CITY OF SALINAS

STORMWATER MASTER PLAN UPDATE

- FINAL -

SALINAS

RICH IN LAND | RICH IN VALUES

City of Salinas
Stormwater
Master Plan Update
October 2024

Submitted by:

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CERTIFICATION

In accordance with the provisions of Section 6735 of the Business and Professions Code of the State of California, this report was prepared by or under the direction of the following Civil Engineer, licensed in the State of California:

ENGINEER IN RESPONSIBLE CHARGE:

10/01/2024

Kari Wagner, PE C66026 **Date**
Expiration: 6/30/2026

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AF	Acre-Feet
CASP	Central Area Specific Plan
CEQA	California Environmental Quality Act
cfs	Cubic feet per second
CIP	Capital Improvements Project
City	City of Salinas
cm	Centimeter
County	Monterey County
DAC	Disadvantaged Community
EDE	Economic Development Element
E.I.T.	Engineer in Training
EIR	Environmental Impact Report
ENR	Engineering News Record
ESRI	Environmental Systems Research Institute
EPA	Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FGA	Future Growth Area
FIS	Flood Insurance Study
fps	Feet per Second
ft	Feet
GCM	Global Climate Change Model
GIS	Geographic Information System
HSG	Hydrologic Soil Group
InfoSWMM	Info Stormwater Management Model- Innovyze InfoSWMM Version 15.1
LID	Low Impact Development
MCWRA	Monterey County Water Resources Agency
MS4	Municipal Separate Storm Sewer System
NAD	North American Datum
NAVD	North American Vertical Datum
ND	Negative Declaration
NRCS	Natural Resources Conservation Service
P.E.	Professional Engineer
PFDS	Precipitation Frequency Data Server
RMSE	Root-Mean-Square-Deviation
SDMH	Storm Drain Manhole
SWDS	Stormwater Development Standards
SWMM	Stormwater Management Model
SWMPU	Stormwater Master Plan Update
WWTP	Wastewater Treatment Plant
USGS	United States Geological Survey
WASP	West Area Specific Plan

EXECUTIVE SUMMARY

This report represents the Stormwater Master Plan Update (SWMPU) for the City of Salinas (City). The City is the largest city in Monterey County and serves as the County seat. The City has a long heritage as the financial and industrial center of Monterey County. US Route 101 bisects the City, while California State Route 68 heads west to Monterey and California State Route 183 runs northwest to Castroville. The City owns and operates a municipal separate storm sewer system (MS4) that conveys stormwater runoff to the major receiving waters, which ultimately flow to Monterey Bay.

INTRODUCTION

In December 2021, the City of Salinas authorized Wallace Group to complete a comprehensive Stormwater Master Plan Update to evaluate the City's storm drainage system. Preparation of the SWMPU will assist the City in prioritizing both existing and future stormwater collection system needs through repair, rehabilitation, replacement, and new facility installation. The master planning process will also tie the stormwater capacity assessment, both existing and future, to the infrastructure budgeting process.

The SWMPU includes analyses of the City's collection system capacity, impact of future developments and land use changes, and a prioritized capital improvement program.

This SWMPU is presented in seven chapters, summarized as follows:

- **Chapter 1: Introduction.** This chapter presents an overview of the goals of this report, authorization and scope of work, and acknowledgement of the various staff and personnel involved in the preparation of this document.

- **Chapter 2: Study Area Characteristics.** This chapter focuses on important characteristics of the study area. Key parameters established in this chapter include existing and future land uses, topography, climate, and hydrologic soil groups in the City. Land surface conditions in the City are essential for evaluating stormwater runoff.

- **Chapter 3: Storm Drain System Overview.** This chapter provides an overview of the City's MS4 system and the sources of MS4 information used. The Salinas MS4 system consists of approximately 140 miles of pipe, with diameters ranging from 4-inch to 84-inch.

- **Chapter 4: Hydrologic Analysis Methodologies.** This chapter describes hydrologic parameters that were used to develop the storm drain model as well as standard criteria developed by the City for identifying system deficiencies. Also discussed is 2NDNATURE's evaluation of climate change impacts to frequency and intensity of rainfall events.

- **Chapter 5: Hydraulic Analysis Methodologies.** This chapter describes hydraulic parameters that were used to develop the storm drain model as well as standard criteria developed by the City for identifying system deficiencies.

- **Chapter 6: Storm Drain System Analysis.** This chapter presents the modeling and hydraulic analysis of the City's storm drain system. The City's trunk storm drain system was modeled, which consists of mainline storm drains 24-inches and larger, the City's detention basins, and outfalls. The hydraulic model was utilized to analyze both existing and future flow conditions.

- **Chapter 7: Capital Improvement Program.** This chapter presents the capital improvement program (CIP), which identifies recommended existing and future storm drain system improvements, including capital costs. This CIP will be used by the City as a strategic planning tool to plan for and forecast needed capital budgets for anticipated storm drain system improvements.

STORM DRAIN MODELING AND ANALYSIS

The City's MS4 system consists of approximately 140 miles of pipe, with diameters ranging from 4-inch to 84-inch. The main trunk storm drain system was analyzed using the Innovyze InfoSWMM Version 15.1 hydraulic modeling program to evaluate performance under both existing and future flow conditions.

Design criteria, as shown in Table ES-1, were applied in the analysis of the trunk storm drain model. Hydrologic and hydraulic criteria are sourced from the City's 2013 Stormwater Development Standards (SWDS) and the August 2021 Final Draft SWDS.

TABLE ES-1. HYDRAULIC AND HYDROLOGIC CRITERIA FOR EXISTING SYSTEMS

STANDARD	CRITERIA
VELOCITY	Minimum: 2.0 fps when full Maximum: 8.0 fps
FRICTION FACTOR MANNING'S N	See TABLE 5-2
MINIMUM PIPE SIZE	15-inch for mainline 12-inch for catch basin laterals
SURCHARGING	Acceptable with a minimum freeboard of 1-foot below ground level
RETURN INTERVAL	20-year for commercial/industrial areas and main trunk 5-year for residential and local drainage facilities
RAINFALL PATTERN	24-hour: NRCS Type I 6-hour: From 2013 SWDS

Pipes were considered deficient if they had less than the minimum 1-foot freeboard during the associated design storm. Storm drain lines that do not meet the velocity criteria in the model were identified, but improvement projects were not recommended based on this criterion alone.

