

APPENDICES

Report for the Stanislaus Multi-Agency Regional Storm Water Resource Plan

Appendix A - SWRP Checklist

Storm Water Resource Plan Checklist and Self-Certification

The following should be completed and submitted to the State Water Resources Control Board Division of Financial Assistance in support of a storm water resource plan /functionally equivalent plan. The documents submitted, including this checklist, will be used to determine State Water Board concurrence with the Storm Water Resource Plan Guidelines and statutory water code requirements.

When combining multiple documents to form a functionally equivalent Storm Water Resource Plan, submit a cover letter explaining the approach used to arrive at the functionally equivalent document. The cover letter should explain how the documents work together to address the Storm Water Resource Plan Guidelines.

STORM WATER RESOURCE PLAN GENERAL CONTACT INFORMATION	
Contact Info: **Name** **Phone Number** **Email**	**Frederic Clark, P.E., L.S.** **(209) 525-4302** **clarkf@stancounty.com**
Date Submitted to State Water Resource Control Board:	**Pending**
Regional Water Quality Control Board:	**Central Valley Regional Water Quality Control Board**
Title of attached documents (expand list as needed):	**Administrative Draft, Stanislaus Multi- Agency Regional Storm Water Resource Plan**

STORM WATER RESOURCE PLAN INFORMATION	
Storm Water Resource Plan Title:	**Stanislaus Multi-Agency Regional Storm Water Resource Plan**
Date Plan Completed/Adopted:	**Pending**
Public Agency Preparer:	**Stanislaus County, Department of Public Works**
IRWM Submission:	**Pending**
Plan Description:	The Stanislaus Multi-Agency Regional Storm Water Resource Plan (SWRP) is an integrated document focusing on regional watershed-based stormwater and dry weather runoff management priorities in Stanislaus County. The primary purpose of the SWRP is to identify and assess multiple-benefit stormwater projects, prioritizing those projects that can best address the water resource management goals in the SWRP planning area of Stanislaus County.

Checklist Instructions:

For **each element** listed below, review the applicable section in the Storm Water Resource Plan Guidelines and enter ALL of the following information**.** Be sure to **p**rovide a clear and thorough justification if a recommended element (non shaded) is not addressed by the Storm Water Resource Plan.

A. Mark the box if the Storm Water Resource Plan meets the provision

B. In the provided space labeled **References**, enter:
   1. Title of document(s) that contain the information (or the number of the document listed in the General Information table above);
   2. The chapter/section, **and page number(s)** where the information is located within the document(s);
   3. The entity(ies) that prepared the document(s) if different from plan preparer;
   4. The date the document(s) was prepared, and subsequent updates; and
   5. Where each document can be accessed[1] (website address or attached).

STORM WATER RESOURCE PLAN CHECKLIST AND SELF-CERTIFICATION		
Mandatory Required Elements per California Water Code are Shaded and Text is **Bold**		
Y/N	**Plan Element**	**Water Code Section**
WATERSHED IDENTIFICATION (GUIDELINES SECTION VI.A)		
	1. Plan identifies watershed and subwatershed(s) for storm water resource planning.	**10565(c) 10562(b)(1) 10565(c)**
References: The SWRP identifies the planning area, as well as the watershed and subwatersheds in Section 2.1 (page 2-1 to 2-4); Figure 2-1 (page 2-3)		
	2. Plan is developed on a watershed basis, using boundaries as delineated by USGS, CalWater, USGS Hydrologic Unit designations, or an applicable integrated regional water management group, and includes a description and boundary map of each watershed and sub-watershed applicable to the Plan.	
References: Section 2 and 2.1 (page 2-1); Figure 2-1 (page 2-3)		

[1] All documents referenced must include a website address. If a document is not accessible to the public electronically, the document must be attached in the form of an electronic file (e.g. pdf or Word 2013) on a compact disk or other electronic transmittal tool.

WATERSHED IDENTIFICATION
(GUIDELINES SECTION VI.A)

	3. Plan includes an explanation of why the watershed(s) and sub-watershed(s) are appropriate for storm water management with a multiple-benefit watershed approach;

References:
The SWRP includes an explanation of why the planning area is appropriate for stormwater management with a multiple-benefit watershed approach in Section 2 (page 2-1)

	4. Plan describes the internal boundaries within the watershed (boundaries of municipalities; service areas of individual water, wastewater, and land use agencies, including those not involved in the Plan; groundwater basin boundaries, etc.; preferably provided in a geographic information system shape file);

References:
Section 2.2 (page 2-4); Figures 2-2 to 2-5 (pages 2-5 to 2-8); Figure 2-9 (page 2-17)

	5. Plan describes the water quality priorities within the watershed based on, at a minimum, applicable TMDLs and consideration of water body-pollutant combinations listed on the State's Clean Water Act Section 303(d) list of water quality limited segments (a.k.a impaired waters list);

References:
Section 2.7.1 (pages 2-22 to 2-28); Section 2.7.3 (pages 2-29 to 2-30); Section 2.7.4 (page 2-30); Section 7 (page 7-5)

	6. Plan describes the general quality and identification of surface and ground water resources within the watershed (preferably provided in a geographic information system shape file);

References:
Section 2.4.2 (pages 2-14 to 2-16); Figure 2-8 (page 2-16); Section 2.5 (pages 2-16 to 2-19); Figure 2-9 (page 2-17); Section 2.7 (pages 2-20 to 2-30); Section 2.7.1 (pages 2-22 to 2-28); Figure 2-10 (page 2-28)

	7. Plan describes the local entity or entities that provide potable water supplies and the estimated volume of potable water provided by the water suppliers;

References:
Section 2.6 (pages 2-19 to 2-20)

	8. Plan includes map(s) showing location of native habitats, creeks, lakes, rivers, parks, and other natural or open space within the sub-watershed boundaries; and

References:
Figure 2-6 (page 2-11); Figure 2-7 (page 2-12); Figure 2-8 (page 2-16); Section 2.3 (pages 2-8 to 2-12); Appendix C

	9. Plan identifies (quantitative, if possible) the natural watershed processes that occur within the sub-watershed and a description of how those natural watershed processes have been disrupted within the sub-watershed (e.g., high levels of imperviousness convert the watershed processes of infiltration and interflow to surface runoff increasing runoff volumes; development commonly covers natural surfaces and often introduces non-native vegetation, preventing the natural supply of sediment from reaching receiving waters).

References:
Section 2.3 (pages 2-8 to 2-12)

WATER QUALITY COMPLIANCE
(GUIDELINES SECTION V)

	10. Plan identifies activities that generate or contribute to the pollution of storm water or dry weather runoff, or that impair the effective beneficial use of storm water or dry weather runoff.	**10562(d)(7)**

References:
Section 3.1 (pages 3-1 to 3-2)

	11. Plan describes how it is consistent with and assists in, compliance with total maximum daily load implementation plans and applicable national pollutant discharge elimination system permits.	**10562(b)(5)**

References:
Section 3.2.2 (pages 3-3 to 3-6); Section 3.3 (pages 3-6 to 3-8)

	12. Plan identifies applicable permits and describes how it meets all applicable waste discharge permit requirements.	**10562(b)(6)**

References:
Section 3.2.1 (pages 3-2 to 3-3); Section 3.2.2 (pages 3-3 to 3-6); Section 3.2.3 (page 3-6); Section 3.2.4 (page 3-6)

ORGANIZATION, COORDINATION, COLLABORATION
(GUIDELINES SECTION VI.B)

	13. Local agencies and nongovernmental organizations were consulted in Plan development.	**10565(a)**

References:
Section 4.1.1 (page 4-1); Section 4.1.2 (pages 4-1 to 4-2); Section 4.1.3 (page 4-3)

	14. Community participation was provided for in Plan development.	**10562(b)(4)**

References:
Section 4.1.3 (page 4-3); Section 4.2 (page 4-5); Section 8.1 (pages 8-1 to 8-3); Section 8.2 (pages 8-3 to 8-5); Section 8.3 (page 8-5 to 8-7)

	15. Plan includes description of the existing integrated regional water management group(s) implementing an integrated regional water management plan.	

References:
Section 4.1.3 (page 4-3)

ORGANIZATION, COORDINATION, COLLABORATION
(GUIDELINES SECTION VI.B)

	16. Plan includes identification of and coordination with agencies and organizations (including, but not limited to public agencies, nonprofit organizations, and privately owned water utilities) that need to participate and implement their own authorities and mandates in order to address the storm water and dry weather runoff management objectives of the Plan for the targeted watershed.

References:
Section 4.1.4 (pages 4-4 to 4-5)

	17. Plan includes identification of nonprofit organizations working on storm water and dry weather resource planning or management in the watershed.

References:
Section 4.1.5 (page 4-5)

	18. Plan includes identification and discussion of public engagement efforts and community participation in Plan development.

References:
Section 4.2 (page 4-5); Section 8.1 (pages 8-1 to 8-3) Section 8.2.2 (pages 8-3 to 8-4)

	19. Plan includes identification of required decisions that must be made by local, state or federal regulatory agencies for Plan implementation and coordinated watershed-based or regional monitoring and visualization

References:
Section 4.1.4 (pages 4-3 to 4-4); Section 4.4 (pages 4-6 and 4-8)

	20. Plan describes planning and coordination of existing local governmental agencies, including where necessary new or altered governance structures to support collaboration among two or more lead local agencies responsible for plan implementation.

References:
Section 4.1.1 (page 4-1); Section 4.1.4 (pages 4-4 to 4-5); Section 4.4 (pages 4-6 and 4-8)

	21. Plan describes the relationship of the Plan to other existing planning documents, ordinances, and programs established by local agencies.

References:
Section 4.3 (pages 4-5 to 4-6)

	22. (If applicable)Plan explains why individual agency participation in various isolated efforts is appropriate.

References:
Section 4.4 (pages 4-7 to 4-8)

QUANTITATIVE METHODS
(GUIDELINES SECTION VI.C)

	23. **For all analyses:** Plan includes an integrated metrics-based analysis to demonstrate that the Plan's proposed storm water and dry weather capture projects and programs will satisfy the Plan's identified water management objectives and multiple benefits.

References:
Section 5.1 (pages 5-1 to 5-5); Table 5-1 (page 5-2); Table 5-2 (page 5-3); Table 5-3 (page 5-4); Section 5.4 (pages 5-7 to 5-23)

	24. **For water quality project analysis (section VI.C.2.a)** Plan includes an analysis of how each project and program complies with or is consistent with an applicable NPDES permit. The analysis should simulate the proposed watershed-based outcomes using modeling, calculations, pollutant mass balances, water volume balances, and/or other methods of analysis. Describes how each project or program will contribute to the preservation, restoration, or enhancement of watershed processes (as described in Guidelines section VI.C.2.a)

References:
Section 5.4.1 (pages 5-8 to 5-12); Table 5-4 (page 5-9); Figure 5-1 (page 5-10); Figure 5-2 (page 5-11); Table 5-5 (page 5-12)

	25. **For storm water capture and use project analysis (section VI.C.2.b):** Plan includes an analysis of how collectively the projects and programs in the watershed will capture and use the proposed amount of storm water and dry weather runoff.

References:
Section 5.4.2 (pages 5-12 to 5-16); Figure 5-3 (page 5-14); Table 5-6 (page 5-13); Figure 5-4 (page 5-15); Table 5-7 (page 5-16)

	26. **For water supply and flood management project analysis (section VI.C.2.c):** Plan includes an analysis of how each project and program will maximize and/or augment water supply.

References:
Section 5.4.2 (pages 5-12 to 5-16) ; Figure 5-3 (page 5-14); Table 5-6 (page 5-13); Figure 5-4 (page 5-15); Table 5-7 (page 5-16); Section 5.4.3 (page 5-16 to 5-18); Table 5-8 (page 5-16); Figure 5-5 (page 5-17); Table 5-9 (page 5-18)

	27. **For environmental and community benefit analysis (section VI.C.2.d):** Plan includes a narrative of how each project and program will benefit the environment and/or community, with some type of quantitative measurement.

References:
Section 5.4.4 (page 5-18 to 5-22); Table 5-10 (page 5-18); Figure 5-6 (page 5-29); Table 5-11 (page 5-20); Table 5-12 (page 5-20); Figure 5-7 (page 5-21); Table 5-13 (page 5-22); Table 5-14 (page 5-22); Figure 5-8 (page 5-23)

	28. **Data management (section VI.C.3):** Plan describes data collection and management, including: a) mechanisms by which data will be managed and stored; b) how data will be accessed by stakeholders and the public; c) how existing water quality and water quality monitoring will be assessed; d) frequency at which data will be updated; and e) how data gaps will be identified.

References:
Section 5.5 (pages 5-24 to 5-25)

IDENTIFICATION AND PRIORITIZATION OF PROJECTS
(GUIDELINES SECTION VI.D)

	29. Plan identifies opportunities to augment local water supply through groundwater recharge or storage for beneficial use of storm water and dry weather runoff.	**10562(d)(1)**

References:
Section 6.4 (pages 6-5 to 6-8); Section 5.4.2 (pages 5-12 to 5-16); Figure 5-3 (page 5-14); Table 6-4 (pages 6-7 to 6-9)

	30. Plan identifies opportunities for source control for both pollution and dry weather runoff volume, onsite and local infiltration, and use of storm water and dry weather runoff.	**10562(d)(2)**

References:
Section 6.4 (pages 6-5 to 6-9); Section 5.4.1 (pages 5-8 to 5-12); Figure 5-1 (page 5-10); Figure 5-2 (page 5-11); Table 6-4 (pages 6-7 to 6-9)

	31. Plan identifies projects that reestablish natural water drainage treatment and infiltration systems, or mimic natural system functions to the maximum extent feasible.	**10562(d)(3)**

References:
Section 6.4 (pages 6-5 to 6-9); Section 5.4.4 (page 5-18 to 5-22); Figure 5-6 (page 5-19); Table 6-4 (pages 6-7 to 6-9)

	32. Plan identifies opportunities to develop, restore, or enhance habitat and open space through storm water and dry weather runoff management, including wetlands, riverside habitats, parkways, and parks.	**10562(d)(4)**

References:
Section 6.4 (pages 6-5 to 6-9); Section 5.4.4 (page 5-18 to 5-22); Figure 5-6 (page 5-19); Table 6-4 (pages 6-7 to 6-9)

	33. Plan identifies opportunities to use existing publicly owned lands and easements, including, but not limited to, parks, public open space, community gardens, farm and agricultural preserves, school sites, and government office buildings and complexes, to capture, clean, store, and use storm water and dry weather runoff either onsite or offsite.	**10562(d)(5), 10562(b)(8)**

References:
Section 6.4 (pages 6-5 to 6-9); Table 6-4 (pages 6-7 to 6-9)

IDENTIFICATION AND PRIORITIZATION OF PROJECTS
(GUIDELINES SECTION VI.D)

	34. For new development and redevelopments (if applicable): Plan identifies design criteria and best management practices to prevent storm water and dry weather runoff pollution and increase effective storm water and dry weather runoff management for new and upgraded infrastructure and residential, commercial, industrial, and public development.	**10562(d)(6)**

References:
Section 6.5 (page 6-10)

	35. Plan uses appropriate quantitative methods for prioritization of projects. (This should be accomplished by using a metrics-based and integrated evaluation and analysis of multiple benefits to maximize water supply, water quality, flood management, environmental, and other community benefits within the watershed.)	**10562(b)(2)**

References:
Section 5.1 (pages 5-1 to 5-5); Section 5.4 (pages 5-7 to 5-23); Table 5-1 (page 5-2); Table 5-2 (page 5-3)

	36. *Overall:* Plan prioritizes projects and programs using a metric-driven approach and a geospatial analysis of multiple benefits to maximize water supply, water quality, flood management, environmental, and community benefits within the watershed.

References:
Section 5.1 (pages 5-1 to 5-3); Section 5.4 (pages 5-7 to 5-23); Section 6.3 (pages 6-3 to 6-5); Table 6-2 (page 6-4); Table 6-3 (page 6-4)

	37. *Multiple benefits:* Each project in accordance with the Plan contributes to at least two or more **Main Benefits** and the maximum number of **Additional Benefits** as listed in Table 4 of the Guidelines. (Benefits are not counted twice if they apply to more than one category.)

References:
Section 6.2 (page 6-2 to 6-3); Section 5.1 (pages 5-1 to 5-3); Appendix F

IMPLEMENTATION STRATEGY AND SCHEDULE
(GUIDELINES SECTION VI.E)

	38. Plan identifies resources for Plan implementation, including: 1) projection of additional funding needs and sources for administration and implementation needs; and 2) schedule for arranging and securing Plan implementation financing.	

References:
Section 7.1.7 (pages 7-4 to 7-6); Section 7.2 (pages 7-6 to 7-9)

	39. Plan projects and programs are identified to ensure the effective implementation of the storm water resource plan pursuant to this part and achieve multiple benefits.	**10562(d)(8)**

References: Section 7.1.1 (page 7-1 to 7-2); Section 7.1.4 (Page 7-3)

	40. The Plan identifies the development of appropriate decision support tools and the data necessary to use the decision support tools.	**10562(d)(8)**

References:
Section 7.1.4 (page 7-3)

	41. Plan describes implementation strategy, including: a) Timeline for submitting Plan into existing plans, as applicable; b) Specific actions by which Plan will be implemented; c) All entities responsible for project implementation; d) Description of community participation strategy; e) Procedures to track status of each project; f) Timelines for all active or planned projects; g) Procedures for ongoing review, updates, and adaptive management of the Plan; and h) A strategy and timeline for obtaining necessary federal, state, and local permits.	

References:
Section 7.3 (pages 7-9 to 7-10); Section 7.1.1 (pages 7-1 to 7-2); Section 7.1.2 (page 7-2); Section 7.1.3 (pages 7-2 to 7-3); Section 7.1.5 (pages 7-3 to 7-4); Appendix F; Section 7.4 (pages 7-10 to 7-12)

	42. Applicable IRWM plan: **The Plan will be submitted, upon development, to the applicable integrated regional water management (IRWM) group for incorporation into the IRWM plan.**	**10562(b)(7)**

References:
Section 7.3 (pages 7-9 to 7-10)

IMPLEMENTATION STRATEGY AND SCHEDULE
(GUIDELINES SECTION VI.E)

	43. Plan describes how implementation performance measures will be tracked.

References:
Section 7.4 (pages 7-10 to 7-12)

EDUCATION, OUTREACH, PUBLIC PARTICIPATION
(GUIDELINES SECTION VI.F)

44. Outreach and Scoping: 10562(b)(4)
Community participation is provided for in Plan implementation.

References:
Section 4.1.3 (page 4-3); Section 4.2 (page 4-5); Section 8.1 (pages 8-1 to 8-3); Section 8.2 (pages 8-3 to 8-5); Section 8.3 (page 8-5 to 8-7)

	45. Plan describes public education and public participation opportunities to engage the public when considering major technical and policy issues related to the development and implementation.

References:
Section 8.1.1 (pages 8-2 to 8-3); Section 8.2.4 (pages 8-4 to 8-5)

	46. Plan describes mechanisms, processes, and milestones that have been or will be used to facilitate public participation and communication during development and implementation of the Plan.

References:
Section 8.2.2 (pages 8-3 to 8-4); Section 8.2.3 (page 8-4)

	47. Plan describes mechanisms to engage communities in project design and implementation.

References:
Section 8.2.4 (pages 8-4 to 8-5)

	48. Plan identifies specific audiences including local ratepayers, developers, locally regulated commercial and industrial stakeholders, nonprofit organizations, and the general public.

References:
Section 8.2.1 (page 8-3)

EDUCATION, OUTREACH, PUBLIC PARTICIPATION (GUIDELINES SECTION VI.F)	
	49. Plan describes strategies to engage disadvantaged and climate vulnerable communities within the Plan boundaries and ongoing tracking of their involvement in the planning process.
References: Section 8.3 (pages 8-5 to 8-7)	
	50. Plan describes efforts to identify and address environmental injustice needs and issues within the watershed.
References: Section 8.3 (pages 8-5 to 8-7)	
	51. Plan includes a schedule for initial public engagement and education.
References: Section 8.1.1 (pages 8-2 to 8-3)	

DECLARATION AND SIGNATURE

I declare under penalty of perjury that all information provided is true and correct to the best of my knowledge and belief.

Authorized Signature	Title	Date
Authorized Signature	Title	Date

Public Agency

Appendix B - Annotated List of Data and Reports

Table 1. Documents Collected

Title	Year Publi-shed	Relevance to SWRP
East Stanislaus Integrated Regional Water Management Plan	2013	Water quality Compliance, Organization, Coordination, Collaboration, Identification and Prioritization of Projects, Education, Outreach, Public Participation
Westside San Joaquin Integrated Regional Water Management Plan	2014	Water quality Compliance, Organization, Coordination, Collaboration, Identification and Prioritization of Projects, Education, Outreach, Public Participation
Mid San Joaquin Regional Flood Management Program	2014	Watershed Identification, Identification and Prioritization of Projects
Stanislaus County Post-Construction Standards Plan	2015	Watershed Identification
Oakdale Stormwater Master Plan*	2015	Watershed Identification, Quantitative Methods, Identification and Prioritization of Projects
Turlock Groundwater Basin Groundwater Management Plan	2008	Watershed Identification, Quantitative Methods
Eastside Water District – Geologic, Hydrologic, and Hydrogeologic Characterizations for Potential Managed Aquifer Recharge of Diffused Stormwater*	2014	Watershed Identification, Identification and Prioritization of Projects, Water Quality Compliance
2011 Revised Guidance Manual for Development Stormwater Quality Control Measures (City of Modesto Stormwater Management Program)	2011	Identification and Prioritization of Projects, Water Quality Compliance
Empire Community Storm Drainage Report Low Impact Development & Greening Study*	2014	Watershed Identification, Project Prioritization
Central California ID Water Management Plan	2014	Watershed Identification, Coordination, Collaboration, Quantitative Methods
Modesto ID AWMP	2015	Watershed Identification, Coordination, Collaboration, Quantitative Methods
Oakdale ID AWMP	2016	Watershed Identification, Coordination, Collaboration, Quantitative Methods
Patterson ID Water Management Plan/AWMP	2016	Watershed Identification, Coordination, Collaboration, Quantitative Methods
Turlock ID AWMP	2015	Watershed Identification, Coordination, Collaboration, Quantitative Methods
West Stanislaus ID Water Management Plan	2014	Watershed Identification, Coordination, Collaboration, Quantitative Methods

Title	Year Publi-shed	Relevance to SWRP
State and Federally Listed Endangered & Threatened Animals of California	2017	Watershed Identification
Merced River Alliance Project Biological Monitoring and Assessment	2008	Watershed Identification
Hughson Climate Action Plan	2013	Identification and Prioritization of Projects
California Adaptation Planning Guide: Planning for Adaptive Communities	2012	Identification and Prioritization of Projects
AB 32 Scoping Plan, First Update	2014	Identification and Prioritization of Projects
California Climate Science and Data for Water Resources Management	2015	Identification and Prioritization of Projects
Climate Ready Water Utilities Adaptation Strategies Guide for Water Utilities	2015	Identification and Prioritization of Projects
California Department of Finance population projections	2017	Watershed Identification
Safeguarding California: Reducing Climate Risk	2014	Identification and Prioritization of Projects
Stanislaus County Agricultural Report	2015	Watershed Identification
2016 Workplan: National Water Program Response to Climate Change	2016	Identification and Prioritization of Projects
National Water Program 2012 Strategy: Response to Climate Change	2012	Identification and Prioritization of Projects
Indicators of Climate Change in California	2013	Identification and Prioritization of Projects
Progress on Incorporating Climate Change into Management of California's Water Resources	2006	Identification and Prioritization of Projects
Stanislaus County Disadvantaged Unincorporated Communities Report	2015	Education, Outreach, Public Participation
Flood Insurance Study: San Joaquin County, California and Incorporated Areas (Vol 1 of 4)	2009	Watershed Identification, Quantitative Methods, Identification and Prioritization of Projects
Flood Insurance Study: Stanislaus County, California and Incorporated Areas	2008	Watershed Identification, Quantitative Methods, Identification and Prioritization of Projects
Stanislaus County General Plan	2016	Identification and Prioritization of Projects
Stanislaus County General Plan Update EIR	2016	Watershed Identification, Water Quality Compliance
City of Turlock General Plan	2012	Identification and Prioritization of Projects

Title	Year Publi-shed	Relevance to SWRP
City of Hughson General Plan	2005	Identification and Prioritization of Projects
City of Modesto General Plan	2008	Identification and Prioritization of Projects
Integrated Regional Groundwater Management Plan for the Modesto Subbasin	2005	Watershed Identification, Water Quality Compliance, Organization, Coordination, Collaboration, Identification and Prioritization of Projects, Education, Outreach, and Public Participation
Groundwater Bulletin 118, San Joaquin Valley Groundwater Basin, Turlock Subbasin	2006	Watershed Identification, Water Quality Compliance, Quantitative Methods
Turlock Groundwater Basin Groundwater Management Plan	2008	Watershed Identification, Water Quality Compliance, Quantitative Methods
Hydrogeological Characterization of the Eastern Turlock Subbasin	2016	Watershed Identification, Water Quality Compliance, Quantitative Methods
Hughson Wastewater Treatment Plant EIR	2007	Water Quality Compliance, Watershed Identification
City of Hughson Storm Drainage System Master Plan	2007	Watershed Identification, Water Quality Compliance, Identification and Prioritization of Projects, Quantitative Methods
City of Hughson Water System Master Plan	2007	Watershed Identification, Water Quality Compliance, Identification and Prioritization of Projects, Quantitative Methods
City of Hughson Sewer System Master Plan	2007	Watershed Identification, Water Quality Compliance, Identification and Prioritization of Projects, Quantitative Methods
City of Hughson Wastewater Treatment Plant Master Plan	2007	Watershed Identification, Water Quality Compliance, Identification and Prioritization of Projects, Quantitative Methods
City of Hughson Storm Water Management Program Report of Waste Discharge	2004	Watershed Identification, Water Quality Compliance
City of Modesto Water System Engineer's Report	2010	Watershed Identification, Quantitative Methods
City of Modesto Water System Engineer's Report PEIR	2009	Watershed Identification, Water Quality Compliance
City of Modesto Comprehensive Annual Financial Report	2011	Coordination
City of Modesto Wastewater Collection System Master Plan	2007	Watershed Identification, Water Quality Compliance, Identification and Prioritization of Projects, Quantitative Methods
City of Modesto 2008 Storm Drainage Master Plan	2008	Watershed Identification, Water Quality Compliance, Identification and Prioritization of Projects, Quantitative Methods
City of Modesto Wastewater Treatment Master Plan Supplement	2008	Watershed Identification, Water Quality Compliance, Identification and Prioritization of Projects, Quantitative Methods

Title	Year Publi-shed	Relevance to SWRP
City of Modesto Stormwater Management Plan	2009	Watershed Identification
City of Modesto Wastewater Master Plan Update Draft EIR	2006	Watershed Identification, Water Quality Compliance
Municipal Service Reviews (all Stanislaus County)	2012	Watershed Identification
Bureau of Indian Affairs Tribal Leaders Directory	2012	Education, Outreach, and Public Participation
Bureau of Indian Affairs Tribes Served – Pacific Region	2013	Education, Outreach, and Public Participation
North Valley Regional Recycled Water Draft EIR	2015	Watershed Identification, Identification and Prioritization of Projects, Water Quality Compliance
North Valley Regional Recycled Water Feasibility Study	2013	Watershed Identification, Identification and Prioritization of Projects, Water Quality Compliance
Water Quality Control Plan for the Sacramento River and San Joaquin River Basins (4th Edition)	1998	Water Quality Compliance
San Joaquin River Management Plan	1995	Watershed Identification
City of Ceres 2015 Urban Water Management Plan	2016	Watershed Identification, Organization, Coordination, Collaboration, Quantitative Methods
City of Modesto 2015 Urban Water Management Plan	2016	Watershed Identification, Organization, Coordination, Collaboration, Quantitative Methods
City of Patterson 2015 Urban Water Management Plan	2016	Watershed Identification, Organization, Coordination, Collaboration, Quantitative Methods
City of Riverbank 2015 Urban Water Management Plan	2016	Watershed Identification, Organization, Coordination, Collaboration, Quantitative Methods
City of Turlock 2015 Urban Water Management Plan	2016	Watershed Identification, Organization, Coordination, Collaboration, Quantitative Methods
City of Ceres Water Master Plan	2011	Watershed Identification, Organization, Coordination, Collaboration, Quantitative Methods, Identification and Prioritization of Projects
City of Oakdale Water Master Plan	2015	Watershed Identification, Organization, Coordination, Collaboration, Quantitative Methods, Identification and Prioritization of Projects
City of Waterford Water Master Plan	2016	Watershed Identification, Organization, Coordination, Collaboration, Quantitative Methods, Identification and Prioritization of Projects
Groundwater Quality Data in the Western San Joaquin Valley Study Unit, 2010	2010	Water Quality Compliance, Quantitative Methods

Title	Year Publi-shed	Relevance to SWRP
Storm Water Management Program for Stanislaus County	2004	Watershed Identification, Water Quality Compliance
2012 California Integrated Report Clean Water Act Sections 303(d) and 305(b)	2014	Water Quality Compliance, Quantitative Methods
City of Oakdale Storm Drain Master Plan	2015	Watershed Identification, Organization, Coordination, Collaboration, Quantitative Methods, Identification and Prioritization of Projects
Central Valley RWQCB MS4 General Permit	2016	Water Quality Compliance
Lower Stanislaus LID Alternative Compliance Plan, City of Riverbank	2015	Watershed Identification, Water Quality Compliance
San Joaquin River Hydrologic Region Regional Report	2013	Watershed Identification, Water Quality Compliance
Middle San Joaquin Watershed Preliminary Watershed Management Plan	2006	Watershed Identification, Identification and Prioritization of Projects
Central Valley RWQCB, San Joaquin River Dissolved Oxygen Control Program Fact Sheet	2014	Water Quality Compliance, Identification and Prioritization of Projects
Central Valley RWQCB, Sacramento-San Joaquin Delta Methylmercury TMDL Fact Sheet	2014	Water Quality Compliance, Identification and Prioritization of Projects
Central Valley RWQCB, Diazinon and Chlorpyrifos in the Sacramento-San Joaquin Delta TMDL Fact Sheet	2015	Water Quality Compliance, Identification and Prioritization of Projects
Central Valley RWQCB, Salt and Boron TMDL for the Lower San Joaquin River Fact Sheet	2015	Water Quality Compliance, Identification and Prioritization of Projects
Central Valley RWQCB, Methylmercury and Mercury in the Sacramento-San Joaquin Delta TMDL Fact Sheet	2014	Water Quality Compliance, Identification and Prioritization of Projects
Central Valley RWQCB, San Joaquin River Organophosphorous (OP) Pesticide TMDL Fact Sheet	2013	Water Quality Compliance, Identification and Prioritization of Projects
Central Valley RWQCB, San Joaquin River Selenium TMDL Fact Sheet	2009	Water Quality Compliance, Identification and Prioritization of Projects
Soil Survey of Stanislaus County, California, Northern Part	2007	Watershed Identification, Identification and Prioritization of Projects
Modesto LGA Project Groundwater Characterization and Recharge Study	2016	Watershed Identification, Identification and Prioritization of Projects
Recharge Characterization for Stanislaus and Tuolumne Rivers Groundwater Basin Association	2007	Watershed Identification, Identification and Prioritization of Projects
Delta Regional Monitoring Program Monitoring Design Summary	2015	Water Quality Compliance

