Attachment 7.1 – Supporting Documents

Madera Region – IRWM Implementation Grant Application

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Attachment 7.1, Project B – MD19 Parkwood Water Supply and Water Meters

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Attachment 7.1, Project B – MD19 Parkwood Water Supply and Water Meters

Project Physical Benefits

Benefit (a): Additional Water Supply to Meet Statutory Requirement: MD19 Parkwood currently serves 605 residential and 28 commercial water connections. This community, designated a Disadvantage Community by DWR (See Attachment 10), is located south of Avenue 13 between Hwy 145 and Raymond Thomas Road in Madera, California.

The District is subject to Enforcement Letter 03-11-11E-007 from the California Department of Public Health. It has been in violation of Section 65445(a), Title 22CCR. This section of the Code states that at all times a public water system's water source(s) shall have the capacity to meet the system's maximum day demand (MDD). CDPH has determined that for Parkwood, the MDD is 680 gallons per minute on a sustained basis.

At one time the Parkwood system had three wells on line, each with over 500 gpm capacity, and was more than capable of meeting this requirement. However, the only remaining well in Parkwood has a current pumping capacity of 400 gpm (down from 470 gpm a year ago).

Each of the three existing wells was constructed along with the Parkwood development in the early 1970's so all are 40 or more years old and approaching the end of their anticipated service lives. One of the wells failed in 2005 and the second failed in 2011, both due to sanding issues. Both wells still exist, but neither are in operation and there is no opportunity to repair them due to the nature of the failures, which is that the well casing has corroded with age.

The corrosion allows erosion around the casing slots, increasing the slot size and allowing soil particles that would normally be retained by the casing to enter the well. Some of intruding soil, which is mostly sand, is then pulled into the pumps where the abrasiveness destroys the pump impellers long before their typical useful life is over. In addition, the sand ends up in the distribution system and eventually in the water fixtures in the residences, where it clogs faucet screens and causes other related damage. Much of the rest of the sand falls to the bottom of the well casing, eventually filling the casing, blocking slots and drastically reducing well production.

Sanding in the two out-of-service wells had reached a level of severity sufficient to render them useless. Production had fallen to minimal levels and sand in the system was substantial.

The third well has lost pumping capacity since 2011, to the current rate of 400 gpm, again due to sanding issues. In the professional opinion of the County Engineer, Kheng Vang, it appears likely that the third well will fail as did the first two, within the next three years.

The remaining well has to pump for approximately 16 hours a day to produce 383,378 gpd to supply the average daily demand of Parkwood. At 100% duty cycle, the well could produce 17.8 million gallons in a month. There are several months on record where the actual delivery of water in the District has been as much as 20 million gallons. This one remaining well falls far short of being an adequate or reliable source of water to the District.

The new well proposed under this project will be designed to produce at least 680 gpm to insure that if the remaining well No. 3 does in fact fail in the next 3 to 5 years as anticipated by the County Engineer, the District would continue to be in compliance with Section 65445(a).

Benefit (b): Installation of Water Meters to Meet Statutory Requirement: MD19 Parkwood's 633 service connections are currently unmetered and pay a flat monthly rate for water. The current annual water use averages 383,378 gpd. January water production averages 7 million gallons, while summer water projection (June, July, August) typically ranges from 17 million to 20 million gallons.

The large difference between summer and winter use is all assignable to outdoor irrigation. Similar systems have experienced 20% to 25% drops in annual water use through installation of water meters and imposition of progressive, revenue-neutral water rates. Parkwood can expect similar results.

With meters installed, a savings of 20 percent would result in a reduction in water production per average day of about 76,675 gpd, which sums to 27,986,375 gallons or 86 acre-feet per year, all of which is water left in the aquifer and directly reducing groundwater overdraft.

Table 9 – Annual Project Physical Benefits

Project Name: MD19 Parkwood Water Supply and Water Meters

Type of Benefit Claimed: a. new well at 680 gpm

Measure of Benefit Claimed (Name of Units): gallons per minute (gpm)

Additional Information About this Measure: Existing well pumps 400 gpm for 16 hours a day to supply 383378 gpd for 633 connections as a sole source of water based on current metered flows from Well # 3 in Parkwood

(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project	With Project	Change Resulting from Project (c) – (b)
2012	400	400	0
2013	300	300	0
2014	200	200	0
2015	0	680	680
2016	0	680	680
2017	0	680	680
2018	0	680	680
2019	0	680	680
2020	0	680	680
2021	0	680	680
2022	0	680	680
2023	0	680	680
2024	0	680	680
2025	0	680	680
2026	0	680	680
2027	0	680	680
2028	0	680	680
2029	0	680	680
2030	0	680	680
2031	0	680	680
2032	0	680	680
2033	0	680	680
2034	0	680	680
2035	0	680	680
2036	0	680	680
2037	0	680	680
2038	0	680	680
2039	0	680	680
2040	0	680	680
2041	0	680	680
2042	0	680	680
2043	0	680	680
2044	0	680	680
2045	0	680	680
2046	0	680	680
2047	0	680	680
2048	0	680	680
2049	0	680	680
2050	0	680	680
2051	0	680	680
2052	0	680	680