DETENTION BASIN EVALUATION

The 2013 SWDS sets requirements for the design of detention basins. Stormwater detention or retention is required for all new development and redevelopment projects to mitigate increases in stormwater discharges. Storage is to be determined using a 24-hour duration design storm, a discharge rate that does not exceed the available downstream capacity, and in conformance with the Monterey County criteria. Basin performance was evaluated using the InfoSWMM model. Per the 2013 SWDS, basins are required to maintain a minimum of 2-feet of freeboard during the 100-year storm event. Basins were considered deficient if they have less than this minimum freeboard.

CAPITAL IMPROVEMENT PROGRAM

Capital improvement projects were identified based on model results and input from the City on known areas of concern. Recommended improvements include replacing undersized inlets, new infrastructure to abandon existing storm drain siphons, upsizing pipes, sediment removal, modifications to existing basins, and focused studies to evaluate specific areas for the potential for new regional facilities.

CAPITAL IMPROVEMENT COSTS

The CIP costs were developed based on engineering judgment, confirmed bid prices for similar work in Monterey County, consultation with vendors and contractors, established budgetary unit prices for the work, and other reliable sources. Hard construction costs are typically escalated by a factor of 1.4 (1.8 for smaller projects) to allow budget for "soft costs" that include preliminary engineering, engineering, administration, construction management and inspection costs. <u>All CIP costs are expressed in Year 2024 dollars, using the McGraw-Hill Engineering News Record (ENR) Construction Cost Index of 13632 (September 2024).</u> Actual project costs will vary depending on economic conditions at the time of construction and should be escalated to the year or years scheduled for the work. The unit cost for new storm drain pipelines includes the proposed pipelines, manholes, lateral re-connections, sewer bypassing, traffic control, etc., and all other aspects of sewer system construction.

CIP RANKING

The capital improvement projects were ranked to determine the priority the recommended projects should be constructed. Table ES-2 evaluates each of the projects in four categories: flooding frequency, flooding severity, impact from climate change, and public safety. These categories are all weighted equally with a scale of 1 to 5 as they are critical aspects to the functionality of the storm drain system. The rankings for the individual categories were then added together to determine its final score. Note that there are some projects labelled "Study" with lower overall ranking scores which were manually categorized as high priority. These projects require further evaluation with specific studies to understand their needs and intricacies.

High priority projects (denoted by project number beginning with a "1") should be undertaken first, as these are critical to the operation and function of the City's storm drain system and then followed by medium ("2") and low ("3") priority projects as funding permit. Table ES-3 goes into detail on the high priority projects providing a brief description of the necessary upgrades and their locations as well as a breakdown of costs.

It is recommended that the City review these projects periodically to determine if any substantial changes have occurred that may re-prioritize a project to a higher ranking. The future capital improvement projects were not ranked as high, medium, or low priority since they are determined by timing of construction of the future development.

