determine the source water quality. After herbicide application, the District also samples water from the canals to ensure complete dispersion of the herbicide.

DRAFT

5 WATER BUDGET

5.1 OVERVIEW

BBID supplies and demands have already been introduced but are paired with incidental rainfall and losses in this section to describe the annual water for 2021 to 2025. The water budget results are presented in calendar years to reflect BBID irrigation practices and operation. BBID's agricultural water deliveries typically occur from mid-March to mid-November but is adjusted based on hydrologic conditions and grower demands.

The water budget is broken down into three separate accounting centers: the pre-1914 rights, the CVP rights, and the post-1914 rights. **Figure 5-1** provides a schematic of the water budget structure that summarizes the inflows and outflows in each accounting center.

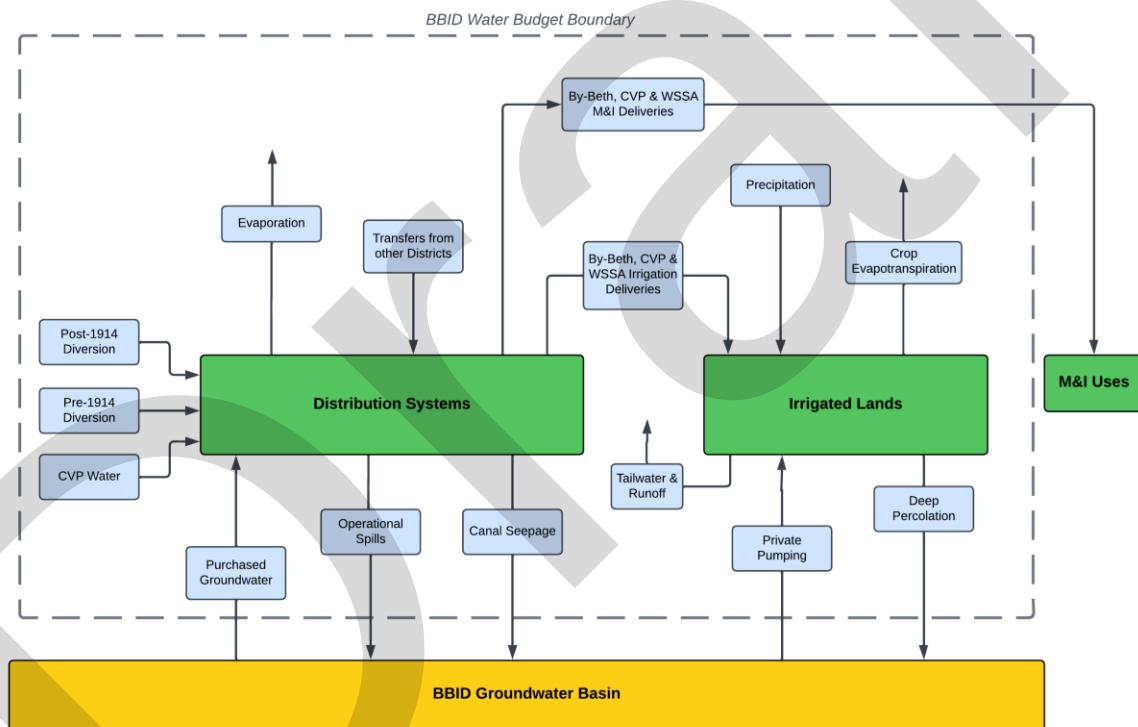


Figure 5-1: BBID Water Balance Model Schematic

5.2 WATER SUPPLY QUANTITY (INFLOWS)

Surface and groundwater inflows to the District are described by service area in Section 4.

This section adds effective precipitation to the mass balance. Effective precipitation is the function of the total precipitation on the irrigated land during a specific period that is available for crops to consume. The quantity of precipitation that could be stored in the root zone depends on the crop characteristics, such as root depth and allowable depletion. The effective precipitation estimated for this analysis was

computed using the CUP+ Model for each crop and depicted for the appropriate BBID service area in **Table 5-1** through **Table 5-3**.

5.2.1 PRE-1914 RIGHTS WATER

The Byron SA and the Bethany SA divert surface water from the State Water Project inlet channel at Clifton Court Forebay to provide water to their agricultural and M&I customers. The Old River water diversions vary annually depending on hydrologic conditions and demands. A limited amount of groundwater is also used to satisfy a portion of irrigation needs within BBID during drought conditions.

Table 5-1 summarizes the surface water diversions, groundwater pumping, transfers and exchange, and effective precipitation from 2021 to 2025.

Table 5-1: Byron SA & Bethany SA Water Supply Quantities

Source	2021 (AF)	2022 (AF)	2023 (AF)	2024 (AF)	2025 (AF)
Pre-1914 Rights	20,962	20,966	13,939	20,025	21,034
Effective Precipitation	1,235	2,543	2,164	2,374	1,475
BBID Groundwater	37	141	0	0	0
Groundwater (Private Pumping Estimate)	3,421	3,544	7,651	5,006	4,441
Transfers & Exchange	0	0	0	0	0
Total	25,656	27,194	23,754	27,404	26,950

5.2.2 CENTRAL VALLEY PROJECT WATER

Table 5-2 summarizes the annual CVP water deliveries, estimated groundwater pumping quantity, and effective precipitation that occurred within the Plain View SA, which is described in more detail in Section 2.1.1 from 2021 to 2025. The Plain View SA supplies CVP surface water to their agricultural and M&I customers. The CVP surface water delivery also varies from year to year depending on the hydrological condition, demands, and availability of CVP water supply. During drought conditions, groundwater is used as a supplemental source to meet irrigation needs. Some landowners within the Plain View SA installed deep wells within their property that they operate as needed to meet crop demands, depending on the CVP water allocation. Groundwater conditions in the Plain View SA are generally more favorable than conditions found in the Byron SA or the Bethany SA. BBID did not keep track of the privately pumped groundwater, thus the private pumping quantity provided in **Table 5-2** is just an estimate of how much groundwater is needed to meet the demand.

Table 5-2: Plain View SA Water Supply Quantities

Source	2021 (AF)	2022 (AF)	2023 (AF)	2024 (AF)	2025 (AF)
CVP ^a	0	0	4,500	6,510	7,830
Surface Water	5,181	4,332	4,142	5,147	4,681
Effective Precipitation	61	555	515	737	224
BBID Groundwater	0	0	0	0	0
Groundwater (Private Pumping Estimate)	399	2,722	1,878	3,347	4,876
Transfers & Exchange	0	0	0	0	0
Total	5,641	7,609	6,535	9,231	9,781
Notes: ^a This volume of CVP water transferred to willing buyers out of District and accounted for in both inflows and outflows of water budget					

5.2.3 POST-1914 RIGHTS WATER

The West Side SA diverts surface water from the Old River to supply water to their agricultural customers. The water diversion from Old River fluctuates every year based on the growers' water demand and the hydrologic conditions. **Table 5-3** summarizes the surface water diversions, groundwater pumping, transfers and exchange, and effective precipitation from 2021 to 2025.

Table 5-3: West Side SA Water Supply Quantities

Source	2021 (AF)	2022 (AF)	2023 (AF)	2024 (AF)	2025 (AF)
Post-1914 Rights	10,167	10,683	9,698	10,625	9,550
CVP ^a	0	0	2,500	2,500	2,500
Effective Precipitation	961	2,879	3,663	3,258	1,418
BBID Groundwater	0	0	0	0	0
Groundwater (Private Pumping Estimate)	4,301	1,866	1,961	2,584	3,984
Transfers & Exchange	0	0	0	0	0
Total	15,429	15,428	15,322	16,467	14,952
Notes: ^a This volume of CVP water transferred to willing buyers out of District and accounted for in both inflows and outflows of water budget					

5.3 WATER USES (OUTFLOWS)

In addition to agricultural and M&I deliveries, water outflows in the BBID service area include evaporation, seepage, operational losses, deep percolation, tailwater. Due to modernization of the irrigation district and on farm, operational losses are minimal from the irrigation district conveyance system and on farm tailwater runoff is nearly non-existent due to the conversion to micro irrigation. Old tiles drains exist in significant portions of the Byron SA and the Bethany SA to lower the shallow

groundwater table below the crop root zone. Tile drain flows ultimately spill to the delta via private drainage ditches in the area.

Evaporation

The Western Regional Climate Center (WRCC) provides the monthly average pan evaporation data at the Tracy Pumping Plant is shown in **Table 5-4** below. The averages reflect a 1955 to 2005 period of record; the annual average is 97.48 inches.

Table 5-4: WRCC Evaporation Data, Tracy Pumping Plant

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Evaporation (in)	1.53	2.47	5.30	8.20	12.01	14.88	16.92	14.55	10.64	6.57	2.93	1.48

BBID uses their irrigation canal system from mid-March to mid-November. The evaporation in these months sums to 87.89 inches.

A pan evaporation correction coefficient from Evaporation Atlas for the Contiguous 48 United States (NOAA, 1982) is used to adjust for local free water surface conditions. For the BBID service area, the correction coefficient is approximately 0.72 as show in **Figure 5-2**.

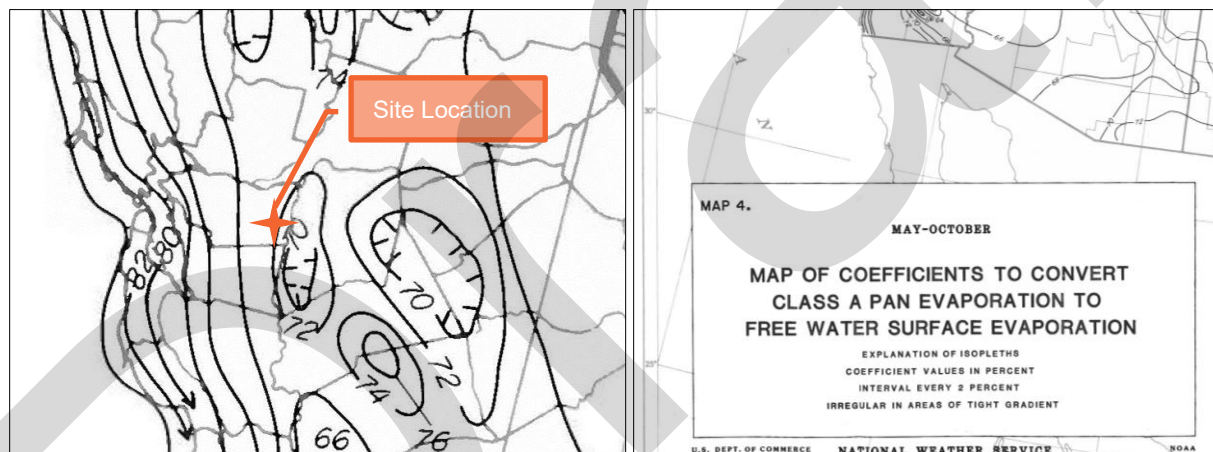


Figure 5-2: Map of Pan Evaporation Coefficients

Equation (1) gives the calculation for evaporation, Where E_p is irrigation season pan evaporation, C_E is the pan evaporation correction coefficient and A is the surface area of the canals.

$$\text{Evaporation} = E_p * C_E * A \quad (1)$$

ArcMap and arial imagery were used to calculate the surface area of BBID canals. The estimated average evaporation is approximately 231 AF/year for the canals within the combined Byron SA, Bethany SA (pre-1914) and the Plain View SA.

Seepage

The District is continually maintaining the existing canal lining and installing lining on the unlined canals to conserve water. The lining projects have significantly reduced seepage loss. The seepage rate was assumed to be approximately 5% of water diverted from Old River. The water loss from seepage passively

recharges the groundwater basin; therefore, this term was considered as recoverable flows in the later calculation of agricultural water use efficiency.

Operational Losses

The District does not measure operational spills, but the loss is assumed to be relatively small since the District operates the system very efficiently and is set to zero for the outflow calculations.

Deep Percolation

Deep percolation is the water lost from the soil when infiltrated water exceeds the storage capacity of the soil during irrigation. The deep percolation water could infiltrate into the aquifer to recharge the groundwater basin or become interflow into rivers or streams. The applied irrigation that becomes deep percolation may become recoverable and reused by the water users. Deep percolation is estimated as the closure term for the service areas.

Tailwater

Tailwater is the irrigation water running off the lower end of the field and is often associated with surface irrigation. Tailwater is considered an outflow from the irrigated lands. Since most of the crops were irrigated by drip irrigation method within BBID's service area, tailwater is assumed to be zero for this analysis.

Transfers and Exchanges

The District transfers some of its CVP water supplies to willing buyer.

5.3.1 PRE-1914 RIGHTS WATER

Table 5-5 summarizes the outflow amount of water used for agricultural and M&I delivery within the Byron SA and the Bethany SA from 2021 to 2025. The irrigation delivery is considered as outflow in the distribution system accounting center and is considered as the inflow into the irrigated lands accounting center as **Figure 5-1** depicted.

Table 5-5: Byron SA and Bethany SA Water Use Quantity

Water Use	2021 (AF)	2022 (AF)	2023 (AF)	2024 (AF)	2025 (AF)
Agricultural Use (ETc)	19,690	20,883	18,242	21,379	20,354
Total M&I	5,928	6,171	5,513	6,025	6,597
Evaporation	188	188	188	188	188
Seepage	1,048	1,048	697	1,001	1,052
Operational Spills	0	0	0	0	0
Deep Percolation	(1,199)	(1,096)	(885)	(1,190)	(1,239)
Tailwater/Runoff	0	0	0	0	0
Transfers & Exchange	0	0	0	0	0
Total	25,656	27,194	23,745	27,404	26,950

5.3.2 CENTRAL VALLEY PROJECT WATER

Table 5-6 summarizes the amount of water used for agricultural and M&I delivery within the Plain View SA from 2021 to 2025. The irrigation delivery is considered as outflow in the distribution system accounting center but is considered as inflow into the irrigated lands accounting center as **Figure 5-1** depicted.

Table 5-6: Plain View SA Water Use Quantity

Water Use	2021 (AF)	2022 (AF)	2023 (AF)	2024 (AF)	2025 (AF)
Agricultural Use (ETc)	4,631	6,307	5,253	8,421	8,481
Total M&I	1,311	1,657	1,282	1,407	1,338
Evaporation	43	43	43	43	43
Seepage	259	217	207	257	234
Operational Spills	0	0	0	0	0
Deep Percolation	(604)	(615)	(250)	(896)	(315)
Tailwater/Runoff	0	0	0	0	0
Transfers & Exchange ^a	0	0	4,500	6,510	7,830
Total	5,641	7,609	6,535	9,231	9,781
Notes: ^a This volume of CVP water transferred to willing buyers out of District and accounted for in both inflows and outflows of water budget					

5.3.3 POST-1914 RIGHTS WATER

Table 5-7 summarizes the amount of water used for agricultural and M&I delivery within the West Side SA from 2021 to 2025. The irrigation delivery is considered as outflow in the distribution system accounting center but is considered as inflow into the irrigated lands accounting center as **Figure 5-1** depicted.