Comments:

Table 9 – Annual Project Physical Benefits

Project Name: MD19 Parkwood Water Supply and Water Meters

Type of Benefit Claimed: b. Savings from Water Meter installed

Measure of Benefit Claimed (Name of Units): gallons per day (gpd)

Additional Information About this Measure: Water Meters save approximatly 20 percent of the water used as opposed to a flat rate that Parkwood currently is under.

(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project	With Project	Change Resulting from Project (c) – (b)
2012	383,378	383,378	0
2013	383,378	383,378	0
2014	383,378	383,378	0
2015	383,378	306,705	-76,673
2016	383,378	306,705	-76,673
2017	383,378	306,705	-76,673
2018	383,378	306,705	-76,673
2019	383,378	306,705	-76,673
2020	383,378	306,705	-76,673
2021	383,378	306,705	-76,673
2022	383,378	306,705	-76,673
2023	383,378	306,705	-76,673
2024	383,378	306,705	-76,673
2025	383,378	306,705	-76,673
2026	383,378	306,705	-76,673
2027	383,378	306,705	-76,673
2028	383,378	306,705	-76,673
2029	383,378	306,705	-76,673
2030	383,378	306,705	-76,673
2031	383,378	306,705	-76,673
2032	383,378	306,705	-76,673
2033	383,378	306,705	-76,673
2034	383,378	306,705	-76,673
2035	383,378	306,705	-76,673
2036	383,378	306,705	-76,673
2037	383,378	306,705	-76,673
2038	383,378	306,705	-76,673
2039	383,378	306,705	-76,673
2040	383,378	306,705	-76,673
2041	383,378	306,705	-76,673
2042	383,378	306,705	-76,673
2043	383,378	306,705	-76,673
2044	383,378	306,705	-76,673
2045	383,378	306,705	-76,673
2046	383,378	306,705	-76,673
2047	383,378	306,705	-76,673
2048	383,378	306,705	-76,673
2049	383,378	306,705	-76,673
2050	383,378	306,705	-76,673
2051	383,378	306,705	-76,673
2052	383,378	306,705	-76,673

Comments:

Attachment 7.1, Project C – MD8 North Fork/ South Fork Sewer System Improvements

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Attachment 7.1, Project C – MD8 North Fork/ South Fork Sewer System Improvements

Project Physical Benefits

The South Fork Area to be served the project includes approximately 55 dwelling units. This private system is located at the North Fork Mill Housing Facility, which contains approximately 24 residential structures. It is subject to Waste Discharge Requirements Order No. 90-051, and Cleanup and Abatement Order No. 99-729, as issued by the Regional Water Quality Control Board (RWQCB). It has been violating RWQCB regulations since 1986. According to the Mill Housing Wastewater Facility, one assessment of the problem is that untreated, raw sewage (effluent) is seeping into the ground and nearby Willow Creek (Facility Inspection Report 2005).

Benefit (a): The project will eliminate the discharge of untreated effluent from septic tanks to the groundwater and potential spills from the North Fork Mill House Facility treatment facility. The depth to groundwater is approximately 30 feet, removal/ abandonment of the existing private septic and leach systems will negate the potential pollution and contamination of the groundwater.

Existing South Fork septic system flows are estimated to be approximately 15,875 gallons per day, assuming an average flow rate of 250 gallons per dwelling unit. The estimated flows are based on the 1999 Provost and Pritchard Report, "Madera County Maintenance District 8A, Wastewater Treatment and Disposal Systems, Preliminary Engineering Report," and reaffirmed by the "South Fork Sewer System, Facilities Plan," dated June 16, 2010 (2010 Report) by Blair, Church and Flynn Consulting Engineers.

The existing South Fork private septic systems will be abandoned and reconfigured to connect to the proposed sewer collection system and pumped to the existing MD-8A North Fork Waste Water Treatment to treated.

See Table 9a, Project C for a detailed analysis of these benefits.

Benefit (b), Treated Effluent Used for Groundwater Recharge: The treated effluent will be discharged via spray fields. The treated effluent will be disposed by percolation, evaporation, and evapo-transpiration. Excess flows will be recaptured by the effluent return ditches and pumped back to be re-circulated. The treated flows that are percolated directly enhance the groundwater recharge in the North Fork area.

See Table 9b, Project C for a detailed analysis of these benefits.