Title	Year Publi-shed	Relevance to SWRP
SWRCB WQO No. 2013-0001-DWQ NPDES General Permit No. CAS000004 (Phase II Small MS4 General Permit)	2013	Water Quality Compliance
County Outfall maps (PDF format)	2017	Water Quality Compliance, Watershed Identification
Cannery Segregation Line (CSL) Cross-Connection Investigation	2004	Water Quality Compliance, Watershed Identification
Ground-Water Conditions and Storage Capacity in the San Joaquin Valley California	1959	Watershed Identification
Late Cenozoic Stratigraphic Units Northeastern San Joaquin Valley, California	1977	Watershed Identification
Pesticides in Storm Runoff from Agricultural and Urban Areas in the Tuolumne River Basin in the Vicinity of Modesto, California	1998	Watershed Identification, Water Quality Compliance, Organization, Coordination, Collaboration, Quantitative Methods, Identification and Prioritization of Projects
Tuolumne River, California, Expedited Reconnaissance Study, Section 905(b) (WRDA 86) Analysis	1998	Watershed Identification
Organic Carbon Trends, Loads, and Yields to the Sacramento San-Joaquin Delta, California, Water Years 1980 to 2000, Second Edition	2003	Watershed Identification, Water Quality Compliance
Diazinon and Chlorpyrifos Loads in Precipitation and Urban and Agricultural Storm Runoff during January and February 2001 in the San Joaquin River Basin, California	2003	Watershed Identification, Water Quality Compliance
Assessing the Susceptibility to Contamination of Two Aquifer Systems Used for Public Water Supply in the Modesto and Fresno Metropolitan Areas, California, 2001 and 2002	2004	Watershed Identification, Water Quality Compliance, Identification and Prioritization of Projects
Hydrogeologic Characterization of the Modesto Area, San Joaquin Valley, California	2004	Watershed Identification
Redevelopment Agency Project Storm Drain Capacity Study, Preliminary Draft	2005	Watershed Identification, Identification and Prioritization of Projects
Water Stress and a Changing San Joaquin Valley	2007	Watershed Identification, Identification and Prioritization of Projects
Simulation of Multiscale Ground-Water Flow in Part of the Northeastern San Joaquin Valley, California	2007	Watershed Identification
Simulations of Ground-Water Flow and Particle Pathline Analysis in the Zone of Contribution of a Public-Supply Well in Modesto, Eastern San Joaquin Valley, California	2008	Watershed Identification, Water Quality Compliance, Identification and Prioritization of Projects

Title	Year Publi-shed	Relevance to SWRP
Hydrogeology, Water Chemistry, and Factors Affecting the Transport of Contaminants in the Zone of Contribution of a Public-Supply Well in Modesto, Eastern San Joaquin Valley, California	2008	Watershed Identification, Water Quality Compliance, Identification and Prioritization of Projects
Simulated response of water quality in public supply wells to land use change	2008	Watershed Identification, Water Quality Compliance, Identification and Prioritization of Projects
Source and transport controls on the movement of nitrate to public supply wells in selected principal aquifers of the United States	2008	Watershed Identification, Water Quality Compliance, Identification and Prioritization of Projects
Assessing the Vulnerability of Public-Supply Wells to contamination: Central Valley Aquifer System near Modesto, California	2009	Water Quality Compliance, Identification and Prioritization of Projects
Effects of Groundwater Development on Uranium: Central Valley, California, USA	2009	Water Quality Compliance, Identification and Prioritization of Projects
Effects of human-induced alteration of groundwater flow on concentrations of naturally-occurring trace elements at water-supply wells	2011	Water Quality Compliance, Identification and Prioritization of Projects
Groundwater Quality in the Central Eastside San Joaquin Valley, California	2011	Water Quality Compliance, Identification and Prioritization of Projects
Methods, Quality Assurance, and Data for Assessing Atmospheric Deposition of Pesticides in the Central Valley of California	2013	Quantitative Methods
Effects of Seasonal Operation on the Quality of Water Produced by Public-Supply Wells	2014	Water Quality Compliance, Identification and Prioritization of Projects
Simulation of the Effects of Seasonally Varying Pumping on Intraborehole Flow and the Vulnerability of Public-Supply Wells to Contamination	2014	Water Quality Compliance, Identification and Prioritization of Projects
City of Modesto Municipal Stormwater Program Annual Progress Report, 2014-2015	2015	Watershed Identification, Water Quality Compliance, Identification and Prioritization of Projects
Hydrologic Model of the Modesto Region, California, 1960–2004	2015	Watershed Identification
City of Modesto Municipal Stormwater Program Annual Progress Report, 2015-2016	2016	Watershed Identification, Water Quality Compliance, Identification and Prioritization of Projects
Groundwater Characterization and Recharge Study	2016	Watershed Identification, Water Quality Compliance, Identification and Prioritization of Projects
City of Modesto Area 2 Storm Drain to Sanitary Sewer Cross Connections Removal Final Preliminary Design Report	2010	Watershed Identification, Water Quality Compliance, Identification and Prioritization of Projects
Antidegradation Analysis for Proposed Wastewater Quality Control Facility Discharge Modification	2007	Watershed Identification, Water Quality Compliance, Identification and Prioritization of Projects

Title	Year Publi-shed	Relevance to SWRP
City of Modesto Rockwell Assessment: Summary Report	2012	Water Quality Compliance, Identification and Prioritization of Projects
City of Modesto Northeast Area Updated Offsite Watershed Storm Drainage Evaluation	2005	Water Quality Compliance, Identification and Prioritization of Projects
City of Modesto Storm Drain Cross Connection Report	2007	Water Quality Compliance, Identification and Prioritization of Projects

* Report is considered cost share for the SWRP.

Table 2. Geographic Information Data

Data	Type	Relevance to SWRP	Source
City Boundaries	GIS file	Watershed Identification	State of California
CA Watersheds	GIS file	Watershed Identification	California Interagency Watershed Map (Calwater 2.2.1)
CA Groundwater Basins 2017	GIS file	Watershed Identification	Department of Water Resources
Hydrography information	GIS file	Watershed Identification	USGS National Hydrography Dataset
DAC locations	GIS file	Education, Outreach, and Public Participation	Department of Water Resources
USGS Surface Water Gauge Locations Stations	GIS file	Watershed Identification	USGS
Land Use	GIS file	Watershed Identification	Department of Water Resources
CA Surface Water	GIS file	Watershed Identification	USGS
CA Rivers and Streams	GIS file	Watershed Identification	USGS
CA Lakes	GIS file	Watershed Identification	USGS
CA Canals	GIS file	Watershed Identification	USGS
Soil information	GIS file	Watershed Identification	NRCS, USDA
Local infrastructure and other data	GIS file	Watershed Identification	City of Modesto
Local infrastructure and other data	GIS file	Watershed Identification	City of Turlock
Service Area Boundaries	GIS file	Watershed Identification	City of Modesto, Stanislaus County
Parcels	GIS file	Watershed Identification	Stanislaus County

Data	Type	Relevance to SWRP	Source
Open Space, Parks, and Reserves	GIS file	Watershed Identification	California Protected Areas Database
Resource Conservation Districts	GIS file	Watershed Identification	California Association of Resource Conservation Districts
Critical Habitat	GIS file	Watershed Identification	USFWS
Wetlands	GIS file	Watershed Identification	City of Modesto
Service areas of individual water agencies, including those not involved in the Plan	GIS file	Watershed Identification	Water Atlas Stanislaus County, Urban Water Management Plans, Agricultural Water Management Plans
County priority outfalls	Maps	Watershed Identification, Project Prioritization	Stanislaus County
Service areas of individual wastewater agencies, including those not involved in the Plan	Maps	Watershed Identification	Stanislaus County LAFCO Municipal Service Reviews

Table 3. Data Needs

Info Needed or Report Title	Type of Data	Relevance to SWRP	Source (Anticipated)
Groundwater monitoring wells locations and reports, if available	Shapefile if available (PDF maps and reports have been collected).	Watershed Identification, Project Prioritization	Individual agencies
Service areas of individual water agencies, including those not involved in the Plan.	Shapefile if available (PDF maps have been collected).	Watershed Identification	Individual agencies
Service areas of individual wastewater agencies, including those not involved in the Plan.	Shapefile if available (PDF maps have been collected).	Watershed Identification	County
Major existing storm water outfalls.	Shapefile preferred (PDF maps and reports have been collected).	Watershed Identification	Applicable agencies
Major existing structural controls of storm and non-storm water (including storm water pump stations, low-flow diversions, urban runoff treatment facilities, low impact developments, detention basins used for storm water treatment, and other catch basin inserts/screens) that discharge to receiving waters.	Shapefile if available (PDF maps and reports have been collected).	Watershed Identification	Applicable agencies
Opportunity sites and/or drainage areas, and the corresponding volume of storm water and dry weather runoff that can be captured at the sites or within the drainage areas.	Shapefile if available (some PDF maps and reports have been collected).	Watershed Identification	Applicable agencies

Appendix C - Supplemental Maps

September 2018

City of Modesto Storm Drainage System and Open Space

- Outfalls to Rivers
- Outfalls to Canals
- Outfall
- Parks - Potential Injection Sites
- Dry Creek
- Tuolumne River
- Rockwell
- Storm Drain Pipe
- Cross Connection Watershed
- Basins
- Schools
- Hetch Hetchy
- Canals
- Parks
- Golf Course
- Positive Drainage Areas
- Stanislaus_County_Islands
- City of Modesto Boundary

DRY CREEK

TUOLUMNE RIVER

County Islands: Areas Lacking Storm Drainage Systems

Legend

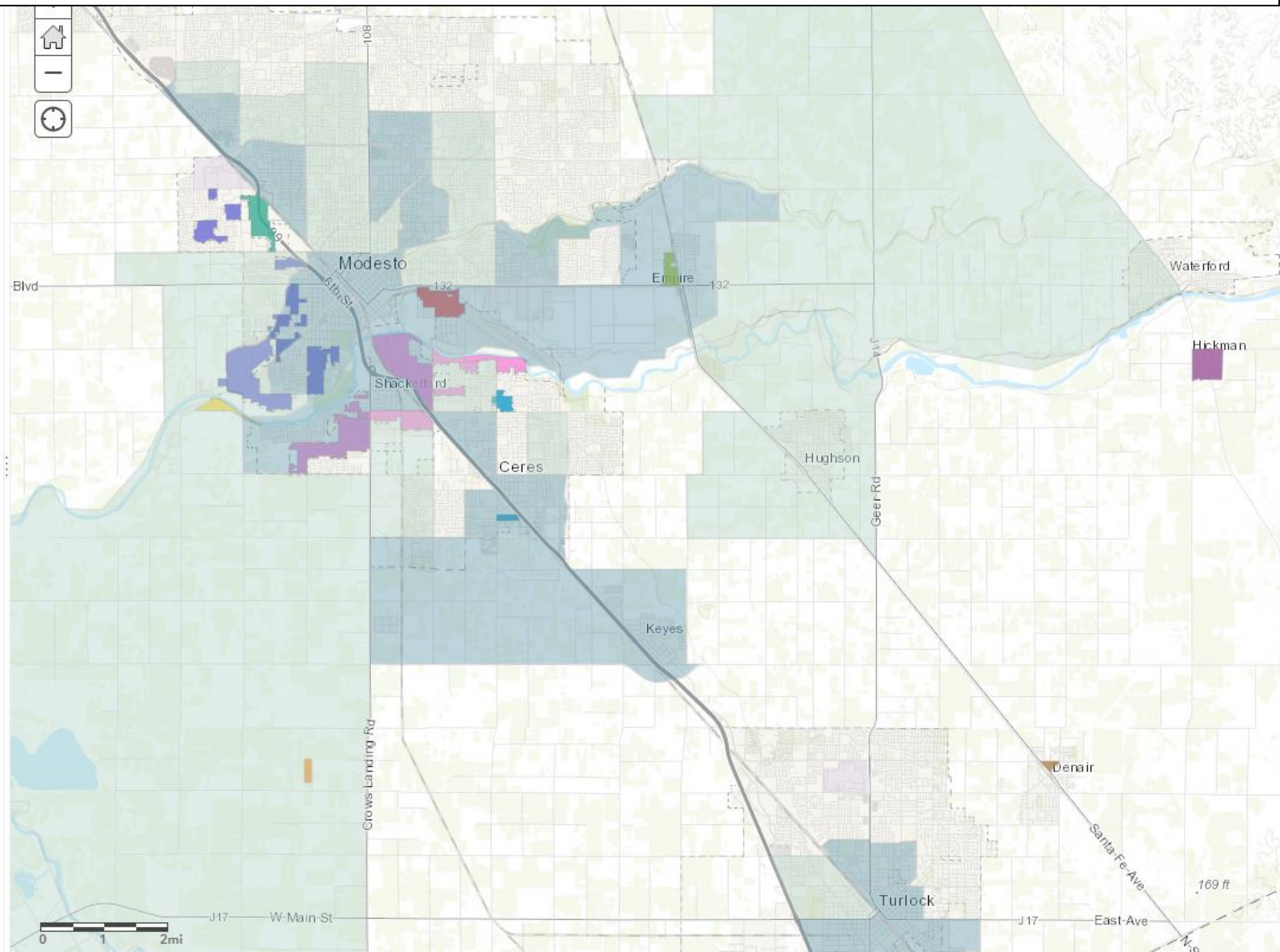
DACs by Tract

MHI14_Long

- Disadvantaged Community
- Severely Disadvantaged Community
- No Data Available

DUCs

- AIRPORT
- CERES
- EMPIRE
- HICKMAN
- MONTEREY TRACT
- RIVERDALE
- S MOD / N CERES
- TURLOCK
- W MOD industr
- WEST MODESTO



Parks
City of Modesto

N

Legend

- Parks

City Boundaries

- Ceres
- Hughson
- Modesto
- Turlock
- Waterford

0 0.25 0.5 1 Miles

WOODARD &CURRAN

© 2018 Microsoft Corporation © 2018 HERE

Parks
City of Turlock

N

Legend

- Parks

City Boundaries

- Ceres
- Hughson
- Modesto
- Turlock
- Waterford

North Turlock Sports Complex
Brad Bates ParkKurt Andre Park
Ferreira Ranch
Cimarron Park
Rose Circle Park
Christoffersen Park
Four Seasons Park
Rotary International Park
Pedretti Park
Centennial Park
Markley Park
Sterling Ranch Park
Bristol Park
Donnelly Park
Summerfaire Park
Crane Park
Denair Park
Dianne Park
Broadway Park
Turlock Memorial Park Cemetery
Soderquist Park
Gar Park
Turlock Central Park
Columbia Park
Bothun Park
Sunnyview Park

0 0.175 0.35 0.7 Miles

© 2018 Microsoft Corporation © 2018 HERE

WOODARD &CURRAN

Parks
City of Ceres

N

Legend

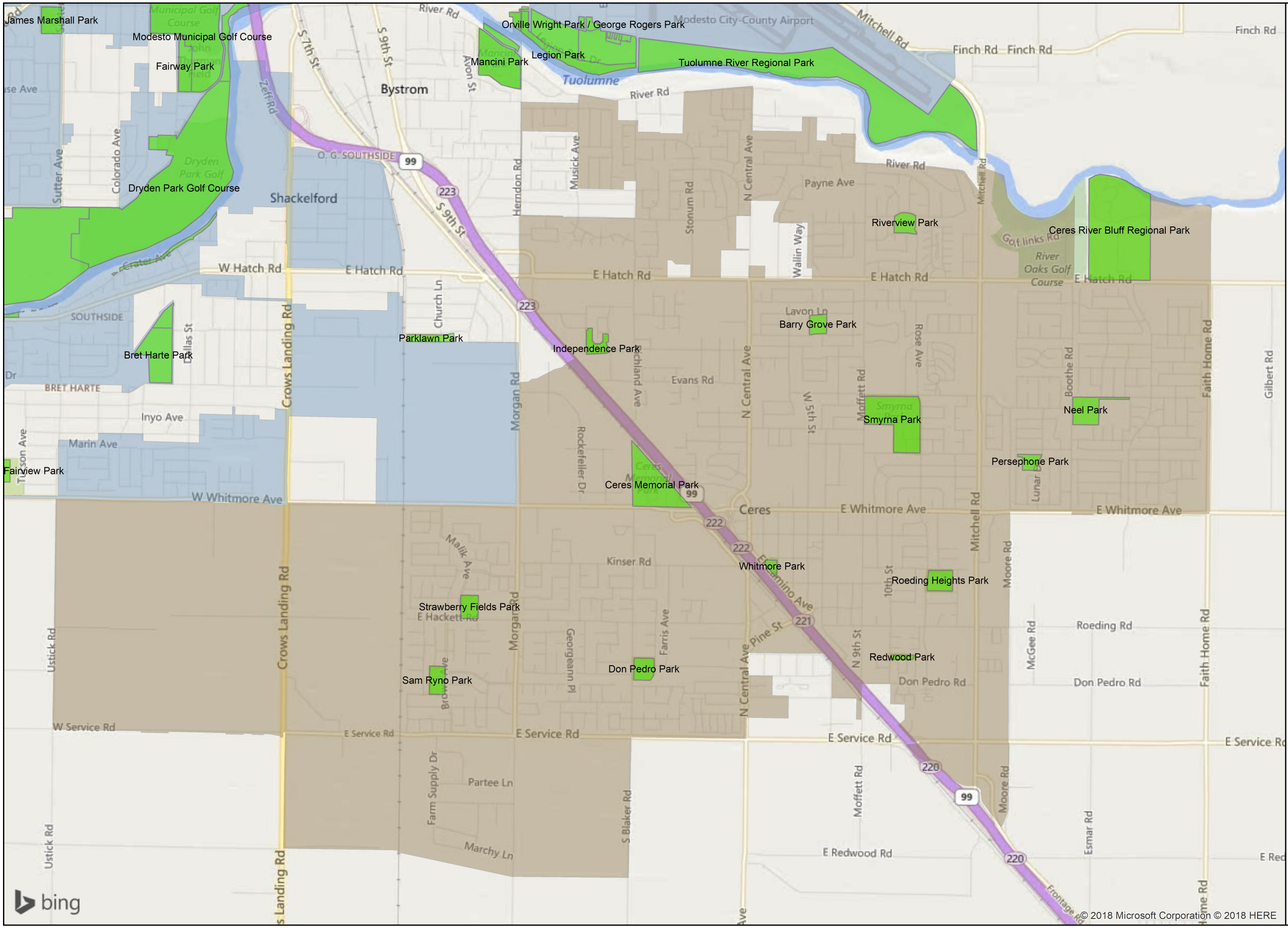
- Parks

City Boundaries

- Ceres
- Hughson
- Modesto
- Turlock
- Waterford

0 0.125 0.25 0.5 Miles

WOODARD &CURRAN



Appendix D - Stormwater Quality Monitoring Report

Appendix D

FINAL 2018-19 MONITORING REPORT

for the

Stanislaus Multi-Agency Regional Storm Water Resource Plan

Grant Agreement No. D1612618

Prepared for:

State Water Resources Control Board

Submitted by:

Stanislaus County

April 2019

Prepared by:

WOODARD &CURRAN

Table of Contents

1 Introduction 1
2 Background 1
3 Overview 2
4 Stormwater Quality Monitoring 3
4.1 Stormwater Monitoring Constituents 3
4.2 Sampling Locations 4
4.3 Stormwater Sampling Methodology 9
4.3.1 Stormwater Sampling Event 9
4.3.2 Field Observations 10
4.3.3 Field Monitoring 10
4.3.4 Sample Collection 10
4.4 Sampling Team 10
4.5 Data Management and Reporting 11
5 Results 11
5.1 Monitored Events 11
5.2 Outfall and Creek Monitoring 11
5.2.1 Hydrology 11
5.2.2 Analytical Results per Storm Event 12
6 Site Analytical Results 18
6.1 BT-001 (Beard Tract – Mariposa at Ag Field) 18
6.2 BT-002 (Beard Tract – McClure at Gilton Facility) 19
6.3 BT-003 (Bear Tract – Codoni at Railroad) 20
6.4 STR-008 (Salida Community) 21
6.5 TUO-001C (Santa Fe Ave. Bridge) 22
6.6 TUO-003 (9th Street Bridge Region) 23
6.7 LSC-001 (Little Salado Creek at Crows Landing) 24
7 Data Quality 25
7.1 Precision 25
7.2 Accuracy 25
7.3 Representativeness 25

7.4 Completeness 27
8 Conclusions and Recommendations 27
8.1 Conclusions 27
8.2 Recommendations 28
9 References 28

List of Tables

Table 4-1. Stormwater Monitoring Constituent List 3
Table 4-2. Stormwater Outfall and Creek Monitoring Locations 4
Table 5-1. Stormwater Outfall and Creek Monitoring Locations 11
Table 5-2. Hydrology Summary 11
Table 5-3. Analytical Results for 11/29/2018 Storm Event 14
Table 5-4. Analytical Results for 12/16/2018 – 12/17/2018 Storm Event 16
Table 6-1: Analytical Results for BT-001 18
Table 6-2: Analytical Results for BT-002 19
Table 6-3: Analytical Results for BT-003 20
Table 6-4: Analytical Results for STR-008 21
Table 6-5: Analytical Results for TUO-001C 22
Table 6-6: Analytical Results for TUO-003 23
Table 6-7: Analytical Results for LSC-001 24
Table 7-1: Representativeness for Field Duplicates at STR-008 26

List of Figures

Figure 2-1. Stanislaus Multi-Agency SWRP Planning Area Watersheds and Waterbodies 2
Figure 4-1. Monitoring Locations Overview 5
Figure 4-2. Monitoring Locations - North 6
Figure 4-3. Monitoring Locations - Central 7
Figure 4-4. Monitoring Locations - South 8
Figure 4-5. Land Use and Monitoring Locations 9
Figure 5-1. Hourly Precipitation for First Storm Event (11/29/2018) 12
Figure 5-2. Hourly Precipitation for Second Storm Event (12/16/2018 - 12/17/2018) 12

1 Introduction

The Stanislaus Multi-Agency Regional Storm Water Resource Plan (SWRP) is being developed to identify and prioritize multi-benefit stormwater resource projects to improve regional water supply resilience and aid in the adaptation of infrastructure to climate change. A focus of the SWRP are projects that augment groundwater recharge to address groundwater overdraft, while also enhancing flood protection, water quality, habitat, and community values. Objective criteria for project evaluation was developed based on a county-wide assessment of stormwater resources, topography, soil conditions, habitat and community needs to quantify project opportunities and benefits.

Stormwater quality data was collected at key outfalls and one creek to assess potential contaminant loading from stormwater to the County's surface receiving waters and groundwater basins. A Monitoring Plan was developed to guide selection of monitoring sites, constituents to be monitored, sampling methodology, and more. The results of the monitoring for Winter 2018-2019 are described in this Monitoring Report.

These results add to existing water quality data from regional, county, and municipal monitoring programs to help establish baseline water quality conditions to support watershed characterization, as well as project assessments and prioritization as part of the development of the SWRP.

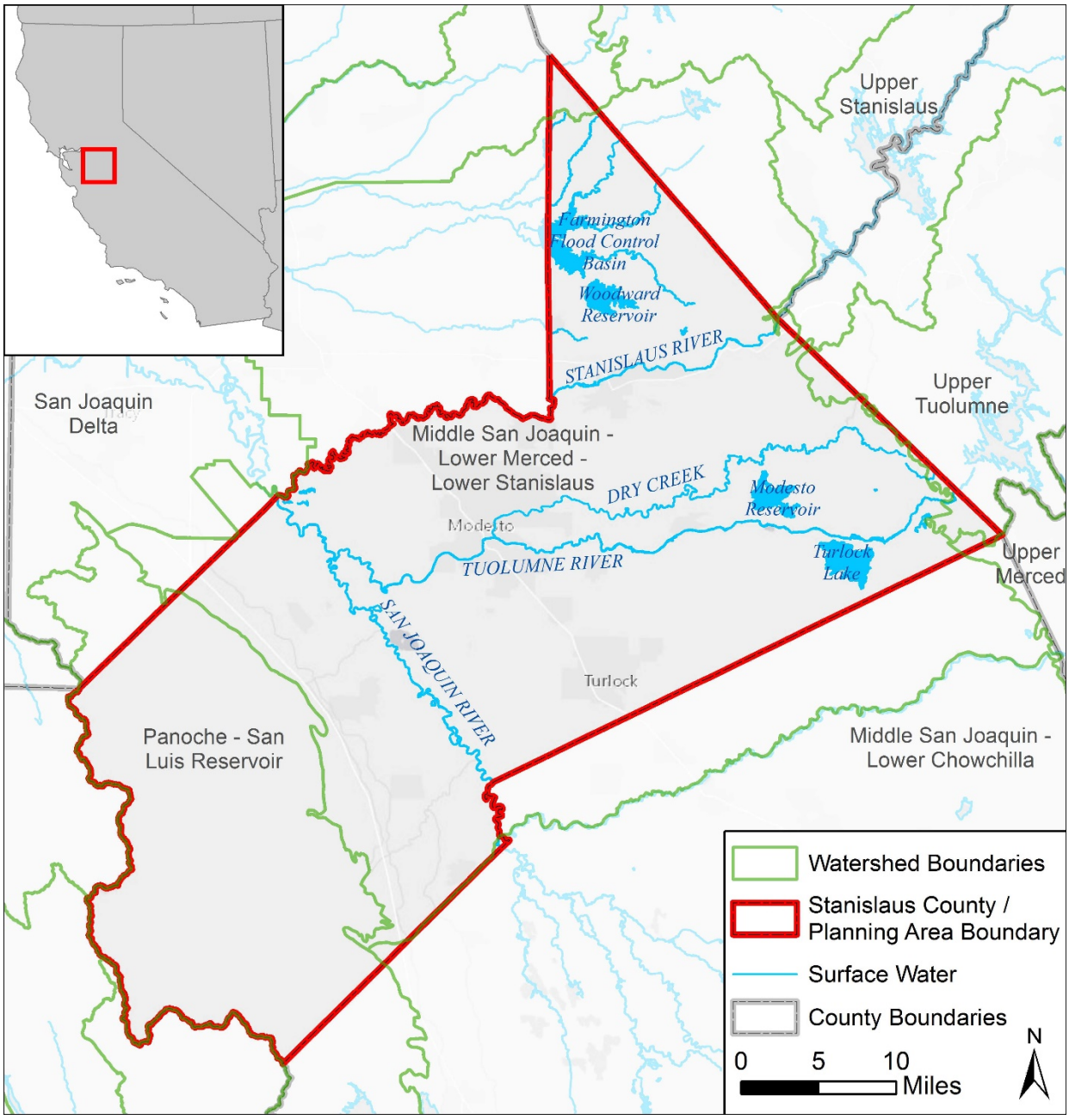
2 Background

The Stanislaus Multi-Agency Regional SWRP planning area aligns with the Stanislaus County boundaries (Figure 2-1) and includes portions of the Lower San Joaquin River watershed, the Tuolumne River watershed downstream of Don Pedro Reservoir, and the southern half of the Stanislaus River watershed downstream of New Melones Reservoir

Water quality concerns in the major rivers (Stanislaus and Tuolumne, and downstream in the Lower San Joaquin) include organophosphorus pesticides (diazinon and chlorpyrifos) and organic carbon, which contributes to low dissolved oxygen levels. These are managed and tracked through a Central Valley-wide Total Maximum Daily Load (TMDL) for pesticides, and a TMDL for the San Joaquin River in the Stockton Deep Water Shipping Channel (DWSC) for low dissolved oxygen.

Several additional water quality impairments are identified in the Regional Board's 303(d) list, which may be the basis of TMDLs in the future. These include: E. coli, salinity, sediment and unknown toxicity, and pH on Del Puerto Creek; E. coli, pesticides and unknown toxicity on Dry Creek; E. coli, salinity, pesticides and toxicity on Ingram Creek, E. coli and salinity on Salado Creek; boron, mercury, pesticides and unknown toxicity on the San Joaquin River between the Merced and Tuolumne Rivers; salinity, mercury, pesticides, and unknown toxicity on the San Joaquin River between the Stanislaus and Tuolumne Rivers; mercury, pesticides, and unknown toxicity in the Lower Stanislaus River; and mercury, pesticides, and unknown toxicity in the Lower Tuolumne River.

Figure 2-1. Stanislaus Multi-Agency SWRP Planning Area Watersheds and Waterbodies



3 Overview

Woodard & Curran prepared a separate Monitoring Plan for use by Provost & Pritchard personnel who were responsible for coordinating and monitoring the sampling events, including providing sampling equipment, obtaining sample bottles from the lab, taking field notes, and ensuring delivery of the samples to the analytical laboratories. A separate document, the Quality Assurance Project Plan (QAPP) discusses the details of how the samples are collected to provide data that are representative and scientifically

defensible. The following sections provide an overview of the stormwater quality monitoring locations, storm events that were sampled, and analytical results.

4 Stormwater Quality Monitoring

The purpose of the SWRP Stormwater Quality Monitoring task is to provide water quality data, in combination with existing water quality data from regional, county, and municipal monitoring programs; and to help establish baseline water quality conditions to support watershed characterization and project assessment as part of the development of the SWRP. Samples were collected at six key outfalls and one creek (Little Salado Creek) over two storm events in the 2017/2018 rainy season.

4.1 Stormwater Monitoring Constituents

Stormwater monitoring constituents (see Table 4-1) were selected based on established TMDLs, the most common 303(d) listed water body impairments, as well as the results of stormwater sampling and analysis completed by the City of Modesto as required by their MS4 Permit R5-2015-0025 NPDES NO. CAS083526. A range of pollutants were analyzed, including bacteria, metals, organics, nutrients, pesticides, and general water chemistry parameters, with the focus on pollutants that may impact groundwater. Some pollutants were excluded from this sampling effort because the complexity was outside the limited timeline of the monitoring program (toxicity bioassays), or because stormwater runoff is not a primary source in receiving waters (boron). Salinity will be assessed through measurements of specific conductivity.

Table 4-1. Stormwater Monitoring Constituent List

Constituent	Analytical Method[1]	Minimum Level	Units
Bacteriological			
E. coli	SM 9221F	1.1	MPN/100 mL
Fecal coliform	SM 9221E	1.8	MPN/100 mL
Conventional			
Dissolved oxygen	Field	5	mg/L
Oil and grease	EPA 1664	1.4	mg/L
pH	Field	0.1	Std. units
Temperature	Field	None	°C
General			
Biochemical oxygen demand (BOD)	SM5210B	2.0	mg/L
Chemical oxygen demand (COD)	SM5220D	9.0	mg/L
Nitrate-nitrite (as N)	Calculation	0.0086	mg/L
Specific conductivity	Field	1.0	µmhos/cm
Total ammonia (as N)	SM4500NH3C	0.1	mg/L
Total dissolved solids (TDS)	SM2540C	5.0	mg/L
Total organic carbon (TOC)	SM5310C	0.2	mg/L
Total phosphorus	SM4500-PE	0.011	mg/L
Total suspended solids (TSS)	SM2540D	0.3	mg/L
Turbidity	EPA 180.1/Field	0.1	NTU
Metals			
Aluminum, Total	EPA 200.8	5.0	µg/L

Constituent	Analytical Method[1]	Minimum Level	Units
Copper, Total	EPA 200.8	0.4	µg/L
Iron, Total	EPA 200.8	10	µg/L
Lead, Total	EPA 200.8	0.060	µg/L
Mercury, Total	EPA 1631	0.200	ng/L
Zinc, Total	EPA 200.8	2.0	µg/L
Methyl mercury	EPA 1630	0.0200	ng/L
Organophosphate Pesticides			
Chlorpyrifos	EPA 614	0.30	µg/L
Diazinon	EPA 614	0.01	µg/L

[1]Or other approved EPA or Standard Method meeting the required minimum level.

4.2 Sampling Locations

Seven sampling sites were selected in an effort to characterize potential stormwater pollutant loading to priority receiving waters and groundwater basins. Site selection considerations included land uses, priority drainages, and importance or nearness to listed receiving waters. Sites include identified County priority outfalls, currently sampled for dry weather flows each year, as well as a location near a potential groundwater recharge project with no existing water quality data records. Site identification, location, receiving water, and land use are summarized in Table 4-2. An overview of the monitoring locations and surface waters are shown in Figure 4-1. Figure 4-2 through Figure 4-4 show the monitoring locations in more detail and the land use is shown in Figure 4-5.