Table 5-7: West Side SA Water Use Quantity

Water Use	2021 (AF)	2022 (AF)	2023 (AF)	2024 (AF)	2025 (AF)
Agricultural Use (ETc)	15,429	15,428	15,322	16,467	14,952
Total M&I	N/A	N/A	9	20	93
Evaporation	0	0	0	0	0
Seepage	508	534	485	531	478
Operational Spills	0	0	0	0	0
Deep Percolation	(508)	(534)	(494)	(551)	(570)
Tailwater/Runoff	0	0	0	0	0
Transfers & Exchange ^a	0	0	2,500	2,500	2,500
Total	15,429	15,666	15,553	17,358	15,354
Notes: ^a This volume of CVP water transferred to willing buyers out of District and accounted for in both inflows and outflows of water budget					

5.4 ANNUAL WATER BUDGET

Table 5-8 through **Table 5-10** provide the water budget results for each of the service areas, including the data source for each flow component, and uncertainty of each component result for the distribution system and irrigated land, respectively, for 2021 to 2025.



Table 5-8: Byron SA & Bethany SA Water Budget Analysis

Flow Type	Flow Component	Data Source	AWMP Location Supporting Calculation	Uncertainty (Percent)	Required?	2021 (AF)	2022 (AF)	2023 (AF)	2024 (AF)	2025 (AF)
Inflows	Pre-1914 Rights	Measured	5.2.1	<5%	X	20,962	20,966	13,939	20,025	21,034
	Effective Precipitation	Measured	5.2.1	<5%	X	1,235	2,543	2,164	2,374	1,475
	BBID Groundwater	Measured	5.2.1	<5%	X	37	141	0	0	0
	Groundwater (Private Pumping Estimate)	Estimated	5.2.1	<5%	X	3,421	3,544	7,651	5,006	4,441
	Transfers & Exchange	Measured	5.2.1	<5%	X	0	0	0	0	0
Outflows	ETc	Measured	5.3.1	<5%	X	19,690	20,883	18,242	21,379	20,354
	M&I Delivery	Measured	5.3.1	<5%	X	5,928	6,171	5,513	6,025	6,597
	Evaporation	Estimated	5.3.1	20%		188	188	188	188	188
	Seepage	Estimated	5.3.1	20%		1,048	1,048	697	1,001	1,052
	Operational Spills	Estimated	5.3.1	30%		0	0	0	0	0
	Deep Percolation	Closure term	5.3.1	30%	X	(1,199)	(1,096)	(885)	(1,190)	(1,239)
	Tailwater/Runoff	Estimated	5.3.1	30%		0	0	0	0	0
	Transfers & Exchanges	Measured	5.3.1	<5%		0	0	0	0	0

Table 5-9: Plain View SA Water Budget Analysis

Flow Type	Flow Component	Data Source	AWMP Location Supporting Calculation	Uncertainty (Percent)	Required?	2021 (AF)	2022 (AF)	2023 (AF)	2024 (AF)	2025 (AF)
Inflows	CVP ^a	Measured	5.2.2	<5%		0	0	4,500	6,510	7,830
	Surface Water	Measured	5.2.2	<5%	X	5,181	4,332	4,142	5,147	4,681
	Effective Precipitation	Measured	5.2.2	<5%	X	61	555	515	737	224
	BBID Groundwater	Measured	5.2.2	<5%	X	302	355	0	596	38
	Groundwater (Private Pumping Estimate)	Estimated	5.2.2	30%	X	399	2,722	1,878	3,347	4,876
	Transfers & Exchange	Measured	5.2.2	<5%	X	0	0	0	0	0
Outflows	ET _c	Modeled	5.3.2	20%	X	4,631	6,307	5,253	8,421	8,481
	M&I Delivery	Measured	5.3.2	30%	X	1,311	1,657	1,282	1,407	1,338
	Evaporation	Estimated	5.3.2	30%		43	43	43	43	43
	Seepage	Estimated	5.3.2	5%		259	217	207	257	234
	Operational Spills	Estimated	5.3.2	5%		0	0	0	0	0
	Deep Percolation	Closure term	5.3.2	5%	X	(604)	(615)	(250)	(896)	(315)
	Tailwater/Runoff	Estimated	5.3.2	5%		0	0	0	0	0
	Transfers & Exchange ^a	Measured	5.3.2	<5%		0	0	4,500	6,510	7,830
Notes:										
^a This volume of CVP water transferred to a willing buyer out of District and accounted for in both inflows and outflows.										

Table 5-10: West Side SA Water Budget Analysis

Flow Type	Flow Component	Data Source	AWMP Location Supporting Calculation	Uncertainty (Percent)	Required?	2021 (AF)	2022 (AF)	2023 (AF)	2024 (AF)	2025 (AF)
Inflows	Post-1914 Rights	Measured	5.2.2	<5%	X	10,167	10,683	9,707	10,645	9,643
	CVP ^a	Estimated	5.2.2	<5%	X	0	0	2,500	2,500	2,500
	Effective Precipitation	Measured	5.2.2	<5%	X	961	2,879	3,663	3,258	1,418
	BBID Groundwater	Measured	5.2.2	<5%	X	N/A	N/A	0	0	0
	Groundwater (Private Pumping Estimate)	Estimated	5.2.2	30%	X	4,301	1,866	1,961	2,584	3,984
	Transfers & Exchange	Measured	5.2.2	20%	X	0	0	0	0	0
Outflows	ETc	Modeled	5.3.3	20%	X	15,429	15,428	15,322	16,467	14,952
	M&I Delivery	Measured	5.3.3	30%	X	N/A	N/A	9	20	93
	Evaporation	Estimated	5.3.3	30%		0	0	0	0	0
	Seepage	Estimated	5.3.3	5%		508	534	485	531	478
	Operational Spills	Estimated	5.3.3	5%		0	0	0	0	0
	Deep Percolation	Closure term	5.3.3	5%	X	(508)	(534)	(494)	(551)	(570)
	Tailwater/Runoff	Estimated	5.3.3	5%		0	0	0	0	0
	Transfers & Exchange ^a	Estimated	5.3.3	<5%				2,500	2,500	2,500
Notes: ^a This volume of CVP water transferred to a willing buyer out of District and accounted for in both inflows and outflows.										

5.5 WATER MANAGEMENT OBJECTIVES

Since the formation of the District, BBID has been committed to providing reliable water supply and water-related services in an environmentally sound and cost-effective manner while responsibly managing local water resources and ensuring customer satisfaction. BBID aspires to promote water management practices that align with the District's vision, mission, and values. The District strives to undertake the following:

- Protect, preserve, and enhance the District's historically acquired pre-1914 appropriative water rights together with managing the District's groundwater resources basin-wide, in cooperation with other water agencies.
- Provide District consumers and landowners with an efficient raw water distribution system.
- Encourage conservation and prudent management of water resources.
- Provide a safe working environment for all District employees and associated personnel.
- Foster a positive working relationship with all agricultural, municipal and industrial consumers, landowners, and other agencies.

To achieve these objectives, BBID has implemented the following water supply planning initiatives:

1. **System Modernization Improvement.** As described in Section 2.2.4, the District has undertaken numerous CIPs to improve physical infrastructure and will continue to be an ongoing effort in the future. As part of this initiative, BBID has implemented a SCADA system to monitor and control the water diversion structures at the Byron SA and the Bethany SA. BBID aims to phase modernization of its system by extending a system-wide SCADA system to operate and control critical gates and structures, automate meter reading, and install variable frequency pumps. Automation of the system has led to increased water order flexibility and a reduction in lead time for water orders. Additionally, BBID intends to evaluate the conditions of the currently installed flowmeters and upgrade them to meet industry standards as necessary in the West Side SA. These upgrades will enable the District to improve its water management capabilities and provide efficient and reliable services to its customers.
2. **System Efficiency Improvement.** As described in Section 2.2.4 and Section 7.1, the District has implemented a number of canal lining projects and will continue its effort to install lining to the unlined canals to reduce water loss during conveyance. As shown in **Table 6-1**, the District completed some Capital Improvement Plan (CIP) projects to upgrade their control structures and pump stations to improve system efficiency. Also, the District is continually seeking any opportunity to operate the system more efficiently and minimize operational spills.
3. **Water Supply Reliability.** One of the District's goals is to provide reliable water service to their customers by diversifying its water supply portfolio. The District has several water sources including the pre-1914 and post-1914 water rights from Old River, CVP water, and the agreement with growers to purchase their privately pumped groundwater. In addition, the District seeks to secure additional water transfer agreement with other agencies to mitigate the potential water shortfall during drought periods. As described in Section 2.2.4, the District is also participating in the Sisk Dam raise project increasing San Luis Reservoir storage by 130,000 AF, which will provide 1,000 AF to BBID, which would provide additional reliability to the District.
4. **Water Conservation.** Promoting mindful and efficient water use among growers is crucial to reducing water demand. The District conducts public outreach meetings to encourage water conservation and provide support to its customers. Additionally, the District encourages growers

to upgrade their on-farm irrigation systems and support transition from flood irrigation to micro-irrigation systems. By doing so, growers can reduce their water consumption and increase the efficiency of their water use. BBID also works with its public relations department to develop documentaries and short films to demonstrate the value and benefits of on farm and conveyance system improvements. BBID maintains all of this information on its website and via its social media links. BBID's efforts to promote water conservation and support grower's adoption of more efficient irrigation systems will contribute to the overall sustainability of the District's water resources.

5.6 EFFICIENCY OF AGRICULTURAL WATER USE

Quantifying the efficiency of agricultural water use allows the water suppliers to understand the performance of their water system and informs where improvements can be made. DWR developed four methods to help water suppliers calculate water use efficiency. The method of water management fraction (WMF) is most applicable to BBID. The WMF represents the sum of applied water evaporation (ET_{AW}) and recoverable flows (RF) divided by the total applied water use (AW) as shown in Equation (2).

$$WMF = \frac{ET_{AW} + RF}{AW} \quad (2)$$

ET_{AW} represents the applied water component of evapotranspiration by subtracting the effective precipitation from the total crop evapotranspiration.

RF is assumed to be a function of applied water only. BBID's distribution system and irrigated lands have interconnection with the groundwater basin. The operational spill, canal seepage and deep percolation will return back to the District's system and/or infiltrate into the aquifer as the growers also pump groundwater to irrigate their crops. The recoverable flows include the agricultural apportion of operational spill and seepage and deep percolation from irrigation.

The AW flows include the surface water and groundwater supply that is used within the District service area.

The numerator in Equation 2 increase the applied water directly used for crop growth by the additional applied water that can be reused. When divided by the total applied water, the WMF represents the total water used for growth; a larger number is better.

Table 5-11 through **Table 5-13** show the calculated WMF for 2021 to 2025 for each of the Service Areas.

Table 5-11: Water Use Efficiency Fraction Pre-1914 Area

	2021	2022	2023	2024	2025
ETc	19,690	20,883	18,242	21,379	20,354
Effective Precipitation	1,235	2,543	2,164	2,374	1,475
Evapotranspiration of Applied Water, ET _{AW} (AF)	18,455	18,340	16,078	19,006	18,878
Seepage	1,048	1,048	697	1,001	1,052
Deep Percolation	(1,199)	(1,096)	(885)	(1,190)	(1,239)
Operational Losses	0	0	0	0	0
Recoverable Flow, RF (AF)	(151)	(47)	(188)	(188)	(188)
Total Surface Water Applied	15,034	14,796	8,427	14,000	14,437
Total Groundwater Applied	3,458	3,685	7,651	5,006	4,441
Total Supply Water, AW (AF)	18,492	18,481	16,078	19,005	18,878
Water Management Fraction, WMF (AF)	99.00%	99.00%	98.80%	99.00%	99.00%

Table 5-12: Water Use Efficiency Fraction CVP Area

	2021	2022	2023	2024	2025
ETc	4,631	6,307	5,253	8,421	8,481
Effective Precipitation	61	555	515	737	224
Evapotranspiration of Applied Water, ET _{AW} (AF)	4,571	5,752	4,738	7,683	8,256
Seepage	259	217	207	257	234
Deep Percolation	(604)	(615)	(250)	(896)	(315)
Operational Losses	0	0	0	0	0
Recoverable Flow, RF (AF)	(345)	(398)	(43)	(639)	(81)
Total Surface Water Applied	3,870	2,675	2,860	3,740	3,342
Total Groundwater Applied	701	3,076	1,878	3,943	4,914
Total Supply Water, AW (AF)	4,571	5,752	4,738	7,683	8,256
Water Management Fraction, WMF (AF)	92.50%	93.10%	99.10%	91.70%	99.00%

Table 5-13: Water Use Efficiency Fraction Post-1914 Area

	2021	2022	2023	2024	2025
ETc	15,429	15,428	15,322	16,467	14,952
Effective Precipitation	961	2,879	3,663	3,258	1,418
Evapotranspiration of Applied Water, ET _{AW} (AF)	14,468	12,549	11,659	13,209	13,534
Seepage	508	534	485	531	478
Deep Percolation	(508)	(534)	(494)	(551)	(570)
Operational Losses	0	0	0	0	0
Recoverable Flow, RF (AF)	(0)	(0)	(9)	(20)	(93)
Total Surface Water Applied	10,167	10,683	9,698	10,625	9,550
Total Groundwater Applied	4,301	1,866	1,961	2,584	3,984
Total Supply Water, AW (AF)	14,468	12,549	11,659	13,209	13,534
Water Management Fraction, WMF (AF)	100.00%	100.00%	99.90%	99.80%	99.30%

The high WMF implies that BBID's water system and irrigation method is highly efficient in utilizing the District's water supplies to meet irrigation demand. The only irrecoverable flow in the water budget flow path is the evaporation loss from the distribution system.

6 CLIMATE CHANGE

The District recognizes that climate change could impact the timing and volume of water availability to their customers, and is committed to increasing the resilience of water supplies. This section discusses the potential impact of climate change to BBID's water supply and demand, and identifies actions to help mitigate the impacts.

6.1 EFFECTS OF CLIMATE CHANGE ON WATER SUPPLY

The local climate change snapshot tool and projected annual average charts available at Cal-Adapt were used to understand the projected changes in temperature, precipitation and wildfire within the BBID service area (Cal-Adapt, 2022a; Cal-Adapt, 2022b). The BBID service area is expected to experience an increase in the overall temperature, more severe weather conditions (i.e., more intense storms and droughts), and increased risks to wildfires. Additionally, sea level rise in the Bay Delta could affect the water quality and the ability to divert water.

6.1.1 CHANGES AS A RESULT OF TEMPERATURE AND PRECIPITATION FLUCTUATION

Snowpack in the Sierra Nevada is an important high quality water source for water users across California. Snowpack acts as a natural storage reservoir that lessens the need for reservoir capacity; during spring and summer, the snowpack gradually melts and releases water to Delta tributaries. Snowmelt in the Sierra Nevada has declined due to increasing temperature over the last century, with more precipitation falling as rain into surface water bodies instead of snow being stored as snowpack. Studies show that the Sierra Nevada snowpack is expected to continue to shrink due to global warming (Reich et al., 2018). As precipitation shifts to rain instead of snow, high runoff volumes will occur earlier in the year, prior to the summer irrigation season. BBID does not currently have surface water storage to capture early season runoff and store it for peak use, nor do many opportunities exist in the western delta upland area. The delta as a waterbody provides storage, which BBID relies upon. Additionally, runoff from precipitation falling as rain instead of snow can flush local contaminants into the surface water bodies (Fecht, 2019), potentially damaging BBID source water quality.

Although the current projection shows little change in average total annual precipitation in California during the next century, dry years are expected to become more frequent and precipitation is expected to be delivered in more intense storms and within a shorter wet season (Cal-Adapt, 2022a). The more intense storms may result in flooding and degradation of future water supply as fast-moving floodwaters erode and carry sediment downstream. The drier years increase the risk of drought and can reduce the available water supply.