Benefit (c), Expanded Sprayfield Disposal Capacity: The North Fork WWTP's current treatment capacity is 60,000 gpd and can easily accommodate the additional flows from South Fork. However, effluent disposal is limited to 38,000 gpd. Connection of South Fork to the North Fork

system will require an expansion of the spray field capacity to accommodate South Fork sewer flows.

By expanding the spray field areas, constructing runoff control ditches and effluent return pump systems, the County can increase discharge capacity to the spray fields as long as evidence is provided that the spray field has runoff controls and effluent return systems for discharges greater than 38,000 gpd and that spray field percolation rates will allow for a 60,000 gpd effluent disposal capacity, adequate to accommodate the South Fork flows. Both of these requirements were outlined in WDR Order No. 94-343.

The treated effluent will be discharged via spray fields. The treated effluent will be disposed by percolation, evaporation, and evapotranspiration. Excess flows will be recaptured by the effluent return ditches and pumped back to be re-circulated.

See Table 9c, Project C for a detailed analysis of these benefits.

Table 9 – Annual Project Physical Benefits

Project Name: MD8 North Fork/ South Fork Sewer System Improvements

Type of Benefit Claimed: a. Septic System flows treated.

Measure of Benefit Claimed (Name of Units): gallons per day (gpd)

Additional Information About this Measure: Existing septic sysytem flows to be collected and pumped to existing WWTP based on 2012 Report page 5 section 4.1.1

(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project	With Project	Change Resulting from Project (c) – (b)
2012	0	15,875	15,875
2013	0	15,875	15,875
2014	0	15,875	15,875
2015	0	15,875	15,875
2016	0	15,875	15,875
2017	0	15,875	15,875
2018	0	15,875	15,875
2019	0	15,875	15,875
2020	0	15,875	15,875
2021	0	15,875	15,875
2022	0	15,875	15,875
2023	0	15,875	15,875
2024	0	15,875	15,875
2025	0	15,875	15,875
2026	0	15,875	15,875
2027	0	15,875	15,875
2028	0	15,875	15,875
2029	0	15,875	15,875
2030	0	15,875	15,875
2031	0	15,875	15,875
2032	0	15,875	15,875
2033	0	15,875	15,875
2034	0	15,875	15,875
2035	0	15,875	15,875
2036	0	15,875	15,875
2037	0	15,875	15,875
2038	0	15,875	15,875
2039	0	15,875	15,875
2040	0	15,875	15,875
2041	0	15,875	15,875
2042	0	15,875	15,875
2043	0	15,875	15,875
2044	0	15,875	15,875
2045	0	15,875	15,875
2046	0	15,875	15,875
2047	0	15,875	15,875
2048	0	15,875	15,875
2049	0	15,875	15,875
2050	0	15,875	15,875
2051	0	15,875	15,875
2052	0	15,875	15,875

Comments:

Table 9 – Annual Project Physical Benefits

Project Name: MD8 North Fork/ South Fork Sewer System Improvements

Type of Benefit Claimed: b. Treated effluent used for groundwater recharge.

Measure of Benefit Claimed (Name of Units): gallons per day (gpd)

Additional Information About this Measure: Existing septic sysytem flows to be collected and pumped to existing WWTP based on 2012 Report page 5 section 4.1.1. Treted Effluent to be utilized for groundwater recharge via existing effluent pond and effluent disposal sprayfield.

(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project	With Project	Change Resulting from Project (c) – (b)
2012	0	15,875	15,875
2013	0	15,875	15,875
2014	0	15,875	15,875
2015	0	15,875	15,875
2016	0	15,875	15,875
2017	0	15,875	15,875
2018	0	15,875	15,875
2019	0	15,875	15,875
2020	0	15,875	15,875
2021	0	15,875	15,875
2022	0	15,875	15,875
2023	0	15,875	15,875
2024	0	15,875	15,875
2025	0	15,875	15,875
2026	0	15,875	15,875
2027	0	15,875	15,875
2028	0	15,875	15,875
2029	0	15,875	15,875
2030	0	15,875	15,875
2031	0	15,875	15,875
2032	0	15,875	15,875
2033	0	15,875	15,875
2034	0	15,875	15,875
2035	0	15,875	15,875
2036	0	15,875	15,875
2037	0	15,875	15,875
2038	0	15,875	15,875
2039	0	15,875	15,875
2040	0	15,875	15,875
2041	0	15,875	15,875
2042	0	15,875	15,875
2043	0	15,875	15,875
2044	0	15,875	15,875
2045	0	15,875	15,875
2046	0	15,875	15,875
2047	0	15,875	15,875
2048	0	15,875	15,875
2049	0	15,875	15,875
2050	0	15,875	15,875
2051	0	15,875	15,875
2052	0	15,875	15,875

Comments:

Table 9 – Annual Project Physical Benefits

Project Name: MD8 North Fork/ South Fork Sewer System Improvements

Type of Benefit Claimed: c. Sprayfield Expansion Benefits

Measure of Benefit Claimed (Name of Units): gallons per day (gpd)

Additional Information About this Measure: Expansion of spray field capacity from current 38,000 gpd to 60,000 gpd provides capacity for disposal of effluent generated by connection of Sotuh Fork units.