TABLE ES-2.
CITY OF SALINAS SWMPU
STORM DRAIN CIP RANKING MATRIX

Project Location	Project Description	Flooding Frequency	Flooding Severity	Climate Change	Public Safety	Total Score	DAC Area	Total Cost ($)	Project Number
		Area of Concern = 5 5-yr and 10-yr storm = 3 20-yr storm = 1	Widespread flooding = 5 Localized flooding = 3 Minimal flooding = 1	Climate Change Impact = 5 No Climate Change Impact = 0	Critical Facility or Evac Route = 5 Major Arterial or Freeway = 5 Minor Arterial or Collector = 3 Local or Private = 1				
John St & Monterey St	Replace undersized inlets	5	5	5	5	20	YES	$960,000	1-1
Natividad Creek E Laurel Crossing	New permanent fencing or barricades	5	5	5	5	20	YES	$360,000	1-2
E Romie Ln & S Main St	Replace undersized inlets	5	5	5	5	20	NO	$1,590,000	1-3
Madrid Entrance to Northridge Mall Nearest to Big 5	Replace undersized inlets	5	5	5	5	20	YES	$710,000	1-4
Williams and Freedom Parkway Silt Basin	Construct larger basin (property acquisition)	5	5	5	5	20	NO	$100,000	1-5
Monte Bella Basin	Remove sediment from existing basin and lower outlet invert	5	5	5	5	20	YES	$510,000	1-6
Monterey St & E Gabilan St	Replace undersized inlets	5	5	5	5	20	YES	$720,000	1-7
Northgate Park	New detention storage at existing park	5	5	5	5	20	YES	$490,000	1-8
Salinas Fairways Golf Course	Study to evaluate feasibility of relief flow to golf course	5	5	5	5	20	YES	$100,000	1-9
1198 Tyler St	Replace existing siphons	5	5	5	5	20	YES	$1,500,000	1-10
E Boronda and Williams Corner	Improve ditch and construct new basin (property acquisition)	5	5	5	5	20	NO	$100,000	1-11
Natividad Rd from E Alvin to E Laurel	New inlets, stabilize ROW with vegetation	5	5	5	5	20	NO	$1,260,000	1-12
Blanco Basin	Study to evaluate necessary maintenance and inlet repairs	5	5	5	5	20	YES	$100,000	1-13
Cesar Chavez Basin	Perform Basin Improvements per Preliminary Design Report	5	5	5	5	20	YES	$2,010,000	1-14
Salinas River Pump Station and Outfall	Condition Assessment of the Salinas River Pump Station and associated outfall pipe to understand the need for and level of rehabilitation necessary	5	3	5	5	18	YES	$200,000	1-15
E Boronda East of Independence Blvd	Study to evaluate floodplain storage (property acquisition)	5	1	5	5	16	NO	$100,000	1-16
Monte Bella Ditch	Establish sediment removal program	5	1	5	5	16	YES	$700,000	1-17
Santa Rita Creek - San Juan Grade and Russell Rd	Study to evaluate floodplain storage (property acquisition)	5	3	5	1	14	YES	$200,000	1-18
1322 Adams St	Replace existing siphons	5	5	5	3	18	YES	$630,000	2-1
E Alisal St	Pipe Upgrades	3	5	5	5	18	NO	$4,330,000	2-2
E Market St	Pipe Upgrades	3	5	5	5	18	YES	$7,840,000	2-3
E Blanco Rd	Pipe Upgrades	3	5	5	5	18	NO	$19,160,000	2-4
Maryal Dr	Pipe Upgrades	3	5	5	5	18	YES	$5,510,000	2-5
Russell Rd	Pipe Upgrades	3	5	5	5	18	NO	$3,210,000	2-6
Acosta Plz	Pipe Upgrades	3	5	5	5	18	YES	$8,640,000	2-7
Eucalyptus Dr	Pipe Upgrades	3	5	5	5	18	YES	$14,190,000	2-8
Chaparral St	Pipe Upgrades	3	5	5	5	18	YES	$16,520,000	2-9
Constitiution Blvd	Pipe Upgrades	3	5	5	5	18	NO	$7,480,000	2-10
Airport	Pipe Upgrades	3	5	5	5	18	NO	$14,970,000	2-11
Sherwood Dr	Pipe Upgrades	3	5	5	5	18	YES	$19,740,000	2-12
La Mancha Way	Pipe Upgrades	3	5	5	5	18	NO	$15,490,000	2-13
Rosarita Dr	Pipe Upgrades	3	5	5	5	18	YES	$22,530,000	2-14
W Market St	Pipe Upgrades	3	5	5	5	18	YES	$16,930,000	2-15
283 Chaparral St	Replace existing siphons	5	5	5	3	18	YES	$5,460,000	2-16
Tuscany Blvd	Pipe Upgrades	3	5	5	5	18	YES	$5,910,000	2-17
Iverson St & Clay St	Extend storm drain, new inlets	5	5	5	3	18	NO	$670,000	2-18
Lincoln Ave & Clay St	Replace undersized inlets	5	5	5	3	18	YES	$2,650,000	2-19
55 Santa Lucia Ave	Replace undersized inlets	5	3	5	5	18	NO	$670,000	2-20
North Bound Off-Ramp to W Market St. from Davis Rd	Replace undersized inlets	5	3	5	5	18	YES	$360,000	2-21
Salinas River Outfall	Rehabilitation (relining) of 66in CMP outfall pipe along with removal of debris impacting flap gate at the Salinas River	5	3	5	5	18	YES	$10,770,000	2-22
East Market St	Pipe Upgrades	3	3	5	5	16	YES	$3,520,000	3-1
E San Luis St & Soledad St	Replace existing siphons	5	3	5	3	16	YES	$1,950,000	3-2
603 Carriage Ct	Replace existing siphons	5	5	5	1	16	YES	$690,000	3-3
Rico St	Pipe Upgrades	3	3	5	5	16	NO	$4,200,000	3-4
E Laurel Dr & Noice Dr	Replace undersized inlets	5	1	5	5	16	YES	$1,120,000	3-5
Chaparral St & Noice Dr	Replace undersized inlets	5	1	5	5	16	YES	$600,000	3-6
N Davis Rd	Pipe Upgrades	3	3	5	5	16	YES	$6,230,000	3-7
N Main St at Harley Shop	Replace undersized inlets	5	1	5	5	16	YES	$630,000	3-8

TABLE ES-2.
CITY OF SALINAS SWMPU
STORM DRAIN CIP RANKING MATRIX

Project Location	Project Description	Flooding Frequency	Flooding Severity	Climate Change	Public Safety	Total Score	DAC Area	Total Cost ($)	Project Number
		Area of Concern = 5 5-yr and 10-yr storm = 3 20-yr storm = 1	Widespread flooding = 5 Localized flooding = 3 Minimal flooding = 1	Climate Change Impact = 5 No Climate Change Impact = 0	Critical Facility or Evac Route = 5 Major Arterial or Freeway = 5 Minor Arterial or Collector = 3 Local or Private = 1				
Manchester Cir & Constitution Blvd	Replace undersized inlets	5	1	5	5	16	NO	$360,000	3-9
W Curtis St	Pipe Upgrades	3	3	5	5	16	NO	$6,400,000	3-10
Freedom Parkway	Pipe Upgrades	3	3	5	5	16	NO	$11,300,000	3-11
E Gabilan St	Pipe Upgrades	3	5	5	3	16	YES	$1,290,000	3-12
California St	Pipe Upgrades	3	3	5	5	16	YES	$2,780,000	3-13
Cortez St	Pipe Upgrades	3	5	5	3	16	YES	$6,070,000	3-14
Towt St	Pipe Upgrades	3	3	5	5	16	YES	$6,720,000	3-15
Cape Cod Way	Pipe Upgrades	3	3	5	5	16	NO	$8,990,000	3-16
W Market St	Pipe Upgrades	3	3	5	5	16	NO	$29,430,000	3-17
Work St	Pipe Upgrades	3	3	5	5	16	NO	$6,890,000	3-18
174 Rosarita Dr	Replace existing siphons	5	5	5	1	16	NO	$1,150,000	3-19
211 Riker Ter	Replace existing siphons	5	5	5	1	16	YES	$1,010,000	3-20
559 Iverson St	Replace existing siphons	5	3	5	3	16	NO	$1,660,000	3-21
229 Maple St	Replace existing siphons	5	3	5	3	16	NO	$1,740,000	3-22
El Dorado Park Bioretention	Restore bioretention basin	5	3	5	3	16	NO	$360,000	3-23

TABLE ES-3.
CITY OF SALINAS SWMPU
HIGH PRIORITY STORM DRAIN CAPITAL IMPROVEMENT PROGRAM (CIP)