6.1.2 CHANGES AS A RESULT OF SEA-LEVEL RISE

Another significant impact of global warming is sea-level rise which will increase high salinity seawater in the Delta (DWR, 2022). Increased seawater intrusion will require more surface water inflows to be directed to the ocean to repel the poorer quality water moving eastward from the shoreline into the Delta (DWR, 2022), allowing lower diversion volumes to downstream contractors.

Sea-level rise could cause flooding of the low-lying areas due to excessive stress on the Delta levees. BBID service area is within the boundaries of the Sacramento-San Joaquin Delta, therefore it could be affected by future sea-level rise.

6.2 EFFECTS OF CLIMATE CHANGE ON WATER DEMAND

The rising temperature and changing precipitation patterns may impact agricultural and M&I water demand.

6.2.1 CHANGES AS A RESULT OF WEATHER AND TEMPERATURE FLUCTUATION

Increased temperature will increase ET_c and change irrigation demand within BBID. Irrigation demand is highest during the hot summer season during peak ET_c (and low rainfall). An increase in summer temperatures will lead to an increase in ET_c requiring higher water deliveries. Also, a longer period of high heat will force a longer irrigation season.

Additionally, if source water quality degrades due to factors discussed in Section 6.1, more irrigation water may be needed to leach out salt from the crop root zones to maintain crop viability.

6.2.2 CHANGES AS A RESULT OF CROP CHANGES

Increases to average temperature cause both summers and winters to increase in temperature. Winter chill is important for fruit and nut crops that require a certain number of hours below a crop-specific chilling temperature to promote leaf growth or flowering. The chilling period ensures that the crops do not flower early, and flower after winter conditions to optimize crop yields (California Environmental Protection Agency–Office of Environmental Health Hazard Assessment, 2018). BBID customers grow several types of fruit and nut crops and a potential decrease to winter chill may affect these crops.

Climate change impacts could potentially lead growers to change their crop types to more heat and drought-resilient crops.

6.3 POTENTIAL ACTIONS AND RESPONSES TO CHANGES

BBID is committed to continuously monitoring the key indicators of climate change and proactively developing solutions to mitigate the impacts on water supply availability. As discussed in Section 7, BBID's ongoing CIP highlights two efforts to limit water loss:

- Increase maintenance and construction of canal lining projects and canal-to-pipeline connections; and
- Upgrade the SCADA system to optimize the water conveyance system and minimize waste and reduce diversions while maintaining agricultural production.

Relevant CIP projects are shown in **Table 6-1**.

Table 6-1: BBID CIP Projects

Project	Status
Canal 45 North of Armstrong Road Canal Lining Project	Completed
Green A-Line and Green B-Line Pipe Replacement	Completed
Kellogg Creek-Canal 45 Radial Gate Replacement and Canal Lining	Completed
Pump Station 4 Replacement	Completed
Pump Station 2 Pipeline Replacement	Completed
R-Line Pipeline Replacement	In progress: design phase
Wicklund Cut Pump Station Rehabilitation	Design and funding phase
Byron and Bethany water control gate automation	Planning and funding phase
Canal Lining and Lining Rehabilitation Projects	Future planned
Pipeline Replacement Projects	Future planned
Smith Pumps Upgrade and Automation Project	In progress
SCADA/Telemetry Upgrade and Extension	In progress
Pump Station 1 North Upgrade (VFDs and new MCC)	Preliminary design; future funding phase

As part of adaptive management measures for climate change, BBID will continue to provide support and initiatives to their growers to improve irrigation efficiency and on-farm technologies.

7 WATER USE EFFICIENCY INFORMATION

This section describes BBID's efforts to improve Water Use Efficiency through the application of efficient water management practices (EWMPs.)

7.1 EWMP IMPLEMENTATION AND REPORTING

WC §10608.48 requires two types of critical EWMPs for all agricultural water suppliers:

1. Measure the volume of water delivered to customers with sufficient accuracy; and
2. Adopt a pricing structure for water customers based at least in part on quantity delivered.

The CWC also lists 14 conditional EWMPs that are required only if they are locally cost-effective and technically feasible.

BBID will continue implementing critical and conditional EWMPs as described in **Table 7-1**.

Table 7-1: Report of EWMPs Implemented/Planned

EWMP No.	EWMP	Implementation Status	Description
Critical EWMP - Water Code §10608.48.b			
1	Measure water deliveries with sufficient accuracy	Implemented in the Pre-1914 Byron SA, the Bethany SA and the Plain View SA, ongoing in the West Side SA	For decades, the District has measured deliveries at each farm turnout with flowmeters. BBID measures flow at the intake diversions with Water Specialty brand propeller type meters for all pump discharge except the pump to Mountain House SA, which is measured by a Magmeter flowmeter. The turnout flowmeters are inspected on an annual basis as well as factory tested on a rotational schedule. All meters have an accuracy of $\pm 2\%$ certified on an annual basis. BBID maintains a database of customer turnout delivery data and aggregates by service area. BBID complies with the terms of its 2003 Agreement with DWR regarding the diversion of water from the Delta by providing daily records of diversions from the intake channel to DWR. Some turnouts within the newly consolidated West Side SA lack electronic flowmeters and manual water measurements are required. The District will conduct an assessment of existing condition of turnouts in the West Side SA.
2	Adopt a pricing structure for water customers based at least in part on quantity delivered	Implemented	The District has used volumetric pricing for agricultural water use since 1965. For all parcels greater than 2 acres, the District charges on a per AF basis. For parcels of 2 acres or less, there is an interruptible annual flat rate water service charge and there is no volumetric pricing. Parcels of 2 acres or less constitute less than 2% of all parcels served.
Conditional EWMP - Water Code §10608.48.c			

EWMP No.	EWMP	Implementation Status	Description
3	Facilitate Alternate Land Use	Implemented/Ongoing	According to CWC §10608.48 (c)(1), this EWMP is the facilitation of alternative land use for lands with exceptionally high-water duties or whose irrigation contributes to drainage and other signification problems. As discussed in Section 2.1.2, the majority of the District is prime farmland and is used for agricultural purposes though some farmland has been developed for municipal uses (MHCS D) due to external drivers in the last 20 years. BBID addressed this change of land use within its Bethany SA and provides raw water to the Mountain House SA and the Tracy Hills SA (MHCS D; see Appendix G for the resolution regarding MHCS D and city of Tracy UWMP).
4	Facilitate Use of Recycled Water	Conceptual planning ongoing	In 2001, the District conducted a system-wide recycled water feasibility study to analyze the integration of recycled water supplies into BBID water resources. In 2009, a recycled water pipeline feasibility study was conducted to provide supply to the Mariposa Energy Project, though it was deemed economically infeasible. Through these efforts, the District has sought out the possibility of using recycled water and most internal opportunities were deemed to be economically infeasible. However, the District continues to pursue recycled water use with regional partners and will continue to do so. Currently, the District is engaged in preliminary studies with the city of Tracy to potentially receive recycled water from the city of Tracy in the West Side SA to diversify its water supply portfolio.
5	Facilitate Financing of On-Farm Irrigation Systems	Not implemented	BBID's priority is to provide water to its customers at the lowest cost. The District does not have the resources to finance on-farm irrigation system capital improvements though landowners continue to make on-farm irrigation efficiency improvements to increase yields.
6	Incentive Pricing Structure	Implemented	The District uses volumetric pricing for water deliveries. No tiered pricing is planned since current growers have near maximum efficiencies, and tiered pricing is not expected to yield greater water efficiency. Growers in the District are very efficient with their water: over 90% of the row crops are irrigated with drip irrigation. The majority of all farms in the District are on drip or micro-spray irrigation.
7	Conveyance and Storage Infrastructure	Implemented/Ongoing	According to CWC §10608.48 (c)(1), this EWMP includes expanding lined or pipe distribution systems, decreasing maintenance, and reducing seepage. The District's CIP includes several projects that will decrease maintenance and reduce seepage. The District is continually

EWMP No.	EWMP	Implementation Status	Description
			maintaining existing canal lining and installing new lining. Table 6-1 shows some of the completed, in progress, and future projects that will decrease maintenance and reduce seepage. The District is currently developing CIP for the newly consolidated West Side SA to improve their agricultural water use efficiency.
8	Water Ordering Flexibility	Implemented/Ongoing	The District is using its CIP to increase order flexibility and decrease lead time for water orders. The District has SCADA system monitoring and control north and south of the Intake Channel (Byron SA and Bethany SA), using a mobile SCADA platform that allows canal operators more flexibility with water orders from any location in the SA by making real-time changes to canal flows. The District is currently reviewing the feasibility of developing a SCADA telemetry system that will allow them to expand their SCADA capabilities further north in the Byron SA, further south in the Bethany SA, and the West Side SA.
9	Spill and Tail-Water Recovery	Implemented	The District has approximately 7 miles of subsurface drains. As discussed in this AWMP, growers in the District have high efficiencies and runoff is minimal. The District's operational outflows are kept to a minimum in the Byron SA and the Bethany SA. In the Plain View SA, runoff is practically zero. The District continues to seek any opportunity to minimize operational spills and efficiently manage water deliveries throughout the District. In the West Side SA, tailwater and runoff is recaptured to convey into Wicklund Cut.
10	Conjunctive Use of Groundwater	Ongoing	Opportunities for groundwater use and development are limited in the District. Historically, BBID has fully relied on surface water supplies with groundwater as a supplement in drought or restricted supply years. The District is a GSA for the Tracy Subbasin and the ECC Subbasin. As a GSA, BBID is working cooperatively with surrounding agencies, cities, and counties to manage groundwater resources in a responsible, sustainable manner. BBID will also continue to look for opportunities for future conjunctive use.
11	Automation	Implemented/Ongoing	The District is reviewing the feasibility of extending its SCADA system automation for the Byron SA and the Bethany SA. BBID has SCADA control and monitoring at Pumping Plant 1 North and at all major facilities in the Bethany SA and the Mountain House SA. A SCADA telemetry plan is being reviewed for feasibility for extending further north into the Byron SA and further south into the Bethany SA to enable more automation of canal control structures and pump stations. Also, as part

EWMP No.	EWMP	Implementation Status	Description
			of this effort, Pumping Station 5 was automated and a radial gate on Canal 45 was automated in 2018.
12	Facilitate Customer Pump Testing	Not Implemented	Because BBID has historically relied on surface water in nearly all years with very limited groundwater for water supply, providing groundwater pump testing for its customers has not been necessary. Customers rely on their power supplier (Pacific Gas & Electric) for pump testing service.
13	Water Conservation Coordinator	Implemented	The District has designated Nader Shareghi as the Water Conservation/Schedule Coordinator; contact information is shown below. Nader Shareghi, P.E. DM, NSPE-CA Assistant General Manager Byron-Bethany Irrigation District 7995 Burns Road Byron CA 94514 (209)835-0375 n.shareghi@bbid.org Website: bbid.org
14	Technical Assistance	Implemented/Ongoing	BBID coordinates irrigation delivery scheduling with all growers and encourages efficient use of water. Additionally, BBID provides intake channel flow data and water quality data to growers upon request. ET rates are available to growers from CIMIS in the vicinity of the District (Station 47 Brentwood and Station 71 Modesto). ET data can be used by growers for irrigation scheduling and maximization of irrigation efficiency.
15	Evaluate Policies	Ongoing	The District believes that there are three basic components to a water delivery service: equity, reliability, and flexibility. When considering modifications to District policies and facilities, BBID is aware of the significance of optimizing these components. The District believes it is also important to recognize the evolving demands of the water users, based on improved water management practices, and to incorporate the means to meet the demands by updating and enhancing District policies as necessary.
16	Water Supplier Pump Efficiency	Ongoing	Since 1964, BBID has been testing pumps of its water supply conveyance system for efficiency and maintaining the pumps to increase the efficiency. As part of the CIP, BBID has replaced, rebuilt, or has plans to replace all of the major pumping stations in the District within

EWMP No.	EWMP	Implementation Status	Description
			the next 10 years. A new VFD type pump was installed on Pumping Station 1S, and Pumping Stations 3, 4 and 5 have been replaced. Pumping Stations 1N, 2 and Smith are planned for replacement with VFDs.

7.2 EWMPS EFFICIENCY IMPROVEMENTS

Quantification of the improvements in water use efficiency is challenging due to the complexity of the system, variable water supply, limited implementation periods, and incomplete data for evaluation. However, a qualitative assessment based on completed and proposed projects and policies is a feasible approach to gauge the level of efficiency improvements. **Table 7-2** provides an estimate of the water use efficiency improvements for each EWMP since the 2020 AWMP and the anticipated improvements to occur in five and ten years. The improvements are qualitatively estimated as denoted ranging from None, Limited, Moderate, and Significant.

Table 7-2: Report of EWMPs Efficiency Improvements

EWMP No.	EWMP	Estimate of Water Use Efficiency Improvements That Occurred Since Last Report	Estimated Water Use Efficiency Improvements 5 and 10 years in future
Critical EWMP - Water Code §10608.48.b			
1	Measure water deliveries with sufficient accuracy	Limited The installed flowmeters in the Byron SA, the Bethany SA, and the Plain View SA help the District measure water deliveries to monitor the water use. The flowmeters are inspected regularly to ensure accuracy. Minor improvement has been made since the last report because the existing flowmeters were already installed with proven accuracy.	Moderate The District is conducting an assessment of the turnout flow measurements that are currently made in the West Side SA and the feasibility of equipping every turnout with a flowmeter there or continuing headgate measurements if sufficiently accurate. Moderate water efficiency improvement may be made over the next 5 to 10 years to comply with water measurements provision of Water Code §10608.48(b).
2	Adopt a pricing structure for water customers based at least in part on quantity delivered	Moderate The District adopted volumetric pricing for agricultural water use since 1965. The volumetric water pricing varies across different service areas to reflect the cost of water for different water sources. The District conducted a study in 2016 to examine the cost of service for delivering agricultural water. The District's Board adopted an increase to the water rates in 2017 but with the consideration of softening the blow to the growers. Moderate improvement has been made.	Moderate The District will continue to implement the established volumetric pricing structure at a uniform water rate, which is different across the six service areas, for all agricultural water deliveries. Moderate improvement is anticipated to be made.
Conditional EWMP - Water Code §10608.48.c			
3	Facilitate Alternate Land Use	Significant As discussed in Table 7-1, some farmland within the Bethany SA has been developed for municipal uses and became part of the MHCS D due to external drivers in the past decades. To accommodate this change of land use, the District had an agreement with the MHCS D District to provide raw M&I water to the Mountain House SA. Significant improvement has been made.	Moderate The MHCS D, now the city of Mountain House, continues to expand to meet the growing demand for more development, with all new construction meeting new efficient building and water use standards. BBID will continue to provide raw water service to the growing water demand in the Mountain House SA in the future. Significant improvement in efficiency is anticipated to be made.
4	Facilitate Use of Recycled Water	Limited	Moderate

EWMP No.	EWMP	Estimate of Water Use Efficiency Improvements That Occurred Since Last Report	Estimated Water Use Efficiency Improvements 5 and 10 years in future
		The District has been actively seeking the possibility of using recycled water in the last decade. The District has been working closely with the neighboring city to look into the potential opportunities to facilitate the use of recycled water between agencies. The facilitation with the city of Tracy was still at conceptual planning phase since the last AWMP report, so limited improvement in efficiency has been made.	The District is currently engaged in preliminary studies with the city of Tracy to potentially receive recycled water from the city of Tracy to diversify its water supply portfolio. The District will continue to pursue recycled water use opportunities with regional partners. Moderate improvement is anticipated to be made.
5	Facilitate Financing of On-Farm Irrigation Systems	None Although the District does not have the resources to finance on-farm irrigation system capital improvement, the District has been supporting growers to shift from flood to drip irrigation.	None The District will continue to support growers to convert from flood to drip irrigation.
6	Incentive Pricing Structure	Limited Although no tiered pricing is implemented or planned because most growers are using water near their maximum efficiencies, the current volumetric pricing structure also encourages growers to use water wisely and efficiently.	Limited The District will continue to implement the volumetric pricing structure for agricultural water deliveries.
7	Conveyance and Storage Infrastructure	Significant The District completed a number of CIP projects on pump stations upgrade and canal lining as shown in Table 6-1. The completed projects have made significant improvements to the water distribution and conveyance system.	Significant The District will continue to investigate the feasibility and invest in CIP projects to increase the water system's efficiency. Also, the District is currently developing a CIP for the newly consolidated West Side SA to improve their agricultural water use efficiency.
8	Water Ordering Flexibility	Moderate With the installation of the SCADA system for the Byron SA and the Bethany SA, the District increases water order flexibility and decreases lead time for water orders. Moderate improvement in efficiency.	Moderate The District continues to seek opportunities to increase water ordering flexibility. The District is currently reviewing the feasibility of expanding the SCADA telemetry system will allow them to expand their SCADA capabilities in the Byron SA, the Bethany SA, and the West Side SA.
9	Spill and Tail-Water Recovery	Moderate The District believes that the runoff is relatively minimal in the Byron SA, the Bethany SA, and the Plain View SA because the growers are mostly on	Moderate The District continues to seek any opportunity to minimize operational spills and efficiently manage water deliveries throughout the District.