(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project	With Project	Change Resulting from Project (c) – (b)
2012	38,000	60,000	22,000
2013	38,000	60,000	22,000
2014	38,000	60,000	22,000
2015	38,000	60,000	22,000
2016	38,000	60,000	22,000
2017	38,000	60,000	22,000
2018	38,000	60,000	22,000
2019	38,000	60,000	22,000
2020	38,000	60,000	22,000
2021	38,000	60,000	22,000
2022	38,000	60,000	22,000
2023	38,000	60,000	22,000
2024	38,000	60,000	22,000
2025	38,000	60,000	22,000
2026	38,000	60,000	22,000
2027	38,000	60,000	22,000
2028	38,000	60,000	22,000
2029	38,000	60,000	22,000
2030	38,000	60,000	22,000
2031	38,000	60,000	22,000
2032	38,000	60,000	22,000
2033	38,000	60,000	22,000
2034	38,000	60,000	22,000
2035	38,000	60,000	22,000
2036	38,000	60,000	22,000
2037	38,000	60,000	22,000
2038	38,000	60,000	22,000
2039	38,000	60,000	22,000
2040	38,000	60,000	22,000
2041	38,000	60,000	22,000
2042	38,000	60,000	22,000
2043	38,000	60,000	22,000
2044	38,000	60,000	22,000
2045	38,000	60,000	22,000
2046	38,000	60,000	22,000
2047	38,000	60,000	22,000
2048	38,000	60,000	22,000
2049	38,000	60,000	22,000
2050	38,000	60,000	22,000
2051	38,000	60,000	22,000
2052	38,000	60,000	22,000
Comments:			

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Attachment 7.1, Project D – Brockman Flood Control Basin

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Attachment 7.1, Project D – Brockman Flood Control Basin

Project Physical Benefits

This attachment presents technical justification for Project D's physical benefits and provides studies, documents, and other reference materials to support the Project. The Project helps to significantly reduce the risk of flood damage in the Madera Ranchos by adding flood storage along Madera Ranchos South drainage (FEMA 100-yr Zone AE Floodplain), one of several designated blue-line stream drainages in the area and the one with the most development adjacent to it.

The Project will also provide groundwater recharge benefits. A new turn-out structure on the MID Lateral 6.2 will create the capability of diverting water to the flood control basin. Source of diverted water would initially be Section 215 floodwater diverted from the San Joaquin River. Every acre-foot of water recharged by the Project will help offset an acre-foot of groundwater overdraft in the local area and surrounding communities. The Project will help to slow the net overdraft in Southeastern Madera County, calculated at 22,000 AF/year, as referenced in a report by Kenneth D. Schmidt Associates entitled '*Hydrogeologic Investigation – Southeastern Madera County*', prepared in 1998 and updated in 2001 (see Electronic Attachment 7.2D a).

The Project will also contribute to local groundwater quality, and will provide additional acreage for habitat and wildlife conservation.

The technical justification and physical benefits of the Project are set forth below. These subjects are discussed in greater detail in Attachment 8, and provided here for reference.

Physical Benefits Being Claimed

Project D will create capacity to store, treat, and recharge stormwater runoff which currently passes through the Madera Ranchos community, realizing flood control and water quality benefits and substantially reducing flood damage risk.

The physical benefits being claimed are listed below, followed with narrative descriptions of expected benefits, background for benefits to be claimed, and tables that describe the methods used to estimate physical benefits.

- Reduced risk of flooding and flood damages;
    - Increased public health and safety protection;
    - Improved stormwater management and flood routing flexibility;
- Increased groundwater recharge efforts;
    - Recharge local flood water and Section 215 San Joaquin River flood water
- Improved water quality;
- Habitat and wildlife improvements;

Benefit (a) - Storm and Flood Water Capture

The basin will be capable of accepting an average inflow of 36.3 cfs for a duration of 10 hours for the critical 24-hour peak storm event (Soil Conservations Service Type 1 Storm Distribution). With this inflow capability, the 100-yr storm event peak flow on the upper watershed hydrograph can be reduced from a peak of 520 cfs (as shown in the FEMA Flood Insurance Study for Madera County) to 140 cfs. The result is the lessening of peak flood water flows in the streets and structures in the 2-mile segment of the Madera Ranchos South drainage through the community of Madera Ranchos. The necessary storage volume for peak flows reductions to the Brockman Flood Control Basin is the initial Project capacity of 30 acre-feet.