Project #	Title	Description	Location	Construction Cost ($)	Soft Cost ($)*	Total Project Cost ($)**
1-1	**John St & Monterey St**	Replace nine undersized curb inlets	1. Intersection of S Main St and Winham St/Clay St: 4 inlets 2. Intersection of John St and Monterey St: 2 inlets 3. Intersection of John St and Soledad St: 3 inlets	$680,000	$280,000	**$960,000**
1-2	**Natividad Creek E Laurel Crossing**	Existing culverts in Natividad Creek under East Laurel Drive are not protected, allowing for trash build-up within the culvert as well as posing a risk to public safety. Install new permanent fencing or barricades to protect these culverts	Natividad Creek, E Laurel Crossing	$200,000	$160,000	**$360,000**
1-3	**E Romie Ln & S Main St**	Replace eight undersized curb inlets	1. Intersection of S Main St and East Acacia St: 1 inlet 2. Intersection of S Main St and Hawthorne St: 2 inlets 3. Intersection of S Main St and East Romie Ln: 3 inlets 4. Intersection of S Main St and Katherine St: 2 inlets	$1,130,000	$460,000	**$1,590,000**
1-4	**Madrid Entrance to Northridge Mall Nearest to Big 5**	Replace three undersized curb inlets and add 300 feet of pipe	Madrid St entrance to Northridge Mall nearest to Big 5: 3 inlets	$390,000	$320,000	**$710,000**
1-5	**Williams and Freedom Parkway Silt Basin**	The current silt basin is undersized. acquire additional property and construct a larger silt basin	Corner of Williams Rd and Freedom Pkwy	$0	$100,000	**$100,000**
1-6	**Monte Bella Basin**	Remove excess sediment from basin, lower invert by approx 2 feet, and reconstruct 100 feet of downstream pipe	Corner of Monte Bella Pkwy and Sconberg Pkwy	$280,000	$230,000	**$510,000**
1-7	**Monterey St & E Gabilan St**	Replace five undersized inlets	1. Intersection of E Monterey St and E Gabilan St: 4 inlets 2. South of intersection of W Gabilan St and Church St: 1 inlet	$400,000	$320,000	**$720,000**
1-8	**Northgate Park**	Northgate Park does not act as a detention basin because it is not connected into the City's storm drain system. Connect the park to the storm drain system with a new pipe and overflow grate	Between Cherokee Dr and Sepulveda Dr	$270,000	$220,000	**$490,000**
1-9	**Salinas Fairway Golf Course**	Perform feasibility study to diverting stormwater to the golf course to reduce flooding along Alisal St	South of E Alisal St	$0	$100,000	**$100,000**
1-10	**1198 Tyler St**	Replace fourteen siphons/undersized curb inlets	1. Intersection of W Laurel Dr and Tyler St: 3 inlets/siphons 2. Intersection of W Laurel Dr and Polk St: 4 inlets/siphons 3. Intersection of W Laurel Dr and Monroe St: 3 inlets/siphons 4. Intersection of W Laurel Dr and Adams St: 4 inlets/siphons	$1,070,000	$430,000	**$1,500,000**
1-11	**E Boronda and Williams Corner**	Perform a study to evaluate the potential for a new sediment basin and basin/ditch configurations at this intersection to reduce flooding and heavy sedimentation	Along Williams Rd, west of corner with E Boronda Rd	$0	$100,000	**$100,000**

***Soft costs include a 40% escalation of the construction costs for planning, engineering, CM, legal/admin for project with more than $400,000 in construction costs and a 80% escalation factor for projects with less than $400,000 in construction costs.**
****All CIP costs are expressed in May 2024 dollars, using McGraw-Hill ENR Construction Cost Index of 13532, and will need to be escalated to the year or years scheduled for the work.**

TABLE ES-3.
CITY OF SALINAS SWMPU
HIGH PRIORITY STORM DRAIN CAPITAL IMPROVEMENT PROGRAM (CIP)

Project #	Title	Description	Location	Construction Cost ($)	Soft Cost ($)*	Total Project Cost ($)**
1-12	**Natividad Rd from E Alvin to E Laurel**	Replace eight undersized curb inlets and stabilize City ROW with vegetation	1. Intersection of Natividad Rd and E Alvin Dr : 3 inlets 2. Intersection of Natividad Rd and Rainier Dr/Chaparral St: 3 inlets 3. Intersection of Natividad Rd and Pacheco St: 2 inlets 4. Intersection of Natividad Rd and E Laurel Dr: 1 inlets 5. Replace vegetation in City ROW along Natividad Rd, between E Alvin Dr to E Laurel Dr	$900,000	$360,000	**$1,260,000**
1-13	**Blanco Basin**	Study to evaluate necessary maintenance and inlet repairs	Blanco Basin, southwest of Blanco Rd	$0	$100,000	**$100,000**
1-14	**Cesar Chavez Basin**	Perform Basin Improvements per Preliminary Design Report	Cesar Chavez Bain, Cesar Chavez Park	$1,430,000	$580,000	**$2,010,000**
1-15	**Salinas River Pump Station and Outfall**	Condition Assessment of the Salinas River Pump Station and associated outfall pipe to understand the need for and level of rehabilitation necessary	Salinas River Pump Station and Outfall, southwest of Blanco Rd	$0	$100,000	**$100,000**
1-16	**E Boronda East of Independence Blvd**	Perform a study to evaluate additional stormwater storage north of Boronda Rd	North of E Boronda Rd, east of Independence Blvd	$0	$100,000	**$100,000**
1-17	**Monte Bella Ditch**	Establish a sediment removal program for Monte Bella Ditch	Monte Bella Ditch, east of Sconberg Pkwy	$500,000	$200,000	**$700,000**
1-18	**Santa Rita Creek - San Juan Grade and Russell Rd**	Identify opportunities to reduce surface flooding in Santa Rita Creek	Santa Rita Creek, between Russell Rd and North Main St	$0	$200,000	**$200,000**
					HIGH PRIORITY STORM DRAIN CIP	**$11.7+ million**

***Soft costs include a 40% escalation of the construction costs for planning, engineering, CM, legal/admin for project with more than $400,000 in construction costs and a 80% escalation factor for projects with less than $400,000 in construction costs.**
****All CIP costs are expressed in May 2024 dollars, using McGraw-Hill ENR Construction Cost Index of 13532, and will need to be escalated to the year or years scheduled for the work.**

CHAPTER 1
INTRODUCTION

This report presents the Stormwater Master Plan Update (SWMPU) for the City of Salinas (City). The City is the largest city in Monterey County (County) and serves as the County seat. According to the 2020 Census, the City's current population is approximately 163,550 people. This Chapter begins the SWMPU by presenting the need for the Master Plan, the references used, and the scope of work.