Table 4-2. Stormwater Outfall and Creek Monitoring Locations

Site ID	Location	Approximate Coordinates		Receiving Water	Land Use
		Latitude	Longitude		
BT-001	Beard Tract - Mariposa at Ag Field	37.62181	-120.934	Tuolumne River	Industrial, Suburban Residential, Commercial
BT-002	Beard Tract - McClure at Gilton Facility	37.62151	-120.93	Tuolumne River	Industrial, Suburban Residential, Commercial
BT-003	Beard Tract - Codoni at Railroad	37.62197	-120.911	Tuolumne River	Industrial, Suburban Residential, Commercial
STR-008	Salida Community	37.73029	-121.109	Stanislaus River	Suburban Residential, Commercial
TUO-001C	Santa Fe Ave. Bridge	37.624007	-120.899678	Tuolumne River	Suburban Residential, Commercial, Open Space
TUO-003	9th Street Bridge Region	37.62707	-120.987	Tuolumne River	Industrial, Urban Residential, Commercial
LSC-001	Little Salado Creek at Crows Landing	37.406256	-121.117681	San Joaquin River	Agricultural, Industrial, Open Space

Figure 4-1. Monitoring Locations Overview

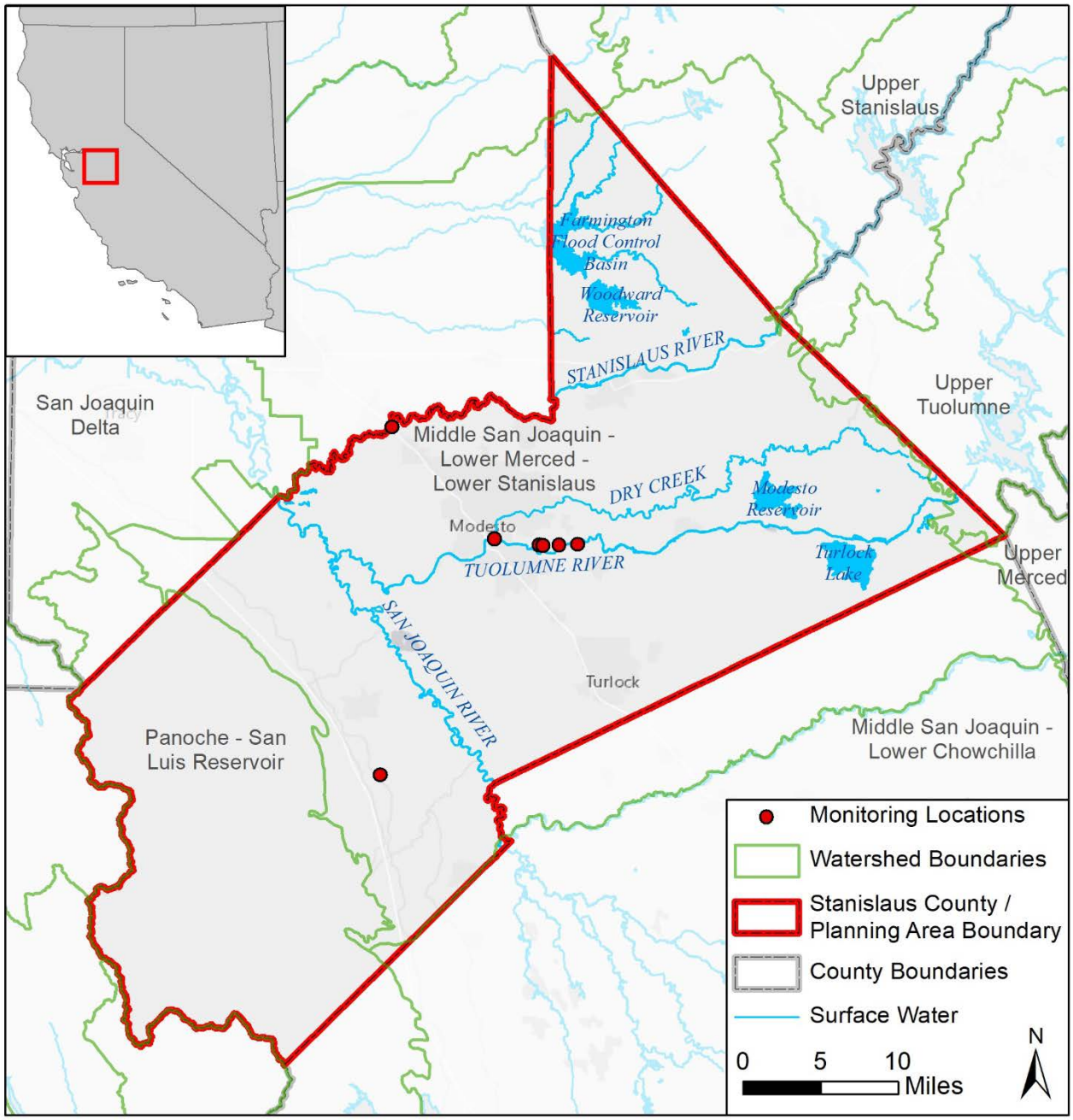


Figure 4-2. Monitoring Locations - North

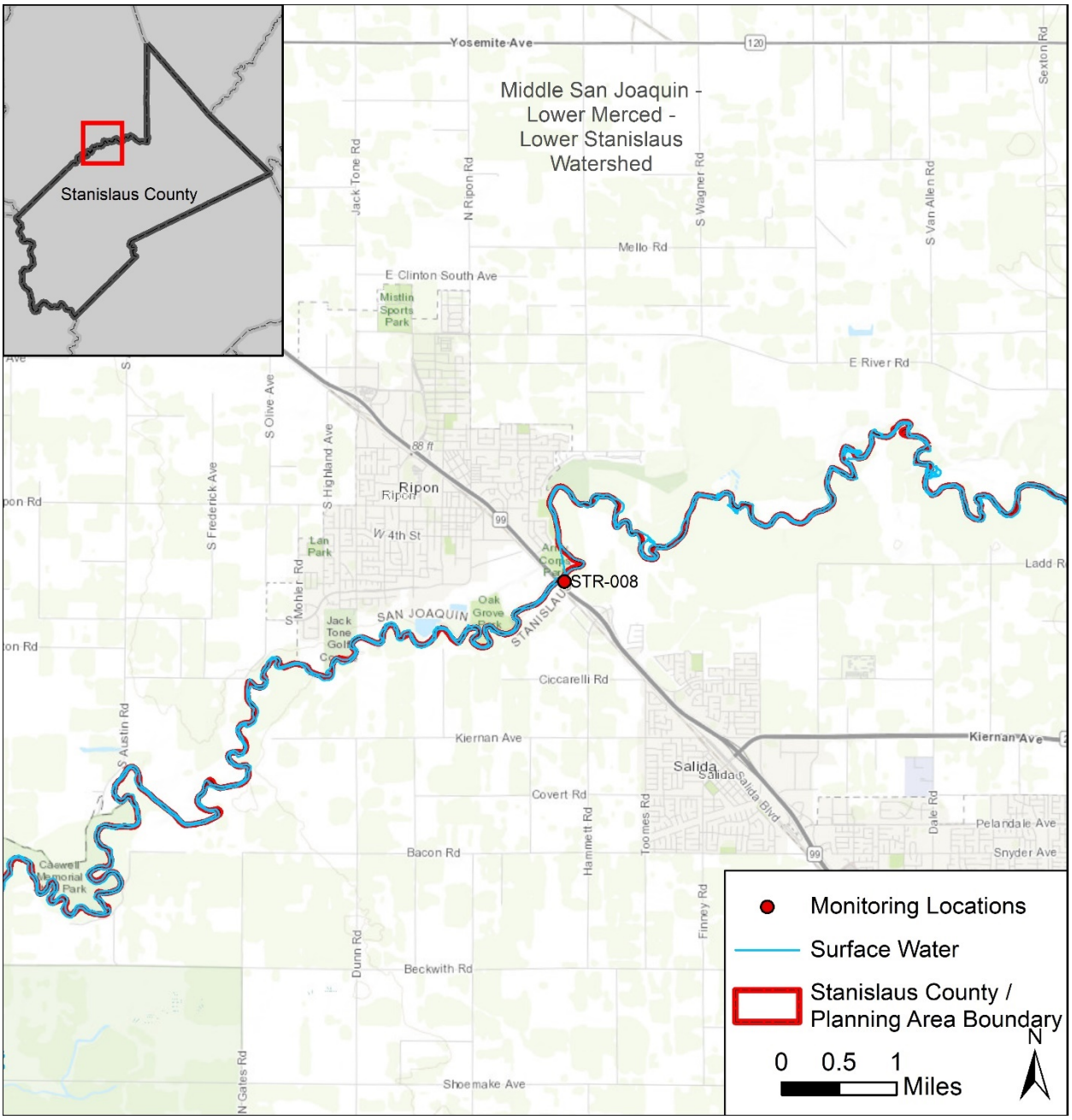


Figure 4-3. Monitoring Locations - Central

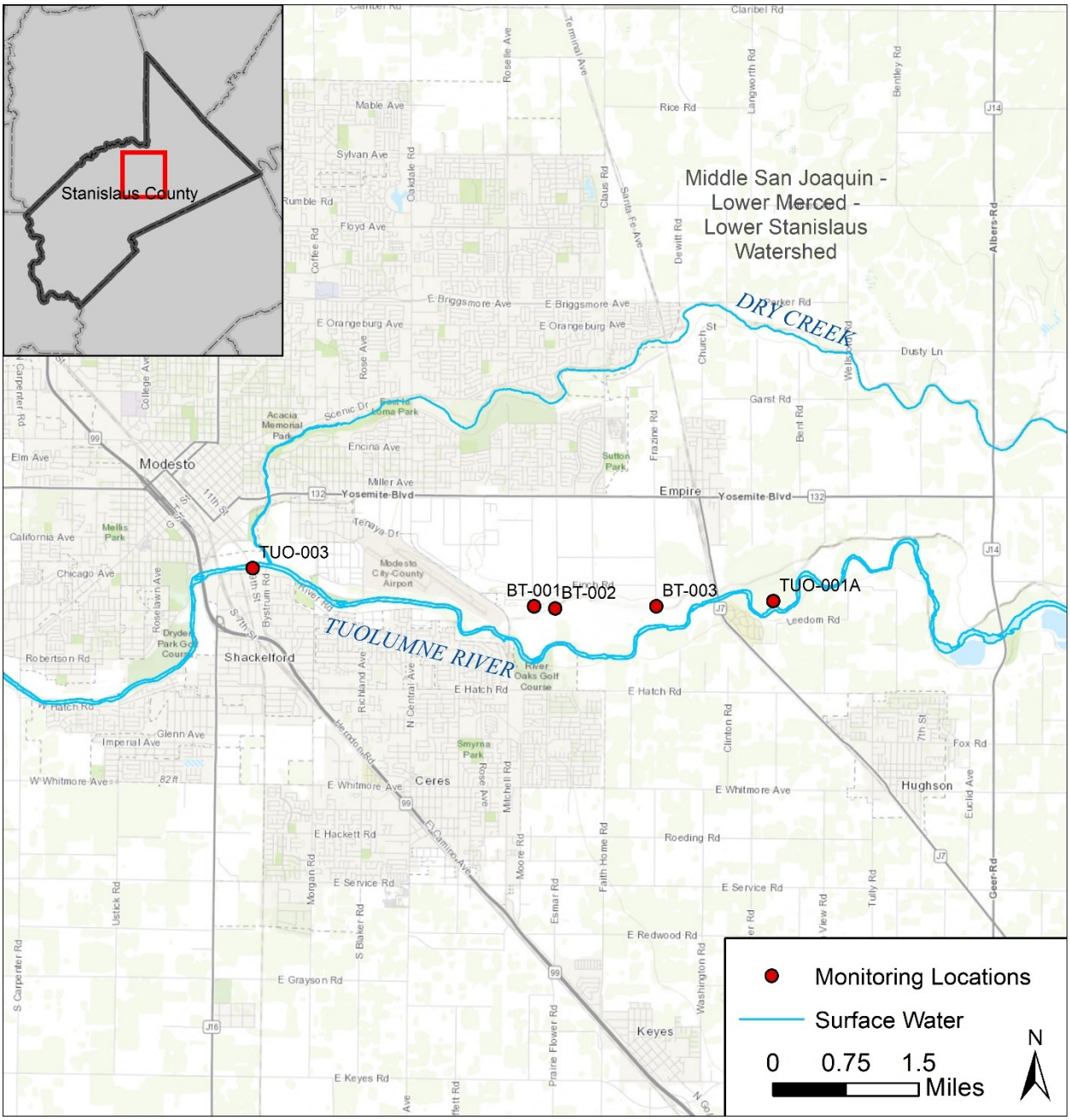


Figure 4-4. Monitoring Locations - South

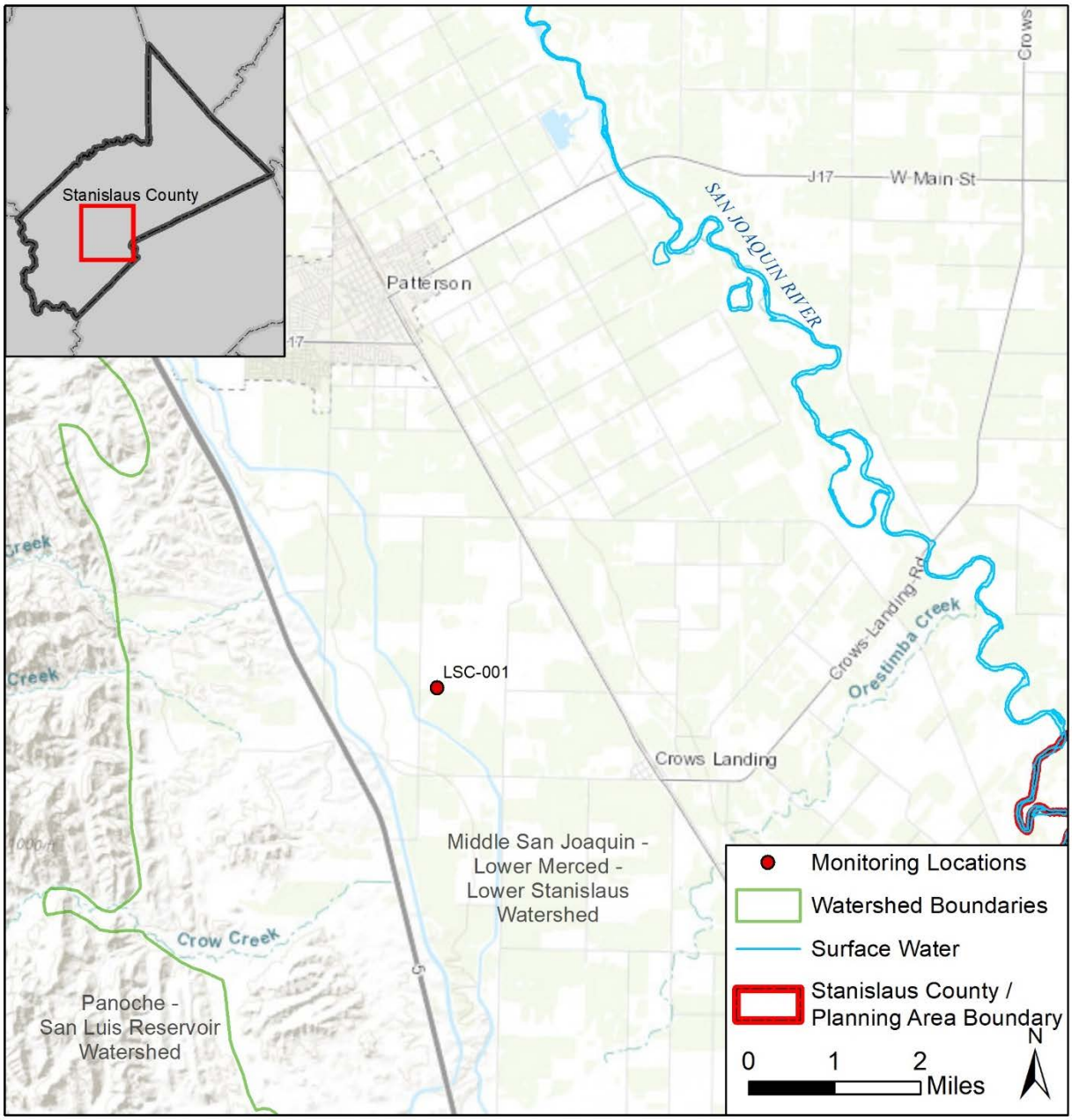
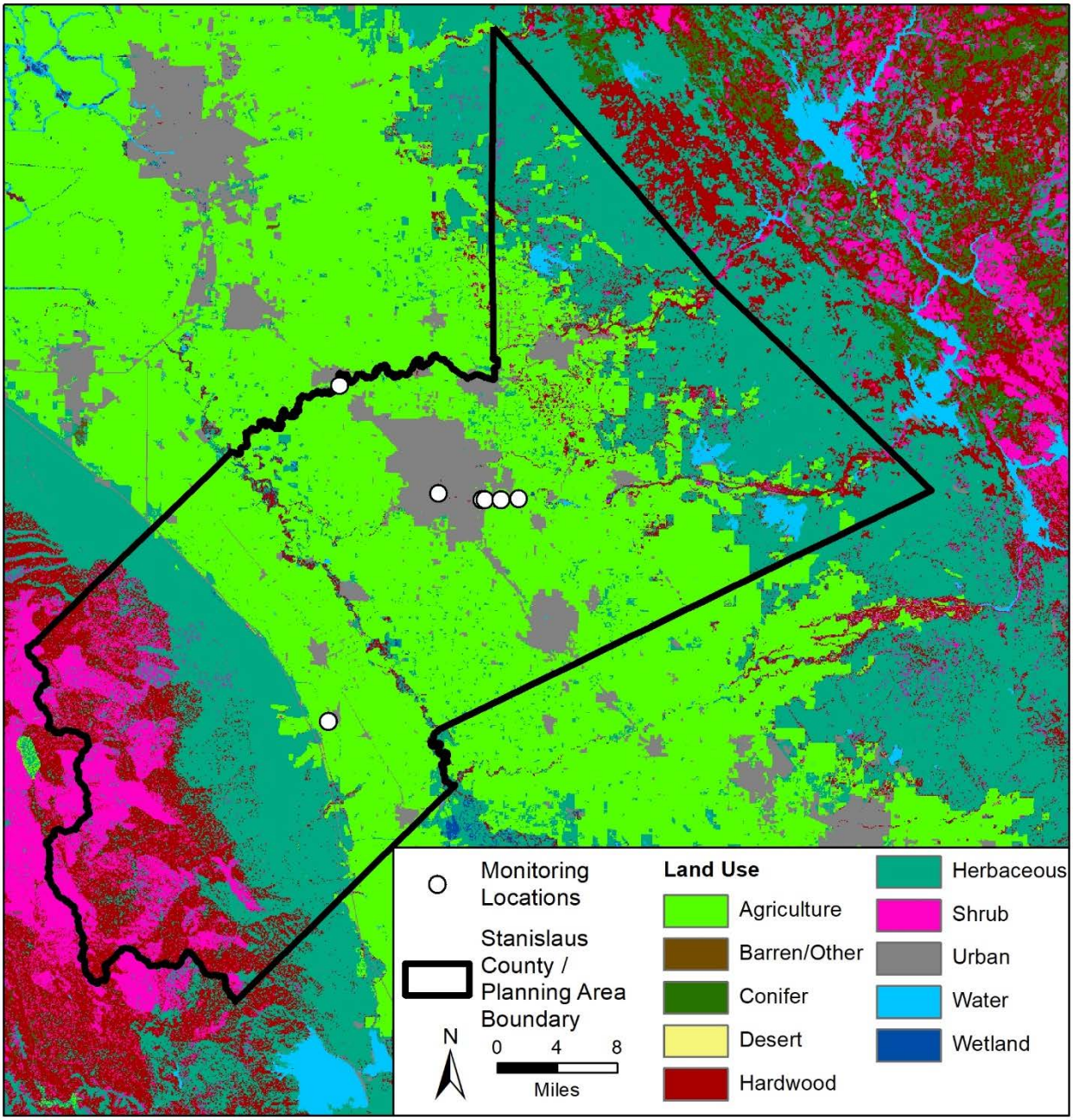


Figure 4-5. Land Use and Monitoring Locations



4.3 Stormwater Sampling Methodology

4.3.1 Stormwater Sampling Event

A wet weather sampling event was defined as an event with 0.2 inches of rainfall. Storm events were considered viable for mobilization if at least 0.2 inches of rainfall is forecast with at least a 70% probability within 72 hours prior to the event. Two wet weather outfall discharge sampling events were monitored

during the 2018/2019 rainy season (which started October 1st), one on 11/29/2018 and one on 12/16/2018 – 12/17/2018. Both are described in greater detail in Section 5.2.1.

4.3.2 Field Observations

During each wet weather monitoring event, narrative descriptions and field observations were recorded at each monitoring location. Narrative descriptions and observations included:

- Sampling location identified by coordinates and street location
- Date, time and duration of the storm event sampled
- Ambient temperature and current weather conditions
- Rainfall estimates of the storm event
- Duration between the storm event sampled and the end of the previous measurable (greater than 0.1 inch of rainfall) storm event

Flow estimation or measurement were intended to be collected in accordance with the United States Environmental Protection Agency (USEPA) Storm Water Sampling Guidance Document (EPA-833-B-92-001), but ultimately could not be collected due to safety concerns related to the high flowrate at sampling locations, inconsistent channel cross-sections, and accessibility issues.

4.3.3 Field Monitoring

During each wet weather monitoring event, grab samples were collected at each location for the analytes tested in the field: pH, temperature, specific conductivity, dissolved oxygen, and turbidity. Samples were immediately analyzed, and the results documented on a field observation form. Sample collection methods are discussed in Section 4.3.4 below. Field monitoring parameters for each constituent are provided in Table 4-1.

4.3.4 Sample Collection

All samples were collected, transported, processed, and analyzed in accordance with Surface Water Ambient Monitoring Program (SWAMP) protocols. Grab samples were collected for the analytes tested in the field, as well as for analytes that require separate sampling protocols and containers (oil & grease, methyl mercury, and bacteria). For all other constituents, composite samples were collected using a minimum of 4 grab samples collected in 20-minute intervals during the first 24 hours of the stormwater discharge. After the storm event, the discrete samples were composited into one time-weighted composite for chemistry analysis. Samples were kept under chain of custody and delivered to the appropriate laboratory within the required holding time. Bacteria samples were kept on ice and stored in a cooler until analysis.

All samples were collected at the outfall discharge point, except for Little Salado Creek (LSC-001) which was collected near where the creek exits a culvert. In cases where the volume and velocity of discharge posed an access hazard, sampling staff stood on nearby concrete embankments and filled a clean plastic container with sample water as close to the outflow as possible, then filled sampling bottles in a safer and more stable location. In this way, no preserving solution would wash out of the bottles under the direct heavy force of the outflow. A new “interim” container was used for each sampling location and was flushed several times with outflow water between samples.

4.4 Sampling Team

Sampling teams at each site were composed of two Provost & Pritchard Consulting Group personnel that collected samples and measured field parameters.

4.5 Data Management and Reporting

Results obtained from both the field investigation parameters and laboratory data were validated for quality, accuracy, and completeness according to the guidelines set forth in the QAPP document. The data were then tabulated in a database format compliant with the SWAMP program, saved, and will be maintained by Stanislaus County designated personnel. Results of these reports were provided as described in the contractual agreement with the State (SWRCB Agreement # D1612618).

5 Results

5.1 Monitored Events

Table 5-1 shows a summary of the sites that were monitored at each storm event.

Table 5-1. Stormwater Outfall and Creek Monitoring Locations

Site Name	Site Number	Storm Event	
		11/29/2018[1]	12/17/2018
BT-001	Beard Tract - Mariposa at Ag Field		✓
BT-002	Beard Tract - McClure at Gilton Facility	✓	✓
BT-003	Beard Tract - Codoni at Railroad	✓	✓
STR-008	Salida Community	✓	✓
TUO-001C	Santa Fe Ave. Bridge	✓	✓
TUO-003	9th Street Bridge Region	✓	✓
LSC-001	Little Salado Creek at Crows Landing		✓

1. *Sites BT-001 and LSC-001 could not be sampled during the 11/29/2018 storm event. BT-001 could not be located and LSC-001 did not have enough flow.*

5.2 Outfall and Creek Monitoring

5.2.1 Hydrology

Table 5-2 shows a summary of the total rainfall, rainfall duration, and maximum rainfall intensity for the two storm events. The distribution of hourly rainfall is shown in Figure 5-1 for the first storm event (11/29/2018) and in Figure 5-2 for the second storm event (12/16/2018 – 12/17/2018).

Table 5-2. Hydrology Summary

Event Date	Storm Event	
	11/29/2018	12/16/2018 - 12/17/2018
Total Rainfall (in)	1.4	1.15
Rainfall Duration (hrs)	15	14
Max Rainfall Intensity (in/hr)	0.37	0.24

Figure 5-1. Hourly Precipitation for First Storm Event (11/29/2018)

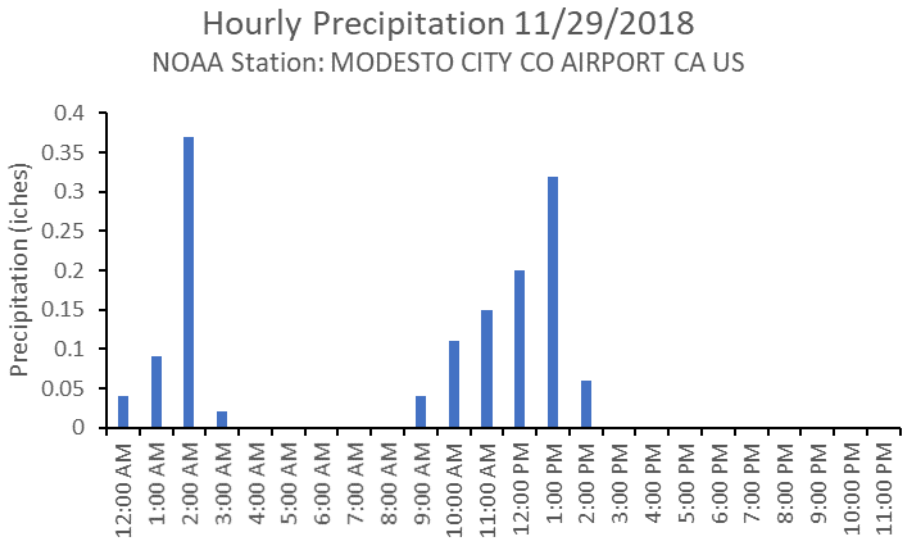
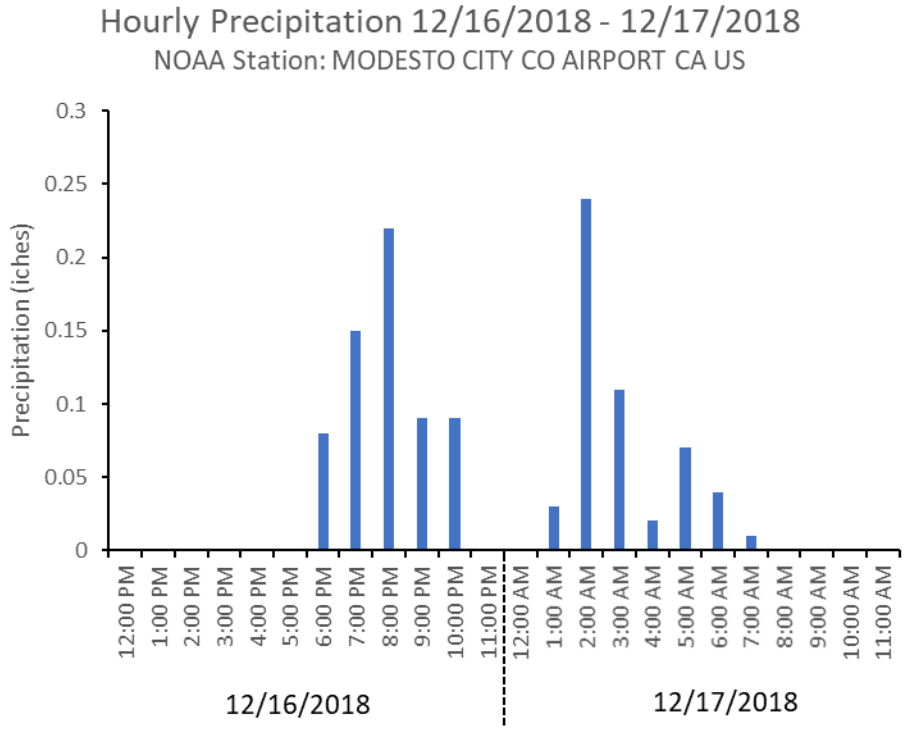


Figure 5-2. Hourly Precipitation for Second Storm Event (12/16/2018 - 12/17/2018)



5.2.2 Analytical Results per Storm Event

Analytical results, including field measurements and laboratory analytical results are shown for all stations for the 11/29/2018 storm event in Table 5-3 and for the 12/16/2018 - 12/17/2018 storm event in Table 5-4.

Samples collected for the first storm event on 11/29/2018 were collected while precipitation was still occurring; samples collected for the second storm event (12/16/2018 - 12/17/2018) were collected just after precipitation ended.