The resulting peak flow rate of less than 140 cfs affects lesser storms as well. According to the FEMA Flood Insurance Study, the predicted peak flow from a 10-year storm is 250 cfs. That storm would be reduced to 140 cfs as well. The effect of Project D is that potential for flood damage is reduced for all events of return frequencies 2-years or greater, and the water taken from the peak of the storm runoff is diverted to the Brockman basin. The facility would not be large enough to fully mitigate flow from a 500-year storm, so the potential for damage from that storm, while lessened, is not eliminated.

Because of the return frequency and size of the storm flows actually diverted, only half of the Brockman Basin capacity is assumed to fill and be available for recharge on an average annual basis. With these assumptions, the Project will capture storm water runoff in the proposed facility to reduce flood damages while providing recharge and improved water quality for approximately 15 acre-feet a year See Attachment 7.1D, Table 9a.

Benefit (b) – Surface Water Import Recharge

The basin will be available outside of peak rainfall months to recharge imported surface water in addition to its primary flood control purpose. All water will be recharged in southeast Madera County, in an area where groundwater surface decline has averaged nearly five feet per year for over 20 years.

The actual long-term permeability of the Project basin has been estimated from geotechnical studies done in the local area for projects with similar soils profiles, including the Rampage Vineyards located immediately east of the Project site. To calculate Project outcomes, a percolation rate of 0.3 feet per day has been used. This value will be verified by pilot testing during project design.

The other variable in recharge capacity is the number of days per year that recharge water is available and the basin is wet. We can compute the estimated annual groundwater recharge by estimating the number of days per year that Section 215 floodwater will be spread into the basin. Data regarding Section 215 floodwater is available for each year since Friant Dam began. The Section 215 floodwater quantities are based on a hydrologic simulation (See Electronic Attachment 7.2D b and 7.2D c). This simulation was originally prepared for the Root Creek Water District In-Lieu Groundwater Recharge project feasibility study.

Based upon the size of the basin, the anticipated percolation rate and the estimated days of Section 215 water availability, the basin will average 75 acre-feet of recharge per year (See Electronic Attachment 7.2D d). See Attachment 7.1D, Table 9b.

Benefit (c)- Groundwater Quality Enhancement

The proposed project will help improve groundwater quality by: 1) Helping to reduce the rate of decline in groundwater levels in an area that shows a significant groundwater overdraft, and 2) recharging cleaner surface water that will mix with and improve the quality of the groundwater.

San Joaquin River water will be diverted for the project. The water originates in the Sierra Nevada Mountains and has excellent quality for irrigation or municipal use. A chemical analysis of the San Joaquin river water is shown in Table 7-1.

Table 7-1 – Chemical Constituents in the San Joaquin River

Constituent	Concentration	Units
Ammonia	ND	mg/L
Calcium	3.3	mg/L
Specific Conductivity	50	µmhos/cm
Copper	ND	µg/L
Hardness	11	mg/L
Magnesium	0.62	mg/L
Nitrate	ND	mg/L
Phosphate	ND	mg/L
pH	7.4	
Temperature	21.2	ºC

Source: "Report of Waste Discharge, Friant Ranch WWTF," Provost & Pritchard Consulting Group, December 2012

As previously stated, in the project area, as the depth of groundwater increases, groundwater contamination increases, with contaminants including iron, manganese, HPC and arsenic. The imported surface water will percolate and mix with the groundwater, thus improving its overall quality in the vicinity of the Brockman Basin.

Benefit (d) – Expansion of Wildlife Habitat

Three wildlife enhancements metrics were used to illustrate wildlife benefits: open space area, pooled surface water area and additional shoreline length. The Brockman Flood Control Basin Project basin will increase the amount of open space, add pooled surface water and add shoreline habitat. In addition, late rain season operational adjustments and springtime recharge (with Section 215 water) will increase the use of these areas by wildlife.

Birds, mammals, frogs, fish and turtles spend some or all of their life cycle in or around the water. Many species depend on this habitat for breeding, foraging, hunting, fishing, and other essential uses. Trees and vegetation along the shoreline are important feeding, nesting, and perching areas for songbirds.

The Brockman Flood Control Basin will provide habitat for a variety of song birds, raptors and water fowl like Red Tail Hawks, Redwing Blackbirds, Grackles, Northern Flicker, American Coot, Great White Egret, Great Blue Heron and the American Avocet. Other species include Grey Foxes, bullfrogs and Western Pond Turtles.