EWMP No.	EWMP	Estimate of Water Use Efficiency Improvements That Occurred Since Last Report	Estimated Water Use Efficiency Improvements 5 and 10 years in future
		drip irrigation. Also, the installation of the SCADA system allows the operators to monitor data in real-time in order to make the necessary adjustment on operation to minimize spills. Moderate improvement has been made.	The SCADA system installation projects that are being reviewed will help the operators to further reduce operational spills. Moderate improvement is anticipated to be made.
10	Conjunctive Use of Groundwater	None Opportunities for groundwater use and development are limited in the District. However, as a GSA, the District is working cooperatively with surrounding agencies, cities, and counties to manage the basins in a responsible, sustainable manner.	Limited The District will continue to be a responsible GSA to work closely with the other agencies to manage the Tracy Subbasin and the ECC Subbasin. The District will also continue to look for opportunities for future conjunctive use.
11	Automation	Significant As discussed previously, the District completed several CIP projects to install the SCADA system to automate controls at canals and pump stations within the Bethany SA. The installed SCADA system significantly improved water efficiency through allowing the operator to make real-time operational decisions and monitor data in real time.	Significant The District is currently reviewing the feasibility of expanding the SCADA telemetry system in the Byron SA, the Bethany SA, and West Side SA. Significant improvement is anticipated to be made.
12	Facilitate Customer Pump Testing	None As emphasized in Table 7-1, this EWMP is not implemented.	None The District doesn't have plans to implement this EWMP in the next 5 to 10 years.
13	Water Conservation Coordinator	Limited A new Water Coordinator was appointed since the last AWMP report. As described in the Drought Plan, several water conservation measures will be made to address the issues of reduced water supply during drought conditions.	Limited The new Water Conservation Coordinator will continue to contribute effort to promote water conservation to the growers.
14	Technical Assistance	Limited The District coordinates with growers on irrigation delivery scheduling and makes intake channel flow data, water quality data, hydrological data available to the growers upon request. Very limited improvement has been made.	Limited The District will continue to provide current assistance to the growers to help them maximize their efficiency.
15	Evaluate Policies	Limited Whether a policy can improve the District's water use efficiency has been one of the important elements when evaluating them.	Limited The District will continue to do the same in the future.

EWMP No.	EWMP	Estimate of Water Use Efficiency Improvements That Occurred Since Last Report	Estimated Water Use Efficiency Improvements 5 and 10 years in future
16	Water Supplier Pump Efficiency	Moderate The District has been testing pumps to evaluate their efficiency and maintaining them to increase efficiency. As shown in Table 6-1, the District completed the Pump Station 4 Replacement project since the last report and made some moderate improvement on efficiency.	Significant As part of the CIP, the District has been planning to replace all of the major pump stations in the future. The new/upgraded pump stations will significantly improve the pump efficiency therefore increasing the water use efficiency.

7.3 SCHEDULE AND BUDGET ALLOTMENT TO IMPLEMENT EWMPs

Table 7-3 summarizes the schedule and budget allotment for implementing the EWMPs. The budget allotments provided in **Table 7-3** may not be particularly assigned to a specific EWMP and may be allocated across multiple EWMPs, therefore they are not additive. The amounts presented have been rounded to the nearest \$100 and are applicable only to the 2026 budget year.

Table 7-3: Schedule and Budget Allotment to Implement EWMPs

EWMP No.	EWMP	Implementation Schedule	Finance Plan	Budget Allotment
Critical EWMP - Water Code §10608.48.b				
1	Measure water deliveries with sufficient accuracy	Implemented in the Byron SA, the Bethany SA, and the Plain View SA, and ongoing in the West Side SA	BBID Approved 2026 Budget	\$500,000
2	Adopt a pricing structure for water customers based at least in part on quantity delivered	Implemented	BBID Approved 2026 Budget	N/A
Conditional EWMP - Water Code §10608.48.c				
3	Facilitate Alternate Land Use	Implemented/Ongoing	BBID Approved 2026 Budget	N/A
4	Facilitate Use of Recycled Water	Conceptual planning ongoing	BBID Approved 2026 Budget	\$0
5	Facilitate Financing of On-Farm Irrigation Systems	Not implemented	BBID Approved 2026 Budget	N/A
6	Incentive Pricing Structure	Implemented	BBID Approved 2026 Budget	
7	Conveyance and Storage Infrastructure	Implemented/Ongoing	BBID Approved 2026 Budget	\$2,000,000 (Total CIP Budget)
8	Water Ordering Flexibility	Implemented/Ongoing	BBID Approved 2026 Budget	\$50,000
9	Spill and Tail-Water Recovery	Implemented	BBID Approved 2026 Budget	\$2,000
10	Conjunctive Use of Groundwater	Ongoing	BBID Approved 2026 Budget	\$50,000
11	Automation	Implemented/Ongoing	BBID Approved 2026 Budget	\$50,000
12	Facilitate Customer Pump Testing	Not Implemented	BBID Approved 2026 Budget	N/A
13	Water Conservation Coordinator	Implemented	BBID Approved 2026 Budget	\$182,600
14	Technical Assistance	Implemented/Ongoing	BBID Approved 2026 Budget	
15	Evaluate Policies	Ongoing	BBID Approved 2026 Budget	
16	Water Supplier Pump Efficiency	Ongoing	BBID Approved 2026 Budget	\$2,000,000 (Total CIP Budget)

7.4 DOCUMENTATION FOR NON-IMPLEMENTED EWMPs

Table 7-4 documents the EWMPs that are not-technically feasible and/or not locally cost-effective to the District. However, the District may re-evaluate these EWMPs if they become more viable to the District to improve water use efficiency in the future.

Table 7-4: Non-Implemented EWMPs Documentations

EWMP No.	EWMP	Technically Infeasible	Not Locally Cost-effective	Justification/Documentation
5	Facilitate Financing of On-Farm Irrigation Systems		X	The District does not have the resources to finance on-farm irrigation system capital improvements though landowners continue to make on-farm irrigation efficiency improvements to increase yields.
12	Facilitate Customer Pump Testing		X	Because BBID has historically relied on surface water in nearly all years with very limited groundwater for water supply, providing groundwater pump testing for its customers has not been necessary. Customers rely on their power supplier (Pacific Gas & Electric) for pump testing service.

8 SUPPORTING DOCUMENTATION

8.1 AGRICULTURAL WATER MEASUREMENT REGULATION DOCUMENTATION

The District supplies water to less than 25,000 acres and is not required to complete this section.

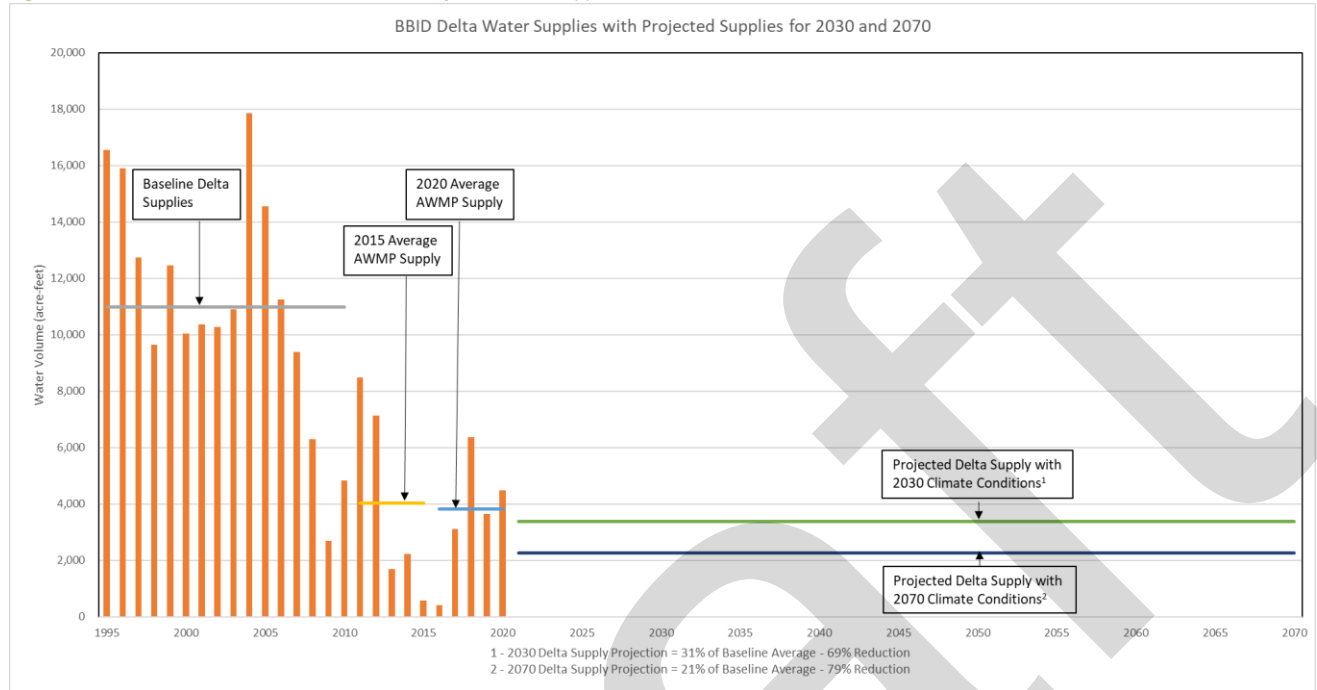
8.2 DELTA PLAN CONSISTENCY

To provide “the expected outcome for measurable reduction in Delta reliance”, baseline historic Delta supplies delivered to BBID were compared to supplies delivered over the past decade. Additionally, Delta supply reduction projections were made for comparison and future planning. For the purposes of comparison, the historic baseline period selected begins in 1995 and ends in 2010 because it is consistent with the typical historic water budget reporting period included in the recently completed Groundwater Sustainability Plans. This period provides a reasonable time frame for assessing average current conditions and to demonstrate consistency with reduced Delta reliance after enactment of the Delta Reform Act (2009). **Table 8-1** below presents historic and projected Delta supplies under modeled climate and regulatory scenarios. BBID continues to evaluate operational, infrastructure, and regional partnership measures to maintain supply reliability for its service areas.

Table 8-1: Historic Average Annual Delta Supplies vs. Projected Average Annual Delta Supplies

Value	Baseline Delta Supplies (1995-2010)	2015 Conditions Delta Supplies	2020 Conditions Delta Supplies	2030 Climate Conditions Delta Supplies	2070 Climate Conditions Delta Supplies
Average Annual Supplies (AF)	10,985	4,027	3,815	3,380	2,265
Percent of Baseline Supply	n/a	37%	35%	31%	21%
Percent Reduction in Supplies	n/a	63%	65%	69%	79%

Figure 8-1: Historic, 2015 and 2020 AWMP and Projected Delta Supplies



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Appendix A: Agricultural Water Management Plan Checklist

AWMP* Location	Guidebook Location	Description	Water Code Section (or as identified)
1	1.4	AWMP Required?	10820, 10608.12
N/A	1.4	At least 25,000 irrigated acres	10853
N/A	1.4	10,000 to 25,000 acres and funding provided	10853
1.3.1	1.4	April 1, 2021 update	10820 (a)
1.3.2	1.4 A.2	Added to the Water Code: AWMP submitted to DWR no later than 30 days after adoption; AWMP submitted electronically	New to the Water Code: 10820(a)(2)(B)
1	1.4 B	5-year cycle update	10820 (a)
N/A	1.4 B	New agricultural water supplier after December 31, 2012 - AWMP prepared and adopted within 1 year	10820 (b)
N/A	1.6, 5	USBR water management/conservation plan:	10828(a)
N/A	1.6, 5.1	Adopted and submitted to USBR within the previous four years, AND	10828(a)(1)
N/A	1.6, 5.1	The USBR has accepted the water management/conservation plan as adequate	10828(a)(2)
3.4	1.4.B	UWMP or participation in area wide, regional, watershed, or basin wide water management planning: does the plan meet requirements of SB X7-7 2.8	10829
1.1	3.1 A	Description of previous water management activities	10826(d)
1.2.2	3.1 B.1	Was each city or county within which supplier provides water supplies notified that the agricultural water supplier will be preparing or amending a plan?	10821(a)
1.2.2	3.2 B.2	Was the proposed plan available for public inspection prior to plan adoption?	10841
1.2.2	3.1 B.2	Publicly-owned supplier: Prior to the hearing, was the notice of the time and place of hearing published within the jurisdiction of the publicly owned agricultural water supplier in accordance with Government Code 6066?	10841
1.2.2	3.1 B.2	14 days notification for public hearing	GC 6066
1.2.2	3.1 B.2	Two publications in newspaper within those 14 days	GC 6066
1.2.2	3.1 B.2	At least 5 days between publications? (not including publication date)	GC 6066
1.2.2	3.1 B.2	Privately-owned supplier: was equivalent notice within its service area and reasonably equivalent opportunity that would otherwise be afforded through a public hearing process provided?	10841
1.2.2	3.1 C.1	After hearing/equivalent notice, was the plan adopted as prepared or as modified during or after the hearing?	10841
1.2.2	3.1 C.2	Was a copy of the AWMP, amendments, or changes, submitted to the entities below, no later than 30 days after the adoption?	10843(a)
	3.1 C.2	The department.	10843(b)(1)
1.2.2	3.1 C.2	Any city, county, or city and county within which the agricultural water supplier provides water supplies.	10843(b)(2)