Table 5-3. Analytical Results for 11/29/2018 Storm Event

Constituent	Units	StationCode				
		535BT002	535BT003	535STR008	535TUO001C	535TUO003
Bacteriological						
Coliform, Total	MPN/100mL	>1600	>1600	>1600	>1600	>1600
Coliform, Fecal	MPN/100mL	>1600	>1600	>1600	>1600	>1600
Conventional						
Oxygen, Dissolved	mg/L	11.29	14.60	9.20	8.53	11.77
Oil and Grease; HEM	mg/L	<MDL	2.1	<MDL	<MDL	3.9
pH	Std. units	5.04	7.82	7.94	6.72	6.51
Temperature	°C	13.94	12.41	13.28	15.25	14.73
General						
BOD	mg/L	4.0	19	6.2	6.7	28
COD	mg/L	15	38	23	32	120
Nitrate + Nitrite as N	mg/L	0.26	0.91	0.52	0.77	0.62
Nitrate as N	mg/L	0.22	0.88	0.49	0.70	0.58
Nitrite as N	mg/L	0.037	0.029	0.038	0.068	0.035
Electrical Conductivity	µmhos/cm	88	480	0.042	56	1397
Ammonia as N	mg/L	0.46	0.63	0.52	0.46	0.77
Total Dissolved Solids	mg/L	26	44	39	51	99
Total Organic Carbon	mg/L	3.85	11.9	8.16	8.76	32.7
Total Suspended Solids	mg/L	200	1000	44	36	110
Turbidity	NTU	84	210	46	50	190
Metals						
Aluminum	µg/L	3800	9500	1600	1200	5500
Copper	µg/L	21	34	9.9	14	92
Iron	µg/L	3900	8700	1500	1300	6100
Lead	µg/L	7.9	12	3.3	6.0	75
Mercury	ng/L	6.29	2.90	4.14	5.48	7.54
Zinc	µg/L	190	200	69	54	440

Constituent	Units	StationCode				
		535BT002	535BT003	535STR008	535TUO001C	535TUO003
Organophosphate Pesticides						
Chlorpyrifos	µg/L	<MDL	<MDL	<MDL	<MDL	<MDL
Diazinon	µg/L	<MDL	<MDL	<MDL	<MDL	<MDL

Note: Non-Detects are reported as <MDL

Table 5-4. Analytical Results for 12/16/2018 – 12/17/2018 Storm Event

Constituent	Units	StationCode						
		535BT001	535BT002	535BT003	535LSC001	535STR008	535TUO001C	535TUO003
Bacteriological								
Coliform, Total	MPN/100mL	>1600	>1600	>1600	>1600	>1600	>1600	>1600
Coliform, Fecal	MPN/100mL	>1600	540	920	>1600	>1600	>1600	1600
Conventional								
Oxygen, Dissolved	mg/L	11.48	11.23	10.85	11.75	9.58	11.31	11.48
Oil and Grease; HEM	mg/L	2.3	<MDL	1.6	2.9	1.7	1.7	<MDL
pH	Std. units	6.27	6.92	6.86	7.83	6.74	6.41	7.48
Temperature	°C	14.28	15.12	14.13	11.58	13.95	14.16	12.69
General								
BOD	mg/L	17	4.9	13	35	5.4	6.9	7.6
COD	mg/L	130	14	38	130	9.3	16	22
Nitrate + Nitrite as N	mg/L	1.2	0.86	3.9	1.3	0.45	0.43	0.46
Nitrate as N	mg/L	1.1	0.82	3.8	1.2	0.42	0.39	0.40
Nitrite as N	mg/L	0.032	0.038	0.095	0.061	0.025	0.040	0.058
Electrical Conductivity	µmhos/cm	0.102	0.0637	102.7	141.7	0.0527	0.038	38.3
Ammonia as N	mg/L	0.21	0.24	0.49	0.10	0.38	0.49	0.49
Total Dissolved Solids	mg/L	90	58	140	220	37	31	53
Total Organic Carbon	mg/L	12.4	5.84	11.5	<MDL	6.71	8.01	9.75
Total Suspended Solids	mg/L	220	23	43	480	9.7	16	19
Turbidity	NTU	200	42	59	500	15	24	38
Metals								
Aluminum	µg/L	770	140	230	2600	390	480	90
Copper	µg/L	32	7.0	13	64	5.3	8.1	16
Iron	µg/L	7100	1400	2100	2600	480	560	860
Lead	µg/L	15	1.8	2.0	12	0.79	2.8	7.3
Mercury	ng/L	3.57	3.27	<MDL	<MDL	3.20	5.15	5.45
Zinc	µg/L	240	52	48	97	32	38	120

Constituent	Units	StationCode						
		535BT001	535BT002	535BT003	535LSC001	535STR008	535TUO001C	535TUO003
Organophosphate Pesticides								
Chlorpyrifos	µg/L	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL
Diazinon	µg/L	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL

Note: Non-Detects are reported as <MDL

6 Site Analytical Results

Sections 6.1 through 6.7 show the same analytical results from Section 5.2.2 - Analytical Results per Storm Event, but arranged by site instead of grouped by event.

6.1 BT-001 (Beard Tract – Mariposa at Ag Field)

The location of BT-001 can be found in Figure 4-3. Dominant land uses include industrial, suburban residential, and commercial. Analytical results for BT-001 can be found in Table 6-1. Note that BT-001 was not sampled during the first storm event because samplers could not locate the site.

The 12/17/2018 field log noted that the water had a "translucent light brown coloring".

Table 6-1: Analytical Results for BT-001

Constituent	Units	Storm Event	
		11/29/2018[1]	12/17/2018
Bacteriological			
Coliform, Total	MPN/100mL		>1600
Coliform, Fecal	MPN/100mL		>1600
Conventional			
Oxygen, Dissolved	mg/L		11.48
Oil and Grease; HEM	mg/L		2.3
pH	Std. units		6.27
Temperature	°C		14.28
General			
BOD	mg/L		17
COD	mg/L		130
Nitrate + Nitrite as N	mg/L		1.2
Nitrate as N	mg/L		1.1
Nitrite as N	mg/L		0.032
Electrical Conductivity	µmhos/cm		0.102
Ammonia as N	mg/L		0.21
Total Dissolved Solids	mg/L		90
Total Organic Carbon	mg/L		12.4
Total Suspended Solids	mg/L		220
Turbidity	NTU		200
Metals			
Aluminum	µg/L		770
Copper	µg/L		32
Iron	µg/L		7100
Lead	µg/L		15
Mercury	ng/L		3.57
Zinc	µg/L		240
Organophosphate Pesticides			
Chlorpyrifos	µg/L		<MDL
Diazinon	µg/L		<MDL

1. *BT-001 was not sampled during 11/29/2018 because the site could not be located.*

6.2 BT-002 (Beard Tract – McClure at Gilton Facility)

The location of BT-002 can be found in Figure 4-3. Dominant land uses include industrial, suburban residential, and commercial. Analytical results for BT-002 can be found in Table 6-2.

The 11/29/2018 field narrative noted that there was "intense turbulent water flow coming from the storm drain, which split into two streams…surrounded by plant life, twigs, and trash. The water had a tan coloring to it."

The 12/17/2018 field log noted that the water had a "translucent brown coloring".

Table 6-2: Analytical Results for BT-002

Constituent	Units	Storm Event	
		11/29/2018	12/17/2018
Bacteriological			
Coliform, Total	MPN/100mL	>1600	>1600
Coliform, Fecal	MPN/100mL	>1600	>1600
Conventional			
Oxygen, Dissolved	mg/L	11.29	11.23
Oil and Grease; HEM	mg/L	<MDL	<MDL
pH	Std. units	5.04	6.92
Temperature	°C	13.94	15.12
General			
BOD	mg/L	4.0	4.9
COD	mg/L	15	14
Nitrate + Nitrite as N	mg/L	0.26	0.86
Nitrate as N	mg/L	0.22	0.82
Nitrite as N	mg/L	0.037	0.038
Electrical Conductivity	µmhos/cm	88	0.0637
Ammonia as N	mg/L	0.46	0.24
Total Dissolved Solids	mg/L	26	58
Total Organic Carbon	mg/L	3.85	5.84
Total Suspended Solids	mg/L	200	23
Turbidity	NTU	84	42
Metals			
Aluminum	µg/L	3800	140
Copper	µg/L	21	7.0
Iron	µg/L	3900	1400
Lead	µg/L	7.9	1.8
Mercury	ng/L	6.29	3.27
Zinc	µg/L	190	52
Organophosphate Pesticides			
Chlorpyrifos	µg/L	<MDL	<MDL
Diazinon	µg/L	<MDL	<MDL

6.3 BT-003 (Bear Tract – Codoni at Railroad)

The location of BT-003 can be found in Figure 4-3. Dominant land uses include industrial, suburban residential, and commercial. Analytical results for BT-003 can be found in Table 6-3.

The 11/29/2018 field narrative noted that "The storm drain was surrounded by rocks, trash, and plant life, both dead and alive" and there was "moderate laminar water flow coming from the storm drain. The water flowed into a small body of water with slow stream run off. The water had a tan coloring to it." A floating empty 5L oil container was noted with a slight odor but no accompanying visible presence of oil.

The 12/17/2018 field log noted that the water was cloudy and "brownish" and that there were light sheens of possible oil in pockets of non-moving water.

Table 6-3: Analytical Results for BT-003

Constituent	Units	Storm Event	
		11/29/2018	12/17/2018
Bacteriological			
Coliform, Total	MPN/100mL	>1600	>1600
Coliform, Fecal	MPN/100mL	>1600	920
Conventional			
Oxygen, Dissolved	mg/L	14.6	10.85
Oil and Grease; HEM	mg/L	2.1	1.6
pH	Std. units	7.82	6.86
Temperature	°C	12.41	14.13
General			
BOD	mg/L	19	13
COD	mg/L	38	38
Nitrate + Nitrite as N	mg/L	0.91	3.9
Nitrate as N	mg/L	0.88	3.8
Nitrite as N	mg/L	0.029	0.095
Electrical Conductivity	µmhos/cm	480	102.7
Ammonia as N	mg/L	0.63	0.49
Total Dissolved Solids	mg/L	44	140
Total Organic Carbon	mg/L	11.9	11.5
Total Suspended Solids	mg/L	1000	43
Turbidity	NTU	210	59
Metals			
Aluminum	µg/L	9500	230
Copper	µg/L	34	13
Iron	µg/L	8700	2100
Lead	µg/L	12	2.0
Mercury	ng/L	2.90	<MDL
Zinc	µg/L	200	48
Organophosphate Pesticides			
Chlorpyrifos	µg/L	<MDL	<MDL
Diazinon	µg/L	<MDL	<MDL

6.4 STR-008 (Salida Community)

The location of STR-008 can be found in Figure 4-2. Dominant land uses include suburban residential and commercial. Analytical results for STR-008 can be found in Table 6-4.

The 11/29/2018 field narrative noted that the gated storm drain was had "collected leaves, twigs, and trash" and that "There was moderate turbulent water flow coming from the storm drain, which [led] into a stream of water along brush, sticks, and trash. The water had a tan coloring to it."

The 12/17/2018 field log noted that the water had a "translucent light brown coloring" and there was trash in the water.

Table 6-4: Analytical Results for STR-008

Constituent	Units	Storm Event	
		11/29/2018	12/17/2018
Bacteriological			
Coliform, Total	MPN/100mL	>1600	>1600
Coliform, Fecal	MPN/100mL	>1600	>1600
Conventional			
Oxygen, Dissolved	mg/L	9.2	9.58
Oil and Grease; HEM	mg/L	<MDL	1.7
pH	Std. units	7.94	6.74
Temperature	°C	13.28	13.95
General			
BOD	mg/L	6.2	5.4
COD	mg/L	23	9.3
Nitrate + Nitrite as N	mg/L	0.52	0.45
Nitrate as N	mg/L	0.49	0.42
Nitrite as N	mg/L	0.038	0.025
Electrical Conductivity	µmhos/cm	0.042	0.0527
Ammonia as N	mg/L	0.52	0.38
Total Dissolved Solids	mg/L	39	37
Total Organic Carbon	mg/L	8.16	6.71
Total Suspended Solids	mg/L	44	9.7
Turbidity	NTU	46	15
Metals			
Aluminum	µg/L	1600	390
Copper	µg/L	9.9	5.3
Iron	µg/L	1500	480
Lead	µg/L	3.3	0.79
Mercury	ng/L	4.14	3.20
Zinc	µg/L	69	32
Organophosphate Pesticides			
Chlorpyrifos	µg/L	<MDL	<MDL
Diazinon	µg/L	<MDL	<MDL

6.5 TUO-001C (Santa Fe Ave. Bridge)

The location of TUO-001C can be found in Figure 4-3. Dominant land uses include suburban residential, commercial, and open space. Analytical results for TUO-001C can be found in Table 6-5.

The 11/29/2018 field narrative noted that the area around the storm drain was "covered in plant life and trash. There was mild laminar water flow coming from the storm drain, which [led] into the river. The water had a tan coloring to it."

The 12/17/2018 field log noted that the water had a "translucent brown coloring".

Table 6-5: Analytical Results for TUO-001C

Constituent	Units	Storm Event	
		11/29/2018	12/17/2018
Bacteriological			
Coliform, Total	MPN/100mL	>1600	>1600
Coliform, Fecal	MPN/100mL	>1600	>1600
Conventional			
Oxygen, Dissolved	mg/L	8.53	11.31
Oil and Grease; HEM	mg/L	<MDL	1.7
pH	Std. units	6.72	6.41
Temperature	°C	15.25	14.16
General			
BOD	mg/L	6.7	6.9
COD	mg/L	32	16
Nitrate + Nitrite as N	mg/L	0.77	0.43
Nitrate as N	mg/L	0.70	0.39
Nitrite as N	mg/L	0.068	0.040
Electrical Conductivity	µmhos/cm	56	0.038
Ammonia as N	mg/L	0.46	0.49
Total Dissolved Solids	mg/L	51	31
Total Organic Carbon	mg/L	8.76	8.01
Total Suspended Solids	mg/L	36	16
Turbidity	NTU	50	24
Metals			
Aluminum	µg/L	1200	480
Copper	µg/L	14	8.1
Iron	µg/L	1300	560
Lead	µg/L	6.0	2.8
Mercury	ng/L	5.48	5.15
Zinc	µg/L	54	38
Organophosphate Pesticides			
Chlorpyrifos	µg/L	<MDL	<MDL
Diazinon	µg/L	<MDL	<MDL

6.6 TUO-003 (9th Street Bridge Region)

The location of TUO-003 can be found in Figure 4-3. Dominant land uses include industrial, urban residential, and commercial. Analytical results for TUO-003 can be found in Table 6-6.

The 11/29/2018 field narrative noted that the "outfall water [was] cloudy and brownish, [and] meanders through a lot of trash and settled debris". The presence of oil was noted as a "light sheen in non-moving pockets" of water.

The 12/17/2018 field log noted "clear brownish water from culvert" with potential presence of oil in "light sheen in pockets of non-moving water".

Table 6-6: Analytical Results for TUO-003

Constituent	Units	Storm Event	
		11/29/2018	12/17/2018
Bacteriological			
Coliform, Total	MPN/100mL	>1600	>1600
Coliform, Fecal	MPN/100mL	>1600	1600
Conventional			
Oxygen, Dissolved	mg/L	11.77	11.48
Oil and Grease; HEM	mg/L	3.9	<MDL
pH	Std. units	6.51	7.48
Temperature	°C	14.73	12.69
General			
BOD	mg/L	28	7.6
COD	mg/L	120	22
Nitrate + Nitrite as N	mg/L	0.62	0.46
Nitrate as N	mg/L	0.58	0.40
Nitrite as N	mg/L	0.035	0.058
Electrical Conductivity	µmhos/cm	1397	38.3
Ammonia as N	mg/L	0.77	0.49
Total Dissolved Solids	mg/L	99	53
Total Organic Carbon	mg/L	32.7	9.75
Total Suspended Solids	mg/L	110	19
Turbidity	NTU	190	38
Metals			
Aluminum	µg/L	5500	90
Copper	µg/L	92	16
Iron	µg/L	6100	860
Lead	µg/L	75	7.3
Mercury	ng/L	7.54	5.45
Zinc	µg/L	440	120
Organophosphate Pesticides			
Chlorpyrifos	µg/L	<MDL	<MDL
Diazinon	µg/L	<MDL	<MDL

6.7 LSC-001 (Little Salado Creek at Crows Landing)

The location of LSC-001 can be found in Figure 4-4. Dominant land uses include agricultural, industrial, and open space. Analytical results for LSC-001 can be found in Table 6-7. Note that LSC-001 was not sampled during the first storm event because there was not enough flow at the sampling site.

The 12/17/2018 field log noted that the sampling site contained "brown turbid water".

Table 6-7: Analytical Results for LSC-001

Constituent	Units	Storm Event	
		11/29/2018[1]	12/17/2018
Bacteriological			
Coliform, Total	MPN/100mL		>1600
Coliform, Fecal	MPN/100mL		>1600
Conventional			
Oxygen, Dissolved	mg/L		11.75
Oil and Grease; HEM	mg/L		2.9
pH	Std. units		7.83
Temperature	°C		11.58
General			
BOD	mg/L		35
COD	mg/L		130
Nitrate + Nitrite as N	mg/L		1.3
Nitrate as N	mg/L		1.2
Nitrite as N	mg/L		0.061
Electrical Conductivity	µmhos/cm		141.7
Ammonia as N	mg/L		0.10
Total Dissolved Solids	mg/L		220
Total Organic Carbon	mg/L		<MDL
Total Suspended Solids	mg/L		480
Turbidity	NTU		500
Metals			
Aluminum	µg/L		2600
Copper	µg/L		64
Iron	µg/L		2600
Lead	µg/L		12
Mercury	ng/L		<MDL
Zinc	µg/L		97
Organophosphate Pesticides			
Chlorpyrifos	µg/L		<MDL
Diazinon	µg/L		<MDL

1. *LSC-001 was not sampled during 11/29/2018 due to not enough flow.*

7 Data Quality

7.1 Precision

Precision is defined as the measure of agreement among repeated measurements of the same property under identical or substantially similar conditions, calculated as either the range or the standard deviation. The precision of instrument-related field measurements was controlled using the same analytical instrument in the field to replicate each field measurement of each water sample three times. The replicated field measurement was reported as the mean, and the precision was calculated as the standard deviation of the measurements. The precision of chemistry laboratory measurements was controlled by comparison of the sample to a laboratory matrix spike / matrix spike duplicate (MS/MSD). Precision was measured by the degree of agreement between the sample and MS/MSD results. Only samples with a ±25% relative percent difference (RPD) were accepted. Only one lab QC sample did not meet this requirement of the 91 samples with RPD reported.

7.2 Accuracy

Accuracy describes how close the measurement is to its true value. The accuracy of chemical measurements in this study applies to laboratory control standards and matrix spike samples. The accuracy of chemical measurements is quantified as percent recovery. Accuracy objectives for toxicity measurements focus on reference toxicant results. Accuracy for toxicity measurements is quantified relative to the mean and standard deviation of previous reference toxicant exposures. Accuracy criteria for bacterial testing were based on presence/absence testing rather than numerical limits owing to the difficulty in preparing solutions of known bacterial concentration. Different percent recovery requirements were set in the QAPP depending on the type of constituent considered. Only 12 lab QC samples did not meet the percent recovery requirements of the 184 samples with percent recovery reported.

7.3 Representativeness

Representativeness is a qualitative term that expresses the degree to which the sample represents a characteristic of the environmental condition. Best professional judgement (BPJ) was used in the field to evaluate whether measurements were made, and physical samples collected in such a manner that the resulting data appropriately reflected the environment or condition being measured or studied. For example, a sampling team may choose not to take measurements at a location that experienced a debris flow from a slumped bank, as the results would not represent an accurate characterization of the discharge. Sample selection and use of approved/documented analytical methods were controlled to the best extent possible that the measurement data represent the conditions at the investigation site.

Field duplicates were collected at STR-008 during both storm events and analyzed to measure representativeness. The compared results between sample and field duplicate are shown in Table 7-1.

Table 7-1: Representativeness for Field Duplicates at STR-008

Constituent	Units	Storm Event				RPD	
		11/29/2018		12/17/2018		11/29/2018	12/17/2018
		Sample	Field Duplicate	Sample	Field Duplicate		
Bacteriological							
Coliform, Total	MPN/100mL	>1600	>1600	>1600	>1600	N/A	N/A
Coliform, Fecal	MPN/100mL	>1600	>1600	>1600	>1600	N/A	N/A
Conventional							
Oil and Grease; HEM	mg/L	<MDL	Not analyzed	1.7	1.7	N/A	0%
General							
BOD	mg/L	6.2	6.3	5.4	5.2	-2%	4%
COD	mg/L	23	25	9.3	<MDL	-8%	N/A
Nitrate + Nitrite as N	mg/L	0.52	0.52	0.45	0.44	0%	2%
Nitrate as N	mg/L	0.49	0.48	0.42	0.42	2%	0%
Nitrite as N	mg/L	0.038	0.038	0.025	0.025	0%	0%
Ammonia as N	mg/L	0.52	0.42	0.38	0.38	21%	0%
Total Dissolved Solids	mg/L	39	30	37	39	26%	-5%
Total Organic Carbon	mg/L	8.16	8.11	6.71	13.3	1%	-66%
Total Suspended Solids	mg/L	44	44	9.7	10	0%	-3%
Turbidity	NTU	46	47	15	15	-2%	0%
Metals							
Aluminum	µg/L	1600	1500	390	390	6%	0%
Copper	µg/L	9.9	11	5.3	5.3	-11%	0%
Iron	µg/L	1500	1800	480	480	-18%	0%
Lead	µg/L	3.3	3.0	0.79	0.79	10%	0%
Mercury	ng/L	4.14	3.52	3.20	3.14	16%	2%
Zinc	µg/L	69	77	32	32	-11%	0%
Organophosphate Pesticides							
Chlorpyrifos	µg/L	<MDL	<MDL	<MDL	<MDL	N/A	N/A
Diazinon	µg/L	<MDL	<MDL	<MDL	<MDL	N/A	N/A

7.4 Completeness

Completeness describes the success of sample collection and laboratory analysis, which should be sufficient to fulfill the statistical criteria of the project. Completeness is measured as the fraction of samples collected and/or analyzed relative to the quantity targeted in the study design. While no specific statistical criteria have been established for this study, it is expected that 90% of all measurements could be taken when anticipated. This accounts for adverse weather conditions, safety concerns, and equipment problems. A loss of 10% of the samples in this study would represent a minimal loss in statistical power to address the study objectives.

In reality, 2 sampling events (BT-001 and LSC-001 on 11/29/2018) out of 14 sampling events (7 sites over 2 storm events) could not be completed. The results in a completeness of 86% which is below the goal of 90%. However, given the limited scope of the monitoring study (due to relatively few sampling sites and limited number of sampling events), there was increased possibility that site issues would cause this to happen so the completeness value is understandable.

8 Conclusions and Recommendations

Since there are no comparable reporting limits for stormwater quality in the County (e.g. no wet weather permit limits), no comparisons were made for most of the constituents reported in the analytical results, with the exception of Chlorpyrifos and Diazinon, described below in relation to TMDLs. Additionally, since this is the first year of stormwater sampling, there are no significant previous datasets to use for multi-year comparisons at this point.

8.1 Conclusions

TMDLs – Chlorpyrifos and Diazinon

The receiving water for sites BT-001, BT-001, BT-003, TUO-001C, and TUO-003 is the Tuolumne River which is listed on the USEPA's 2016 303(d) list as impaired for Chlorpyrifos, Group A Pesticides, Mercury, Diazinon, Toxicity, and Temperature (water).

The receiving water for STR-008 is the Stanislaus River which is listed on the USEPA's 2016 303(d) list as impaired for Chlorpyrifos, Group A Pesticides, Mercury, Diazinon, Toxicity, and Temperature (water).

For both the Tuolumne and Stanislaus Rivers, all the listed constituents still require a TMDL, except for Chlorpyrifos and Diazinon which are being addressed through the Central Valley Pesticide TMDL which became effective August 2017. Under this TMDL, Chlorpyrifos has a maximum 1-hour average (acute) concentration of 0.025 µg/L and a maximum 4-day average (chronic) concentration of 0.015 µg/L, not to be exceeded more than once in a three-year period. Diazinon has a maximum 1-hour average (acute) concentration of 0.16 µg/L and a maximum 4-day average (chronic) concentration of 0.10 µg/L, not to be exceeded more than once in a three-year period.

Chlorpyrifos and Diazinon were both non-detect at all sites during both storm events where they were sampled, though it should be noted that the method detection limit (MDL) was 0.30 µg/L which is above the maximum acute and chronic concentration limits of the TMDL.

The receiving water for LSC-001 is the San Joaquin River (segment from Merced River to Tuolumne River) which is listed on the USEPA's 2016 303(d) list as impaired for alpha-BHC (Benzenehexachloride or alpha-HCH), Chlorpyrifos, DDE (Dichlorodiphenyldichloroethylene), DDT (Dichlorodiphenyltrichloroethane), Electrical Conductivity, Specific Conductivity, Total Dissolved Solids, Group A Pesticides, Mercury, Toxicity, and Temperature (water). All constituents still require a TMDL, except for Chlorpyrifos which is being addressed through the Lower San Joaquin River Diazinon and Chlorpyrifos TMDL which

became effective 2006. Under this TMDL, Chlorpyrifos has a maximum 1-hour average (acute) concentration of 0.025 µg/L and a maximum 4-day average (chronic) concentration of 0.015 µg/L, not to be exceeded more than once in a three-year period.

Similar to the other sites, Chlorpyrifos was non-detect during the 12/17/2018 storm event, though it should be noted that the method detection limit (MDL) was 0.30 µg/L which is above the maximum acute and chronic concentration limits of the TMDL.

Bacteria

Bacteria counts for nearly all sampling events were above a maximum threshold of 1600 MPN/100mL. It is common for high bacteria levels to be found in stormwater runoff regardless of the land use type in the watershed. Sources of bacteria are primarily from animal waste (both domestic pets and wildlife), but can also include trash, leaking sewer lines, or other illicit discharges.

Metals

Metals generally appear to be found at higher concentrations during the first storm event at each site than the second. This may be partly due to samples being collected in the beginning of discharge for the first storm event, catching early flushing, in contrast with samples collected near the end of precipitation for the second storm event, due to daylight safety constraints. Additionally, the first storm occurred earlier in the rainy season, so higher metal concentrations would be expected as they would have accumulated on surfaces (e.g. roads) during the summer.

8.2 Recommendations

Further sampling is needed across multiple years at a greater number of monitoring sites in order to robustly study trends and characterize water quality. Similar such sampling has been done by the City of Modesto based on permit compliance requirements. Stanislaus County's existing permit requires annual dry weather sampling at priority sites (some of which were included in this grant-funded study), but an expansion in time and number of locations will be limited by available funding.

9 References

Modesto, City of. 2009. Storm Water Management Plan (SWMP). August 2009

Regional Water Quality Control Board, Central Valley Region. 2005. RWQCB Resolution No. R5-2005-0138. *Amending the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins for the Control of Diazinon and Chlorpyrifos Runoff into the San Joaquin River*.

Regional Water Quality Control Board, Central Valley Region. 2014. RWQCB Resolution No. R5-2014-0041. *Amendment to the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins for the Control of Diazinon and Chlorpyrifos Discharges*.

Regional Water Quality Control Board, Central Valley Region. 2016. Clean Water Act Sections 305(b) and 303(d) 2014 Integrated Report for the Central Valley Region. December 2016.

State Water Resources Control Board, Central Valley Region. RWQCB Order No. R5-2015-0025 NPDES No. CAS083526. Waste Discharge Requirements, City of Modesto Storm Water Discharge Municipal Separate Storm Sewer System.

United States Environmental Protection Agency (USEPA). 1992. NPDES Storm Water Sampling Guidance Document (EPA-833-B-92-001). July, 1992. Available online at: http://www.epa.gov/npdes/pubs/owm0093.pdf.

Appendix E - Stormwater Capture/Groundwater Recharge Site Assessment

TECHNICAL MEMORANDUM

TO: Dhyan Gilton, Stanislaus County
Frederic Clark, Stanislaus County
Walt Ward, Stanislaus County
Miguel Alvarez, City of Modesto

PREPARED BY: Lauren Salberg, Woodard & Curran

REVIEWED BY: Leslie Dumas, Woodard & Curran

DATE: April 9, 2019

RE: Stormwater Capture / Groundwater Recharge Site Selection Methodology and Infiltration Rate Test Results

As part of the *Stanislaus Multi-Agency Regional Storm Water Resource Plan,* a preliminary groundwater recharge evaluation was performed to characterize local near-surface hydrogeologic conditions and to identify favorable areas for groundwater recharge in Stanislaus County (County). This memo describes the methodology used to identify potential recharge sites and the results of the field testing at those sites.

Site Selection Methodology

The methodology used to identify favorable areas for groundwater recharge included:

1. Performing a desktop evaluation of soil properties, extent of Corcoran Clay (areas of limited permeability), and topography to identify potential land parcels (project locations) for stormwater capture/groundwater recharge projects.
2. Soliciting input from staff at the County and the City of Modesto to select two project locations for field analysis.
3. Identifying five test sites at each project location to perform percolation studies.

Ultimately, two project locations were selected for potential stormwater capture and/or groundwater recharge on three land parcels - one parcel near Crows Landing and two parcels along the Tuolumne River (shown in Figures 1 and 2, respectively). The preliminary desktop evaluation indicated soils along the Tuolumne River and near Crows Landing are likely to have characteristics favorable to groundwater recharge, either through in-stream or off-stream percolation facilities. The two project locations identified during the evaluation were for targeted field investigations to confirm suitability for groundwater recharge. Field investigations included advancing and logging hand-driven boreholes at each site and falling-head infiltration testing.

A detailed discussion of the methodology used to identify and select the two stormwater capture/groundwater recharge project locations is presented below.

Step 1: Desktop Evaluation

As part of the preliminary evaluation, Woodard & Curran first performed a desktop review of County soils. Favorable stormwater capture/groundwater recharge sites were those located on land that met the following characteristics:

- High to very high recharge potential. A map of recharge potential was developed using data from the 2007 *Recharge Characterization for Stanislaus and Tuolumne Rivers Groundwater Basin Association (STRGBA).* The study rank soil types on a scale of 1 to 5, with 1 being the least favorable conditions for recharge and 5 being the most favorable. Rankings are based on hydrologic soil groups, soil texture, slope, presence of Corcoran Clay, depth to groundwater, and land use.

- Absent of Corcoran Clay. The Department of Water Resources - San Joaquin District's 1981 map *Depth to the Top of the Corcoran Clay* was used to map the extent of the Corcoran Clay in the project area and identify locations outside of the clay layer extent. Although both sites are located within the extent of the Corcoran Clay, the clay layer is not encountered until depths around 150 feet or deeper and would not be a limiting factor for shallow groundwater recharge (DWR, 1981).
- Open space. Space is required to accommodate percolation ponds for off-stream diversion. Sites farthest from urban build-up and closest to potential recharge source waters were prioritized.
- Publicly-owned property. Only land parcels owned by Stanislaus County or the City of Modesto were considered. Publicly-owned parcels were considered easier to coordinate and obtain access permission and to construct projects as compared to privately-owned land. Parcel owners were identified using Stanislaus County's Parcel Inquiry Map feature in the GIS Central database and a map provided by County staff of County- and City-owned parcels.

A map was developed that layered soil texture, soil permeability, the extent of the Corcoran Clay, and land parcels owned by the City and County. No project locations were analyzed east of the city of Waterford since extensive recharge studies and projects have been conducted to date in those areas. Once mapped, locations meeting all four characteristics outlined above were selected for further investigation.

Step 2: Solicit Stanislaus County and City of Modesto Input

Once favorable recharge locations were identified through the desktop evaluation, the locations were discussed with County and City staff to narrow down the options to two potential project locations on three selected land parcels.