PURPOSE

The preparation of this SWMPU will assist the City of Salinas in prioritizing both existing and future storm drain system needs through repair, rehabilitation, replacement, or new facilities. The last SWMP was prepared in 2004 and there have been significant changes and growth in the City since then.

PREVIOUS MASTER PLAN AND REFERENCED STUDIES

The City and other sources provided Wallace Group with data regarding the existing storm drain system for this analysis. The following is a summary of the information Wallace Group has reviewed for the SWMPU.

- Existing 2004 Stormwater Master Plan
- Land use information developed for the May 2023 Sanitary Sewer Master Plan Update, based on the City's General Plan, Housing Element, and Economic Development Element (EDE)
- Future Planned Land Uses from zoning maps and comprehensive plan
- December 2019 West Area Specific Plan (WASP)
- June 2020 Central Area Specific Plan (CASP)
- City Municipal Separate Storm Sewer System (MS4) (stormwater system map)
- 2NDNATURE on-line platform
- 2NDNATURE Technical Memo of Salinas Precipitation Frequency Projections
- As-built data
- City GIS Data including the storm drain system, land use, and Future Growth Areas (FGA)
- Information on the operation and maintenance of the system and known flooding, erosion, maintenance problem areas and other deficiencies, through discussions with City personnel
- Rim elevations of Storm Drain Manholes (SDMH) and other facilities (outfall or catch basin) and invert elevations of the flow lines and diameter of pipes through survey effort conducted by Wallace Group
- Hydrologic and hydraulic criteria from the City's 2013 Storm Water Development Standards (SWDS) and the August 2021 Final SWDS
- Preliminary Design Report for Cesar Chavez Park Dry Basin Assessment

ENVIRONMENTAL REVIEW

In accordance with Title 14, California Code of Regulations, Chapter 3, Article 18 (Statutory Exemptions), this SWMPU is considered a planning study and therefore adoption of this document is exempt from the requirements to prepare Environmental Impact Reports (EIR) or Negative Declarations (ND). However, on a project-specific basis, California Environmental Quality Act (CEQA) must be satisfied for any major capital improvement projects described in this report that will be implemented by the City in the future, through the preparation of an appropriate EIR or ND.

AUTHORIZATION AND SCOPE OF WORK

In December 2021, the City authorized Wallace Group to prepare a comprehensive Stormwater Master Plan Update. The scope of work is as follows:

Task 1. Document Review and Data Collection

Wallace Group reviewed the existing 2004 Stormwater Master Plan and City documents, including but not limited to the 2NDNATURE on-line platform, the Salinas General Plan, and the EDE. Data collection included review of the City's as-built data, known flooding, erosion, and maintenance problem areas, and GIS data. Wallace Group also prepared a Preliminary Findings Memorandum which served as the basis for the storm drain analysis prepared for this Master Plan.

Task 2. Field Effort & GIS Update

Task 2.1 Survey Storm Drain Manholes

Wallace Group surveyed the rim elevations of each SDMH or other facilities (outfall or catch basin) to be modeled and dip the manholes to obtain the invert elevation (invert in and invert out) of the flow lines and the diameter of the pipes. Based on photos and visual observation from ground surface, Wallace Group ascertained pipe material.

Task 2.2 Update GIS Database

Based on data collected, Wallace Group in coordination with our subconsultant Second Nature updated the City's GIS database (2NFORM). 2NFORM can be used to generate GIS maps and atlas maps for the City's MS4 permit.

Task 3. Develop a Storm Drain Model

Wallace Group utilized data collected in Tasks 1 and 2, and the updated GIS database for use in the Innovyze modeling program (InfoSWMM). The storm drain system has been modeled under existing and future buildout conditions for the 5-, 10-, 20-, and 100-year storm (24-hour rainfall). In addition, potential impacts of climate change were modeled based on future rainfall projections provided by Second Nature. The City's detention basins and trunk storm drain mains (typically 24-inch and larger), were modeled with enough detail to identify hydraulic constraints, predict pipe flows including existing trunk capacity, predict conduit overflows, identify mainlines that are at or near capacity and recommend upsizing to accommodate for future growth, and quantify the effects of detention, surcharge storage, and overflow flood storage.

Task 4. Develop Capital Improvement Program

Using data collected during Field Investigations, and the modeling efforts of Task 3, Wallace Group has developed a Storm Drain Capital Improvements Projects (CIP) recommending high, medium, low, and maintenance level priority projects and improvements necessary to address identified system deficiencies. Improvements recommended in the 2004 stormwater master plan were reviewed to determine if any of the uncompleted improvements are still necessary. The costs of each recommended improvement were estimated as well.

Capital improvement plan recommendations developed for the Stormwater Master Plan were incorporated into the City's asset management program by Second Nature, for compliance with section 1.1.c of the MS4 permit.

Task 5. Draft and Final Stormwater Master Plan Update

Wallace Group prepared a draft Stormwater Master Plan report for City review and comment. Upon receiving written comments from the City for the draft Stormwater Master Plan report, Wallace Group addressed City comments and prepared the Final Stormwater Master Plan Update.

ACKNOWLEDGEMENTS

The City of Salinas SWMPU is prepared by Wallace Group on behalf of the City of Salinas. Wallace Group gratefully acknowledges the City of Salinas and 2NDNATURE for their efforts, involvement, and assistance in preparing the City of Salinas SWMPU.

City of Salinas

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The City of Salinas SWMPU was completed with the efforts of many Wallace Group team members. They include:

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CHAPTER 2
STUDY AREA CHARACTERISTICS

This Chapter presents an overview of the characteristics of the study area. This chapter establishes the regional watershed conditions, topography, climate, existing and future land uses, and HSGs within the study boundary. All figures are located at the end of this chapter.

INTRODUCTION

The City of Salinas is the largest city in Monterey County and serves as the County seat. The City has a long heritage as the financial and industrial center of Monterey County. US Route 101 bisects the City, while California State Route 68 heads west to Monterey and California State Route 183 runs northwest to Castroville. The City was incorporated in 1874 and is known as the “Salad Bowl of the World” for its large agricultural industry.