AWMP* Location	Guidebook Location	Description	Water Code Section (or as identified)
1.2.2	3.1 C.2	Any groundwater management entity within which jurisdiction the agricultural water supplier extracts or provides water supplies.	10843(b)(3)
1.3.3	3.1 C.3	Adopted AWMP availability	10844
1.3.3	3.1 C.3	Was the AWMP available for public review on the agricultural water supplier's Internet Web site within 30 days of adoption?	10844(a)
1.3.3	3.1 C.3	If no Internet Web site, was an electronic copy of the AWMP submitted to DWR within 30 days of adoption?	10844(b)
1.4	3.1 D.1	Implement the AWMP in accordance with the schedule set forth in its plan, as determined by the governing body of the agricultural water supplier.	10842
2	3.3	Description of the agricultural water supplier and service area including:	10826(a)
2.1.1	3.3 A.1	Size of the service area.	10826(a)(1)
2.1.1	3.3 A.2	Location of the service area and its water management facilities.	10826(a)(2)
2.1.2	3.3 A.3	Terrain and soils.	10826(a)(3)
2.1.3	3.3 A.4	Climate.	10826(a)(4)
2.2	3.3 B.1	Operating rules and regulations.	10826(a)(5)
2.2.2	3.3 B.2	Water delivery measurements or calculations.	10826(a)(6)
2.2.3	3.3 B.3	Water rate schedules and billing.	10826(a)(7)
2.2.4	3.3 B.4	Water shortage allocation policies and detailed drought plan	10826(a)(8) 10826.2
3	3.4	Water uses within the service area, including all of the following:	10826(b)(5)
3.1	3.4 A	Agricultural.	10826(b)(5)(A)
3.2	3.4 B	Environmental.	10826(b)(5)(B)
3.3	3.4 C	Recreational.	10826(b)(5)(C)
3.4	3.4 D	Municipal and industrial.	10826(b)(5)(D)
3.5	3.4 E	Groundwater recharge, including estimated flows from deep percolation from irrigation and seepage	10826(b)(5)(E)
4	3.5 A	Description of the quantity of agricultural water supplier's supplies as:	10826(b)
4.1.1	3.5 A.1	Surface water supply.	10826(b)(1)
4.1.2	3.5 A.2	Groundwater supply.	10826(b)(2)
4.1.3	3.5 A.3	Other water supplies, including recycled water	10826(b)(3)
4.1.3	3.5 A.4	Drainage from the water supplier's service area.	10826(b)(6)
4.2	3.5 B	Description of the quality of agricultural waters suppliers supplies as:	10826(b)
4.2.1	3.5 B.1	Surface water supply.	10826(b)(1)
4.2.2	3.5 B.2	Groundwater supply.	10826(b)(2)
4.2.3	3.5 B.3	Other water supplies.	10826(b)(3)
4.2.4	3.5 C	Source water quality monitoring practices.	10826(b)(4)
5, 5.1, 5.2, 5.3, 5.4		Added to Water Code:	<u>Added to Water Code</u> 10826(c)

AWMP* Location	Guidebook Location	Description	Water Code Section (or as identified)
	3.6	Annual water budget based on the quantification of all inflow and outflow components for the service area.	
5.5	3.7 C	Added to Water Code: Identify water management objectives based on water budget to improve water system efficiency	<u>Added to Water Code</u> 10826(f)
5.6	3.8 D	Added to Water Code: Quantify the efficiency of agricultural water use	<u>Added to Water Code</u> 10826(h)
0	3.9	Analysis of climate change effect on future water supplies analysis	10826(d)
7	4	Water use efficiency information required pursuant to § 10608.48.	10826(e)
7.1	4.1	Implement efficient water management practices (EWMPs)	10608.48(a)
7.1	4.1 A	Implement Critical EWMP: Measure the volume of water delivered to customers with sufficient accuracy to comply with subdivision (a) of §531.10 and to implement paragraph (2).	10608.48(b)
7.1	4.1 A	Implement Critical EWMP: Adopt a pricing structure for water customers based at least in part on quantity delivered.	10608.48(b)
7.1	4.1 B	Implement additional locally cost-effective and technically feasible EWMPs	10608.48(c)
7.1	4.1 C	If applicable, document (in the report) the determination that EWMPs are not locally cost- effective or technically feasible	10608.48(d)
7.1	4.1 C	Include a report on which EWMPs have been implemented and planned to be implemented	10608.48(d)
7.1	4.1 C	Include (in the report) an estimate of the water use efficiency improvements that have occurred since the last report, and an estimate of the water use efficiency improvements estimated to occur five and 10 years in the future.	10608.48(d)
N/A	5	USBR water management/conservation plan may meet requirements for EWMPs	10608.48(f)
N/A	6 A	Lack of legal access certification (if water measuring not at farm gate or delivery point)	CCR, title 13, §597.3(b)(2)(A)
N/A	6 B	Lack of technical feasibility (if water measuring not at farm gate or delivery point)	CCR, title 13, §597.3(b)(1)(B), §597.3(b)(2)(B)
N/A	6 A, 6 B	Delivery apportioning methodology (if water measuring not at farm gate or delivery point)	CCR, title 13, §597.3.b(2)(C),
N/A	6 C	Description of water measurement BPP	CCR, title 13, §597.4(e)(2)
N/A	6 D	Conversion to measurement to volume	CCR, title 13, §597.4(e)(3)
N/A	6 E	Existing water measurement device corrective action plan? (if applicable, including schedule, budget and finance plan)	CCR, title 13, §597.4(e)(4))

Appendix B: Coordination Activities: Public Notification of Agricultural Water Management Plan Preparation

DRAFT

Document to be added with final draft

Appendix C: Agricultural Water Management Plan Update Resolution

Draft

Document to be added with final draft

Appendix D: BBID Rules and Regulations

Draft



RULES AND REGULATIONS
Of the
BYRON BETHANY IRRIGATION DISTRICT

Governing the Distribution
Of Water

Updated: 2025

BYRON BETHANY IRRIGATION DISTRICT

OFFICERS

Charles Tuso.....	President
Jack Alvarez.....	Vice-President
Ed Pattison.....	General Manager
Nader Shareghi.....	Assistant General Manager
Ilona Ruiz.....	Board Secretary
Somach Simmons and Dunn.....	Legal Counsel
Richardson & Company, LLP.....	Auditor
Hazen & Sawyer	Engineers

BOARD OF DIRECTORS

Pete Petrovich.....	Director, Division I
Mark Maggiore.....	Director, Division II
Tim Maggiore.....	Director, Division III
Amanjit Sandhu.....	Director, Division IV
Charles Tuso.....	Director, Division V
Tom Pereira.....	Director, Division VI
Jack Alvarez.....	Director, Division VII

District Headquarters

7995 Bruns Road
Byron, California 94514-1625

Office (209) 835-0375
Facsimile (209) 835-2869

The Board of Directors holds their Regular Board Meeting on the third Tuesday of each Month
at the District Headquarters on 7995 Bruns Road Byron, California 94514-1625.

BYRON BETHANY IRRIGATION DISTRICT

MISSION STATEMENT

**Providing for the beneficial use of water
and water-related services for
consumers and landowners**

Byron Bethany Irrigation District is committed to providing reliable water and water-related services in an environmentally sound and cost-effective manner.

The District shall endeavor to:

- ❖ Protect, preserve, and enhance District's historically acquired pre-1914 appropriative water rights together with managing the District's groundwater resources basin wide, in co-operation with other water agencies.
- ❖ Provide District consumers and landowners with an efficient raw water distribution system.
- ❖ Encourage conservation and prudent management of the water resources.
- ❖ Provide a safe working environment for all District employees and associated personnel.
- ❖ Foster a positive working relationship with all: agricultural, municipal and industrial consumers, landowners, and other agencies.

RULES AND REGULATIONS OF BYRON BETHANY IRRIGATION DISTRICT Governing the Distribution and Use of Water

The Byron Bethany Irrigation District is a State agency governed by a board of directors elected by the people. It operates under the authority conferred by the Water Code of the state of California. It makes no profit and is operated for the sole benefit of the lands and people within its boundaries. The benefits they can derive from it will be enhanced by the extent to which the people within the district cooperate to make it a success.

These rules and regulations are adopted under the authority conferred by the Water Code to affect an orderly and equitable procedure of operations.

DEFINITIONS

As used in these rules and regulations the words hereinafter set forth shall be interpreted as follows:

1. "District" means the Byron Bethany Irrigation District functioning as an Irrigation District under the California Water Code.
2. "Board" means the Board of Directors of the District.
3. "Manager" means the General manager appointed by the Board.
4. "Works" of the District includes conduits, ditches, pipelines, flumes, drains, measuring and control devices therein and their appurtenances.
5. "Conduit" includes conduits, laterals, ditches, pipelines, flumes, drains, measuring and control devices therein and their appurtenances.
6. "Private Conduit" means any conduit that is not owned or controlled by the District.
7. "District Conduit" means a conduit owned by the District in place and installed according to District records.
8. "Consumer" includes water user or users of other services of District and includes but is not limited to, any services of District and includes but is not limited to, any person, firm, association, partnership, business, trust, corporation company, joint venture and public agency.
9. "Irrigation water" means untreated water provided by the District that is applied by an irrigation system: (a) to assist crop and pasture growth, provide livestock watering, and water for residential gardens, lawns, trees, and shrubbery; (b) for pre-irrigation, frost protection, chemical application, weed control, field preparation, harvesting, dust suppression, leaching of salts from the root zone, consumptive uses, and conveyance losses; and (c) to land that is zoned for agricultural use. Where a property is zoned for mixed use, it is within the Board's discretion to determine the type of water supplied thereto.

10. "Municipal and Industrial Water" (M&I water) means untreated water provided by the District: (a) to a city, town, or special district for the purposes of firefighting, street washing, flushing of water lines, maintaining municipal services and infrastructure, as well as treating for the customers' later distribution of drinking water to a minimum of 15 connections; (b) for industrial purposes such as fabrication, mining, refining, and commercial processing, open- and closed-loop cooling, and any associated conveyance losses; (c) to commercial facilities such as motels, hotels, office buildings, and industrial parks, solely for the landscaping associated therewith, which shall also include ornamental water features such as ponds, fountains, and lakes; and (d) to commercially or industrially zoned areas. Where a property is zoned for mixed use, it is within the Board's discretion to determine the type of water supplied thereto.

I. GENERAL RULES

1.1 Purpose

The District was organized for the purpose of supplying irrigation service for farm crops. The water quality and District facilities are not suitable for domestic use, raising of fish or use for industrial or commercial use; however, the District may provide water services for municipal, industrial and domestic uses. Any service for purposes other than irrigation will only be provided on a special order of the Board entered in its minutes.

1.2 Management

The operation and maintenance of the conduits and works of the District shall be under the exclusive control of the Manager. No one not authorized by the Manager shall interfere with the operation of any part of the water transmission, conveyance and distribution system.

The Manager shall employ such water service workers and other assistants as may be required and authorized by the Board for the operation and maintenance of the system and at rates of compensation fixed by the Board.

Employees shall distribute the water fairly and impartially to all persons entitled to water service, and shall apply the Rules and Regulations without favor. It is the specific duty of each employee to maintain cordial relations with all landowners and consumers in the District. Every consumer is entitled to courteous service.

Complaints by consumers shall first be referred to the field personnel. If such complaints are not satisfactorily settled they should be taken up with the Manager. Final appeal may be made to the Board. Every employee is charged with the duty and responsibility of cooperating with the consumers and the Board in a sincere effort to cooperating with the consumers and the Board in a sincere effort to render as satisfactory service as can reasonably be attained. Every consumer has a right to such service, and every employee of the District is enjoined to maintain and execute this policy.

1.3 Control of Works

In order that proper control may be exercised over the water service and that it be as uniform as possible over the entire district, the system is divided into two division, known as the Byron Division and the Bethany Division, each division to be operated under the direction of a Watermaster, who will report the Manager.

No gate, takeout siphon or other structure or device shall be installed or placed in any works of the District except with the written consent of the Manager and in the manner directed by the Manager; nor shall any person interfere with any works of the District without permission of the Manager or his assistants.

Only employees of the District will be allowed to open and close diverting gates, except in cases of emergency where prompt action is necessary to avoid damage.

1.4 Private Conduits

No private stopgates, standpipes, turnout pipes or valves, lift or sprinkler pumps or privately-owned facilities or conduits of any type shall be connected to or placed in or on District facilities, conduits, or drains conveying District water unless and until all of the following have occurred:

- a) A written application setting forth the type and specifications of the installation has been filed with the Manager; and,
- b) The application and specifications are approved in writing by the Manager or the Board prior to the start of construction; and,
- c) If any of the work is to be performed by the District, or under a District contract, the full estimated cost to the District is paid to the District by the applicant in advance; however, the applicant shall be responsible for the actual costs of construction, regardless of the amount of the estimate. Upon completion, the applicant shall pay the difference between the estimated amount and the actual cost if the estimate is exceeded. If the actual cost is not paid to District within thirty (30) days of billing, applicant agrees that District may impose the lien procedures set forth in Water Code 25806 et seq. If the actual cost is less than the estimate, the applicant will receive a refund from the District for the overpayment.
- d) In order that all involved be protected, in the discretion of the Manager, a written contract may be requested specifying the conditions of performing the work and the conditions applicable to the use of the facilities.
- e) If the work can affect the flow of water in the works of the District, the work must not be performed without first receiving the prior written approval of the Manager.
- f) Under no circumstances, even where the private conduit has been constructed by the District, shall the District be responsible for the repair and maintenance of the private conduit. Additionally, unless otherwise specified in writing, any private conduit, including those constructed or repaired by the District, is not under the ownership and control of the District, and the conduit owner is solely responsible for such facilities.

1.5 Use of District Conduits

The District intends that its conduits be used solely for the purpose of conveying water for use on land and for conveying agricultural drainage water away from the land. Their use for recreational purposes, play or other purposes, is prohibited.

Landowners and consumers are urged to prevent use of District conduits and their banks for swimming or play.

1.6 Ownership of Water

All water introduced into the district is property of the District and is subject to diversion, control and use by the District. No landowner or consumer acquires any proprietary right in the water by reason of such use, nor does such landowner or consumer acquires any proprietary right in the water by reason of such use, nor does such landowner or consumer acquire any right to resell the water purchased or used, or the right to use it on premises or for a purpose other than for which it was applied and as to recapture, reuse and resell all water that passes from the premises described in the application as the place of use, and asserts its right to all waters introduced into the District.

If a consumer uses water on land outside the District that was applied for use within the District, whether by routing through a conduit, first flowing it across the land within the District, by recapturing it from drains, or otherwise, the District may refuse service to the charges for use of the water on the outside land, as fixed by the Board, are paid and the consumer or landowner makes such physical changes in his fields or irrigation system as the Board deems necessary to assure the District that no future use of District water on the outside can occur.

All persons intercepting, using or impounding District water will be charged for such water at the rates established by the District, irrespective of whether water at the rates established by the District, irrespective of whether water is diverted from a conduit or taken from or impounded in a natural channel or drain, or whether it is waste, spill, seepage, runoff or other water. In order that rates may be kept as low as possible, consumers should notify the District of any waste or unauthorized use of water.