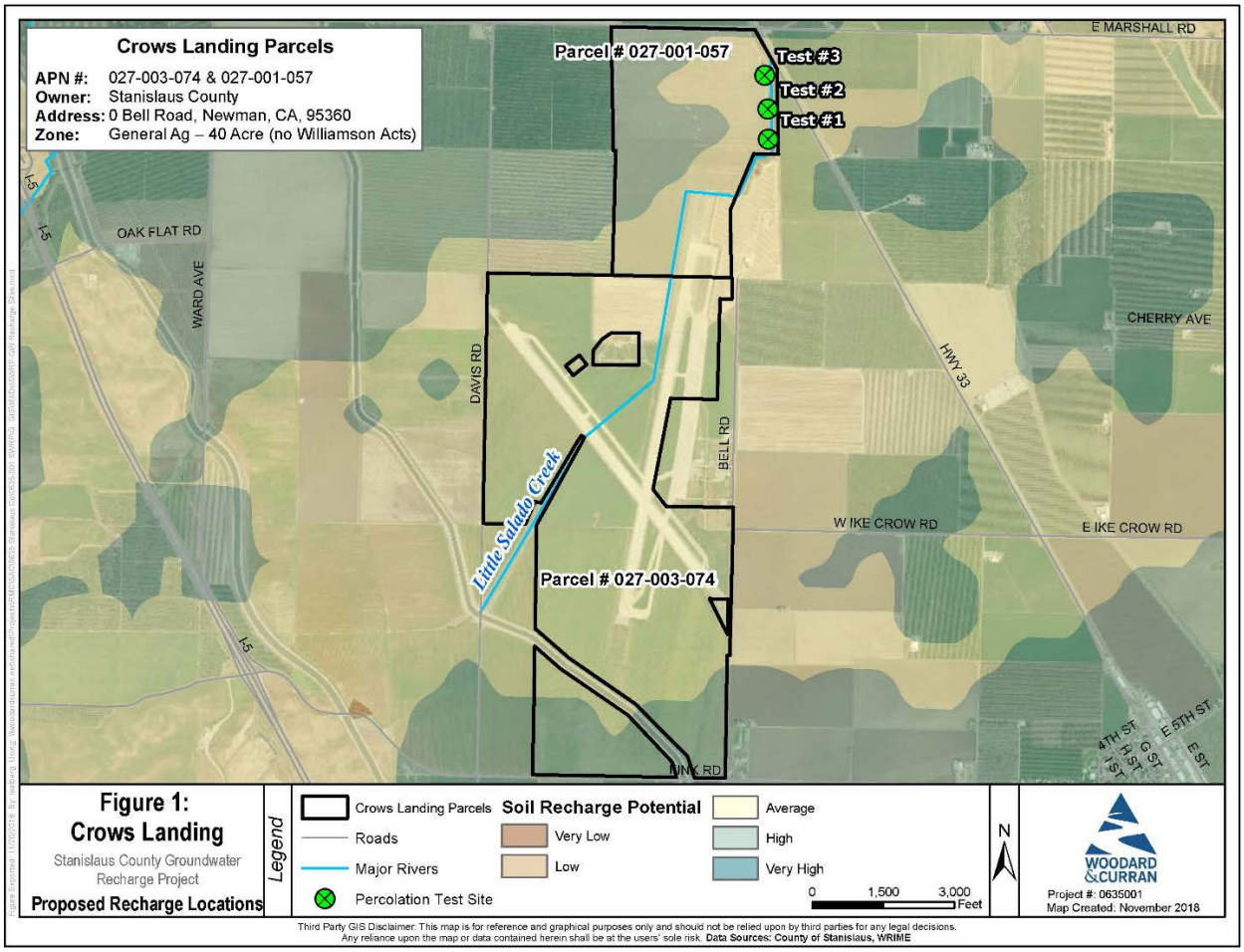
The Crows Landing project location was selected because a location along Little Salado Creek was specifically requested by Stanislaus County in the project's Request for Proposal as one of the locations to be evaluated. The proposed project location in Crows Landing lies downstream of Little Salado Creek, northeast of a former NASA-owned landing site located on accessors parcel number 027-001-057, which is owed by Stanislaus County. The area is currently undeveloped and uninhabited but is in the initial planning stages for development of a large business park that includes a multi-purpose stormwater pond. As such, the site's hydrology has been well characterized as part of a *2017 Drainage Study* by AECOM to assess the area's suitability for the business park. A public review draft of the Environmental Impact Report for the *Crows Landing Industrial Business Park Specific Plan* was released in January 2018. Findings from the 2017 study note that the parcel is located within a floodplain and peak flows discharged from Little Salado Creek (100-year, 24-hour storm) to the project location are approximately 700 cubic feet per second (cfs) (AECOM, 2017). Though soils in the Little Salado Creek drainage area are predominantly Type C, sandy clay loams with low infiltration rates, the Drainage Study denoted infiltration rates could be increased approximately ½-inch per hour by adding crushed rock to the base of a detention pond and by deep tillage. The Crows Landing project parcel is a favorable project location for stormwater retention and groundwater recharge as the site experiences stormwater ponding and flooding and on-site infrastructure improvements will be underway with the development of the proposed business park. Further, the field work performed as part of this study would help inform about the ability of the site to retain and infiltrate stormwater, as well as provide greater understanding of conditions in the region.

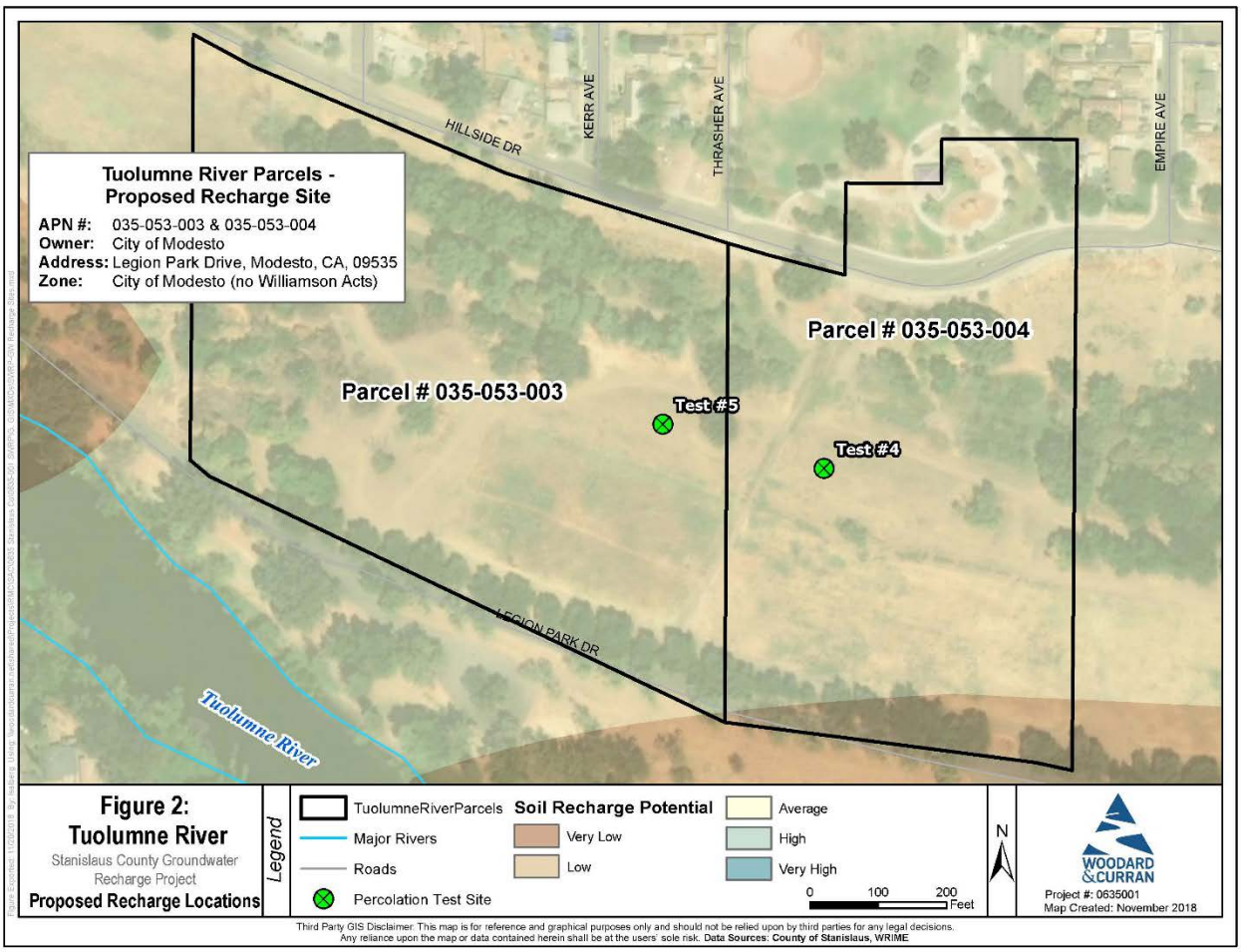
The Tuolumne River location was identified by City of Modesto staff as the second option for a potential recharge project as it offers the most multi-beneficial uses (in addition to favorable site conditions) by counteracting localized groundwater overdraft, offering grant opportunities and public benefits. Initially, there were three potential parcels identified near and along Dry Creek that could serve as the selected project location. Ultimately, the selected parcels for the project location (accessors parcel numbers 035-053-003 and 035-053-004, owned by the City of Modesto) were chosen as they offer both environmental and socioeconomic benefits. The parcels are located in southwest Modesto on Hillside Drive, south of Orville Wright Elementary School and George Rogers Park, and southwest of the Modesto City-County Airport. All of the parcels are in an undeveloped portion of Legion Park. The area is a depressed alluvial

bed within the Tuolumne River floodplain that is prone to flooding; it flooded during the 2017 storms and experienced an 80-year flood in 1997 where flow rates on the Tuolumne River reached 56,000 cfs. As this area is large, undeveloped, depressed, and actively flooded, it is a favorable project location for stormwater retention and groundwater recharge as it would control, divert, and infiltrate excess flood flows. Additional benefits associated with a project located on the Tuolumne River parcels could include targeting a known groundwater cone of depression, preventing the flooding of adjacent disadvantaged communities, restoring habitat, and developing recreational opportunities.

Step 3: Identify Test Sites for Percolation Studies

Ben Crawford & Associates reviewed the two parcels at Crows Landing and Dry Creek and selected a total of five test sites to perform percolation studies. Three test sites (#1-3) are located within the Crows Landing parcel and two test sites (#4-5) are located within the Tuolumne River parcels, as shown in Figures 1 and 2, respectively.





As shown in Figure 1, all three Crows Landing test sites meet the requirements of a favorable recharge location as they are all located in areas classified as having average soil recharge potential, on the same County-owned land parcel, and located in rural areas with room to install diversion and recharge features.

Similarly, as shown in Figure 2, both Tuolumne River test sites meet the requirements of a favorable recharge location as they are located in areas classified as having average soil recharge potential on parcels owned by the City, and are located in a large, open space along the Tuolumne River with room to install diversion and recharge facilities. The two green dots in Figure 2 identify the recommended test sites, which are within an old river bed and adjacent to an access road to facilitate access to the site during the field.

Field investigations, including advancing and logging hand-driven boreholes at each site and falling-head infiltration testing, were then performed at each of the five identified test sites to confirm the sites' suitability for groundwater recharge, as described in the following section.

Infiltration Rate Testing and Results

Infiltration testing was conducted in February 2019 at the sites identified in Figure 1 and Figure 2. Soil infiltration rates were determined using the United States Bureau of Reclamation falling head test method. In general, the test procedure consists of the following:

- Drill a 4-inch diameter hole to the targeted test depth of 5 feet below ground surface.
- Clean the borehole
- Place a two-inch layer of fine gravel at the bottom of the hole, and set an observation pipe. Secure the perforated pipe with gravel to prevent movement during testing.
- Saturate the bottom of the hole with a minimum of 12 inches of water for at least 18 hours
- Begin measuring water levels from a fixed reference point at 5-minute intervals
- Infiltration rates are considered stable after three consecutive readings show a consistent water level drop rate.

The infiltration test results are summarized in Table 1, and the complete field testing memorandum is included as Attachment A.

Table 1. Infiltration Test Data

Project Site	Boring Number	Test Depth (ft)	Field Infiltration Rate	Absorption Rate (gal/ft^2 per day)	USCS Soil Classification	Percent Fines
Crows Landing	T1	5	14.4	6.6	CL	70
Crows Landing	T2	5	14.4	6.1	CL	70*
Crows Landing	T3	5	1x10^{-5}	--	CL	78
Tuolumne River	T4	5	9.68	4.4	CL	51
Tuolumne River	T5	5	0.16	0.05	CL	68

*Visual Classification based on Unified Soil Classification System

For the Crows Landing site, field tests ranged from very low to very high infiltration rates (1x10^{-5} to 14.4 inches per hour). For the Tuolumne River site, field tests ranged from low to high infiltration rates (approximately 0.16 to 9.7 inches per hour). The falling head test method can yield variable results due to variations in subsurface soil conditions, location of more or less permeable materials, and existing saturation. Due to the alluvial nature of the soils underlying the sites, there can also be significant lateral and vertical variation in soil type and infiltration rates within relatively short distances. Silty sands were found at both locations, but significant variability may be present.

Recommendations

Silty sands are found at both the Crows Landing and Tuolumne River locations. Both locations show potential for recharge projects. Because site-specific conditions will determine the feasibility of a recharge project, more testing will be required to determine the best site-specific recharge locations on each parcel. Further testing may include performing more borings to deeper depths, additional infiltration and percolations testing, and performing onsite percolation tests in test pits. Results of further testing can help quantify ranges of potential percolation rates and determine the acreage that would be needed to percolate estimated stormwater flow volumes, which will then, in turn, support identification of specific sites and design of field testing programs at those locations. Therefore, further work is recommended to determine necessary project size and potential siting.

REFERENCES:

AECOM. 2017. *Drainage Study for Crows Landing Industrial Business Park.* Available at http://www.stancounty.com/planning/pl/act-proj/pln2013-0091_appendix-i-drainage-study-.pdf. Accessed November 2018.

AECOM. 2018. *Crows Landing Industrial Business Park Specific Plan Environmental Impact Report.* Available at http://www.stancounty.com/planning/pl/act-proj/pln2013-0091_crows-landing-public-deir-.pdf. Accessed November 2018.

Department of Water Resources. 1981. *Depth to the Top of the Corcoran Clay.*

ATTACHMENT A

Stanislaus County Multi-Agency SWRP Geotechnical Memorandum

Crawford & Associates, Inc.
Geotechnical Engineering, Design and Construction Services
Sacramento | Modesto | Pleasanton | Rocklin | Ukiah

Corporate Office: 1100 Corporate Drive, Suite 230 | Sacramento, CA 95831 | (916) 455-4225
Modesto: 1165 Scenic Drive, Suite A | Modesto, CA 95350 | (209) 312-7668
Pleasanton: 6200 Stoneridge Mall Road, Suite 330 | Pleasanton, CA 94588 | (925) 401-3515
Rocklin: 4220 Rocklin Road, Suite 1 | Rocklin, CA 95677 | (916) 455-4225
Ukiah: 100 North Pine Street | Ukiah, CA 95482 | (707) 240-4400

March 26, 2019
CAInc File No. 19-501.1

Hawkeye Sheene
Woodard & Curran
1545 River Park Drive
Sacramento, CA 95815

Subject: **Geotechnical Memorandum**
Infiltration Rate Data
Stanislaus County Multi-Agency SWRP Project
Stanislaus County, California

Dear Ms. Hawkeye Sheene,

At your request, Crawford & Associates, Inc. (CAInc) prepared this geotechnical memorandum summarizing the results of our infiltration rate tests at two sites (Dry Creek and Crows Landing) in Stanislaus County, California.

SCOPE OF SERVICES

To prepare this memorandum, CAInc:

- Discussed the infiltration testing process and test locations with Hawkeye Sheene and Leslie Dumas;
- Reviewed soil data on the United State Department of Agriculture (USDA) Web Soil Survey;
- At the Crows Landing Site, CAInc completed three hand auger borings (T1 through T3), at the locations shown on Figure 1, to a depth of 5 ft below ground surface (bgs) and performed falling head infiltration rate tests on February 23, 2019;
- At the Dry Creek Site, CAInc completed two hand auger borings (T4 and T5) to a depth of 5 ft bgs, at the locations selected by Miguel Alvarez of the City of Modesto and performed infiltration rate tests on February 22, 2019; and,
- Completed laboratory testing on soil samples obtained during subsurface exploration.

SITE DESCRIPTION AND USDA SOIL SURVEY

CROWS LANDING

The Crows Landing site is located within the former Crows Landing Air Facility, approximately 3 miles northwest of the community of Crows Landing. The Crows Landing site is adjacent to the intersection of W Marshall Road, Bell Road, and State Route 33. The site is a County-owned property. Three infiltration rate tests were completed west of Little Salado Creek as shown on Figure 1.

The USDA Web Soil Survey (websoilsurvey.nrcs.usda.gov/app, accessed October 23, 2018) indicates that the Crows Landing site is underlain by Capay clay to a depth of 5 ft bgs. The soils encountered in T1, T2, and T3 are consistent with the Web Soil Survey mapping and generally consist of lean clays to the bottom of each hand auger boring (5 ft depth).

DRY CREEK

The Dry Creek site is located in property owned by the City of Modesto along Hillside Drive, just south of Orville Wright Elementary School and north of the Tuolumne River. Miguel Alvarez from the City of Modesto identified these locations for infiltration rate testing. Two infiltration rate tests were completed within two hand borings at the Dry Creek site as shown on Figure 2.

The Web Soil Survey indicates that the Dry Creek site is underlain by Hanford Sandy Loam to a depth of 5 ft bgs. Loam is considered a soil with equal parts of sand, silt, and clay. The soils encountered in T4 and T5 consist of interbedded layers of sandy silt, clayey sand, and lean clay. The sandy silt and clayey sand are generally consistence with Web Soil Survey mapping.

INFILTRATION RATE TESTING

To determine soil infiltration rates, we used the United States Bureau of Reclamation falling head test method. We performed our infiltration tests within proposed basin area. In general, the test procedure consists of the following:

- Drill a 4-inch diameter hole to test depth.
- Clean the borehole
- Place a two-inch layer of fine gravel at the bottom of the hole, and set an observation pipe. Secure the perforated pipe with gravel to prevent movement during testing.
- Saturate the bottom of the hole with a minimum of 12 inches of water for at least 18 hours;
- Begin measuring water levels from a fixed reference point at 5 minute intervals.
- Infiltration rates are considered stable after three consecutive readings show a consistent water level drop rate.

The infiltration test locations are shown on Figures 1 and 2. We present the results of our infiltration tests in Table 1.

Table 1: Infiltration Test Data

Project Site	Boring Number	Test Depth (ft)	Field Infiltration Rate (in/hr)	Absorption Rate (gal/ft^2 per day)	USCS Soil Classification	Percent Fines
Crows Landing	T1	5	14.4	6.6	CL	70
Crows Landing	T2	5	14.4	6.1	CL	70*
Crows Landing	T3	5	$1x10^{-5}$	--	CL	78
Dry Creek	T4	5	9.68	4.4	CL	51
Dry Creek	T5	5	0.16	0.05	CL	68

*Visual Classification based on Unified Soil Classification System

For the Crows Landing site, our field tests ranged from very low to high infiltration rates of approximately $1x10^{-5}$ and 14.4 inches per hour. During the test, T3 sat for over an hour with no change in water depth. The Web Soil Survey data indicates that the upper five feet of clayey

soil in the project area should more closely match the T3 results and yield much lower infiltration rates between 0.06 to 0.2 inches per hour. For the Dry Creek site, our field tests ranged from low to high infiltration rates of approximately 0.16 and 9.7 inches per hour. The Web Soil Survey data indicates that the upper five feet of loam soil in the project area should generally yield infiltration rates of about 1.98 to 5.95 inches per hour.

Based on our experience, the falling head test method can yield results that vary by as much as 90% between tested locations due to variations in subsurface soil conditions, location of more or less permeably materials, and existing saturation. Due to the variability and reliability of the test method, CAInc recommends the designer consider the USDA Soil Survey information, the soil gradation, and applying a minimum factor of safety of 4 to the above infiltration rate values.

Due to the alluvial nature of the soils underlying the sites, there can also be significant lateral and vertical variation in soil type and infiltration rates within relatively short distances.

LIMITATIONS

CAInc prepared this memorandum in accordance with generally accepted geotechnical engineering principles and practices currently used in this area. This report is intended for the design team to use during preliminary design. CAInc based this report on the current site conditions. We assumed the soil conditions are representative of the subsurface conditions on the site. Actual conditions between hand auger borings could be different.

Depending on the purpose of the project, a deep boring (at each site) to establish the groundwater table and additional soil layers should be completed and additional percolation testing should be considered. Do not use this information for different locations or projects without the written consent of CAInc.

We appreciate the opportunity to work with you on this project. Please call if you have questions.

Sincerely,
Crawford & Associates, Inc.,

Benjamin D. Crawford, PE, GE
Principal Geotechnical Engineer

REGISTERED PROFESSIONAL ENGINEER
BENJAMIN D. CRAWFORD
No. 68457
CIVIL
STATE OF CALIFORNIA

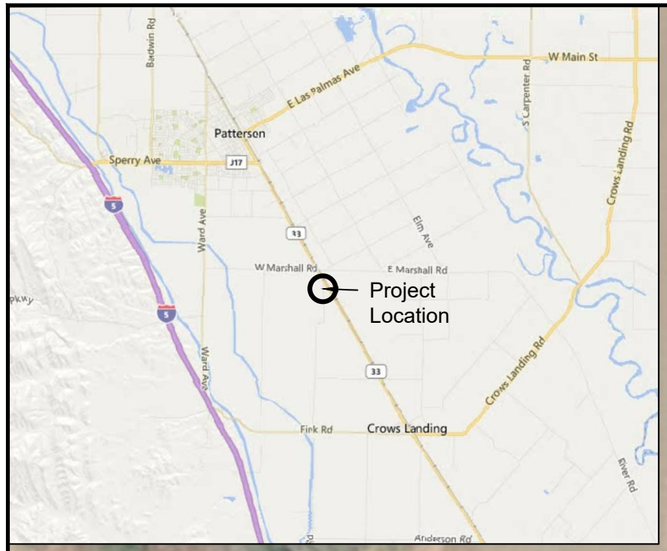
Ellen Tiedemann, EIT
Project Engineer

LIST OF ATTACHMENTS:

Figure 1: Crows Landing Exploration Location Map
Figure 2: Dry Creek Exploration Location Map
Appendix I – Laboratory Test Results

FIGURES

Figure 1: Crows Landing Exploration Location Map
Figure 2: Dry Creek Exploration Location Map



T1

T2

T3

Little Salado Creek

Bell Road

CA 33

North

LEGEND

T1 PERCOLATION TEST LOCATIONS

Crawford & Associates, Inc.
Geotechnical Engineering, Design and Construction Services
Taber Since 1954
1100 Corporate Way
Suite 230
Sacramento, CA 95831
(916) 455-4225

STANISLAUS COUNTY MULTI-AGENCY SWRP PROJECT

STANISLAUS COUNTY, CA

Figure 1
Crows Landing Exploration Location Map

Proj. No:	19-501.1
Scale:	1"=100'
Date:	3/8/19



North

LEGEND

T1 PERCOLATION TEST LOCATIONS

Crawford & Associates, Inc.
Geotechnical Engineering, Design and Construction Services
Taber Since 1954
1100 Corporate Way
Suite 230
Sacramento, CA 95831
(916) 455-4225

STANISLAUS COUNTY MULTI-AGENCY SWRP PROJECT

STANISLAUS COUNTY, CA

Figure 2
Dry Creek
Exploration Location
Map

Proj. No: 19-501.1
Scale: 1"=100'
Date: 3/8/19

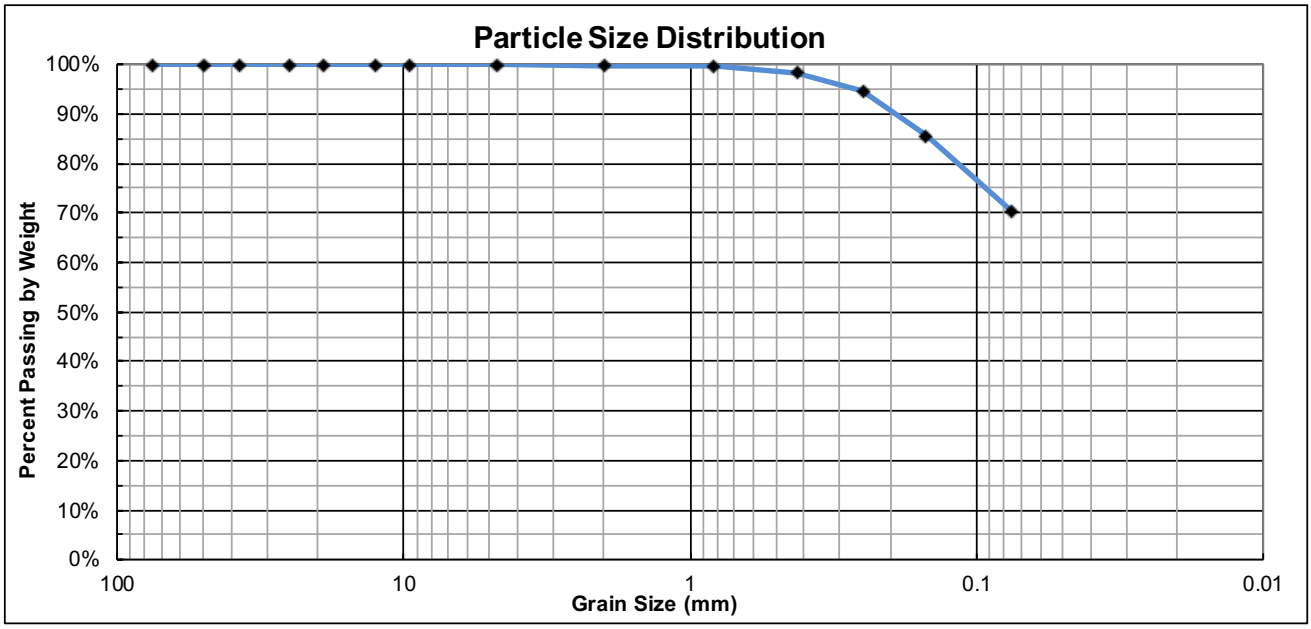
APPENDIX I

Laboratory Test Results

Crawford & Associates, Inc.
Geotechnical Engineering, Design and Construction Services

Project Name: Stanislaus County Multi-Agency SWRP
CAInc File No: 19-501.1
Date: 3/11/19
Technician: BJU
Sample ID: T1-2
Depth (ft): 5
USCS Classification: SANDY Lean CLAY (CL)

ASTM 6913 - Method A



% Cobble	% Gravel		% Sand			% Fines
	Coarse	Fine	Coarse	Medium	Fine	Silt/Clay
	0	0	0	2	28	
0	**0**		**30**			**70**

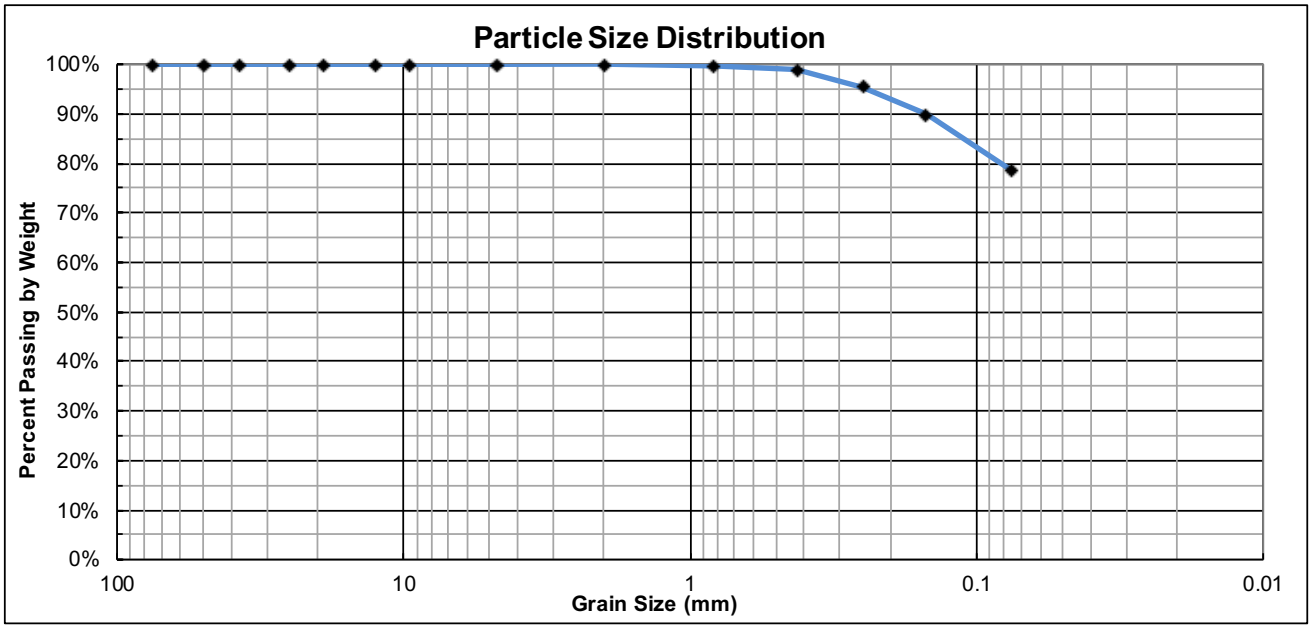
		Sieve #	Opening mm	Cummulative Mass Retained (g)	% Passing %
Cobbles		**3"**	75	0.0	100%
Gravel	Coarse	**2"**	50	0.0	100%
		1-1/2"	37.5	0.0	100%
		1"	25.0	0.0	100%
		3/4"	19.0	0.0	100%
	Fine	**1/2"**	12.5	0.0	100%
		3/8"	9.50	0.0	100%
		#4	4.75	0.0	100%
Sand	Coarse	**#10**	2.00	0.8	100%
	Medium	**#20**	0.825	1.7	99%
		#40	0.425	5.4	98%
	Fine	**#60**	0.250	18.6	94%
		#100	0.150	49.2	85%
		#200	0.075	100.7	70%

Coefficient of Uniformity	Coefficient of Curvature
Cu = NA	Cc = NA

Crawford & Associates, Inc.
Geotechnical Engineering, Design and Construction Services

Project Name: Stanislaus County Multi-Agency SWRP
CAInc File No: 19-501.1
Date: 3/11/19
Technician: BJU
Sample ID: T3-3
Depth (ft): 5
USCS Classification: Lean CLAY with SAND (CL)

ASTM 6913 - Method A



% Cobble	% Gravel		% Sand			% Fines
	Coarse	Fine	Coarse	Medium	Fine	Silt/Clay
	0	0	0	1	21	
0	**0**		**22**			**78**

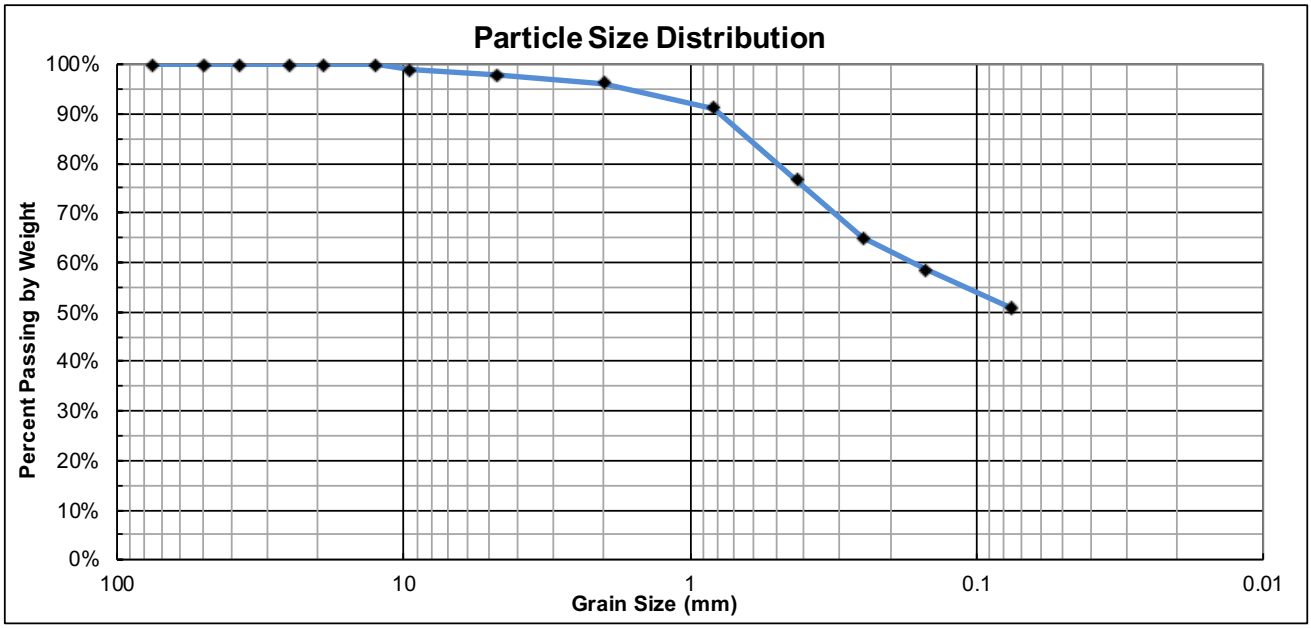
		Sieve #	Opening mm	Cummulative Mass Retained (g)	% Passing %
Cobbles		**3"**	75	0.0	100%
Gravel	Coarse	**2"**	50	0.0	100%
		1-1/2"	37.5	0.0	100%
		1"	25.0	0.0	100%
		3/4"	19.0	0.0	100%
	Fine	**1/2"**	12.5	0.0	100%
		3/8"	9.50	0.0	100%
		#4	4.75	0.0	100%
Sand	Coarse	**#10**	2.00	0.1	100%
	Medium	**#20**	0.825	0.6	100%
		#40	0.425	2.3	99%
	Fine	**#60**	0.250	8.6	95%
		#100	0.150	19.1	90%
		#200	0.075	40.4	78%