STUDY AREA

The following sections discuss the existing characteristics of the study area as well as the existing and future land uses. Establishing existing and future land use for the City is important for evaluating stormwater runoff due to land surface conditions. The existing land uses are based on the City’s Geographic Information System (GIS) database and General Plan Land Use Map.

Regional Watershed

The City of Salinas is the largest community in the Salinas River Watershed. Near the City of Salinas, the Salinas River watershed is comprised of two major subwatersheds, the Reclamation Ditch watershed and the Lower Salinas River watershed. The Reclamation Ditch subwatershed drains to the Old Salinas River and contains Tembladero Slough and its tributaries: the Reclamation Ditch, Espinosa Slough/Santa Rita Creek, Gabilan Creek, Natividad Creek, Alisal Creek, and Towne Creek. The Lower Salinas River subwatershed drains to the Salinas River Lagoon and contains the Salinas River and its tributaries: Blanco Drain, Toro Creek, Quail Creek, and Chualar Creek. Both the Old Salinas River and the Salinas River Lagoon empty to Monterey Bay.

Receiving Waters Characterization

The City’s NPDES Permit Order R3-2019-0073, effective October 1, 2019, characterizes the City’s receiving water bodies as follows:

> Stormwater runoff is generated from various land uses in the Order coverage area and discharges into receiving waters, which in turn flow into Monterey Bay. Four major creeks and several minor tributaries pass through the Salinas area and receive stormwater discharges from the Order coverage area northeast and adjacent to Highway 101. Santa Rita Creek carries stormwater discharges from a small portion of the Order coverage area to Espinosa Slough. The three other major creeks—Natividad, Gabilan, and Alisal Creeks—are interconnected. Alisal Creek becomes the Reclamation Ditch. Natividad and Gabilan Creeks flow through the northeastern portion of the City to Carr Lake. Carr Lake is often dry and is utilized for farming, but also functions to detain stormwater flows. Flows leaving Carr Lake discharge to the Reclamation Ditch. The Reclamation Ditch flows west from the Order coverage area, paralleling the Alisal Slough and eventually discharges to the Tembladero Slough. Espinosa and Tembladero Sloughs discharge to the Old Salinas River. Stormwater from the southernmost portion of the City flows to a lift station which discharges to the Salinas River. The Salinas River, like Espinosa and Tembladero Sloughs, discharges to the Old Salinas River during low-flow periods and

> directly to Monterey Bay during high flows. The Old Salinas River discharges into the Pacific Ocean at the downstream end of the Elkhorn Slough and Moro Cojo Slough estuary system near Moss Landing. (pg. 6)

FIGURE 2-1 shows the receiving waters in Salinas.

Study Boundary

The SWMPU study boundary includes the City's storm drain system and tributary drainage areas This area generally follows the City boundary, as shown on FIGURE 2-2, and also includes some agricultural areas outside City limits that drain to and have an impact on the City's storm drain system. The following FGAs and Target Areas are included in the study area based on existing drainage patterns or proposed storm drain systems that would tie-into the City's existing main storm drain trunkline (24-inches and greater):

- Portion of the WASP that will connect to the City's storm drain system, per the WASP Closed Conduit Stormwater System layout (Figure 7-5 of the 2019 WASP, attached in Appendix C)
- East Area Specific Plan
- East FGA
- The Ag-Industrial Center area at the southwest corner of the City
- All Target Areas as identified by the City's EDE, except B and F which do not drain to the City's storm drain system

The following areas are not included in the study area based on drainage patterns that outfall to an existing creek and are not anticipated to drain through the City's storm drain system:

- The northwest portion of the WASP that drains directly to Santa Rita Creek, per the WASP Closed Conduit Stormwater System layout (Figure 7-5 of the 2019 WASP)
- The northwest portion of the East Area Specific Plan that drains directly to Natividad Creek
- The CASP that drains to both Gabilan Creek and Natividad Creek, per the CASP Conceptual Storm Drain Layout (Figure 6-8 of the 2020 CASP, attached at the end of this memo)
- The Southeast FGA that drains directly to Alisal Creek
- The West Boronda FGA that drains directly to Markeley Swamp and the Reclamation Ditch
- Bolsa Knolls drains directly to Santa Rita Creek
- Target Areas B and F that drain to directly Alisal Creek

Topography

The City of Salinas generally slopes in a westerly and southwesterly direction. Elevations range from approximately 140 ft in the northeast corner of the City at Boronda Road and Williams Road to approximately 30 ft in the southwest corner of the City at South Davis Road and West Blanco Road.

The 2017 United States Geological Survey (USGS) aerial lidar data, report CA AZ FEMA R9 LIDAR 2017 D18, was used as the basis for identifying overland drainage flow paths and land slope. The absolute vertical accuracy of this study was 15 cm Root-Mean-Square-Deviation (RMSE).

Climate

The City of Salinas has a temperate climate, with an average daytime high temperature ranging from 71°F during the summer months to 63°F during the winter months. The City's yearly rainfall averages around 15 inches, with most of the rain occurring in between November through April. January is typically the rainiest month, with an average monthly rainfall of 3.3 inches. All climate data was obtained from the National Centers for Environmental Information U.S. Climate Normals for the weather station Salinas #2, with records from 1991-2020.

Land Use

The City is comprised of 12,455 acres of land, zoned for residential, commercial, industrial, agricultural, and public facilities. TABLE 2-1 summarizes the different land uses in the City's boundary and includes the special assessment district in Bolsa Knolls since it is part of the City's existing service area. Land use data shown on FIGURE 2-3 is a combination of GIS data provided by the City and the General Plan Land Use Map.