1.7 Measurement of Water

The unit of measurement used by the District in delivering water will in all cases, be a cubic foot per second ("cfs"). The unit for charging will be the acre foot (" AF"), which is the quantity of water that is necessary to cover one acre of ground one foot deep.

Water will be delivered to consumers only through measuring devices approved and installed by the District. The price charged for water shall be set by the Board before the beginning of each irrigation season and may be modified if necessary.

1.8 Unauthorized Taking of Water

Persons interfering with the regulation of water in District conduits are subject to prosecution. If any person takes water without permission of the Watermaster or authorized District employees, they may be subject to criminal prosecution.

1.9 Recapture of Water

All water introduced into the District by District works is District water and is subject to rediversion and use by the District. All such water, whether waste and/or seepage water, intercepted and used by consumers will be charged for at the rate established by the District. All return flows, from water served by District shall become the property of District when such flows enter a District lateral or surface drainage system, leave the boundaries of a landowner's property, or percolate into the District's sub-surface drainage system or

other District facility. All such water, whether return flow, tail water, waste and/or seepage water is subject to redirection and use by District.

1.10 Access to Land

The agents of the District shall have free access at all times to the property being supplied with water from the District's system for the purpose of examining the lands irrigated, the flow of water thereon, the water facilities and any private canal, ditches, sumps, or drains.

1.11 Rights of Way

No building or structure shall be constructed over/under District rights of way (prescriptive or deeded [unless provided otherwise in the deed]), and no trees, vines, or bushes shall be planted upon District rights of way without first receiving written approval from the Manager. No fences other than necessary cross fences shall be constructed on Districts rights of way. Cross fences on District Rights of way shall be constructed in the manner directed by the Manager with gates to permit passage along canal banks by ditch tenders and District equipment and to permit maintenance work to be done, and in a manner, that will not interfere with the flow of water.

Any obstruction on District rights of way interfering with District operation and maintenance may be removed by the District without notice and the cost of removal charged to the landowner, and if not paid within thirty (30) days of billing, the lien provisions of Water Code 25806 shall apply.

1.12 Canal Bank Roads

Use of District canal bank roads is at the sole risk of the user. Use of such roads by vehicles not owned by the district is prohibited.

1.13 Non-Liability

Neither the District, its officers or employees will be liable for any damage of any kind or nature resulting directly or indirectly from any conduit not owned by the District or the water flowing therein, or by reason of lack of capacity therein or for negligent, wastefully or other use of handling of water by the users thereof.

All water furnished by the District flows through many miles of open conduits and is therefore subject to pollution, shortages, fluctuation in flow and interruption in service. Ditch tenders are forbidden to make any agreements binding the District to serve an uninterrupted constant supply of water. All water furnished by the District will be on the basis of irrigation deliveries and every user putting the water to other uses does so at his own risk and by doing so assumes that may occur as a result of the water quality, shortages, excess flow, fluctuation in flow, and interruption in service.

Neither the District, its officers or employees, will be liable for defective quality of water, shortage or excess of water either temporary or permanent, or for failure to deliver such water.

Pumping by users of District water is done at the user's risk and the District, its officers and employees, assume no liability for damages to pumping equipment or any other damages that may occur.

Nothing contained in these rules shall be construed as an assumption of liability on the part of the District, its directors, officers or employees for any damages occasioned through the improper construction, maintenance, or use of conduits, or waste of water, or by permitting the flow of water, or turning water in any conduit, or to any land.

District sells water as a commodity only and not as a guaranteed service and will not be liable for defective quality of water, shortage of water, either temporary or permanent, or for failure to deliver water or delay in doing so.

District assumes no liability for damages to persons or property occasioned through defective works.

Each consumer shall be liable to the District and to third parties for all damages caused by his or her neglect or malicious, careless or willful acts.

1.14 Nuisances

No tree or vine prunings, brush, weeds, grass, rubbish, swill, garbage, manure or refuse, or dead animal matter from any barnyard stable, dairy or hog pen, or other material or substance that will become offensive to the senses or injurious to health or injuriously affect the quality of water, or obstruct the flow of water, or result in the scattering of seeds or noxious weeds, plants or grasses, shall be placed or dumped in any District conduit or be place or left so as to roll, slide flow or be washed or blown into any such conduit. Any violation of this rule will subject the offender to prosecution and all costs of the District in removing such nuisance shall be charged to the perpetrator. All employees of the District shall promptly report any violation of this rule, and the consumers of the District are especially urged to cooperate in its enforcement.

1.15 Enforcement of Rules

Failure or refusal of any landowner or water user to comply with these Rules and Regulations, or any interference by any landowner or water user, or their agents, servants of employees, with the rights, duties or obligations of the District, or its employees, shall entitle the owner or user until the landowner or water user shall furnish satisfactory proof to the Board of their intention to comply these Rules and Regulations and shall likewise remove any default existing at the time service of water is discontinued. If it shall be necessary for District to commence legal action to enforce the Rules and Regulations, the District shall be entitled to recover the reasonable value of staff time spent in enforcing the Rules and Regulations and the reasonable value of attorney services incurred, as well as out-of-pocket costs incurred by the District.

1.16 Disputes

Whenever there is a dispute between a District employee and a consumer, the matter shall first be referred to the Watermaster. If the decision of the Watermaster is not acceptable to either party, the dispute may be taken to the Manager. If the Manager is unable solve the dispute to the mutual satisfaction of the parties, either party may present the matter in writing to the Board of a hearing and discussion. The decision of the Board shall be final and binding.

1.17 Prohibited Acts of Consumers

It is unlawful to do any of the following without authority of the Board:

1. Take water from a District conduit without express authorization of the District;
2. Disturb any work of the District
3. Cause to be emptied or placed into any District conduit or other facility any rubbish, debris, or any other material or obstruction to the free flow of water.
4. Willfully and maliciously cut, break, injure, or destroy any bridge, dam, District conduit, work of the District, or any signs owned by the District.

II. IRRIGATION WATER SERVICES

2.1 Water Use and Availability

The beginning of the irrigation season shall be established by the Manager each year and approved by the Board of Directors and shall end on October 31st. Water will be available for use in the laterals of the District, during the irrigation season, provided sufficient irrigators make application to make the use of said lateral economically feasible.

Water must be used continuously by the irrigator throughout the period of the run. If water is wasted or inefficiently or improperly used, the Manager may refuse further delivery of water until the cause of waste or inefficient or improper use is removed.

Consumers are required to give the Watermaster at least three to eight hours notice, depending on the individual lateral, of the changing or turning on or off of water.

Consumers must provide sufficient and competent help on a twenty-four-hour day basis, if necessary as determined by the Manager, to reduce surface runoff to a minimum and prevent excessive water applications.

The District will not be liable for any damage resulting, directly or indirectly, from the operation of a private ditch or pipeline or water flowing therein whether transporting irrigation or drainage water. The District's responsibility and/or liability ceases at each District service point to a landowner on a lateral or sub-lateral. Disposition of any waters once having left the District's service points shall be the responsibility of the consumer.

2.2 Application of Water

No applications for water will be accepted or acted upon until all previously incurred obligations to District by landowner or tenant, including but not limited to, water charges, standby charges, tax assessments, or other charges incurred for services performed have been fully paid.

Applications will not be accepted from tenants unless written authorization from the landowner is filed with the District. Unless otherwise stated in landowners written authorization, said authorization for tenant's request water service shall be deemed to remain in effect for subsequent irrigation seasons until revoked in writing to District by the landowner.

Applications for water must be signed on forms available for this purpose at the District's office in Byron. Requests for water service will be accepted by telephone twenty-four hours a day after the initial application is signed each season.

2.3 Charges for Water and Payment

Water rates and the terms thereof will be established annually by the Board of Directors prior to commencement of the Irrigation Season. Payment for water delivered shall be due and payable thirty (30) days after completion of the irrigation.

The rates and terms of payment for water for special acreage and low-volume usage and for municipal, commercial and industrial purposes shall be determined by the Board from time to time in instances where such use is permitted by Board order or contract.

2.4 Unpaid Tolls and Refusal of Service

All charges for service remaining unpaid at the time of the delivery of the assessment book to the collector of the District, may be added to and become a part of the annual assessment levied by the District as provided for by Sections 25806 and 25807 or may be secured by the recording of a Certificate in the office of the County Recorder in accordance with California Water Code Section 25806.

District reserves the right to refuse or discontinue service to any consumer who is in default in the payment of water charges and to any land on which water charges are delinquent unless and until such defaulted payments shall have been paid in full.

Any landowner whose land is being rented by a tenant shall be responsible for all water charges or installments not paid by tenant at the time the same become due regardless of the person or persons requesting and making application for the water. All unpaid by tenant, or landlord, at the time specified by law for the delivery of the Assessment Book to the Collector of the District, in November of each year, may be added to and become a part of the annual assessment levied by the District as provided for by Sections 25806 and 25087 of the Water Code. Nothing herein contained shall deprive the District of any other rights it may have to enforce payment of charges.

If less than the full amount of unpaid water charges is paid by a consumer irrigating several parcels of land, the District reserves the right to determine to which of the parcels payment shall be applied. This rule shall be effective notwithstanding the fact that the applicant may not be the same person who owned or farmed the land when the delinquent water charges were incurred.

2.5 Point of Delivery

Water will be delivered to landowners at a convenient point on the existing District's conduit, the exact point to be determined by the Manager. The District is not obligated to construct any extensions to its existing conduits. The landowner desiring service must at their expense construct an adequate take out box in the District's existing conduit and a conduit to transport the water from that point to their land.

2.6 Waste of Water

Irrigators will be required at all times to keep their ditches and facilities for conveying and distributing in good condition so that water can be used without undue loss or waste of time, and without damage to other lands. Lands must be prepared so that water can be distributed without waste and landowners shall construct adequate drainage facilities so that adjacent land will not be damaged. The Manager or Watermaster may refuse to deliver water to a consumer whose ditches and structures are not in a proper state of repair or whose land is not prepared to convey or use water in an economic and non-wasteful manner.

No consumer shall be entitled to a greater amount of water than the consumer can beneficially use without waste and with due regards to the needs of other consumers.

2.7 Water Rationing

When the demand for water deliveries exceeds the capability of the District's system, or the supply of water available, the Manager will prorate water according to the limits of the system. The general cropping preference will be set by the manager with approval of the Board of Directors in the manner most likely to minimize the overall detriment which might result from the district's inability to serve water in the other requested.

During periods of critical supply, the District may not be able to provide water delivery on time. If the consumer has not received water within five (5) days from date requested and feels permanent damage may result to the crop from such delay in delivery of water, the consumer shall file a written factual statement with the Manager. The Manager will immediately review this statement with a committee of two Directors and determine (in their complete discretion) if crop priorities should and could be modified. It is understood that the capacity of the District's system can be over reached by demands or outages occurring which could result in a delay up to or exceeding five (5) days.

2.8 Sump Requirements (Drainage)

All consumers who will drain their surface run-off (tailwater) into District facilities will be required to install sumps according to District's "Sump Standards and Requirements."

Both the standards and the requirements have been established for the protection of District facilities, and should the water user's system not be adequate for this purpose, the Manager will require the water user to correct the condition before his water enters the District's facilities.

2.9 Surface Drainage Discharge and Tile Drain Interconnections

No water, including tailwater, will be placed into the District's irrigation or drainage system without the approval of the Manager. Adequate safeguards must be established to prevent entry of trash, silt, herbicides, pesticides, fertilizers, etc., into the District's system.

Any concern or control which may result from quality of tailwater, including injury to third parties, shall be the responsibility of the discharger (consumer). The District may require reasonable periodic testing of tailwater discharged into District's system at expense of discharger.

The landowners benefiting by the extension or enlargement of any drainage conduit shall assume the cost for any improvements needed to the District's existing subsurface drainage system.

Any construction or modification to the subsurface drainage system must be done in accordance with District specifications at the sole expense of the party desiring the work to be accomplished and must have the approval of the Board.

2.10 Damage to Rights-of-Way, Conduits, Laterals, Drains or Ditch Banks

Any person whose equipment, livestock, poultry or waterfowl damages or injures any works, facilities or other property of the District or who shall damage,, injure or destroy by burning or otherwise any such works, or who shall dump any rubbish therein or thereon, or erect signs, fences or structures on District rights-of-way, shall pay to the District upon demand, all expenses incurred in repairing the damage, or removing the rubbish, signs, fences or structures, including reasonable value of staff time and attorneys' fees expended in enforcing this provision.

2.11 Division of Property

Where a division of property is made within the District creating smaller parcels requiring separate irrigation or drainage service by the District, the landowner dividing the property shall provide the necessary rights of way to such smaller parcels as required for service by District and the cost of any additional facilities required to provide such service shall be borne by either the landowner creating such lot splits or the landowners of the lots created. District shall not be responsible for service of water to any lot or parcel separated from the District water facility as to which such rights of way and additional distribution facilities have not been provided, as may be required by District.

2.12 Water Service Outside the Irrigation Season

The District may serve water outside the irrigation season, when and where possible, subject to the following conditions:

- ★ A finding by the Manager that such service would not interfere with the District's maintenance program and that the District has sufficient personnel available to administer the water delivery.
- ★ The charge per acre foot shall be determined by the Board of Directors.
- ★ All applicable District Rules and Regulations shall govern the Distribution of water either during or outside the irrigation season.

III. MUNICIPAL AND INDUSTRIAL WATER SERVICES

3.1 Municipal and Industrial Water

As provided in the Definition section hereinabove, Any water sold or delivered "by the District: (a) to a city, town, or special district for the purposes of firefighting, street washing, flushing of water lines, maintaining municipal services and infrastructure, as well as treating for the customers' later distribution of drinking water to a minimum of 15 connections; (b) for industrial purposes such as fabrication, mining, refining, and commercial processing, open- and closed-loop cooling, and any associated conveyance losses; (c) to commercial facilities such as motels, hotels, office buildings, and industrial parks, solely for the landscaping associated therewith, which shall also include ornamental water features such as ponds, fountains, and lakes; and (d) to commercially or industrially zoned areas shall be known as municipal and industrial water." M&I water shall only be made available in accordance with an agreement between the District and the consumer requesting such service.

3.2 Water Charges and Payment

Water charges will be billed in accordance with the District water rate schedule for M&I water. If payment is not made within thirty (30) days after date of billing, service of the water may be discontinued until the water user has paid for all water delivered and interest

at the rate of one and one-half percent (1-1/2%) per month will be charged until paid and a lien may be adopted and recorded pursuant to Water Code 25806 *et seq.*

3.3 Permit Required

All new municipal and industrial water systems for the delivery of potable water must be installed in accordance with the provisions of Sections 4011 through 4035 of the California Health & Safety Code prior to making application for water service. All facilities necessary for such uses of water must be constructed at the sole cost of the consumer requesting such service. A permit must be obtained from the Department of Public Health on all potable water systems which are connected to District conduit and supply water for municipal and industrial purposes.

3.4 Meters

The District will determine, in its sole discretion, the appropriate measurement system for M&I water. The District is authorized to require the installation of and payment of, meters when in the District's sole judgement such installation is the most appropriate for the type of use, is necessary to conserve water, or when a user willfully or negligently wastes water.

3.5 Emergency Shutoff of Water

In case of necessity, water may be shut off from the District's system, but such interruptions in service shall be for the shortest possible time. Except in the case of emergencies, the users will be notified in advance by public notice of such action. Users shall, in event of failure of services, be responsible for damages to all household appliances.