Coefficient of Uniformity	Coefficient of Curvature
Cu = NA	Cc = NA

Crawford & Associates, Inc.
Geotechnical Engineering, Design and Construction Services

Project Name: Stanislaus County Multi-Agency SWRP
CAInc File No: 19-501.1
Date: 3/11/19
Technician: BJU
Sample ID: T4-2
Depth (ft): 5
USCS Classification: SANDY Lean CLAY (CL)

ASTM 6913 - Method A



% Cobble	% Gravel		% Sand			% Fines
	Coarse	Fine	Coarse	Medium	Fine	Silt/Clay
	0	2	2	19	26	
0	**2**		**47**			**51**

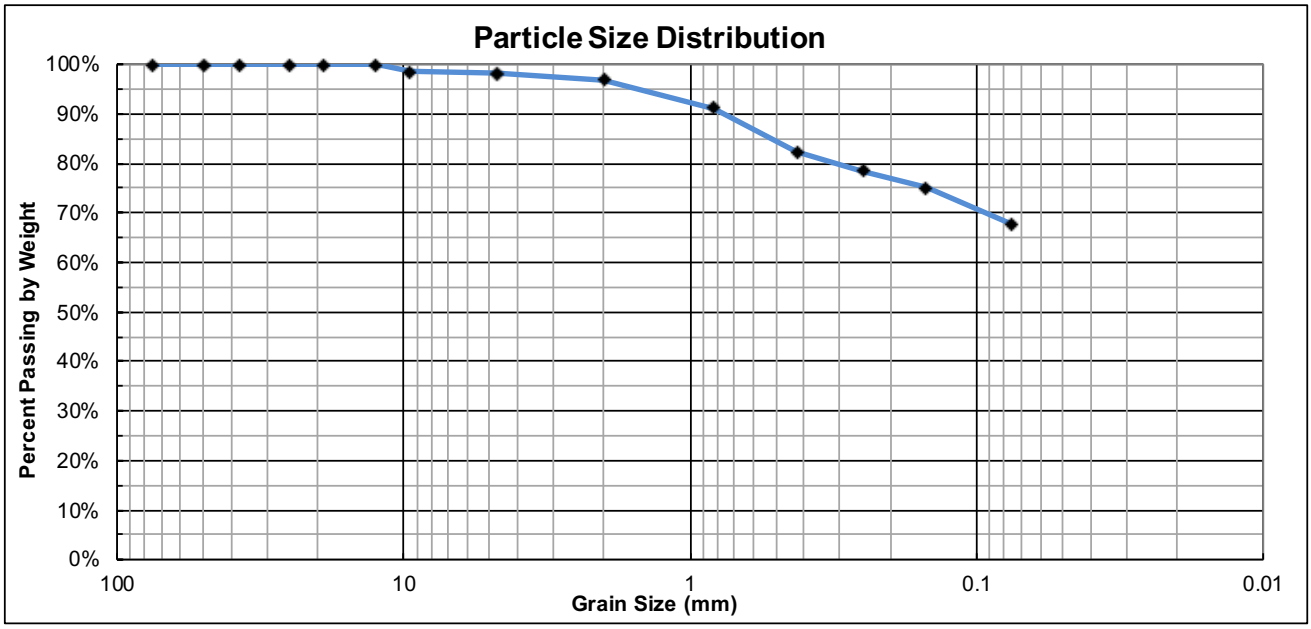
		Sieve #	Opening mm	Cummulative Mass Retained (g)	% Passing %
Cobbles		**3"**	75	0.0	100%
Gravel	Coarse	**2"**	50	0.0	100%
		1-1/2"	37.5	0.0	100%
		1"	25.0	0.0	100%
		3/4"	19.0	0.0	100%
	Fine	**1/2"**	12.5	0.0	100%
		3/8"	9.50	3.3	99%
		#4	4.75	6.2	98%
Sand	Coarse	**#10**	2.00	10.4	96%
	Medium	**#20**	0.825	24.1	91%
		#40	0.425	63.3	77%
	Fine	**#60**	0.250	95.3	65%
		#100	0.150	112.7	58%
		#200	0.075	133.8	51%

Coefficient of Uniformity	Coefficient of Curvature
Cu = NA	Cc = NA

Crawford & Associates, Inc.
Geotechnical Engineering, Design and Construction Services

Project Name: Stanislaus County Multi-Agency SWRP
CAInc File No: 19-501.1
Date: 3/11/19
Technician: BJU
Sample ID: T5-3
Depth (ft): 5
USCS Classification: SANDY Lean CLAY (CL)

ASTM 6913 - Method A



% Cobble	% Gravel		% Sand			% Fines
	Coarse	Fine	Coarse	Medium	Fine	Silt/Clay
	0	2	1	15	14	
0	**2**		**30**			**68**

		Sieve #	Opening mm	Cummulative Mass Retained (g)	% Passing %
Cobbles		**3"**	75	0.0	100%
Gravel	Coarse	**2"**	50	0.0	100%
		1-1/2"	37.5	0.0	100%
		1"	25.0	0.0	100%
		3/4"	19.0	0.0	100%
	Fine	**1/2"**	12.5	0.0	100%
		3/8"	9.50	3.7	98%
		#4	4.75	4.4	98%
Sand	Coarse	**#10**	2.00	7.1	97%
	Medium	**#20**	0.825	20.7	91%
		#40	0.425	41.3	82%
	Fine	**#60**	0.250	50.2	79%
		#100	0.150	58.4	75%
		#200	0.075	75.6	68%

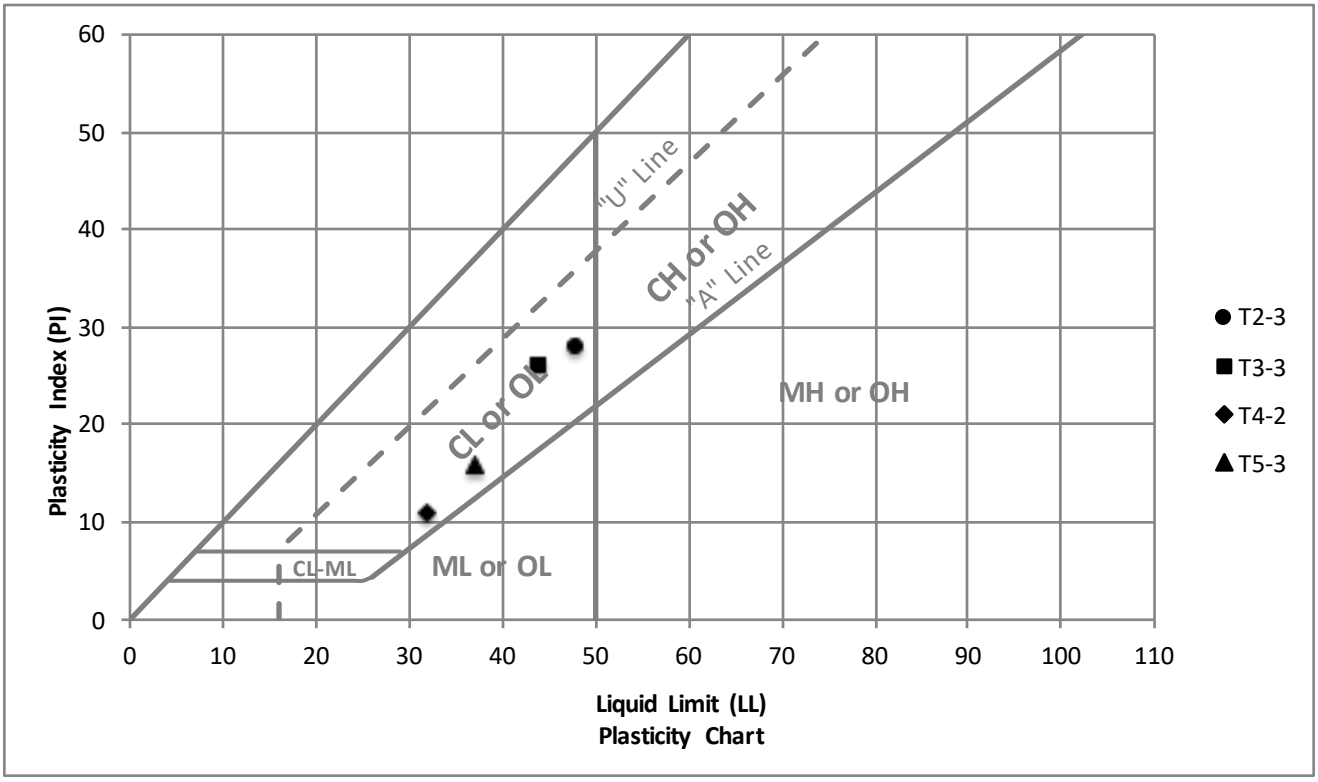
Coefficient of Uniformity	Coefficient of Curvature
Cu = NA	Cc = NA

Crawford & Associates, Inc.
Geotechnical Engineering, Design and Construction Services

Project Name: Stanislaus County Multi-Agency SWRP
CAInc File No: 19-501.1
Date: 3/13/19
Technician: BJU/CAP

Plastic Index - ASTM D4318

Sample ID	Depth (ft)	Liquid Limit	Plastic Limit	PI
T2-3	5	48	20	28
T3-3	5	44	18	26
T4-2	5	32	21	11
T5-3	5	37	21	16



Appendix F - Project Information and Prioritization

Appendix F - Project Information and Prioritization

Appendix F contains materials summarizing the projects submitted during the 2017 Stanislaus SWRP Call for Projects, as well as information on project prioritization and scoring.

Content	Page Number
Project Description and Scoring Summary Sheet This sheet summarizes project submitted, including proponent, project description, benefits, and overall score.	F-2
Detailed Scoring Summary This sheet details the full set of scores assigned to each project.	F-10
Benefits Quantification Summary Sheet This sheet summarizes the quantitative benefits provided by the projects.	F-14
Project Solicitation Form This is the solicitation form which was used to collect project information from SWRP project proponents.	F-16
Project Schedule Information This sheet summarizes the project schedule information provided by SWRP project proponents.	F-29
Opti Quick Start Guide This sheet provides instructions on how to create an Opti account and submit a project.	F-31

Stanislaus County Multi-Agency Regional Storm Water Resource Plan

Project Description and Scoring Summary Sheet

Project Name	Project Proponent	Project Description	Score	Project Type	Benefit Categories Met
Ready to Proceed and Preliminary Design Complete Projects					
Tuolumne River Regional Park	Tuolumne River Regional Park JPA	Continued development of the undeveloped areas of the Tuolumne River Regional Park including the Gateway Parcel. http://www.midsjrfloodplan.org/projects/tuolumne-river-regional-park	64	Ready to Proceed	Water Quality, Water Supply, Flood Management, Environmental, Community
Modesto Area 2 Stormwater to Sanitary Sewer Cross-Connection Removal Project	City of Modesto	The proposed multi-benefit project captures, treats, and infiltrates stormwater. The project uses LID Techniques including bio-retention planters, infiltration trenches, and a underground retention basin under Roosevelt Park. The project recharges the groundwater aquifer, reduces stormwater flows to the wastewater treatment plant, the number of Sanitary Sewer Overflows, and improve water quality for Dry Creek, and the Lower Tuolumne River (303d water bodies). Located in the fully developed northwest portion of Modesto which has no positive storm drainage system, the project is a cost effective and LID Alternative to constructing detention basins in undeveloped portions of the city and constructing miles of storm drains. Fourteen failed dry wells and six sanitary sewer cross connections will be removed. The project will reduce localized flooding on Granger Avenue a heavily traveled local street.	60	Ready to Proceed	Water Quality, Water Supply, Flood Management, Environmental, Community
Mustang Creek MAR Project	Eastside Water District	The Mustang Creek MAR Project will divert Mustang Creek flows during extreme flood events at an existing Bifurcation Structure located downstream of the flood control Detention Basin. The Bifurcation Structure presently diverts flood flows into a 95-acre-foot off-channel impoundment basin covering 74 acres for flood protection. The Bifurcation Structure is estimated to allow up to 210 cfs to be diverted into the existing impoundment basin. The Mustang Creek MAR Project will include ripping the 74-acre basin site to encourage percolation, similar to an agricultural practice used prior to planting an almond orchard. coordinated. Operation of the Bifurcation Structure with and the upstream Mustang Creek Detention Basin will be coordinated to divert storm surges and maximize the potential diversion for groundwater recharge at the Mustang Creek MAR Project. The Project will enhance the primary function of the Detention Basin; flood control.	52	Ready to Proceed	Water Supply, Flood Management, Community
Rouse Lake Managed Aquifer Recharge (MAR) Project	Eastside Water District	This Rouse Lake MAR Project consists of the following three (3) components: 1) Four (4) or more floating lake intakes with a pumping capacity of each at about 1,500 gallons per minute; designed with screens and pumping schemes to comply with all BMPs for similar type facilities; 2) Pipelines to deliver Rouse Lake water to existing developed lands for irrigation purposes; varying from 8-inch to 30-inch in diameter; 3) Up to 20 vertical drains (dry-wells) within the receded Rouse Lake lakebed to accomplish direct groundwater recharge. This is an environmentally sensitive water supply project that achieves new yield from the conjunctive management of surface and groundwater sources; direct GW recharge via vertical drains; in-direct GW recharge via irrigation; and additional GW recharge via use of Rouse Lake as a regulatory reservoir. Benefits to supply are matched by benefits to DACs, SDACs, EDAs, and the local ecology.	52	Ready to Proceed	Water Supply, Flood Management, Community
Little Salado Creek Groundwater Recharge and Flood Control Basin	Stanislaus County	Construction of a stormwater detention basin to partially divert, retain and percolate up to 270 cubic feet per second (cfs) of flow from Little Salado Creek.	50	Ready to Proceed	Water Quality, Water Supply, Flood Management, Environmental, Community

Stanislaus County Multi-Agency Regional Storm Water Resource Plan

Project Description and Scoring Summary Sheet

Project Name	Project Proponent	Project Description	Score	Project Type	Benefit Categories Met
West Stanislaus Irrigation District Fish Screen Project	West Stanislaus Irrigation District	The Proposed Project/Action consists of the following elements which are described in more detail below: (1) cone screens located at the mouth of the existing intake canal; (2) a low-lift pump station at the same location; (3) approximately 2,100 feet of underground pipeline from the proposed pump station to the intake canal; (4) sediment removal and management along the length of the intake canal; (5) upgrading of existing roads along the intake canal; (6) two wildlife crossings of the intake canal, one of which would also allow flood conveyance; (7) facilities for providing late fall-water deliveries to the Refuge; and (8) a flood connectivity structure to support the USFWS' management of the Refuge for floodplain reconnection; WSID will not operate the spillway structure as part of this project. The project footprint measures approximately 26.7 acres, with an additional approximately 57.8 acres within areas designated operations and access routes.	49	Ready to Proceed	Water Quality, Water Supply, Flood Management
TRRP - Carpenter Road/West Modesto Flood Management and Park Development	TRRP JPA	Help reduce flood damages in West Modesto neighborhoods while developing the adjacent Tuolumne River Regional Park. http://www.midsjrfloodplan.org/projects/tuolumne-river-regional-park-%E2%80%93-carpenter-roadwest-modesto-flood-management-and-park	47	Ready to Proceed	Water Quality, Water Supply, Flood Management, Environmental, Community
Orestimba Creek Recharge and Recovery Project (OCRRP)	Del Puerto Water District	The Orestimba Creek Recharge and Recovery Project (OCRRP) will construct a 20 acre recharge facility near Orestimba Creek and the Delta-Mendota Canal (DMC) that would allow recharge of 500 acre feet per year (afy) to the local groundwater basin. Existing connections to the DMC would deliver up to 500 afy of excess winter flows and recaptured storm water flows. The banked water would be available for recovery during dry periods through the construction of an extraction well at the site. The recharge water source would vary from year to year, but could include excess winter flows from CCID and storm water flows from the Kings River, San Joaquin River, and Orestimba Creek.	41	Ready to Proceed	Water Supply, Flood Management
Catherine Everett Park Cross Connection Elimination	City of Modesto	The City is removing cross connections (storm water is discharged to the sanitary sewer system) to capture, treat, and infiltrate approx. 5.5 ac-ft of storm water runoff to augment groundwater supplies, reduce flood-related damage, improve the quality of storm water runoff percolating to the underlying groundwater basin, and reduce sanitary sewer overflows, and peak wet weather flow in the sanitary sewer collection system. Catharine Everett Park has been identified in the Area 2 SD Cross Connection Removal Report - Phase 1 (www.modestogov.com). Retention is recommended based on open area and percolation tests. This project would also provide improvements to an existing park to enhance the functionality and/or improve quality of usability.	41	Ready to Proceed	Water Quality, Water Supply, Flood Management, Community
JM Pike Park Cross Connection Elimination	City of Modesto	JM Pike Park has been identified in the Area 2 SD Cross Connection Removal Report (www.modestogov.com). The PDR notes that detention (12 ac-ft) of storm runoff) was estimated to have significantly lower capital costs than retention (24 ac-ft of storm runoff). Due to SGMA, opportunities for groundwater recharge have priority, therefore this project should be re-evaluated to consider cost-effective retention. Excavation will be required at the park site (detention or retention), reconstruction of facilities are expected to include ADA-compliant access, surface improvements, baseball infield, large play area. New facilities are expected to include ADA-compliant access.	41	Ready to Proceed	Water Quality, Water Supply, Flood Management, Community

Stanislaus County Multi-Agency Regional Storm Water Resource Plan

Project Description and Scoring Summary Sheet

Project Name	Project Proponent	Project Description	Score	Project Type	Benefit Categories Met
Empire Community Storm Drainage Plan	Stanislaus County	Design and construct the Empire Community Storm Drainage Infrastructure Improvement Project located in the unincorporated town of Empire in Stanislaus County. This project facilitates storm water recharge into the underlying groundwater basin by the re-grading of public roadways and construction of curbless roadside swales, which will collect, treat and percolate storm water runoff from the public right-of-way. Sidewalks will be constructed throughout the community of Empire, for two purposes: (1) to prevent stormwater runoff from flowing off of private property into the public roadside swales; and (2) to increase pedestrian safety and enhance livability in this Disadvantaged Community (DAC). The project is located adjacent to approximately 340 parcels.	40	Ready to Proceed	Water Quality, Water Supply, Community
First Street Basin Rehabilitation	City of Riverbank	Rehabilitate the basin by adding ground water recharge, habitat enhancement and public access.	37	Ready to Proceed	Water Quality, Flood Management, Community
F St Storm Pond	City of Waterford	Create a new storm retention pond that is an open space for public access to use as a park. This storm pond will redirect runoff from the river to a retention basin. This retention basin will will be a source of groundwater recharge in times of rain and also improve water quality to surface waters by allow the earth to cleanse the water naturally.	34	Ready to Proceed	Water Quality, Water Supply, Flood Management, Environmental, Community
Orestimba Creek Flood Management Project	City of Newman	The chevron levee will be constructed parallel to the east bank of the CCID Main Canal. Starting at the Newman Wasteway, the levee would continue north to a location near Lundy Road, at which point the levee alignment would angle diagonally away from the canal toward the northeast for another 0.7 miles to tie in to the CNRR embankment near an existing culvert. This existing culvert would function to reduce the frequency and duration of floodwater ponding on the north side of the levee. The levee would also extend an additional 35 feet east of the CNRR embankment to ensure that floodwaters do not flank the proposed levee. Construction of a 4.7-mile chevron levee along east bank of CCID Main Canal and a 1-mile cross levee to reduce flood risk to Newman and adjacent agricultural areas, providing a 200-year level of protection. The chevron levee would include 3 feet of freeboard above the mean 200-year water surface elevation.	31	Ready to Proceed	Water Quality, Water Supply, Flood Management
North Valley Regional Recycled Water Project	City of Turlock on behalf of NVRRWP Partners	The North Valley Regional Recycled Water Project (NVRRWP) will deliver up to ~60,000 AFY of recycled water produced by the Cities of Modesto and Turlock to the Del Puerto Water District (DPWD) via the Delta Mendota Canal (DMC). DPWD is a California Special District located along the west side of the San Joaquin Valley in Stanislaus, San Joaquin, and Merced Counties. DPWD's sole source of water supply is Central Valley Project (CVP) water under contract with the U.S. Bureau of Reclamation. Under its long-term contract, it receives up to 140,210 AFY of water to provide to approximately 45,000 acres of highly productive farmland with a production value of over $100 million gross farm dollars annually. In recent years, DPWD has experienced reduced allocations under its contract. In 2014, it received 0% of its full contractual amount which will be devastating to the agricultural growers, the disadvantaged communities in the service area, and the Region as a whole.	31	Ready to Proceed	Water Quality, Water Supply, Community
7th Street Low Impact Development (LID) Storm Drainage Improvements	City of Hughson	Construct Low Impact Development storm water facility on existing street with inadequate drainage facilities and no outlet to detention/retention basin. Project will avoid the need for a basin, thereby avoiding conversion of farmland for that purpose.	30	Ready to Proceed	Water Quality, Water Supply, Flood Management
7th Street Outfall Rehabilitation	City of Riverbank	Project will replace failed outfall, piping and construct a trash filter.	25	Ready to Proceed	Water Quality, Community

Stanislaus County Multi-Agency Regional Storm Water Resource Plan

Project Description and Scoring Summary Sheet

Project Name	Project Proponent	Project Description	Score	Project Type	Benefit Categories Met
Conceptual Projects					
Stormwater Infrastructure and Dual Use Basins for County Islands (DUCs)	Stanislaus County	There are various older urban Disadvantaged Communities (DACs) in unincorporated Stanislaus County that lack a storm drainage system. This project utilizes existing Mono Park, Mancini Park, Tuolumne Regional River Park and other County parks and public right of way as groundwater recharge locations to collect and percolate storm water runoff locally. Curb, gutter and sidewalks will be installed to enhance the community's use of walking paths, streets and private property by preventing localized flooding. Storm drain systems will be installed to capture runoff and direct it through a series of storm drainage pipes and a filtration system prior to it entering a subsurface retention system which will store and percolate the runoff. Dual-use basins will be installed in some areas to provide aboveground storage, groundwater recharge and recreational opportunities for the surrounding neighborhoods.	69	Concept	Water Quality, Water Supply, Flood Management, Environmental, Community
Airport Neighborhood Stormwater Retention System and Dual Basin/Low Impact Strategies Stormwater Runoff	Tuolumne River Trust	The Airport Neighborhood is hampered by several factors including its geographic location (bordered by an industrial area, the Modesto Airport, and Highway 132); jurisdiction (half the neighborhood is within Modesto City limits, the other half is county); extreme socioeconomic challenges; its limited recreational activities and infrastructure. Many streets have no sidewalks making walking and bicycling dangerous. One of the priorities is to identify safe routes to walk/bicycle in the Neighborhood. As such, Airport families are actively participating in the Walking School Bus, Airport Bicycle Club and the Airport Walking Club. Using existing neighborhood parks like Mono, Oregon, George Rogers or the TRRP can be used as a recharge location for the neighborhood to facilitate a storm drain project. By adding curb gutter sidewalks as part of storm drain project, this enhances the community's use of walking/cycling paths, and streets by preventing localized flooding.	63	Concept	Water Quality, Water Supply, Flood Management, Environmental, Community
Dry Creek Watershed Detention Reconnaissance Study	Stanislaus County	Complete a reconnaissance study of potential options for reducing flood risks by detaining flood flows in the Dry Creek watershed, upstream of the City of Modesto. Evaluate opportunities for groundwater recharge in the detention areas. Conduct a Flood Hazard Assessment in an Integrated Development Planning Study. Stanislaus County will lead the effort, through the collection and review of generally available resource information, including reviewing the 1998 USACE reconnaissance study. The team will review available topographic, hydrologic and vegetation mapping as well as aerial and satellite imagery. This data will then describe the need for a flood hazard assessment. http://www.midsjrfloodplan.org/projects/dry-creek-watershed-detention-reconnaissance-study.	58	Concept	Water Quality, Water Supply, Flood Management, Environmental, Community
Stormwater Outfall Capture and Storage Project	City of Modesto	The City has 64 river outfalls and 26 canal outfalls, these sources of runoff will be evaluated, for the feasibility to capture and reuse the runoff. Project concept needs to be developed, each outfall needs to be evaluated and prioritized; proceed with developed project as funding allows	54	Concept	Water Quality, Water Supply, Flood Management, Environmental, Community
Modesto Urban Stormwater Basin Recharge Enhancement Program	City of Modesto	The purpose of this program is to optimize groundwater recharge opportunities through use of the existing stormwater basins. This project will analyze Modesto's stormwater retention and detention storage basins, identify missing data needs, determine basin capacities where unknown, establish percolation rates, review operational parameters and constraints and rank basins and their associated stormwater runoff areas as to greatest need and potential for increasing stormwater basin recharge opportunities. Potential solutions could include changing operational criteria and installation of infrastructure to maximize percolation instead of pumping stormwater to irrigation facilities and discharges to Tuolumne River. These efforts could also allow areas that currently have inadequate flood mitigation facilities (aka inefficient storm basins) to increase their stormwater management capabilities to provide reduced flooding potential.	52	Concept	Water Quality, Water Supply, Flood Management, Environmental, Community

Stanislaus County Multi-Agency Regional Storm Water Resource Plan

Project Description and Scoring Summary Sheet

Project Name	Project Proponent	Project Description	Score	Project Type	Benefit Categories Met
Tuolumne River Flood Management Feasibility Study	Tuolumne River Regional Park JPA	Complete a USACE Feasibility Study, or a study similar in scope, that evaluates how the management of the Tuolumne River could be revised to improve flood control, enhance aquatic habitat, and improve water quality. http://www.midsjrfloodplan.org/projects/tuolumne-river-flood-management-feasibility-study	47	Concept	Water Supply, Flood Management, Environmental, Community
Eastisde Regional Storm Recharge Basin	City of Riverbank	This will be a combined storm water basin and ground water recharge facility coordinated with Oakdale Irrigation District and Stanislaus County.	46	Concept	Water Quality, Water Supply, Flood Management, Environmental, Community
Northeast Storm Drainage Interceptor Project	City of Modesto	This project would construct a series of four large storm water detention basins and an interceptor pipe east of the AT&SF Rail line to an existing outfall at Dry Creek for the purpose of eliminating the overland 100-year flood event risk to northeast Modesto from roughly 2,335 acres of northeast watershed area. This project could also utilize collected runoff from more frequent storm runoff events for the purpose of promoting groundwater recharge strategies in areas that have high potential to provide good recharge instead of discharging to Tuolumne River via proposed interceptor channel.	46	Concept	Water Quality, Water Supply, Flood Management, Environmental, Community
Install Storm Drainage Capture and Recharge Systems in Flood-prone Areas	City of Modesto	Priority Recommendations in SDMP have been updated due to new direction with SGMA, storm drain systems will be moving away from installing new detention systems and going towards installing new retentions systems for recharge and groundwater sustainability. Construct pipelines and retention systems in Hot Zones (areas served by rockwells that have historically experienced flooding, which require City operations and maintenance to pump the surface storm water into the sanitary sewer system periodically after storms). A couple areas have already been mitigated utilizing existing storm drainage system extensions and underground capture and recharge.	44	Concept	Water Quality, Water Supply, Flood Management, Environmental, Community
Newman LID Water Quality and Conservation Project	City of Newman	The City of Newman has acquired and is proposing to develop 103 acres, located near E. Inyo and Canal School Road, for treating urban water runoff such as nuisance water from parks and landscaped areas through a Low Impact Development (LID). The City plans to develop 78 acres for water treatment, implementing LID applications such as vegetated swales, constructed wetlands, and bio retention basins. The project will include a trail system with educational signs for LID application. The remaining 25 acres will be used for the storage of the treated water, which can be used for irrigation of city land, maximizing groundwater recharge and water conservation by reusing the treated water. The project, through implementation of Best Management Practices, will reduce discharge of sediment/pollutants; improve the quality of urban water runoff; re-use treated water for irrigation; and provide an attractive recreational area for use by bicyclists and pedestrians.	41	Concept	Water Supply, Environmental, Community
Borax Ct Storm Basin	City of Waterford	Borax storm basin successfully collects storm water but is not constructed for infiltration. The concept would be to reconstruct the basin for infiltration and possible a green space.	36	Concept	Water Quality, Water Supply, Environmental, Community
Dry Well Rehabilitation, Rejuvenation, Reconstruction	City of Waterford	Conduct project research to identify best approach to rehabilitate and rejuvenate a series of dry wells on Tim Bell Rd from Bentley to Bonnie Brea or outline the project to be a complete overhaul and include a conveyance system to captured storm water and dry weather runoff and direct to a storm water basin to infiltrate and recharge groundwater.	36	Concept	Water Quality, Water Supply, Environmental, Community
Forrestal Storm Basin	City of Waterford	Forrestal Storm basin successfully collects storm water but is not constructed for infiltration. The concept would be to reconstruct the basin for infiltration and possible a green space for DAC community.	36	Concept	Water Quality, Water Supply, Environmental, Community
Gst and Church Storm Basin	City of Waterford	The storm basin is due for upgrades and storm water infiltration rejuvenation. Potential site for green space as well for a DAC community.	36	Concept	Water Quality, Water Supply, Environmental, Community

Stanislaus County Multi-Agency Regional Storm Water Resource Plan

Project Description and Scoring Summary Sheet

Project Name	Project Proponent	Project Description	Score	Project Type	Benefit Categories Met
Old Downtown Green Street Improvements	City of Patterson	The proposed project consists of green street improvements on various streets located in the city's historic downtown. The project will consist of removing existing sidewalk and installing pervious interlocking joint pavers to treat stormwater as well as recharge groundwater. Tree wells, vegetated swales and curb extension would be installed at intersections and mid-block which would maximize street parking as well as provide additional capture capacity. This project would improve water quality, promote stormwater LID improvements, mitigate flooding that has been on-going issue, increase esthetics and property values, along with other benefits.	36	Concept	Water Quality, Water Supply, Environmental, Community
Patterson Green Street Improvement Project	City of Patterson	The proposed project consists of green street improvements on various streets located in the city's historic downtown. The project consists of removing existing sidewalks and installing pervious interlocking joint pavers to treat stormwater as well as recharge groundwater. Tree wells, vegetated swales, and curb extensions would also be installed at intersections and mid-block which would maximize street parking as well as provide additional capture capacity. This project would improve water quality, introduce stormwater LID improvements, mitigate flooding that has been on-going issue, increase esthetics & property values among other benefits.	36	Concept	Water Quality, Water Supply, Flood Management, Environmental, Community
Percolation Ponds for Stormwater Capture and Recharge	City of Patterson	PP-1 Construct percolation ponds to capture and infiltrate storm water from Del Puerto Creek. The ponds should cover roughly 14 acres. Sizing of the percolation ponds was based on existing infiltration rate data and will be updated when field investigations are complete. The percolation pond project can be phased so that the ponds are constructed over a few years, allowing for the increase of aquifer recharge capacity.	36	Concept	Water Quality, Water Supply, Flood Management, Environmental, Community
Stein Basin	City of Waterford	Reconstruct basin for storm water to infiltration for groundwater recharge and potentially turn into a green space in a DAC community.	36	Concept	Water Quality, Water Supply, Environmental, Community
Candlewood Storm Drainage System Upgrade	City of Riverbank	Construct new storm outfall in Candlewood system to reduce flooding and to filter water.	35	Concept	Water Quality, Flood Management, Community
Various Storm Water Pipeline Rehabilitation projects	City of Riverbank	Repair, upsize and/or construct new storm drain lines to reduce existing flood areas.	35	Concept	Water Quality, Flood Management
Airport Neighborhood Urban Greening Project	Stanislaus County	Stanislaus County received a grant from the Strategic Growth Council to develop the Airport Neighborhood Urban Greening Plan. The objective of the Plan is to reduce the carbon footprint by creating a plan for native plantings, storm drain study, and non-vehicular paths and trails with low-impact development (LID). The Plan is currently under development. This Project consists of implementing the projects identified in the Plan which could include, but are not limited to: improvement of roadways and pedestrian pathways including stormwater management technology, such as bioretention swales, permeable concrete and LID methods.	34	Concept	Water Quality, Water Supply, Environmental, Community
San Joaquin Riverfront Park Project	City of Patterson	Creation of a riverfront park, recreational trail and enhanced habitat along the western bank of the San Joaquin River between Old Las Palmas Avenue and Eucalyptus Avenue.	34	Concept	Flood Management, Environmental, Community
Various Storm Water Basin and Outfall Projects	City of Riverbank	Rehabilitate, filter and provide ground water recharge at various storm water basins and outfalls.	34	Concept	Water Quality, Water Supply, Flood Management
Storm Filter Installation Projects	City of Riverbank	Add storm drainage filters to existing drain inlets, provide regional storm water filtering prior to discharge.	32	Concept	Water Quality, Flood Management, Community
Patterson Green Alley Retrofit Project	City of Patterson	The proposed project consists of retrofitting 55 existing public alleyways (approximately 530,200 square feet) located in the city's historic downtown. The alleys would be converted to green alleys to provide multiple benefits that include stormwater LID, flood mitigation, water quality, increasing esthetic & property values and many other benefits.	32	Concept	Water Quality, Water Supply, Flood Management, Community