TABLE 2-1 CITY EXISTING LAND USE

	NUMBER OF PARCELS	AREA (ACRES)	% OF SERVICE AREA
LOW DENSITY RESIDENTIAL	18,253	3,003	24.1%
MEDIUM DENSITY RESIDENTIAL	6,906	929	7.5%
HIGH DENSITY RESIDENTIAL	2,007	635	5.1%
MOBILE HOME	9	116	0.9%
COMMERCIAL	1,397	1,297	10.4%
INDUSTRIAL	306	814	6.5%
HOTEL	34	34	0.3%
SCHOOL	59	752	6.0%
PUBLIC/SEMI-PUBLIC	232	1,294	10.4%
OPEN SPACE	4	31	0.2%
AGRICULTURE	51	3,261	26.2%
VACANT	324	289	2.3%
TOTAL	29,482	12,455	100%

Future Land Use

One major purpose of the SWMPU is to forecast the impact of future developments on stormwater runoff to the existing stormwater system. Additional runoff may be contributed by growth areas in the future, both within and outside City limits. Both the City's General Plan and EDE were used as the sources to evaluate future land use. The EDE is the most recent document, dated September 2017, and is the eighth element of the 2002 City's General Plan. The EDE provides amendments to the City's General Plan that reflects the goals, policies, and actions outlined in the EDE. Focused Growth Areas, FGAs, and Target Areas are shown on FIGURE 2-4.

The development types found in the General Plan and the EDE provide the most conservative projections for City buildout in the Year 2045. However, it is important to note that these are based on planning projections and preliminary locations around the City. As future developments enter final engineering and design, it is recommended that the City re-evaluate the storm drain model based on more accurate runoff projections, engineering plans, and storm drain tie-in locations.

Focused Growth Areas

The General Plan identifies five (5) Focused Growth Areas to accommodate new developments. The Focused Growth Areas are:

- Laurel Drive at North Main Street
- North Main Street/Soledad Street
- East Alisal Street/East Market Street
- Abbott Street
- South Main Street

According to the General Plan, these areas of existing developments would "benefit from redevelopment or revitalization, change of land uses, and/or the incorporation of mixed-use residential uses." Runoff from these focused growth areas will be modeled based on the future land use designation; however, the impact to the City's storm drain system is likely marginal since most focused growth areas already contribute existing runoff. Additional modeling may be necessary in the event of more intensification of use. These Focused Growth Areas and the future land uses per the City's General Plan are shown on FIGURE 2-4.

Future Growth Areas

Four (4) FGAs were identified in the City's General Plans as areas outside the City limits where new growth will occur on land that is currently used for agricultural production. The FGAs are:

- North Boronda FGA
- East FGA
- Southeast FGA
- West Boronda FGA

The FGAs and future land uses associated per the City's General Plan are shown on Figure 2-5. In 2008, the North Boronda FGA was annexed into the City. Prior to development, FGAs are subject to the adoption of Specific Plans by the City Council. The North Boronda FGA was split into three (3) Specific Plans: West Area, Central Area, and East Area, shown on FIGURE 2-4. In December 2019, the WASP was approved by City Council, and in 2020, the Draft CASP was made public for review. These Plans specify the ultimate distribution, location, and intensity of land uses.

Soils

The soil characteristics within the City are an important factor when considering runoff. Runoff is directly impacted by the amount of water a soil can absorb as defined by its infiltration rate and Hydrologic Soil Group (HSG).

Hydrologic Soil Groups

The Natural Resources Conservation Service (NRCS) evaluates and assigns each soil type an HSG rating of A, B, C, or D. An HSG represents soils with similar stormwater runoff potential under similar storm and ground cover conditions. Soil properties considered for the HSG rating may also influence infiltration rate, including depth to groundwater table, saturated hydraulic conductivity, and depth to a layer with slow water transmission rate. An HSG designation of "A" represents a soil with lower runoff potential, while an HSG designation of "D" represents a soil with higher runoff potential. A summary of this classification and breakdown of the City's HSGs is listed in TABLE 2-2 and illustrated on FIGURE 2-5. A small area of soil near Natividad Creek is classified as C/D. There are also minor areas where HSG is not classified, such as open water bodies. To be conservative, these areas were modeled as soil type D.

TABLE 2-2. CLASSIFICATION OF HYDROLOGIC SOIL GROUPS

Soil Group	Texture	Composition	Infiltration Rate	Acres within Study Area	Percent of Study Area
A	Gravel, Sand	< 10 % Clay, > 90% Sand	High	794	5.1%
B	Loam, Loamy Sand	10 – 20 % Clay, 50 – 90 % Sand	Moderate	0	0%
C	Loam, Silt Loam, Sandy Clay Loam, Silty Clay Loam, Clay Loam	20 – 40 % Clay, < 50 % Sand	Slow	10,773	69.4%
D	Clay	> 40 % Clay, < 50 % Sand	Very Slow	3,959	25.5%
			TOTAL	15,526	100%