The Project will increase the potential seasonal pooled surface water area by 4.3 acres and shoreline habitat by approximately 2,000 feet, which will further establish and enhance existing wildlife ecosystems within the Southeast Madera County region. See Attachments 7.1D, Tables 9c and 9d.

Table 9 – Annual Project Physical Benefits

Project Name: Project D - Brockman Flood Control Basin

Type of Benefit Claimed: a. Local Flood Water Captured

Measure of Benefit Claimed (Name of Units): Acre-Feet

Additional Information About this Measure: Values are conservative based on the basin filling to capacity every second year.

(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project	With Project	Change Resulting from Project (b) – (c)
2012	0	0	0
2013	0	0	0
2014	0	0	0
2015-2061	0	15	15

Comments:

Table 9 – Annual Project Physical Benefits

Project Name: **Project D - Brockman Flood Control Basin**

Type of Benefit Claimed: **b. Groundwater Water Recharge - Section 215 Floodwaters**

Measure of Benefit Claimed (Name of Units): **Acre-Feet**

Additional Information About this Measure: Values are presented as acre-feet per the attached available imported surface water analysis. See commentary, Attachment 7.1D.

(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project	With Project	Change Resulting from Project (b) – (c)
2012	0	0	0
2013	0	0	0
2014	0	0	0
2015-2061	0	75	75

Comments:

Table 9 – Annual Project Physical Benefits

Project Name: **Project D - Brockman Flood Control Basin**

Type of Benefit Claimed: **d. Part 1 - Acreage of Habitat Improved and Protected**

Measure of Benefit Claimed (Name of Units): **Acres of added wildlife habitat area**

Additional Information About this Measure: Habitat improvements is a product of the Madera County FWCA's ability to increase pooled surface water area as a result of the project.

(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project	With Project	Change Resulting from Project (b) – (c)
2012	0	0	0
2013	0	0	0
2014	0	0	0
2015-2061	0	4.3	4.3

Comments:

Table 9 – Annual Project Physical Benefits

Project Name: **Project D - Brockman Flood Control Basin**

Type of Benefit Claimed: **d. Part 2 -- Lineal Feet of Pond Shoreline Improved and Protected**

Measure of Benefit Claimed (Name of Units): **Lineal Feet of Added Shoreline**

Additional Information About this Measure: Additional shoreline is an outgrowth of Madera County's ability to increase pooled surface water area as a result of the Project.

(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project	With Project	Change Resulting from Project (b) – (c)
2012	0	0	0
2013	0	0	0
2014	0	0	0
2015-2061	0	2,000	2,000

Comments:

Attachment 7.1, Project E – CSA 14 Chuk-Chanse Sewer System Improvements

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Attachment 7.1, Project E – CSA 14 Chuk-Chanse Sewer System Improvements

Project Physical Benefits

Benefit (a): Installation of Water Meters to Meet Statutory Requirement: CSA14 Chuk-Chanse is a Disadvantaged Community which has 31 water service connections, all of which are currently unmetered. The customers pay a flat quarterly rate for water. The current annual water use averages 25,000 gpd. January water production averages 500,000 gallons, while summer water projection (June, July, August) typically is 1,000,000 gallons per month. The water is supplied by a single well that produces 31 gpm and pumps to a 48,000 gallon storage tank and is then boosted to a hydro pneumatic tank to provide pressure to the system.

At 100% duty cycle, the well could produce 1.34 million gallons of water in a 30-day month. Since summer water production is only 75% of that amount, the water system is not production-constrained. However, the single well has no backup, and any failure of that well is an immediate and critical problem.

The large difference between summer and winter use is all assignable to outdoor irrigation. Similar systems have experienced 20% to 25% drops in annual water use through installation of water meters and imposition of progressive, revenue-neutral water rates. Chuk-Chanse can expect similar results.

With meters installed, a savings of 20 percent would result in a reduction in water production per average day of about 5,000 gpd, which sums to 1,825,000 gallons or 5.60 acre-feet per year, all of which is water left in the aquifer and would directly reduce groundwater overdraft in the severely overdrafted region.

Benefit (b): Elimination of Groundwater Contamination by Sewer System Improvements: CSA14 Chuk-Chanse operates a small facultative-lagoon wastewater treatment system located about one mile west of the community. The WWTP currently has two long-neglected maintenance issues.

The first is severe cracking in a 300-foot section of the original 12-inch vitrified clay pipe (VCP) collector sewer. Because this section is located directly within a local drainage, the cracking results in excess I&I into the collection line, which then has to be pumped into the lagoon. Also, the infiltrated water causes the volume of the inflow to exceed the design disposal rate of the lagoons, which creates pond capacity issues especially in very wet seasons. The cracks are also causing groundwater contamination during the dry months, as they allow raw wastewater to exfiltrate from the sewer collector and into the surrounding drainage.