Stanislaus County Multi-Agency Regional Storm Water Resource Plan

Project Description and Scoring Summary Sheet

Project Name	Project Proponent	Project Description	Score	Project Type	Benefit Categories Met
Salado Creek Landscape and Pedestrian Path Project	City of Patterson	Salado Creek Landscape and Pedestrian Path Project	32	Concept	Water Supply, Flood Management, Environmental, Community
Safreno Park Storm Drainage System Upgrades	City of Riverbank	Provide ground water recharge, filter water and connect to MID canal.	31	Concept	Water Quality, Flood Management, Community
Castleberg Storm Drainage System Upgrades	City of Riverbank	Increase storage capacity, install parallel pipe system ,provide ground water recharge and filter water prior to river discharge.	28	Concept	Water Quality, Flood Management
EWD Diffused Surface Water Project Merced County Dry Creek Project	Eastside Water District	Control local diffused water supply to direct and in-lieu groundwater recharge facilities using existing and enhanced infrastructure. Turlock Irrigation District (TID) and Eastside Water District (EWD) plan to agree on terms for EWD to use TID conveyance facilities to deliver diffused surface water to recharge facilities currently being designed by EWD. The EWD Board of Directors expects between 15,000 and 30,000 AFA of diffused surface water to become available as early as during the 2017-18 rainy season. TID has 49 inlets to its canals that are opened to allow runoff into the canals and protect the canal levees from damage. These locations and many others will be investigated to design groundwater recharge facilities at location where the groundwater Basin can benefit most from this diffused surface water supply. EWD projects include Rouse Lake, Sand Creek, and Mustang Creek, described in the ES IRWM, and the Merced County's Dry Creek Project focused on herein.	28	Concept	Water Supply
Gangi Cannery Site MS4 Compliance	City of Riverbank	Eliminate the cross connection of the cannery site storm drainage system with the sanitary sewer system.	28	Concept	Water Quality, Flood Management
Townsend Avenue storm drainage improvements to reduce repeated flood events.	City of Riverbank	Improve the Townsend Avenue storm drainage system piping, drainage basin and filter water.	28	Concept	Water Quality, Flood Management
City of Riverbank/OID Roselle Avenue Basin Improvements	City of Riverbank	Rehabilitate basin and provide ground water recharge, filter water and transfer ownership from Oakdale Irrigation District to City of Riverbank.	27	Concept	Water Quality, Water Supply, Flood Management
City of Patterson Storm Treatment Compliance Program	City of Patterson	In order to comply with the Trash Amendments, the city of Patterson has chosen Track 1 of the statewide Trash Provisions. Planning efforts will include identifying work that needs to be completed, funded and scheduled. Work is currently expected to include outfall identification, prioritization, BMP selection, preliminary cost estimates and reporting.	26	Concept	Water Quality, Flood Management, Community
Non-Potable Pipeline Connection to WQCF	City of Patterson	Construction of new non-potable pipeline to connect WQCF to the non-potable system to incorporate tertiary treated water. Installation of 7,910 linear feet of new 12 inch pipeline	23	Concept	Water Supply, Community
City of Patterson Zone 3 Storage Tank	City of Patterson	New 1.0 MG storage to meet peak day demands and fire flow for zone 3.	22	Concept	Water Supply, Community
New Tertiary Filtration System at WQCF	City of Patterson	Construct a new tertiary filtration system at the WQCF to produce Title 222 compliant recycled water. This train will divert a portion of the total WQCF flow (roughly 1.5 MGD) for additional treatment and distribution through the city's non-potable system.	22	Concept	Water Quality, Water Supply
Patterson Wellhead Treatment	City of Patterson	Although the MCL has since been rescinded, it is anticipated the SWRCB will approve a new MCL for Chromium 6. If this occurs, all seven of the city's potable wells would be out of compliance. This project would provide wellhead treatment for all of the system's seven (7) wells with either RCF, SBA or WBA technology. A feasibility study was conducted as part of the city's Corrective Action Plan (CAV).	22	Concept	Water Quality, Water Supply, Community

Stanislaus County Multi-Agency Regional Storm Water Resource Plan

Project Description and Scoring Summary Sheet

Project Name	Project Proponent	Project Description	Score	Project Type	Benefit Categories Met
Hydraulic and Channel Migration Studies	Stanislaus County	Two regional studies (mainstream San Joaquin River flood hydraulics and channel migration) and three focused hydraulic studies are needed to better inform flood management in the Mid SJR Region. http://www.midsjrfloodplan.org/projects/hydraulic-and-channel-migration-studies	18	Concept	Flood Management, Environmental
Storm Drainage Enhancements along Salado Creek	City of Patterson	Installation of reinforced concrete pipelines under the California Northern Railroad wooden bridge to improve storm drainage along Salado Creek.	18	Concept	Flood Management, Community
Salado Creek Flood Management and Repair Project	City of Patterson	Widening of Salado Creek from the Delta Mendota Canal to the city limits and repair creek from damaged obtained during flood in February 2017.	16	Concept	Water Quality, Flood Management
F Street / Bryan Groundwater Recharge	City of Oakdale	Install French Drain system at this low point that currently floods during large storms, to help alleviate the flooding and recharge the groundwater.	15	Concept	Water Quality, Water Supply, Flood Management

Stanislaus County Multi-Agency Regional Storm Water Resource Plan

Detailed Scoring Summary

Project Name	Project Proponent	Benefits				Priorities				Implementation			Score (pts)
		Main Benefits (pts)	Main Benefits Quantified (pts)	Additional Benefits (pts)	Additional Benefits Quantified (pts)	Achieves the goals of an existing TMDL (pts)	Reduces pollutant discharges into an Impaired Water Body (pts)	Augments water supply via recharge into a groundwater basin (pts)	Provides a SWRP Main or Additional Benefit to a DAC or an EDA (pts)	Permanent local or regional funding (pts)	Location (public land or existing easement) (pts)	Readiness to proceed (pts)	
Tuolumne River Regional Park	Tuolumne River Regional Park JPA	24	0	16	0	4	2	4	4	4	4	2	64
Modesto Area 2 Stormwater to Sanitary Sewer Cross-Connection Removal Project	City of Modesto	16	8	12	4	0	2	4	4	4	4	2	60
Mustang Creek MAR Project	Eastside Water District	16	8	4	2	0	0	4	4	4	4	6	52
Rouse Lake Managed Aquifer Recharge (MAR) Project	Eastside Water District	20	10	4	2	0	0	4	4	4	4	0	52
Little Salado Creek Groundwater Recharge and Flood Control Basin	Stanislaus County	24	2	10	0	0	2	4	4	0	4	0	50
West Stanislaus Irrigation District Fish Screen Project	West Stanislaus Irrigation District	20	10	0	0	0	0	4	4	4	4	3	49
TRRP - Carpenter Road/West Modesto Flood Management and Park Development	TRRP JPA	24	0	6	0	0	0	4	4	4	4	1	47
Orestimba Creek Recharge and Recovery Project (OCRRP)	Del Puerto Water District	16	6	2	1	0	0	4	0	4	4	4	41
Catherine Everett Park Cross Connection Elimination	City of Modesto	16	0	8	0	0	0	4	4	4	4	1	41
JM Pike Park Cross Connection Elimination	City of Modesto	16	0	8	0	0	0	4	4	4	4	1	41
Empire Community Storm Drainage Plan	Stanislaus County	12	0	4	0	0	2	4	4	4	4	6	40
First Street Basin Rehabilitation	City of Riverbank	12	6	4	1	0	2	4	0	4	4	0	37
F St Storm Pond	City of Waterford	20	0	2	0	0	0	4	4	4	0	0	34
Orestimba Creek Flood Management Project	City of Newman	16	0	2	0	0	0	0	4	4	4	1	31
North Valley Regional Recycled Water Project	City of Turlock on behalf of NVRRWP Partners	12	0	2	0	4	2	0	0	4	4	3	31
7th Street Low Impact Development (LID) Storm Drainage Improvements	City of Hughson	8	0	6	0	0	0	4	4	4	4	0	30
7th Street Outfall Rehabilitation	City of Riverbank	8	4	2	1	0	2	0	0	4	4	0	25

Projects submitted during Solicitation Period from 10/23/2017 to 12/8/2017

Stanislaus County Multi-Agency Regional Storm Water Resource Plan

Detailed Scoring Summary

Project Name	Project Proponent	Benefits				Priorities				Implementation			Score (pts)
		Main Benefits (pts)	Main Benefits Quantified (pts)	Additional Benefits (pts)	Additional Benefits Quantified (pts)	Achieves the goals of an existing TMDL (pts)	Reduces pollutant discharges into an Impaired Water Body (pts)	Augments water supply via recharge into a groundwater basin (pts)	Provides a SWRP Main or Additional Benefit to a DAC or an EDA (pts)	Permanent local or regional funding (pts)	Location (public land or existing easement) (pts)	Readiness to proceed (pts)	
Stormwater Infrastructure and Dual Use Basins for County Islands (DUCs)	Stanislaus County	28	6	12	1	4	2	4	4	4	4	0	69
Airport Neighborhood Stormwater Retention System and Dual Basin/Low Impact Strategies Stormwater Runoff	Tuolumne River Trust	28	0	12	1	4	2	4	4	4	4	0	63
Dry Creek Watershed Detention Reconnaissance Study	Stanislaus County	28	0	8	0	4	2	4	4	4	4	0	58
Stormwater Outfall Capture and Storage Project	City of Modesto	28	0	4	0	4	2	4	4	4	4	0	54
Modesto Urban Stormwater Basin Recharge Enhancement Program	City of Modesto	28	0	2	0	4	2	4	4	4	4	0	52
Tuolumne River Flood Management Feasibility Study	Tuolumne River Regional Park JPA	24	0	6	0	0	0	4	4	4	4	1	47
Eastisde Regional Storm Recharge Basin	City of Riverbank	24	0	8	0	0	2	4	0	4	4	0	46
Northeast Storm Drainage Interceptor Project	City of Modesto	24	0	4	0	4	2	4	4	4	0	0	46
Install Storm Drainage Capture and Recharge Systems in Flood-prone Areas	City of Modesto	24	0	4	0	0	0	4	4	4	4	0	44
Newman LID Water Quality and Conservation Project	City of Newman	16	0	8	0	0	0	4	4	4	4	1	41
Borax Ct Storm Basin	City of Waterford	16	0	4	0	0	0	4	4	4	4	0	36
Dry Well Rehabilitation, Rejuvenation, Reconstruction	City of Waterford	16	0	4	0	0	0	4	4	4	4	0	36
Forrestal Storm Basin	City of Waterford	16	0	4	0	0	0	4	4	4	4	0	36
Gst and Church Storm Basin	City of Waterford	16	0	4	0	0	0	4	4	4	4	0	36
Old Downtown Green Street Improvements	City of Patterson	16	0	6	0	0	2	4	0	4	4	0	36
Patterson Green Street Improvement Project	City of Patterson	16	0	6	0	0	2	4	0	4	4	0	36
Percolation Ponds for Stormwater Capture and Recharge	City of Patterson	20	2	6	0	0	0	4	0	4	0	0	36
Stein Basin	City of Waterford	16	0	4	0	0	0	4	4	4	4	0	36

Stanislaus County Multi-Agency Regional Storm Water Resource Plan

Detailed Scoring Summary

Project Name	Project Proponent	Benefits				Priorities				Implementation			Score (pts)
		Main Benefits (pts)	Main Benefits Quantified (pts)	Additional Benefits (pts)	Additional Benefits Quantified (pts)	Achieves the goals of an existing TMDL (pts)	Reduces pollutant discharges into an Impaired Water Body (pts)	Augments water supply via recharge into a groundwater basin (pts)	Provides a SWRP Main or Additional Benefit to a DAC or an EDA (pts)	Permanent local or regional funding (pts)	Location (public land or existing easement) (pts)	Readiness to proceed (pts)	
Candlewood Storm Drainage System Upgrade	City of Riverbank	12	6	6	1	0	2	0	0	4	4	0	35
Various Storm Water Pipeline Rehabilitation projects	City of Riverbank	12	4	4	1	0	2	4	0	4	4	0	35
Airport Neighborhood Urban Greening Project	Stanislaus County	16	0	10	0	0	0	0	4	0	4	0	34
San Joaquin Riverfront Park Project	City of Patterson	20	0	6	0	0	0	0	0	4	4	0	34
Various Storm Water Basin and Outfall Projects	City of Riverbank	12	4	4	0	0	2	4	0	4	4	0	34
Storm Filter Installation Projects	City of Riverbank	12	4	4	2	0	2	0	0	4	4	0	32
Patterson Green Alley Retrofit Project	City of Patterson	16	0	4	0	0	0	4	0	4	4	0	32
Salado Creek Landscape and Pedestrian Path Project	City of Patterson	12	0	6	0	0	2	4	0	4	4	0	32
Safreno Park Storm Drainage System Upgrades	City of Riverbank	8	4	4	1	0	2	4	0	4	4	0	31
Castleberg Storm Drainage System Upgrades	City of Riverbank	8	4	2	0	0	2	4	0	4	4	0	28
EWD Diffused Surface Water Project Merced County Dry Creek Project	Eastside Water District	8	4	2	1	0	0	4	4	4	0	1	28
Gangi Cannery Site MS4 Compliance	City of Riverbank	8	0	6	0	0	2	4	0	4	4	0	28
Townsend Avenue storm drainage improvements to reduce repeated flood events.	City of Riverbank	8	4	2	0	0	2	4	0	4	4	0	28
City of Riverbank/OID Roselle Avenue Basin Improvements	City of Riverbank	12	6	2	1	0	2	4	0	0	0	0	27
City of Patterson Storm Treatment Compliance Program	City of Patterson	12	0	4	0	0	2	0	0	4	4	0	26
Non-Potable Pipeline Connection to WQCF	City of Patterson	12	0	2	0	0	0	0	0	4	4	1	23
City of Patterson Zone 3 Storage Tank	City of Patterson	12	0	2	0	0	0	0	0	4	4	0	22

Projects submitted during Solicitation Period from 10/23/2017 to 12/8/2017

Stanislaus County Multi-Agency Regional Storm Water Resource Plan

Detailed Scoring Summary

Project Name	Project Proponent	Benefits				Priorities				Implementation			Score (pts)
		Main Benefits (pts)	Main Benefits Quantified (pts)	Additional Benefits (pts)	Additional Benefits Quantified (pts)	Achieves the goals of an existing TMDL (pts)	Reduces pollutant discharges into an Impaired Water Body (pts)	Augments water supply via recharge into a groundwater basin (pts)	Provides a SWRP Main or Additional Benefit to a DAC or an EDA (pts)	Permanent local or regional funding (pts)	Location (public land or existing easement) (pts)	Readiness to proceed (pts)	
New Tertiary Filtration System at WQCF	City of Patterson	12	0	2	0	0	0	0	0	4	4	0	22
Patterson Wellhead Treatment	City of Patterson	12	0	2	0	0	0	0	0	4	4	0	22
Hydraulic and Channel Migration Studies	Stanislaus County	8	0	2	0	0	0	0	4	0	4	0	18
Storm Drainage Enhancements along Salado Creek	City of Patterson	8	0	2	0	0	0	0	0	4	4	0	18
Salado Creek Flood Management and Repair Project	City of Patterson	8	0	4	0	0	0	0	0	0	4	0	16
F Street / Bryan Groundwater Recharge	City of Oakdale	12	0	2	0	0	0	0	0	0	0	1	15

	Water Quality Benefits	Project Stage: Conceptual	Project Stage: Ready to Proceed	Total
Quantified benefits	Reduction in TSS loading (lbs/yr)	204,100	750	204,850
	Trash removed (lbs/yr)	5,100	100	5,200
	Volume of water treated (mgd)	510	10	520
	Volume of runoff infiltrated (AFY)	2,582	3,042	5,624
Project counts	*Number of projects providing increased filtration and/or treatment of runoff*	29	13	42
	Number of projects providing water treatment	2	1	3
	Number of projects providing runoff infiltration	2	2	4
	Number of projects providing nonpoint source pollution control	13	5	18
	Number of projects reestablishing natural water drainage and treatment	9	3	12

	Water Supply Benefits	Project Stage: Conceptual	Project Stage: Ready to Proceed	Total
Quantified benefits	Increase in water supply through direct groundwater recharge (AFY)	19,332	19,542	38,874
	Increase in water supply through direct use (AFY)	2,572	101,000	103,572
	Increase in water supply through in lieu recharge/conjunctive use (AFY)	15,000	10,000	25,000
	Reduction in water use (AFY)	-	240	240
Project counts	*Number of projects improving water supply reliability*	28	14	42
	Number of projects providing conjunctive use	8	5	13
	Number of projects providing water conservation	9	4	13

	Flood Management Benefits	Project Stage: Conceptual	Project Stage: Ready to Proceed	Total
Quantified benefits	Reduction in peak flow discharge (cfs)	145	2,685	2,830
	Reduction in volume of potential flood water (AFY)	2,662	25,052	27,714
	Reduction in sewer overflow volumes (AFY)	7	-	7
Project counts	*Number of projects that decrease flood risk by reducing runoff rate and/or volume*	27	11	38
	Number of projects reducing sanitary sewer overflows	15	7	22

	Environmental Benefits	Project Stage: Conceptual	Project Stage: Ready to Proceed	Total
Quantified benefits	Habitat protected or improved (acres)	50	3,513	3,563
	Instream flow rate improvement (cfs)	65	15	80
	Energy consumption reduced (KWH/year)	525,000	997,500	1,522,500
	GHG emissions reduced (tons/year)	391	743	1,134
Project counts	*Number of projects providing environmental habitat protection and improvement*	14	9	23
	Number of projects increasing urban green space	20	3	23
	Number of projects providing reduced energy use	7	6	13
	Number of projects contributing to reestablishment of natural hydrograph	3	3	6
	Number of projects providing water temperature improvements	1	1	2

	Community Benefits	*Project Stage*		Total
		Conceptual	Ready to Proceed	
Quantified benefits	Number of employment opportunities provided	-	4	4
	Participants per year	62	200	262
	Number of outreach materials provided or events conducted	-	27	27
	Estimated visits per year	20,250	10,200	30,450
Project counts	*Number of projects providing employment opportunities*	13	6	19
	Number of projects providing public education	22	10	32
	Number of projects providing community involvement	16	8	24
	Number of projects that enhance and/or create recreational and public use areas	22	10	32

East Stanislaus Regional Water Management Partnership

Project Name:

Description:

Contact:

Partner(s):



Total Cost:

Last Update: Wednesday Aug 15, 2018

ESIRWM Instructions Project Info ESIRWM Requirements Contact Description ESIRWM Benefits Feasibility Cost/Funding Other Considerations SWRP Eligibility SWRP Benefits

ESIRWM Instructions Top

Instructions

The East Stanislaus Integrated Regional Water Management (IRWM) Planning Region is an official IRWM planning region approved by the California Department of Water Resources (DWR). The Cities of Modesto, Turlock, Ceres, Hughson, and Waterford, and Stanislaus County executed a Memorandum of Understanding (MOU) to participate as members of the East Stanislaus Regional Water Management Partnership (ESRWMP), the Regional Water Management Group for the Region, and have initiated an update of the 2013 East Stanislaus Integrated Regional Water Management Plan (IRWMP). We are seeking projects to be included in the 2017 East Stanislaus IRWMP

If you have a project that you would like to be included in the 2017 East Stanislaus IRWMP, please complete the following project information form (either in hard copy or electronically online at http://www.eaststanirwm.org/projects). Project information can be submitted electronically through the ESRWMP IRWM Project Database (OPTI) at the web address above. If you do not have internet access, please mail or hand-deliver one copy of your application to:

Jim Alves
City of Modesto Public Works Department
1010 Tenth Street, Suite 4600
P.O. Box 642
Modesto, CA 95353

For consideration and inclusion in the East Stanislaus IRWMP, project information forms MUST BE submitted by 5:00 PM on September 15, 2017.

Instructions
Projects submitted for consideration will be separated into three categories: Concept Projects, Preliminary Design Complete, and Ready-to-Proceed (RTP) Projects. RTP Projects consist of projects that are ready or close to being ready for implementation. They can be construction projects, research projects, or studies, but must be developed enough to have detailed budget and schedule information available and most planning, design and environmental documentation (if required) must be complete. Concept Projects are projects that are at a conceptual level and require additional project development before being implementation-ready. Preliminary Design Complete projects are further developed than the Concept Projects, but not yet ready for implementation. Concept Projects, Preliminary Design Complete projects, and RTP Projects will be included in the IRWMP, but Concept Projects will not be considered for inclusion in applications for funding through DWRs IRWM Grant Program.

Important Items to Note Regarding Future Grant Funding

This project solicitation process is for the purpose of compiling projects to be included in the East Stanislaus IRWMP, not for the purpose of applying to DWR for IRWM grant funding at this time. Per DWR's IRWM Guidelines, all project proponents with projects included in an IRWM grant application must adopt the IRWM Plan. At this time, DWR anticipates having an IRWM Implementation Grant solicitation in early 2018. In order to be eligible for grant funding, the East Stanislaus IRWMP must be reviewed and approved by DWR through the Plan Review Process (PRP). In order for projects to be eligible for funding, they must be included in the adopted IRWMP. Submitting your project for consideration for inclusion in the East Stanislaus IRWMP now will make it eligible for future IRWM grant cycles.

However, inclusion of your project in the IRWMP will not guarantee that it is included in a grant application or that it receives grant funding. Projects submitted for consideration through this project solicitation process will be prioritized; only the top-ranked projects and those meeting required application criteria (as stipulated in individual Proposal Solicitation Packages released by DWR prior to grant solicitations) will likely get submitted for IRWM implementation grant funding. Projects may move up through the ranking process over time as they are further developed or as DWR and/or the East Stanislaus region's goals and objectives, and program preferences change.

If you are submitting a Ready-to-Proceed (RTP) project for consideration for inclusion in the East Stanislaus IRWMP, please be aware of the following as it relates to receiving future grant funding:

Conflict of Interest

All participants are subject to State and Federal conflict of interest laws, including business and financial disclosure provisions. Failure to comply will result in a grant application being rejected. **Confidentiality**

Once a grant application is submitted to DWR, privacy rights and confidentiality protections are waived. **Labor Code Compliance**

Should grant funding be received from DWR, the entity receiving funding must adopt and enforce a labor compliance program pursuant to California Labor Code §1771.5(b). **CEQA/NEPA Compliance**

Project funded under the IRWM grant program must be compliant with the California Environmental Quality Act (CEQA). The recipient of grant funds must demonstrate that it is or has a plan to be compliant with all applicable CEQA and National Environmental Policy Act (NEPA) requirements. A schedule of when environmental documents will be completed is required. **Monitoring Requirements**

Projects that affect water volume and quality shall include a monitoring component that allows the integration of data into State-wide monitoring efforts, including, but not limited to, the Surface Water Ambient Monitoring Program (SWAMP) and the Groundwater Ambient Monitoring and Assessment (GAMA) Program carried out by the State Water Resources Control Board. **Groundwater Management Plan Compliance**

Due to the recent passage of the Sustainable Groundwater Management Act (SGMA), there will be a transition period between groundwater management plans (GWMPs) and SGMA. Therefore, the 2016 Proposition 1 IRWM Guidelines note that grant eligibility will have to consider both GWMP eligibility and Groundwater Sustainability Agency (GSA)/Groundwater Sustainability Plan (GSP) progress. For groundwater management and recharge projects and for projects with potential groundwater impacts, the applicant or the project proponent responsible for such projects must demonstrate that they comply with the following regulations:

Water Code §10720 et seq. Groundwater project proponents must demonstrate that their project is consistent with SGMA efforts in the basin. Groundwater Management Plan Compliance For groundwater projects or other projects having a direct effect on groundwater levels or quality, the applicant or project proponent must meet one of the following conditions (Water Code §10753.7 (b)(1):

They conform to the requirements of an adjudication of water rights in the subject groundwater basin They have prepared and implemented a GWMP in compliance with CWC §10753.7 They participate or consent to be subject to a GWMP, basin-wide management plan, or other IRWM program or plan that meets the requirements of CWC §10753.7(a) For projects located in low or very low priority groundwater basins without an existing GWMP, the proposal commits to adopting a GWMP compliant with Water Code §10753.7 or a GSP compliant with Water Code §10727 et seq.

Water Code § 10920 Compliance

For high and medium priority basins without a California Statewide Groundwater Elevation Monitoring (CASGEM) monitoring entity, grant applicants and project proponents that have been identified as potential monitoring entities will not be eligible for grant funding. Counties whose jurisdictions include unmonitored high and medium priority basins will not be eligible for grant funding. If the entire service area of the grant applicant or the individual project proponents service area is demonstrated to be a DAC, the project will be considered eligible. **Local Plan Consistency**

Any watershed protection activities must be consistent with the applicable, adopted, local watershed management plans and the applicable Regional Water Quality Control Plan (Basin Plan) adopted by the Regional Water Quality Control Board. **Requirements for Urban Water Suppliers**

An Urban Water Supplier is a supplier, either publicly or privately owned, that provides water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually (CWC § 10617). Urban water suppliers must comply with the following:

Urban Water Management Planning Act Compliance Water suppliers who were required by the Urban Water Management Planning Act (CWC § 10610 et seq.) to submit an Urban Water Management Plan (UWMP) to DWR must have submitted a complete UWMP to be eligible for IRWM Grant Program funding. Applicants and project proponents that are urban water suppliers and have projects that would receive funding through the IRWM grant program must have a complete UWMP by the time a grant is awarded to be eligible to receive funding. SB X7-7 Compliance Requires all water suppliers to increase water use efficiency and sets an overall goal of reducing per capita water use by 20% by December 31, 2020. Urban water suppliers must prepare an Urban Water Management Plan (UWMP) that includes documentation of compliance with interim water use targets. In order to qualify for funding, urban water suppliers must have a UWMP approved by DWR. CWC § 529.5 Compliance - Requires on or after January 1, 2010, any urban water supplier applying for state grant funds for wastewater treatment projects, water use efficiency projects, drinking water treatment projects, or for a permit for a new or expanded water supply, shall demonstrate that they meet the water meter requirements in CWC § 525 et seq.

Requirement for Agricultural Water Suppliers

In accordance with CWC §10608.56, an agricultural water supplier is ineligible for funding unless it complies with requirements of Part 2.55 (commencing with §10608) of Division 6. This requires that the agricultural water supplier measure the volume of water delivered, adopt a pricing strategy based at least partially on quantity delivered, and implement additional efficient management practices. The supplier must prepare an AWMP which must be approved by DWR in order to qualify for funding. SB X7-7 also requires preparation of an AWMP for grant eligibility.

Thank you for your participation. If you have questions or comments, please visit our website at http://www.eaststanirwm.org/ or contact Jim Alves, Associate Civil Engineer at the City of Modesto, at jalves@modestogov.com or (209) 571-55572.

Project Info Top

Project Info

Select the Program(s) for which you would like to enter your project (select IRWM, SWRP, or both):

☐ **East Stanislaus Integrated Regional Water Management Program**: Any project that would like to be considered for IRWM funding should select this program. Projects must meet at least one IRWM Plan Objective, one Resource Management Strategy, one Statewide Objective, and must be technically feasible in order to be considered for inclusion in the Plan and to be considered for IRWM funding. For more information about the IRWM grant program visit the California Department of Water Resources' website.

☐ **Stanislaus County Multi-Agency Storm Water Resource Plan**: All storm water and dry weather runoff capture projects (e.g., Green Infrastructure, Rainwater and storm water capture, Storm water treatment facilities, and Demonstration or pilot projects that are consistent with the eligibility requirements of Prop 1, Chapter 7) should select this program, regardless of whether they are seeking IRWM or Storm Water grant funding. Inclusion in the Storm Water Resource Plan is required for storm water and dry weather runoff capture projects seeking Proposition 1 funding. For more information about the Storm Water Grant Program visit the State Water Resources Control Boards website.

Project Name: *

Organization: *

Project Location

Project Coordinates: Enter decimal latitude and longitude below or

Latitude: * Longitude: *

Project Area:

File Name	Type

ESIRWM Requirements Top

Minimum Requirements for Inclusion in the East Stanislaus IRWMP

If the Proposed Project does not meet the following requirements, it will not be considered for inclusion in the East Stanislaus IRWMP:

The Project must be within the boundaries of the East Stanislaus IRWM Planning Region or include part of the East Stanislaus IRWM Planning Region. The Project must meet at least one of the East Stanislaus Region's Objectives listed below. Check all that apply. The Project must fulfill at least one of the DWR's Resource Management Strategies and one of DWR's Statewide Priorities. Be technically feasible.

East Stanislaus Goals & Objectives *

Water Supply Goal - To protect existing water supplies and water rights, and improve regional water supply reliability

Water Supply Objectives

☐ Provide a variety of water supply sources, including recycled water, to meet all current and future demands (urban, agricultural and the environment) under various hydrologic conditions.
☐ Promote the use of groundwater storage and conjunctive use options to reduce groundwater overdraft.
☐ Protect existing water rights, including permitted diversions and extractions.
☐ Implement water conservation plans for both urban and agricultural uses.
☐ Support monitoring and research to improve understanding of water supplies and needs.
☐ Address intra- and inter-regional conveyance infrastructure needs.
☐ Address changes in runoff and recharge due to climate change, including amount, timing, and variability.

Flood Protection Goal - To ensure flood protection strategies are developed and implemented through a collaborative process, utilizing both local and watershed-wide approaches designed to maximize opportunities for comprehensive water resource management that meet multiple objectives.

Flood Protection Objectives

☐ Develop outlines of regional projects and plans necessary to protect infrastructure from flooding and erosion from the 100-year event.
☐ Work with stakeholders to preserve existing flood attenuation by implementing land management strategies throughout the watershed.
☐ Develop approaches for adaptive management that minimizes maintenance requirements and protects water quality and availability while preserving and enhancing ecologic and stream functions, as appropriate.
☐ Provide community benefits beyond flood protection, such as public access, open space, recreation, agricultural preservation, and economic development.
☐ Protect, restore, and enhance the natural ecological, geomorphic, and hydrologic functions and processes of rivers, creeks, streams and

their floodplains.

☐ Address changes in timing and intensity of runoff due to climate change.