3.6 Application for water

Applications for municipal and industrial service may be made on forms furnished by the District and accompanied by advance payment.

3.7 Connection Fees

New service may be subject to connection fees to reimburse the District for cost of special distribution facilities. Fees will be in accordance with a fee schedule adopted by the Board.

3.8 Installation of Facilities

All conduits and water treatment facilities for M&I water, including subdivision continues and facilities, which are to become a part of the District's system, must be installed in accordance with plans approved by the District or its engineers, at no cost to the District and in accordance with District specifications.

3.9 Method of Conveyance and Use of Water

Consumers of M&I water will be required to transport, convey, distribute and use water in a reasonable manner at all times and not to waste water under any circumstances. The Manager or Watermaster may refuse to deliver water to consumers of M&I water who do not put water to a beneficial use who otherwise waste the water.

3.10 Pro-ration of Water in Case of Shortages

When the demand for water deliveries exceeds the capabilities of the District's system, or the District's water supply, the District and the Manager may pro-rate water according to the limits of the system.

3.11 Damage to District Facilities

Any person causing damage to District's rights-of-way, conduits, or other facilities, shall pay to the District upon demand all expenses incurred in repairing the damage, including reasonable value of staff time and attorneys' fees expended in enforcing this provision.

Appendix E: Water Meter Device Information

DRAFT



CERTIFIED TEST REPORT

CUSTOMER: TECHNOFLO SYSTEMS
MODEL NO: LP32D-12
METER SERIAL NO: 20170805

CONFIGURATION

METER INSIDE DIAMETER: 11.734
DIAL: AFT X 0.01 6 CFS
INDEX: 0.8307
TEST FACILITY: Volumetric

As Calibrated

CALIBRATION DATA

	FLOW RATE GPM	% ACCURACY
1	2681.36	101.78
2	1566.51	101.82
3	313.31	98.43

TEST DATE: 5/9/2017

PRINT DATE: 5/9/2017

This calibration was performed on a gravimetric or volumetric test facility, traceable to the National Institute of Standards and Technology, USA. The estimated flow measurement uncertainty of the calibration facilities are:
Gravimetric +/- 0.15% Volumetric +/- 0.5%



McCROMETER

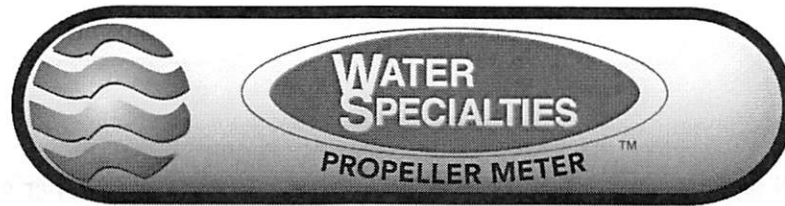
3255 WEST STETSON AVENUE
HEMET, CA 92545 USA

PHONE (951) 652-6811 / FAX (951) 652-3078

WEB SITE: <http://www.mccrometer.com> E-MAIL: customerservice@mccrometer.com

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5/9/2017 6:44:33 AM
Version 1.0 (3/9/2007)



13.27 Chahal

6"-20" STRAP-ON ELECTRONIC LOW PRESSURE METERS

**MODEL
LP04D, LP12D, LP32D**

OPERATION AND MAINTENANCE MANUAL PARTS LIST

FEATURING:

- * CERAMIC BEARING CARTRIDGE
- * STAINLESS STEEL SADDLE & U-STRAP
- * MODEL FC101 FLOWCOM REGISTER INDICATOR-TOTALIZER
- * ONE PIECE SEPARATOR/SPINDLE AND THREADED REVERSE THRUST BEARING CARTRIDGE



**3255 WEST STETSON AVENUE
HEMET, CALIFORNIA 92545 U.S.A.**

**PHONE: 951-652-6811
FAX: 951-652-3078
VISIT OUR WEBSITE: www.mccrometer.com**

WARRANTY

This Warranty shall apply to and be limited to the original purchaser consumer of any McCrometer product. Meters or instruments defective because of faulty material or workmanship will be repaired or replaced, at the option of McCrometer, free of charge, FOB the factory in Hemet, California, within a period of one (1) year from the date of delivery.

Repairs or modifications by others than McCrometer or their authorized representatives shall render this Warranty null and void in the event that factory examination reveals that such repair or modification was detrimental to the meter or instrument. Any deviations from the factory calibration require notification in writing to McCrometer of such recalibrations or this Warranty shall be voided.

In case of a claim under this Warranty, the claimant is instructed to contact McCrometer, 3255 W. Stetson Ave., Hemet, California 92545, and to provide an identification or description of the meter or instrument, the date of delivery, and the nature of the problem.

The Warranty provided above is the only Warranty made by McCrometer with respect to its products or any parts thereof and is made expressly in lieu of any other warranties, by course of dealing, usages of trade or otherwise, expressed or implied, including but not limited to any implied warranties of fitness for any particular purpose or of merchantability under the uniform commercial code. It is agreed this Warranty is in lieu of and buyer hereby waives all other warranties, guarantees or liabilities arising by law or otherwise. Seller shall not incur any other obligations or liabilities or be liable to buyer, or any customer of buyer for any anticipated or lost profits, incidental or consequential damages, or any other losses or expenses incurred by reason of the purchase, installation, repair, use or misuse by buyer or third parties of its products (including any parts repaired or replaced); and seller does not authorize any person to assume for seller any other liability in connection with the products or parts thereof. This Warranty cannot be extended, altered or varied except by a written instrument signed by seller and buyer.

This Warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

McCrometer reserves the right to make improvements and repairs on product components which are beyond the Warranty period at the manufacturer's option and expense, without obligation to renew the expired Warranty on the components or on the entire unit. Due to the rapid advancement of meter design technology, McCrometer reserves the right to make improvements in design and material without prior notice to the trade.

All sales and all agreements in relation to sales shall be deemed made at the manufacturer's place of business in Hemet, California and any dispute arising from any sale or agreement shall be interpreted under the laws of the State of California.

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ELECTRONIC LOW PRESSURE METER INSTALLATION

I. UNCRATING. When uncrating the meter, any damage due to rough or improper handling should be reported to the transportation firm and McCrometer. If for any reason it is determined that the unit or parts of the unit should be returned to the factory, please contact McCrometer for clearance prior to shipment. Each unit must be properly crated to prevent any further damage. The factory assumes no responsibility for equipment damage in return shipment due to improper packaging. The shipping crate contains the following items:

Low Pressure Meter Assembly with FC101.....	1
Mounting Equipment as required.....	1
Operation and Maintenance Manual.....	1
Tool T-2402X-1.....	1

II. INSTALLATION of McCrometer Low Pressure Electronic Meters varies depending upon the type and model of meter selected for each application. The meter must have a full flow of liquid for proper accuracy. Fully opened gate valves, fittings or other obstructions that tend to set up flow disturbances should be a minimum of ten pipe diameters upstream and two pipe diameters downstream from the meter. Installations with less than ten pipe diameters of straight pipe require straightening vanes. Meters with straightening vanes require at least five pipe diameters upstream and one pipe diameter downstream from the meter. The meter installations fall into three basic categories:

1. FLANGED TUBE METERS can be installed exactly as you would install any short length of flanged pipe. Flanged ends are standard pattern and drilling for any meter size.

2. PLAIN END TUBE METERS can be installed similar to replacing a short length of plain end pipe in the line by either welding, or by using one of a variety of pipe couplings available. **Note:** Meter saddle assembly (#23) should be removed before welding. (See step IV.)

3. STRAP-ON SADDLE METERS can be installed on an existing pipeline by cutting a hole of proper size in the existing pipeline. The installation steps outlined below should be followed carefully to achieve proper mounting of the meter:

A. ALIGN the cutout template in the desired position for the meter on the pipe. Make certain that the center line of the pipe and the center line marked on the template are parallel with each other.

B. MARK the pipe using a center punch as indicated on the cutout template. These marks will help to properly align the saddle over the cutout opening.

C. SCRIBE the pipe along the line specified for your meter size cutout.

D. CUT OUT the section of pipe within the scribed line and remove all burrs, slag, and rough edges from the inside and outside of the cutout section.

E. STRAIGHTENING VANES are recommended when there are less than ten pipe diameters of straight pipe (no fittings or obstructions) directly upstream from the meter location. Straightening vanes are available from the factory. (See Straightening Vane Installation Instructions if required for your meter.)

F. METER ASSEMBLY should be placed on the pipe with the "D" shaped ring gasket in position on the bottom of the saddle. The saddle must be positioned so that the D-ring maintains contact with the surface of the pipe completely around the cutout opening. Align the centerline of the saddle with centerline of the pipe and locate the saddle so that it is exactly between, and aligned with, the center punch marks on the pipe. Each edge of the meter saddle should be approximately 1/8" from the center punch mark on the pipe. U-Strap nuts should be tightened evenly. **WARNING:** Customers are warned that the U-Strap nuts are to be tightened evenly to approximately 30 foot pound torque. This is sufficient to seal the saddle to the pipeline. Additional tightening may be required to seal the saddle on rough or irregular pipe.

ELECTRONIC LOW PRESSURE METER INSTRUCTION AND MAINTENANCE MANUAL

III. MCCROMETER products have been carefully designed to be as maintenance free as possible. Periodic preventive maintenance, however, is highly recommended and should be practiced according to schedule to assure continuous accuracy and trouble-free performance of your propeller meters. The maintenance and inspection procedure can also be used as a guide to locating a problem in the unit that may be the cause of abnormal meter operation.

Routine preventative maintenance should be performed on all meters, which includes cleaning and an inspection of the propeller and its bearing. The interval between inspections depends on the water quality and the usage of the meter. The initial inspection should be performed after one to two years of service to determine the period between future inspections. After five to ten years, the complete meter should be inspected to ensure years of dependable service.

IV. METER SADDLE ASSEMBLY (#23) should be removed from the service line by removing the U-strap nuts (#27) and lifting up the rear (downstream) portion of the meter saddle (#23), carefully pulling the assembly back (downstream) and up at the same time to allow the propeller (#2) to clear the cutout opening in the pipeline so the

meter can be lifted free. Inspect the meter saddle D-ring (#22) for any sign of damage and replace, if necessary. Replace the meter assembly (#23) with a dummy cover saddle if the service line is to remain in operation.

V. WORKING AREA chosen for disassembly and reassembly of the meter components should be clean to reduce the chance of dust or dirt particles being introduced into the propeller area.

VI. DISASSEMBLY AND INSPECTION OF METER includes cleaning the propeller assembly (#1), ceramic sleeve bearing (#8), separator assembly (#12) and drive magnet (#9).

1. PROPELLER REMOVAL can be accomplished by first removing the thrust bearing cartridge assembly (#5). Loosen the set screw (#3) in the side of the nose of the propeller. Remove the thrust bearing cartridge (#5) by turning it counterclockwise while holding the propeller in place.

2. REVERSE THRUST BEARING CARTRIDGE (#6) must now be removed. Turn the propeller (#2) so that the Allen wrench clearance hole is lined up with the set screw in the side of the reverse thrust bearing cartridge (#6). The location of the set screw is marked by a small hole drilled in the face of the reverse thrust bearing cartridge. With a 5/64 inch Allen wrench, loosen the set screw (#7) in the reverse thrust bearing cartridge (#6) two to three turns, which will allow the cartridge to be unscrewed without damaging the spindle thread. **Note:** If the bearing area appears to be clogged with dirt or sediment, making it difficult to locate the set screw (#7) or to allow the Allen wrench to fit into the set screw socket, then the bearing area should be flushed out with water. Insert Tool T-2402X-1 into the propeller through the threaded nose. The tabs in the tool should engage in the screwdriver slot in the end of the reverse thrust bearing cartridge (#6). Remove the propeller assembly (#1) and reverse thrust bearing cartridge (#6) by turning Tool T-2402X-1 counterclockwise, unscrewing the reverse thrust bearing cartridge (#6) from the spindle (#12). The propeller assembly with reverse flow cartridge will now slide off the spindle. **WARNING:** If the reverse thrust cartridge does not unscrew easily, it may be because the set screw was not unscrewed enough. If unscrewing the reverse flow cartridge is continued with the set screw binding on spindle thread, damage to thread could occur.

3. WATER LUBRICATION of the ceramic sleeve bearing (#8) is achieved by means of two openings in the end of the thrust bearing cartridge (#5) which allows air to be purged from the bearing area. These should be cleared of any foreign material by running a small wire through the holes on either side of the screwdriver slot.

4. CERAMIC BEARING CARTRIDGE (#8) and drive magnet (#9) should be cleaned of any foreign material and inspected for damage. Using a bottle brush, thoroughly clean the ceramic bearing surface (#8) and the magnet inside diameter (#9). After cleaning the propeller, flush the inside out with water. The outside surfaces of the propeller should also be cleaned to assure a smooth, unrestricted flow across the surface of the propeller. Do not use an oil-based solvent in cleaning, as damage to the assembly could occur.

5. SPINDLE CERAMIC SLEEVE and the O.D. or surface of the separator should be cleaned and inspected for any substantial amount of wear. The reverse thrust bearing (#6) should be checked for any damage. If it is determined that the spindle ceramic sleeve or separator are worn sufficiently, the separator/support spindle assembly (#12) should be replaced.

6. SEPARATOR / SUPPORT SPINDLE ASSEMBLY (#12) can be removed for replacement by removing the four mounting screws (#13) which thread into the gearbox. The separator O-ring (#14) should be replaced and the new O-ring (#14) covered with a thin coat of silicone grease. The separator/support spindle assembly (#12) can then be replaced in the front of the gearbox (#16) with a firm push, gently rotating the assembly at the same time. Replace and tighten the four mounting screws (#19).

VII. REASSEMBLING METER

1. PROPELLER INSTALLATION is accomplished by following these steps:

a) The reverse thrust cartridge set screw (#7) should be protruding out of the reverse thrust bearing cartridge so it will not bind up on the spindle thread. **Note:** Look through the end of the propeller and hole in the reverse thrust cartridge to be sure the set screw is not showing.

b) Slide the propeller assembly onto the support spindle (#12) until the reverse thrust bearing cartridge (#6) contacts the threads on the end of the spindle (#12). Using Tool T-2402X-1, thread the reverse thrust bearing cartridge onto the spindle. If you feel any resistance when threading the reverse thrust cartridge on, stop at once and check to be sure the set screw is not binding on the thread. Be careful not to cross-thread the reverse thrust bearing cartridge. Thread the reverse thrust bearing cartridge (#6) onto the spindle (#12) until the trailing edge of the propeller contacts the gearbox (#16). Set the proper end play by inserting a 5/64" Allen wrench into the reverse thrust bearing set screw (through the side of the propeller) and loosening the reverse thrust bearing cartridge (#6) one half turn counterclockwise. Tighten the set screw in reverse thrust bearing cartridge. There should be approximately .02" clearance

between the gearbox (#16) and trailing edge of the propeller when the propeller is pulled forward (away from the gearbox). The propeller must not contact the gearbox.