The second issue is flooding of a neighboring orchard during the spring and early summer months, caused by seepage beneath the western levee of the lagoons. Investigation by Madera County Special Districts Staff Joe Beck and Marty Duvall in 2005 revealed that rather than simply percolating into the ground, the seepage travels laterally to the west into a neighboring nut orchard, on top of an impervious hardpan layer that is about five feet below the ground surface. The water migrates to the surface, leaving standing puddles that bloom with algae in the spring and early summer months. While this seepage has not yet drawn enforcement action from the RWQCB, such discharges onto neighboring properties are not permissible and repair is required.

The Project recommends a two-part repair to address these separate contamination issues:

1. Replacement of the 500 LF of cracked VCP sewer by constructing a parallel 12-inch PVC SDR35 sewer, connected to the original collector line at each end of the PVC using 45-degree connections with a standard 48-inch manhole at each angle point. Since the collector sewer travels through open ground, the parallel construction can be accomplished by simple conventional construction methods and is by far the most cost effective alternative. See Table 9 in Attachment 7.1E.

2. Construction of 300 LF of trench drain along the toe of the west end of the lagoon levee. See Attachment 8.1, Project E for details. The trench drain will allow seepage water to penetrate the hardpan and percolate into the deeper ground layers, eliminating the lateral travel and the puddling in the neighbor's orchard.

Each of these repairs is simple, cost effective, and beyond the reach of CSA14's very limited capital program budget, which is funded only by the user charges from 31 connections in this DAC.

Table 9 – Annual Project Physical Benefits

Project Name: Project E: CSA14 Chuk-Chanse Sewer System Improvements

Type of Benefit Claimed: b. Savings from Water Meter installed

Measure of Benefit Claimed (Name of Units): gallons per day (gpd)

Additional Information About this Measure: Water Meters save approximatly 20 percent of the water used as opposed to a flat rate that Chuk-Chanse currently is under.

(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project	With Project	Change Resulting from Project (c) – (b)
2012	25,000	25,000	0
2013	25,000	25,000	0
2014	25,000	25,000	0
2015	25,000	20,000	-5,000
2016	25,000	20,000	-5,000
2017	25,000	20,000	-5,000
2018	25,000	20,000	-5,000
2019	25,000	20,000	-5,000
2020	25,000	20,000	-5,000
2021	25,000	20,000	-5,000
2022	25,000	20,000	-5,000
2023	25,000	20,000	-5,000
2024	25,000	20,000	-5,000
2025	25,000	20,000	-5,000
2026	25,000	20,000	-5,000
2027	25,000	20,000	-5,000
2028	25,000	20,000	-5,000
2029	25,000	20,000	-5,000
2030	25,000	20,000	-5,000
2031	25,000	20,000	-5,000
2032	25,000	20,000	-5,000
2033	25,000	20,000	-5,000
2034	25,000	20,000	-5,000
2035	25,000	20,000	-5,000
2036	25,000	20,000	-5,000
2037	25,000	20,000	-5,000
2038	25,000	20,000	-5,000
2039	25,000	20,000	-5,000
2040	25,000	20,000	-5,000
2041	25,000	20,000	-5,000
2042	25,000	20,000	-5,000
2043	25,000	20,000	-5,000
2044	25,000	20,000	-5,000
2045	25,000	20,000	-5,000
2046	25,000	20,000	-5,000
2047	25,000	20,000	-5,000
2048	25,000	20,000	-5,000
2049	25,000	20,000	-5,000
2050	25,000	20,000	-5,000
2051	25,000	20,000	-5,000
2052	25,000	20,000	-5,000

Comments:

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Attachment 7.1, Project F – MD 33 Fairmead Sewer Collection, Treatment and Disposal System Plans

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Attachment 7.1, Project F – MD 33 Fairmead Sewer Collection, Treatment and Disposal System Plans

Project Physical Benefits

Construction of a community wastewater treatment system in Fairmead is in accordance with the Basin Plan objectives to eliminate the contamination threat posed by septic systems. As discussed in Attachment 3.1F, this project does not propose construction, but will be a feasibility study of the options available to the community for implementation of a wastewater system, then preparation of the preliminary and final plans and specifications for the selected alternative in anticipation of seeking future grant funding for construction.

Alternatives considered will include consolidation with the City of Chowchilla, which operates the closest Publicly Owned Treatment Works, about 5-1/2 miles from Fairmead. Other alternatives will look at locally-based WWTPs which will address not only the issue of potential groundwater contamination, but by making treated effluent available as recycled water, will help address the issue of declining groundwater table by offering neighboring ag interests some ability to replace groundwater pumping with use of recycled water.

Because of the nature of the project, the benefits are qualitative and will emerge only with the construction of the improvements to be planned. The evaluation of benefits assumes construction will be accomplished.