☐ Increase and improve the quantity, diversity, and connectivity of riparian, wetland, floodplain, aquatic, and shaded riverine aquatic habitats, including the agricultural and ecological values of these lands.

☐ Identify opportunities and incentives for expanding or increasing use of floodway corridors.

Water Quality Goal - To protect and improve water quality for beneficial uses consistent with regional interests and the RWQCB Basin Plan in cooperation with local, state and federal agencies and regional stakeholders

Water Quality Objectives

☐ Meet or exceed all applicable water quality regulatory standards, including drinking water standards.

☐ Deliver agricultural water to meet water quality guidelines established by stakeholders.

☐ Aid in meeting Total Maximum Daily Loads established, or to be established, for the Tuolumne, Stanislaus, Merced, and San Joaquin River watersheds.

☐ Protect surface waters and groundwater basins from contamination and threat of contamination.

☐ Manage existing land uses while preserving or enhancing environmental habitats.

☐ Minimize impacts from storm water through implementation of Best Management Practices, Low Impact Development or other similar projects.

☐ Promote programs and projects to reduce the quantity and improve the quality of urban and agricultural runoff.

☐ Promote and support regional monitoring to further understanding of water quality issues.

Environmental Protection and Enhancement Goal - To protect the environmental resources of the Stanislaus, Tuolumne, Merced and San Joaquin River watersheds by identifying, promoting and implementing opportunities to assess, restore and enhance natural resources of these watersheds

Environmental Protection and Enhancement Objectives

☐ Identify and incorporate (where possible and reasonable) opportunities to assess, protect, enhance, and/or restore natural resources when developing water management strategies.

☐ Minimize adverse effects on biological and cultural resources, including riparian habitats, habitats supporting sensitive plant or animal species, and archaeological sites when implementing strategies and projects.

☐ Identify opportunities for open spaces, trails and parks along creeks and other recreational projects in the watershed to be incorporated with water supply, water quality, or flood protection projects.

☐ Contribute to the long-term sustainability of agricultural, commercial, industrial, and urban land uses and activities within the basin.

☐ Identify opportunities to protect, enhance, or restore habitat to the support all watersheds in the Region in conjunction with water supply, water quality, or flood protection projects.

☐ Support projects to understand, protect, improve and restore the region's ecological resources.

☐ Promote the recovery and stability of regionally present native species and populations.

Regional Communication and Cooperation Goal - To implement and promote this IRWM Plan through regional communication, cooperation, and education

Regional Communication and Cooperation Objectives

☐ Develop a forum for consensus decision-making and IRWM Plan implementation by regional entities.

☐ Build relationships with State and Federal regulatory agencies and other water forums and agencies to facilitate permitting of water-related projects and ensure continued consistency with state water plans.

☐ Facilitate dialogues between regional and inter-regional entities to reduce inconsistencies and conflicts in water management and to maximize benefits from water-related projects.

☐ Maintain avenues of communication with the general public and offering opportunities to provide feedback on the IRWM and water-related projects through the regional websites and other public forums.

☐ Identify opportunities for public education about water supply, water quality, flood management, and environmental projection.

☐ Implement focused outreach to DACs and EDAs relative to opportunities for water supply, water quality, flood management, and environmental protection projects.

Economic and Social Responsibility Goal - To promote development and implementation of projects, programs and policies that are socially impartial and economically sound

Economic and Social Responsibility Objectives

☐ Support the participation of disadvantaged communities and economically distressed areas in the development, implementation, monitoring and long-term maintenance of water resource projects.

☐ Develop cost-effective multi-benefit projects.

☐ Consider disproportionate community impacts to ensure environmental justice.

☐ Maximize economies of scale and governmental efficiencies.

☐ Protect cultural resources.

☐ Reduce energy use and associated GHG emissions and/or use of renewable resources where appropriate.

☐ Adopt carbon sequestration strategies where appropriate

Resource Management Strategies

A Resource Management Strategy (RMS) is a project, program, or policy that helps local agencies and governments manage their water and related resources. Place a check by the RMS that your project employs.

Reduce Water Demand

☐ Agricultural Water Use Efficiency
☐ Urban Water Use Efficiency

Improve Operational Efficiency and Transfers

☐ Conveyance - Delta
☐ Conveyance - Regional/Local
☐ System Reoperation
☐ Water Transfers

Increase Water Supply

☐ Conjunctive Management & Groundwater Storage
☐ Desalination
☐ Precipitation Enhancement
☐ Recycled Municipal Water
☐ Surface Storage - CALFED
☐ Surface Storage - Regional/Local

Improve Water Quality

☐ Drinking Water Treatment and Distribution
☐ Groundwater Remediation/Aquifer Remediation
☐ Matching Quality to Use
☐ Pollution Prevention
☐ Salt and Salinity Management
☐ Sediment Management
☐ Urban Runoff Management

Improve Flood Management

☐ Flood Management

Practice Resource Stewardship

☐ Agricultural Lands Stewardship
☐ Economic Incentives (Loans, Grants, and Water Pricing)
☐ Ecosystem Restoration
☐ Forest Management
☐ Outreach and Engagement
☐ Recharge Area Protection
☐ Water and Culture
☐ Water-Dependent Recreation
☐ Watershed Management

Other Strategies

☐ Crop Landing for Water Transfers
☐ Dew Vaporation or Atmospheric Pressure Desalination
☐ Fog Collection
☐ Irrigated Land Retirement
☐ Rainfed Agriculture
☐ Waterbag Transport/Storage Technology

Statewide Priorities

Please check all that apply. For detailed information regarding the Statewide Priorities, see pages 8 to 11 of the 2016 IRWM Guidelines, available here.

☐ Make Conservation a California Way of Life
☐ Increase Regional Self-Reliance and Integrated Water Management Across All Levels of Government
☐ Achieve the Co-Equal Goals for the Delta
☐ Protect and Restore Important Ecosystems

☐ Manage and Prepare for Dry Periods
☐ Expand Water Storage Capacity and Improve Groundwater Management
☐ Provide Safe Water for All Communities

☐ Increase Flood Protection

Contact Top

Primary Contact

Name:*
Agency/Organization:*
Title:*
Email Address:*
Phone Number: * Ext:

Secondary Contact

Name:
Agency/Organization:
Title:
Email Address:
Phone Number: Ext:

Description Top

Description

Project Category* Select

Project Type:* Select

Project Description:*

Pilot/Demonstration Project: ☐ No ☐ Yes

If yes, please explain:

Project Status (% complete):

Project Partners:

Please list any project partners and their role in the project.

Other Stakeholders

Please list any stakeholders to the project, including the name of the stakeholder and type (e.g. water supply purveyor, wastewater agency, flood control agency, local government, special district, power utility, State/federal/regional agency, school/university, environmental stewardship organization, community/civic organization, agriculture, Native American tribe, disadvantaged community, other).

ESIRWM Benefits Top

Benefits

Please select the primary benefit provided by the project. Choose ONLY one.

☐ **1. Water Supply:** Protect existing water supplies and water rights, and improve regional water supply reliability.

☐ **2. Water Quality:** Protect and improve water quality for beneficial uses consistent with regional interests and the RWQCB Basin Plan in cooperation with local, state, and federal agencies and regional stakeholders.

☐ **3. Environmental Protection and Enhancement:** Protect the environmental resources of the Stanislaus, Tuolumne, Merced, and San Joaquin River watersheds by identifying, promoting and implementing opportunities to assess, restore and enhance natural resources of these watersheds.

☐ **4. Flood Protection:** Ensure flood protection strategies are developed and implemented through a collaborative process, utilizing both local and watershed-wide approaches designed to maximize opportunities for comprehensive water resources management that meet multiple objectives.

☐ **5. Regional Communication and Cooperation:** Implement and promote the East Stanislaus IRWM Plan through regional communication, cooperation, and education.

☐ **6. Economic and Social Responsibility:** Promote development and implementation of projects, programs, and policies that are socially impartial and economically sound.

Does your project help the region meet additional benefits? If yes, please describe the benefits as applicable.

1. Water Supply ☑ No ☐ Yes If so, please explain
2. Water Quality ☑ No ☐ Yes If so, please explain
3. Environmental ☑ No ☐ Yes If so, please explain
4. Flood Management ☑ No ☐ Yes If so, please explain
5. Regional Communication and Cooperation ☑ No ☐ Yes If so, please explain
6. Economic and Social Responsibility ☑ No ☐ Yes If so, please explain

Describe any steps taken to provide multiple benefits from your project:

Feasibility Top

Project Status

Project Start Date:

Complete all Sections:

Planning:	Select	Estimated Completion:
Feasibility Study:	Select	Estimated Completion:
Environmental Documentation:	Select	Estimated Completion:
Pre-Project Monitoring:	Select	Estimated Completion:
Design:	Select	Estimated Completion:
Environmental Permits *:	Select	Estimated Completion:
Building/Other Permits:	Select	Estimated Completion:
Construction/Implementation:	Select	Estimated Completion:
Post Project Monitoring:	Select	Estimated Completion:

*Describe Environmental Permits Required for the Project:

Cost/Funding Top

Project Funding

Year Basis for Estimates (2017?):

Total Estimated Capital Cost:

Estimated Annual O&M Cost:

Estimated Life of Project:

Replacement Part:

Estimated Replacement Cost:

Year of Replacement:

Replacement Part:

Estimated Replacement Cost:

Year of Replacement:

Replacement Part:

Estimated Replacement Cost:

Year of Replacement:

Total Estimated Project Cost:

Local Funding:

Source of Local Funding:

Total Cost Funding through Existing Grants:

Total Estimated Cost Currently Unfunded:

Project Cost Breakdown

Please enter estimated costs. If unknown, please state so.

☐ N/A ☐ Unknown ☐ Land Purchase/Easement:

☐ N/A ☐ Unknown ☐ Planning:

☐ N/A ☐ Unknown ☐ Design:

☐ N/A ☐ Unknown ☐ Environmental Review:

☐ N/A ☐ Unknown ☐ Permits:

☐ N/A ☐ Unknown ☐ Construction/Implementation:

☐ N/A ☐ Unknown ☐ Environmental Mitigation/Compliance:

☐ N/A ☐ Unknown ☐ Construction Management/Project Management:

☐ N/A ☐ Unknown ☐ Other:

Specify Other:

Total:

Other Considerations Top

Disadvantaged Communities (DAC) and Economically Distressed Areas (EDAs)

A DAC is a community with an annual median household income that is less than 80% of the Statewide annual median household income. An EDA is a community that is reasonably isolated from a larger municipality with an annual median household income that is less than 85% of the Statewide annual median household income, and also has either a low population density, or an unemployment rate at least 2% greater than the Statewide average.

Does your project help address critical water supply and water quality needs of DACs and/or EDAs within the East Stanislaus Region? ☐ No ☐ Yes

If so, how?

What Community(ies)?

How were the DACs/EDAs included in the planning or development of the project?

Native American Tribal Communities

Does your project help to address critical water supply and water quality needs of Native American Tribal Communities within the East Stanislaus region? ☐ No ☐ Yes

If so, how?

What tribe(s)?

How were the tribe(s) included in the planning or development of the project?

Climate Change Adaptation / Greenhouse Gas (GHG) Emission Reduction

Does your project consider and/or address the effects of climate change on the region through adaptation? ☐ No ☐ Yes

If so, how?

Does your project consider the contribution of GHG emissions compared to project alternatives? ☐ No ☐ Yes

If so, how?

Does your project reduce energy consumption and/or GHG emissions? ☐ No ☐ Yes

If so, how?

Performance, Monitoring, and Data Management

What data will be collected from the project or monitoring of the project?

How will the data be desiminiated/shared with the region?

How will the data be maintained?

Technical Feasibility

Is your project technically feasible; please describe?

What documents can you provide that demonstrate/document this technical feasibility?

Are there data gaps that require additional studies to develop the project?

SWRP Eligibility Top

SWRP Project Submission Instructions

In April 2017, Stanislaus County was awarded a Prop 1 storm water planning grant from the State Water Resources Control Board. Representatives from the County and local municipalities, agencies, and non-profit groups are now collaborating to develop the Stanislaus Multi-Agency Regional Storm Water Resource Plan (SWRP) encompassing all watersheds within the County. The primary purpose of the SWRP is to identify and assess projects that promote storm water as a resource, prioritizing those multi-benefit projects that can best meet the identified planning area and watershed priorities. As all storm water and dry weather runoff capture projects must now be included in a SWRP to be eligible for state grant funding, the SWRP will be completed by July 2018, in time for projects included in the plan to be eligible to apply for upcoming funding opportunities.

If you have a project to be included in the SWRP, please complete the appropriate project information tabs and click the submit button. For projects that are within the East Stanislaus IRWM region, please complete all of the project information tabs. Projects that are not located within the East Stanislaus IRWM region should complete all of the tabs except for the ESIRWM Instructions, Requirements, and Benefits tabs.

Click here for additional information on how to enter and submit a SWRP project in Opti.
Click here for information on the project prioritization criteria that will be used by the SWRP.

Project Eligibility

Each Project must meet all of the following to be included in the SWRP.

Can the project be sponsored by an eligible applicant? ☐ No ☐ Yes
Is the project a storm water or dry weather runoff project? ☐ No ☐ Yes

Does the project meet 2 or more of the following SWRP main benefits? ☐ No ☐ Yes

Water Quality - Increased filtration and/or treatment of runoff Water Supply - Water supply reliability Water Supply - Conjunctive use Flood Management - Decreased flood risk by reducing runoff rate and/or volume Environmental - Environmental and habitat protection and/or improvement Environmental - Increased urban green space Community - Employment opportunities provided Community - Public education

Does the project provide at least one of the following SWRP Additional Benefits? ☐ No ☐ Yes

Water Quality - Nonpoint source pollution control Water Quality - Reestablished natural water drainage and treatment Water Supply - Water conservation Flood Management - Reduced sanitary sewer overflows Environmental - Reduced energy use, greenhouse gas emissions, or provides a carbon sink Environmental - Reestablishment of natural hydrograph Environmental - Water temperature improvements Community - Community involvement Community - Enhance and/or create recreational and public use areas

Stanislaus Multi-Agency Regional Watershed Priorities

Does the Project implement water quality improvements to help achieve the goals of an existing TMDL? (check all that apply)
☐ Sacramento-San Joaquin Delta Methylmercury TMDL
☐ Sacramento-San Joaquin Delta Diazinon and Chlorpyrifos TMDL
☐ Central Valley Pesticide TMDL

Does the project reduce pollutant discharges into a 303(d) listed Impaired Water Body? ☐ No ☐ Yes

If yes, please list water body.

Does the project augment water supply by capturing storm water for recharging into a groundwater basin? ☐ No ☐ Yes

Does the Project provide a SWRP Main or Additional Benefit to a disadvantaged community or economically distressed area? ☐ No ☐ Yes
If yes, please list communities.

Progress Towards Project Implementation

Is the project supported by entities that have created permanent, local or regional funding? ☐ No ☐ Yes
Is the project located on public land? ☐ No ☐ Yes
If not, does the project have an easement or right of way agreement with a local land owner? ☐ No ☐ Yes

SWRP Benefits Top

Water Quality Benefits

Does the project provide any of the following benefits (check all that apply and provide applicable quantitative estimate, if available):

☐ Increased filtration and/or treatment of runoff (SWRP Main Benefit)
Average annual pollutant load reduction:
TSS (lbs/yr)
Mercury (lbs/yr)
Diazinon (lbs/yr)
Chlorpyrifos (lbs/yr)
Selenium (lbs/yr)
Diuron (lbs/yr)
bacteria - fecal coli. / E. coli (MPN/yr)
pyrethroids (lb/yr)
trash (lb/yr)
Total Nitrogen (lb/yr)
Other constituent

Volume of water treated (mgd)

Volume of runoff infiltrated (af/year)

Other quantitative metric

☐ Nonpoint source pollution control (SWRP Additional Benefit)

Provide quantitative metric

☐ Reestablished natural water drainage and treatment (SWRP Additional Benefit)

Provide quantitative metric

Describe how the project will achieve these benefits.

Describe the method or study used to quantify the benefits described above.

Water Supply Benefits

Does the project provide any of the following benefits (check all that apply and provide applicable quantitative estimate, if available):

☐ Water supply reliability (SWRP Main Benefit)

Increase in water supply through direct groundwater recharge (af/year)

Increase in water supply through direct use (af/year)

Other quantitative metric

☐ Conjunctive use (SWRP Main Benefit)

Increase in water supply through in lieu recharge/conjunctive use (af/year)

Other quantitative metric

☐ Water conservation (SWRP Additional Benefit)

Reduction in water use (af/year)

Other quantitative metric

Describe how the project will achieve these benefits.

Describe the method or study used to quantify the benefits described above.

Flood Management Benefits

Does the project provide any of the following benefits (check all that apply and provide applicable quantitative estimate, if available):

☐ Decreased flood risk by reducing runoff rate and/or volume (SWRP Main Benefit)

Reduction in peak flow discharge (cfs)

Reduction in volume of potential flood water (af/year)

Other quantitative metric

☐ Reduced sanitary sewer overflows (SWRP Additional Benefit)

Reduction in sewer overflow volumes (af/year)

Other quantitative metric

Describe how the project will achieve these benefits.

Describe the method or study used to quantify the benefits described above.

Environmental Benefits

Does the project provide any of the following benefits (check all that apply and provide applicable quantitative estimate, if available):

☐ Environmental habitat protection and improvement, including wetland enhancement/creation, riparian enhancement, and/or instream flow improvement (SWRP Main Benefit)

Size of habitat protected or improved (acres)

Amount of instream flow rate improvement (cfs)

Other quantitative metric

☐ Increased urban green space (SWRP Main Benefit)

Size of increase in urban green space (acres)

Other quantitative metric

☐ Reduced energy use, greenhouse gas emissions, or provides a carbon sink (SWRP Additional Benefit)

Amount of energy consumption reduced (KWH/year)

Amount of GHG emissions reduced (tons/year)

Other quantitative metric

☐ Reestablishment of natural hydrograph (SWRP Additional Benefit)

Provide quantitative metric

☐ Water temperature improvements (SWRP Additional Benefit)

Amount of temperature improvement (degrees F)

Describe how the project will achieve these benefits.

Describe the method or study used to quantify the benefits described above.

Community Benefits

Does the project provide any of the following benefits (check all that apply and provide applicable quantitative estimate, if available):

☐ Employment opportunities provided (SWRP Main Benefit)

Number of employment opportunities provided

Other quantitative metric

☐ Public education (SWRP Main Benefit)

Number of outreach materials provided or events conducted

Other quantitative metric

☐ Community involvement (SWRP Additional Benefit)

Number of participants per year

Other quantitative metric

☐ Enhance and/or create recreational and public use areas (SWRP Additional Benefit)

Estimated visits per year

* Minimum Required Information for Project Submission

Other quantitative metric

Other quantitative metric

Contact Us

he project will achieve these benefits.

Describe the method or study used to quantify the benefits described above.

Summary of Project Schedule Information Provided by SWRP Project Proponents

Project Name	Organization	Project Category	Planning Status	Feasibility Status	Environmental Documentation Status	Design Status	Environmental Permits Status	Construction/ Implementation Status
7th Street Low Impact Development (LID) Storm Drainage Improvements	City of Hughson	RTP	N/A	N/A	N/A	Not Started	N/A	Not Started
Modesto Area 2 Stormwater to Sanitary Sewer Cross-Connection Removal Project	City of Modesto	RTP	Completed	Completed	Completed	In Progress	In Progress	Not Started
Catherine Everett Park Cross Connection Elimination	City of Modesto	RTP	Completed	Completed	Not Started	In Progress	Not Started	Not Started
JM Pike Park Cross Connection Elimination	City of Modesto	RTP	Completed	Completed	Not Started	In Progress	Not Started	Not Started
Orestimba Creek Flood Management Project	City of Newman	RTP	Not Started	Completed	Not Started	Not Started	Not Started	Not Started
First Street Basin Rehabilitation	City of Riverbank	RTP	In Progress	In Progress	Not Started	Not Started	Not Started	Not Started
7th Street Outfall Rehabilitation	City of Riverbank	RTP	In Progress	In Progress	Not Started	In Progress	Not Started	Not Started
Little Salado Creek Groundwater Recharge and Flood Control Basin	Stanislaus County	RTP	-	-	-	-	-	-
Empire Community Storm Drainage Plan	Stanislaus County	RTP	Completed	Completed	Completed	Completed	Completed	Not Started
Carpenter Road/West Modesto Flood Management and Park Development	Tuolumne River Regional Park JPA	RTP	Completed	-	-	Not Started	Not Started	Not Started
North Valley Regional Recycled Water Project (NVRRWP)	City of Turlock on behalf of NVRRWP Partners	RTP	In Progress	Completed	In Progress	Completed	In Progress	Not Started
F St Storm Pond	City of Waterford	RTP	In Progress					
Orestimba Creek Recharge and Recovery Project (OCRRP)	Del Puerto Water District	RTP	In Progress	Completed	Completed	Completed	In Progress	In Progress
Mustang Creek MAR Project	Eastside Water District	RTP	Completed	Completed	Completed	Completed	Completed	Not Started
Rouse Lake Managed Aquifer Recharge (MAR) Project	Eastside Water District	RTP	In Progress	In Progress	In Progress	In Progress	Not Started	Not Started
Tuolumne River Regional Park	Tuolumne River Regional Park JPA	RTP	Completed	-	Completed	In Progress	In Progress	In Progress
West Stanislaus Irrigation District Fish Screen Project	West Stanislaus Irrigation District	RTP	Completed	Completed	In Progress	Completed	In Progress	Not Started
Stormwater Outfall Capture and Storage Project	City of Modesto	Concept	Not Started	Not Started	Not Started	Not Started	Not Started	Not Started
Modesto Urban Stormwater Basin Recharge Enhancement Program	City of Modesto	Concept	In Progress	Not Started	Not Started	Not Started	Not Started	Not Started
Northeast Storm Drainage Interceptor Project	City of Modesto	Concept	In Progress	In Progress	Not Started	Not Started	Not Started	Not Started
Install Storm Drainage Capture and Recharge Systems in Flood-prone Areas	City of Modesto	Concept	In Progress	Not Started	Not Started	Not Started	Not Started	Not Started
Newman LID Water Quality and Conservation Project	City of Newman	Concept	Not Started	Completed	In Progress	Not Started	Not Started	Not Started
F Street / Bryan Groundwater Recharge	City of Oakdale	Concept	Completed	Completed	Not Started	Not Started	Not Started	Not Started
Old Downtown Green Street Improvements	City of Patterson	Concept	Not Started	Not Started	Not Started	Not Started	Not Started	Not Started
Patterson Green Street Improvement Project	City of Patterson	Concept	Not Started	Not Started	Not Started	Not Started	Not Started	Not Started
Percolation Ponds for Stormwater Capture and Recharge	City of Patterson	Concept	Not Started	In Progress	Not Started	Not Started	Not Started	Not Started
San Joaquin Riverfront Park Project	City of Patterson	Concept	Not Started	Not Started	Not Started	Not Started	Not Started	Not Started
Patterson Green Alley Retrofit Project	City of Patterson	Concept	Not Started	Not Started	Not Started	Not Started	Not Started	Not Started
Salado Creek Landscape and Pedestrian Path Project	City of Patterson	Concept	Not Started	Not Started	Not Started	In Progress	Not Started	Not Started
City of Patterson Storm Treatment Compliance Program	City of Patterson	Concept	Not Started	Not Started	Not Started	Not Started	Not Started	Not Started

Project Name	Organization	Project Category	Planning Status	Feasibility Status	Environmental Documentation Status	Design Status	Environmental Permits Status	Construction/ Implementation Status
Non-Potable Pipeline Connection to WQCF	City of Patterson	Concept	Not Started	Completed	Not Started	Not Started	Not Started	Not Started
City of Patterson Zone 3 Storage Tank	City of Patterson	Concept	Not Started	N/A	Not Started	Not Started	N/A	Not Started
New Tertiary Filtration System at WQCF	City of Patterson	Concept	Not Started	Not Started	Not Started	Not Started	Not Started	Not Started
Patterson Wellhead Treatment	City of Patterson	Concept	Not Started	In Progress	Not Started	Not Started	Not Started	Not Started
Storm Drainage Enhancements along Salado Creek	City of Patterson	Concept	In Progress	Not Started	Not Started	Not Started	Not Started	Not Started
Salado Creek Flood Management and Repair Project	City of Patterson	Concept	Not Started	Not Started	Not Started	Not Started	Not Started	Not Started
Eastside Regional Storm Recharge Basin	City of Riverbank	Concept	In Progress	In Progress	Not Started	Not Started	Not Started	Not Started
Candlewood Storm Drainage System Upgrade	City of Riverbank	Concept	In Progress	In Progress	Not Started	Not Started	Not Started	Not Started
Various Storm Water Pipeline Rehabilitation projects	City of Riverbank	Concept	In Progress	In Progress	Not Started	Not Started	Not Started	Not Started
Various Storm Water Basin and Outfall Projects	City of Riverbank	Concept	In Progress	In Progress	In Progress	Not Started	Not Started	Not Started
Storm Filter Installation Projects	City of Riverbank	Concept	In Progress	In Progress	In Progress	In Progress	N/A	Not Started
Safreno Park Storm Drainage System Upgrades	City of Riverbank	Concept	In Progress	Not Started	Not Started	Not Started	Not Started	Not Started
Castleberg Storm Drainage System Upgrades	City of Riverbank	Concept	In Progress	In Progress	Not Started	Not Started	Not Started	Not Started
Gangi Cannery Site MS4 Compliance	City of Riverbank	Concept	In Progress	In Progress	Not Started	Not Started	Not Started	Not Started
Townsend Avenue storm drainage improvements to reduce repeated flood events.	City of Riverbank	Concept	In Progress	In Progress	Not Started	Not Started	Not Started	Not Started
City of Riverbank/OID Roselle Avenue Basin Improvements	City of Riverbank	Concept	In Progress	In Progress	Not Started	Not Started	Not Started	Not Started
Borax Ct Storm Basin	City of Waterford	Concept	-	-	-	-	-	-
Dry Well Rehabilitation, Rejuvenation, Reconstruction	City of Waterford	Concept	-	-	-	-	-	-
Forrestal Storm Basin	City of Waterford	Concept	-	-	-	-	-	-
G St and Church Storm Basin	City of Waterford	Concept	-	-	-	-	-	-
Stein Basin	City of Waterford	Concept	-	-	-	-	-	-
EWD Diffused Surface Water Project Merced County Dry Creek Project	Eastside Water District	Concept	In Progress	Completed	In Progress	In Progress	N/A	N/A
Stormwater Infrastructure and Dual Use Basins for County Islands (DUCs)	Stanislaus County	Concept	-	-	-	-	-	-
Evaluation of Stormwater Management and Groundwater Recharge Projects in the Dry Creek Watershed of Stanislaus County	Stanislaus County	Concept	Not Started	In Progress	Not Started	Not Started	Not Started	Not Started
Airport Neighborhood Urban Greening Project	Stanislaus County	Concept						
Hydraulic and Channel Migration Studies	Stanislaus County	Concept	Not Started	Not Started	Not Started	Not Started	Not Started	Not Started
Tuolumne River Flood Management Feasibility Study	Tuolumne River Regional Park JPA	Concept	Completed		Not Started	Not Started	Not Started	Not Started
Airport Neighborhood Stormwater Retention System and Dual Basin/Low Impact Strategies Stormwater Runoff	Tuolumne River Trust	Concept	Not Started	Not Started	Not Started	Not Started	Not Started	Not Started

Note: RTP refers to a ready-to-proceed project.

opti quick start guide

Opti **helps you locate, connect, share, and integrate IRWMP project information within your IRWM Community. This Quick Start Guide will assist you to jump start the use of *Opti*.**

How to Gain Access to Opti

Opti is a public system. On the login screen, input the required information and click on the *Register* button. Once your account has been successfully created, you may enter your email and password in the "Existing Users" box and click *Login*.

How to Navigate Opti

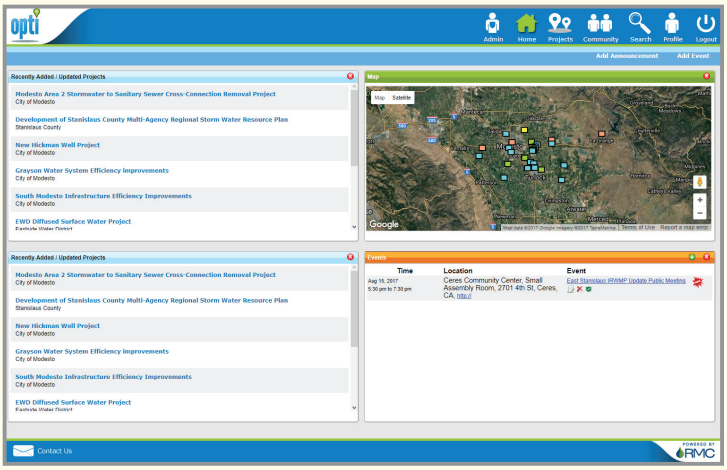
Once logged into *Opti*, information and tools are accessible via the navigation bar. Click on the icons to display different modules in your screen. Modules provided are:

- **Home –** displays Announcements, Events, and Recently Added Projects
- **Projects –** displays a map or list of the projects and allows users to add or share projects
- **Community –** displays a list of Individuals and Organizations
- **Search –** provides various criteria to find projects of interest
- **Profile –** allows users to manage their profile information and access the User Guide

How to View Announcements and Events

Announcements and Events are posted in the **Home** page.

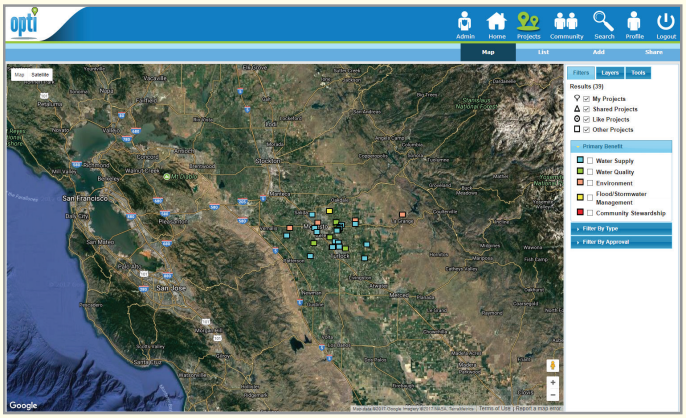
- Click on an Announcement or Event hyperlink to view the details and download attachments.
- Click on **Add Announcement** or **Add Event** in the sub-navigation bar to add a new announcement or event.



How to Become a Community Member

To add and submit projects to *Opti*, you must first become a Community Member.

- Click on the **Profile** icon to open your account information.
- Fill out all the required fields and click the *Become a Community Member* button at the bottom of the **Contact Info** window. You will receive an email when your request has been authorized.



NOTE: *Your project will not be visible to the public until you have submitted it to the administrator and it has been accepted for publication.*

How to Add a New Project

To add a project to *Opti*:

- Click on the **Projects** icon in the navigation bar
- Click **Add** in the sub-navigation bar. If you are a Community Member, the project entry screens will open.
- Fill out the project information and click the *Save* button.
- You may continue to update project information prior to and after submitting the project to the administrator.

How to Share a Project

The Share Tool allows a select group of users to be able to view and edit your project prior to and after submission.

- Click on the **Projects** icon in the navigation bar
- Click on **Share** in the sub-navigation bar to open the Share Tool.

How to View Project Details

To view project details and update your project:

- Click on the **Projects** icon in the navigation bar.
  - In the Map view, mouse over your project and click on the project title when it appears.
  - In the List view, filter the list to show "My Projects" and select your project.
- A new window will open with the project details.
- Click on **Details** in the sub-navigation bar to view and edit project information.

RMC water and environment WOODARD & CURRAN



Prepared by:

WOODARD &CURRAN

1545 River Park Drive
Suite 425
Sacramento, CA 95815
916.999.8700