2. THRUST BEARING CARTRIDGE ASSEMBLY (#5) should be inspected for damage and replaced in the nose of the propeller. The thrust bearing cartridge (#5) is used to adjust the amount of longitudinal end play of the propeller assembly on its spindle (#12), which should be about 1/64 inch. End play can be adjusted by turning the thrust bearing cartridge assembly (#5) clockwise until it tightens against the end of the support spindle (#12), then turning thrust bearing cartridge (#5) counterclockwise 1/8 of a turn. Tighten set screw (#3). Check the longitudinal end play of the propeller to insure it's not excessive and does not allow the propeller (#2) to contact the gearbox (#16). Check the clearance between the propeller (#2) and gearbox (#16). The clearance should be approximately .01" between the gearbox (#16) and trailing edge of the propeller when the propeller is pushed back (toward the gearbox). The propeller assembly (#1) must spin freely.

3. PROPELLER BEARING (#1) can be checked for excessive radial play by rocking the propeller (#2) gently from side to side on the spindle (#12). Some play is required for proper operation of the water lubricated ceramic sleeve bearing.

VIII. SENSOR AND FC101 DIGITAL INDICATOR-TOTALIZER

1. FC101 DIGITAL INDICATOR (#34) should not be removed from the meter unless battery or sensor replacement is required. If the unit must be removed, proceed as follows:

2. FC101 (#34) can be removed from meter head by removing the four screws (#32) then slightly lifting unit up and turning over to disconnect the 2-lead sensor wires from the bottom of the FC101. If the meter is equipped with a transmitter, the transmitter wires must also be disconnected.

3. SENSOR HOUSING should be removed only if replacement is necessary. The sensor can be taken out of the separator after removing the gearbox backplate (#17). Once the backplate is removed, pull the sensor wire and sensor assembly out of the back of the gearbox.

4. BEFORE REPLACING THE SENSOR be sure the separator is dry. Slide sensor housing and wire assembly into the separator until it stops against the inside of separator. **Note:** It does not make any difference what rotation position sensor is installed, however, wire must be positioned toward back (open end) of separator. Feed the sensor wire up through the gearbox and out the meter head.

5. **LITHIUM BATTERY** should offer 6 to 10 years of operation. The FC101 has a low battery display that comes on when approximately six months of life is remaining. The battery should test at least 2.8 to 3.6 volts to be considered good. **NOTE: Batteries should be disposed of in an environmentally safe manner.**

6. **THE FC101 DIGITAL INDICATOR-TOTALIZER (#34)** can now be installed in one of four positions for more convenient reading with four screws (#32).

IX. PRIOR TO INSTALLING METER

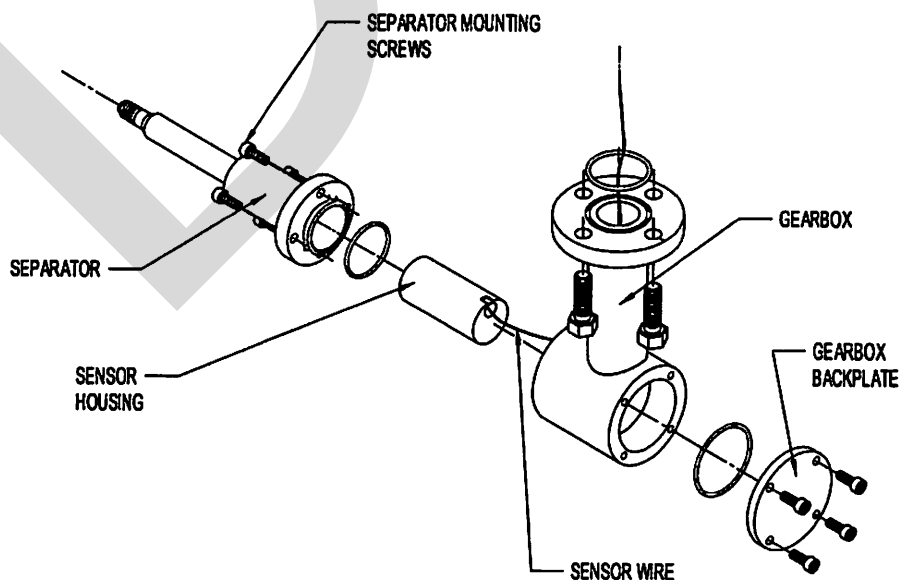
1. **PROPELLER ASSEMBLY (#1)** should be dipped in water to lubricate the propeller ceramic sleeve bearing (#8). Spin the propeller (#2) gently to make certain the meter operates smoothly and no bind or drag is apparent.

2. **FC101 (#34)** and sensor (#15) should be checked to be sure they are connected and that the battery is good. Turn the propeller by hand at a fairly fast even speed and the indicator should display a flow rate.

3. **METER SADDLE D-RING (#22)** should be inspected for any sign of damage and covered with a thin coat of silicone grease. The meter can now be installed in the service line. (See step II-F for proper installation.) When replacing the meter on the line, make certain that the top of the pipeline is smooth and free of any foreign material. Make certain that no foreign materials are attached to the inside of the service line pipe, as any flow disturbance or obstruction may affect the accuracy of the meter.

X. ORDERING PARTS OR RETURN TO FACTORY

Inspection of all meter components that may be replaced in the field has been accomplished at this point. Should any of the meter parts, upon inspection, appear to be damaged or excessively worn, they must be replaced to assure proper meter operation and prevent further damage. Cost for replacement parts not covered by warranty are available by contacting the factory. If it is determined that the meter should be returned for repair, please notify Mc-Crometer prior to shipment. Each meter must be properly packaged to prevent damage to the meter in shipment.



NOTES

Draft

6"-20" STRAP-ON LOW PRESSURE METERS MODEL LP04D, LP12D, LP32D PARTS LIST

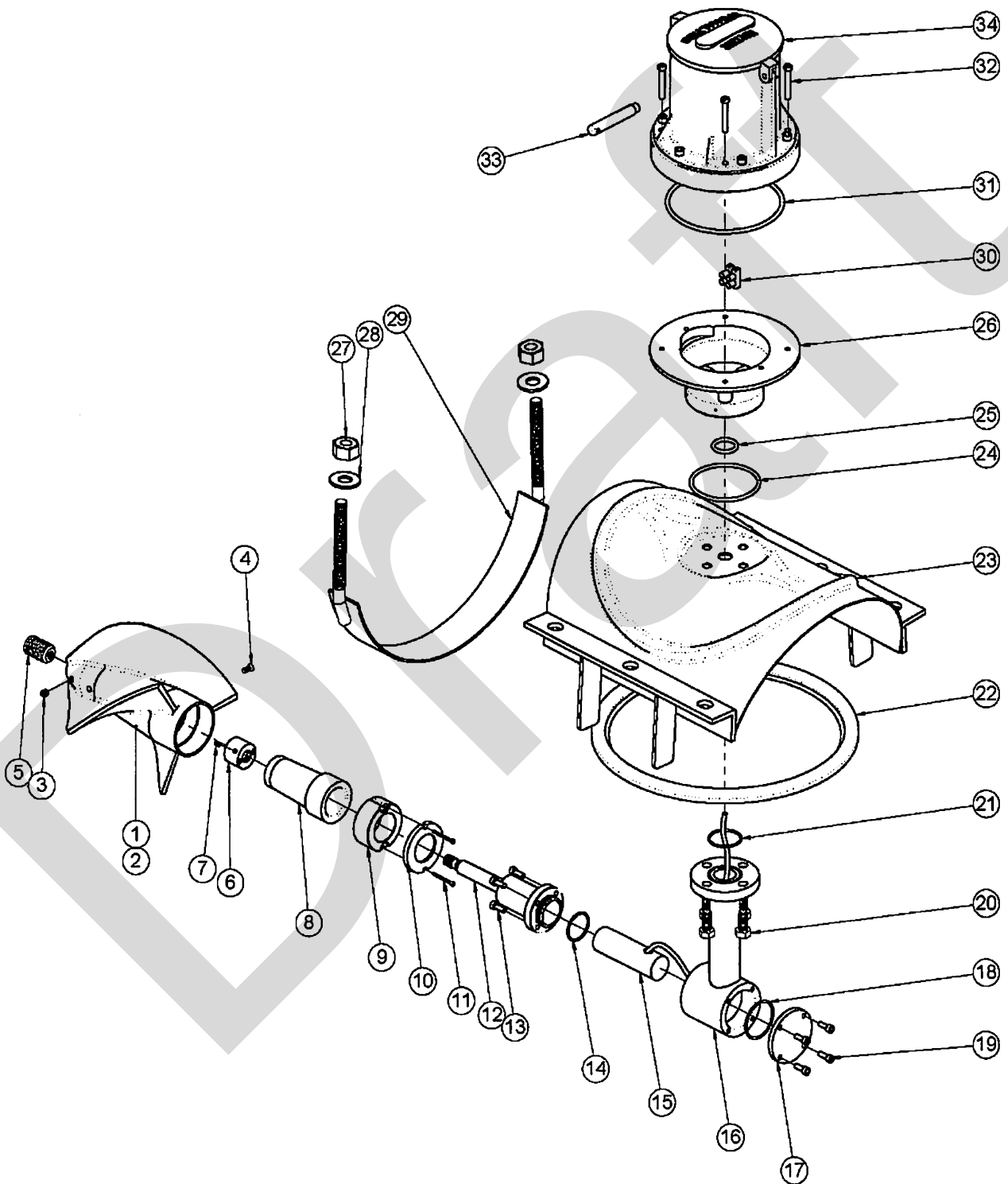
No.	QTY	Part Number	Description
none	1	7-ML1D-*	Model MLI1D Main Line Meter Head Assembly
1	1	5-2425-‡PT	Propeller Assembly (Items 2 thru 8)
2	1	3-2425-‡P	Propeller
3	1	1-1125-6	Set Screw, Nylon Point
4	1	1-1116-8-6	Screw, Bearing Cartridge Mounting
5	1	3-2356	Thrust Bearing Cartridge Assembly
6	1	3-2402-2	Reverse Thrust Bearing Cartridge Assembly (Items 6 and 7)
7	1	1-1101-8-5	Set Screw, Reverse Thrust Bearing
8	1	2-2426-P-1	Ceramic Bearing Cartridge
9	1	2-1601-2	Drive Magnet
10	1	1-2428-‡	Drive Magnet Retaining Plate
11	2	1-1115-3-18	Screw, Magnet Retaining Plate (each)
12	1	4-2455-2	Separator/Support Spindle Assy
13	4	1-1103-8-7	Screw, Separator/Spindle Mounting (each)
14	1	1-1551-24	O-ring, Separator
15	1	4-2730-3-‡	Sensor Housing, Sensor and Wire Assembly
16	1	3-2394-*304	Gearbox
17	1	2-2731	Gearbox Backplate
18	1	1-1551-2	O-ring, Gearbox Backplate
19	4	1-1103-8-7	Screw, Gearbox Backplate Mounting (each)
20	4	1-1251-5-12	Bolt, Gearbox Mounting (each)
21	1	10110-10	O-ring, Gearbox
22	1	1-1552-23	D-Ring Meter Saddle
23	1	3-2414-‡‡	Meter Saddle Assembly
24	1	1-1551-25	O-Ring, Meter Head - Outer
25	1	1-1551-50	O-Ring, Meter Head - Inner
26	1	1-2441	Meter Head (Sizes 6" thru 20")
27	6	1-1211-1	Nut, U Strap (each)
28	6	1-1301-14	Washer, U Strap Bolt (each)
29	3	3-2437-*	U Strap Assembly (each)
30	1	1-1707-19 or -20	InLine Terminal (19) 2 Wire (-20) 3 Wire For Remote
31	1	1-1551-38	O-Ring - 243 Buna
32	4	10605	Screw 10-32 x 1.25" Long
33	1	FC101-M	Magnet Wand
34	1	FC101-*	FC101 Flowcom Ind.-Tot. & Bonnet Complete - See IOM Manual
none	1	10015-00K	Desiccant Bag

*Insert meter size to complete part number - for example:
use -06 for 6", -08 for 8", etc.)

‡Consult factory to complete part number

‡‡Insert -06 for 6"; -08 for 8" - 20"

When ordering replacement parts, please specify:
• Meter Size • Meter Model • Meter Serial Number
Contact Factory For Pricing.

6"-20" STRAP-ON LOW PRESSURE METERS**MODEL LP04D, LP12D, LP32D*****MODEL FC101 INDICATOR-TOTALIZER ASSEMBLY*****CERAMIC BEARING CARTRIDGE PROPELLER*****ONE PIECE SEPARATOR/SPINDLE & THREADED REVERSE THRUST BEARING CARTRIDGE**

WARNING:

BEFORE REMOVING THE METER SADDLE FROM THE PIPELINE THE WATER MUST BE TURNED OFF AND PRESSURE MUST BE RELIEVED FROM THE LINE. SERIOUS INJURY CAN RESULT FROM REMOVING A METER SADDLE UNDER PRESSURE.

Appendix F: 2017 Water Rate Charge Resolution

DRAFT

RESOLUTION 2017-04

ESTABLISHMENT OF CONSUMPTIVE BASED
WATER RATES AND OPERATION & MAINTENANCE (O&M) CHARGES FOR 2017

WHEREAS, the Board of Directors of BYRON BETHANY IRRIGATION DISTRICT has the authority to establish rates and charges for the operation of the DISTRICT;

BE IT RESOLVED, the Board hereby orders the following rates and charges for 2017:

- Agricultural Water Rate within the Byron & Bethany Agricultural Service Areas, with a minimum charge of one acre-foot per turn-on.....\$65.00 per acre-foot;
- Industrial Raw Water Rate for sand-mining purposes and wetlands mitigation, within the Byron Service Area.....\$95.00 per acre-foot;
- Annual Flat Rate Water Service Charge (Interruptible), within the Byron & Bethany Agricultural Service Areas, based on 2 acres or less.....\$120.00 per year;
- Construction Water (District Wide)\$6.00 per unit (3500 gallons);
- Water Availability/Stand-by Charge within the Byron & Bethany Agricultural Service Areas.....\$8.00 per acre;
- Category 1 O&M Charge (Central Valley Project Service Area).....\$5.15 per acre;
- Category 2 O&M Charge (Central Valley Project Service Area).....\$66.00 per acre;
- Category 3 O&M Charge (Central Valley Project Service Area).....\$145.50 per acre;
- Category 4 O&M Charge (Central Valley Project Service Area).....
WAIVED;
- Applicable rates and charges of the Bureau of Reclamation and San Luis & Delta-Mendota Water Authority, including the Authority membership assessment, shall constitute the per acre-foot water charge within the Central Valley Project Service Area.

PASSED AND ADOPTED at a Regular Board Meeting of the BYRON BETHANY IRRIGATION DISTRICT, Board of Directors on 15 February 2017 by the following vote:

AYES: Brown, Enos, Kagehiro, M. Maggiore, T. Maggiore, Musco, Tusso

NOES:

ABSENT:

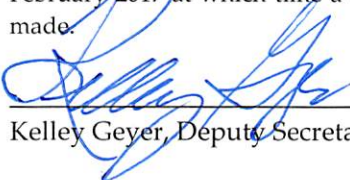
ABSTAINED:



Mr. Russell Kagehiro President

Secretary's Certification

I, Kelley Geyer, Deputy Secretary of the Board of Directors of the Byron Bethany Irrigation District, do hereby certify that the foregoing Resolution is a true and correct copy entered into the Minutes of the Regular Board Meeting on 15 February 2017 at which time a quorum was present, and no motion to amend or rescind the above resolution was made.



Kelley Geyer, Deputy Secretary

Appendix G: Urban Water Management Plan Resolution

Draft

Document to be added with final draft