Benefit (a): Elimination of Water Quality Threat in a DAC Due to Septic Tanks: The proposed project, once carried through to construction completion, will replace existing private individual septic tanks (many of which are failing and leaking) with a community-wide sewer disposal system to serve the disadvantaged community of Fairmead. These septic tanks have been noted by Madera County Environmental Health Department in their annual system assessment as having potential to create outside contamination of the District's wells. A copy of the complete assessment may be viewed at the State's website, www.dhs.ca.gov/ps/ddwem/technical/dwp/source_info/source_index.htm.

If the proposed project does not happen, the residents of the disadvantaged community of Fairmead will remain dependent on individual and failing individual septic systems. This creates a potential health hazard for Fairmead's residents.

Benefit (b): Groundwater Overdraft Mitigation: Together with elimination of the documented threat to water quality, the project would bring a groundwater savings benefit. This area of the Central Valley is experiencing a severe groundwater overdraft. Groundwater in the Fairmead area is subsiding at a rate which reaches 5 feet per year. Once a WWTP is constructed the effluent would be useable by surrounding growers for agricultural irrigations. Since all nearby growers are reliant on groundwater, the in-lieu irrigation would present a gallon-for-gallon benefit to the groundwater aquifer.

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Table 9 – Annual Project Physical Benefits

Project Name: Project F: MD33 Fairmead Sewer Collection, Treatment and Disposal System Plans

Type of Benefit Claimed: Reduction in Water Pumping Cost and Well Replacement

Measure of Benefit Claimed (Name of Units): Dollars

(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project	With Project	Change Resulting from Project (b) – (c)
2012	21024	16819	4205
2013	21024	16819	4205
2014	21024	16819	4205
2015	21024	16819	4205
2016	21024	16819	4205
2017	21024	16819	4205
2018	21024	16819	4205
2019	21024	16819	4205
2020	21024	16819	4205
2021	21024	16819	4205
2022	21024	16819	4205
2023	21024	16819	4205
2024	21024	16819	4205
2025	22075	17660	4415
2026	22075	17660	4415
2027	22075	17660	4415
2028	22075	17660	4415
2029	22075	17660	4415
2030	22075	17660	4415
2031	22075	17660	4415
2032	22075	17660	4415
2033	22075	17660	4415
2034	22075	17660	4415
2035	22075	17660	4415
2036	22075	17660	4415
2037	23179	18543	4636
2038	23179	18543	4636
2039	23179	18543	4636
2040	23179	18543	4636
2041	23179	18543	4636
2042	23179	18543	4636
2043	23179	18543	4636
Etc.	23179	18543	4636
Last Year of Project Life	23179	18543	4636

Comments: The cost savings due to a reduction in water pumping costs and conversely well replacement savings is expected to translated into an annual savings of $4,205 through year 2024, an annual savings of $4,415 from year 2025 through year 2036, and an annual savings of $4,636 from year 2037 through year 2043. The water pumping costs and well replacement costs is also expected to be incremental.

Table 9 – Annual Project Physical Benefits

Project Name: Project F: MD33 Fairmead Sewer Collection, Treatment and Disposal System Plans

Type of Benefit Claimed: Forego need to replace and/or maintain private septic systems

Measure of Benefit Claimed (Name of Units): Dollars

(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project	With Project	Change Resulting from Project (b) – (c)
2012	58450	0	58450
2013	58450	0	58450
2014	58450	0	58450
2015	58450	0	58450
2016	58450	0	58450
2017	58450	0	58450
2018	58450	0	58450
2019	58450	0	58450
2020	58450	0	58450
2021	62293	0	62293
2022	62293	0	62293
2023	62293	0	62293
2024	62293	0	62293
2025	62293	0	62293
2026	62293	0	62293
2027	62293	0	62293
2028	67802	0	67802
2029	67802	0	67802
2030	67802	0	67802
2031	67802	0	67802
2032	67802	0	67802
2033	67802	0	67802
2034	67802	0	67802
2035	67802	0	67802
2036	70641	0	70641
2037	70641	0	70641
2038	70641	0	70641
2039	70641	0	70641
2040	70641	0	70641
2041	70641	0	70641
2042	70641	0	70641
2043	70641	0	70641
Etc.	70641	0	70641
Last Year of Project Life	70641	0	70641

Comments: The community-wide annual cost to replace or maintain private septic systems is estimated to be $58,450 through year 2020, $62,293 replacement and/or maintenance cost per year from 2021 through year 2027, $67,802 replacement and/or maintenance cost per year from year 2028 through year 2035, and $70,641 replacement and/or maintenance cost per year from year 2036 through year 2043. The annual cost savings per is expected to continue be incremental, thereafter.