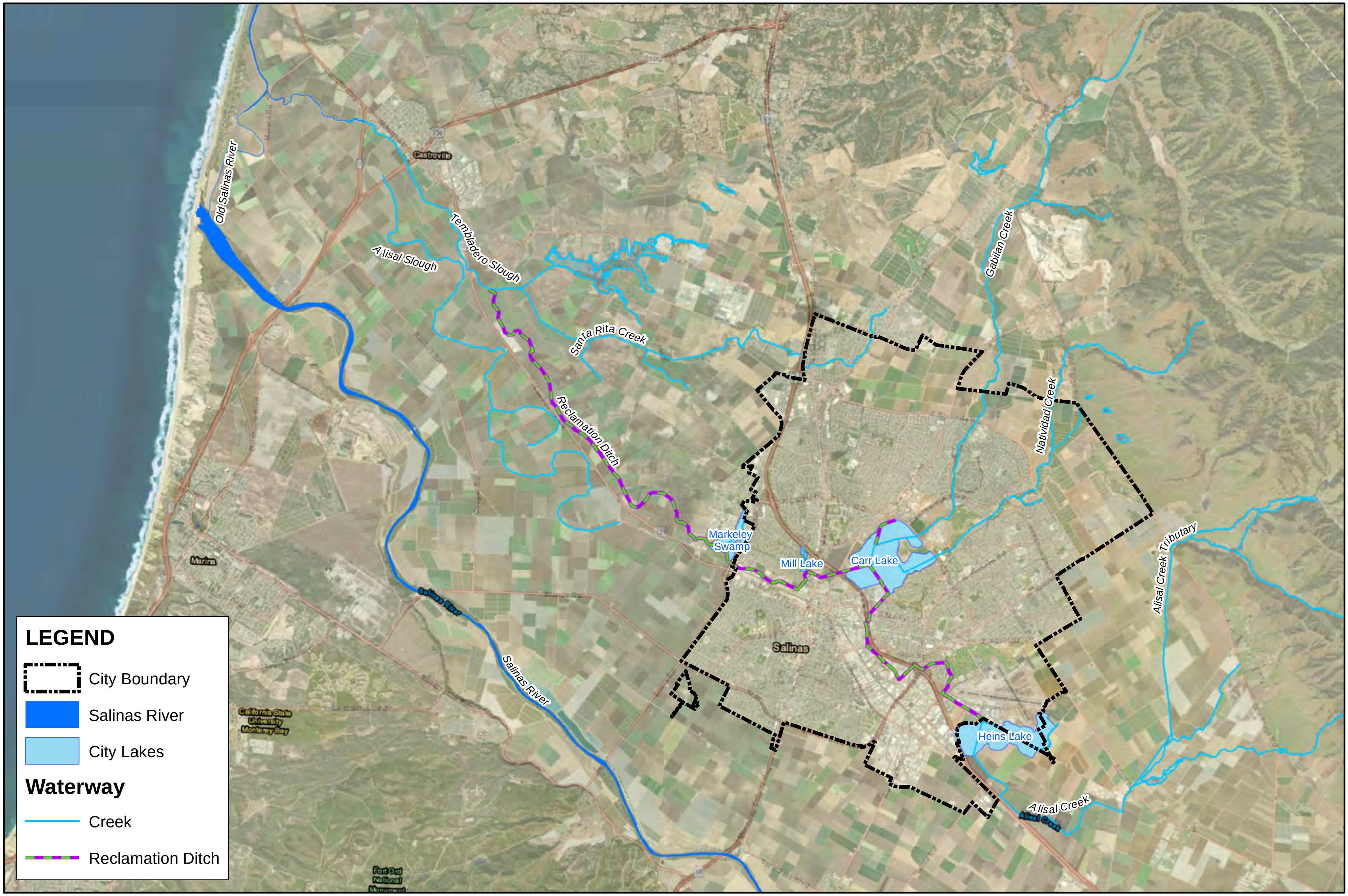

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FIGURE 2-1. SALINAS RECEIVING WATERS

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DATE: 09/27/2024

EXHIBIT NOTES:
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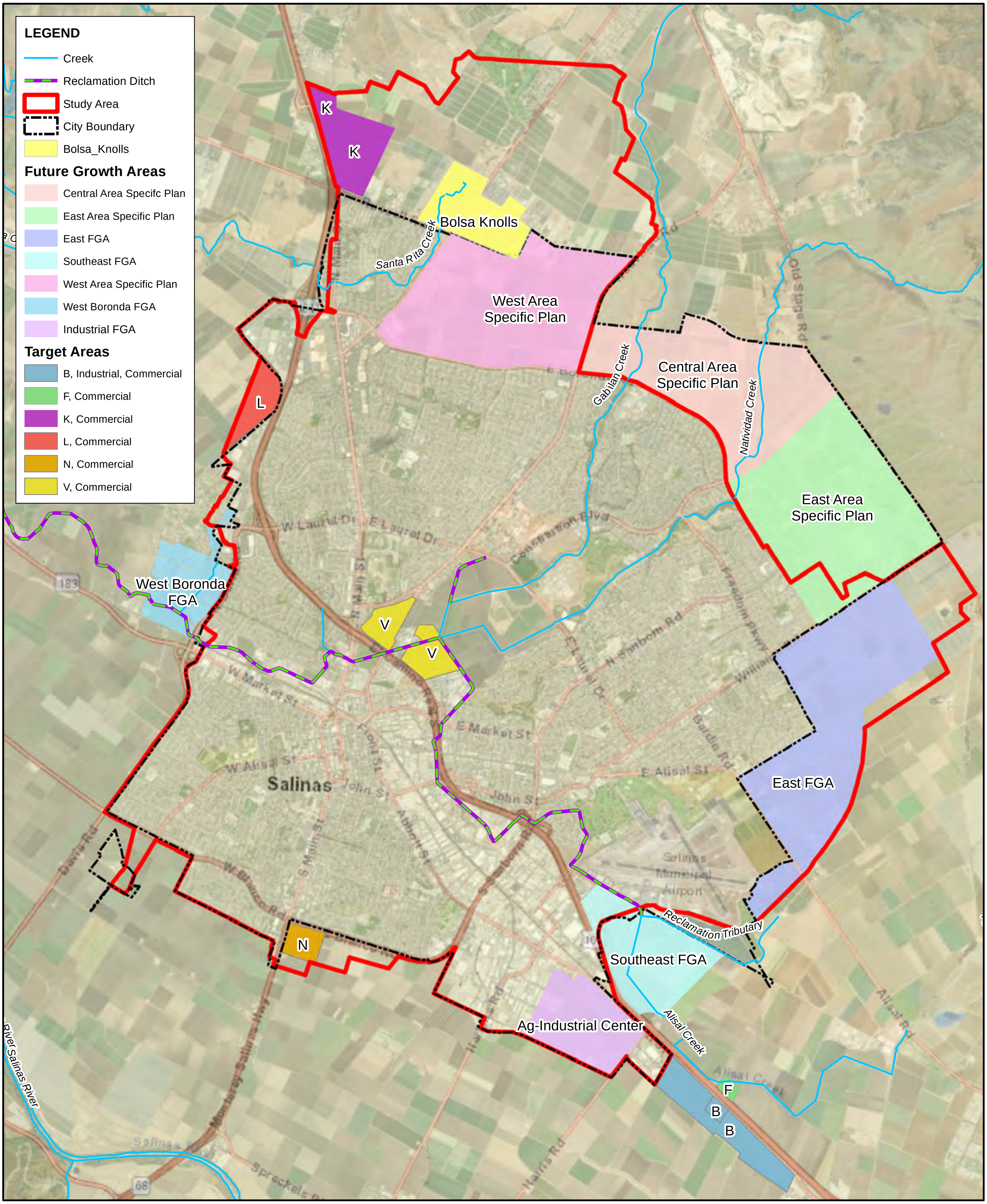

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FIGURE 2-2. SWMPU STUDY AREA

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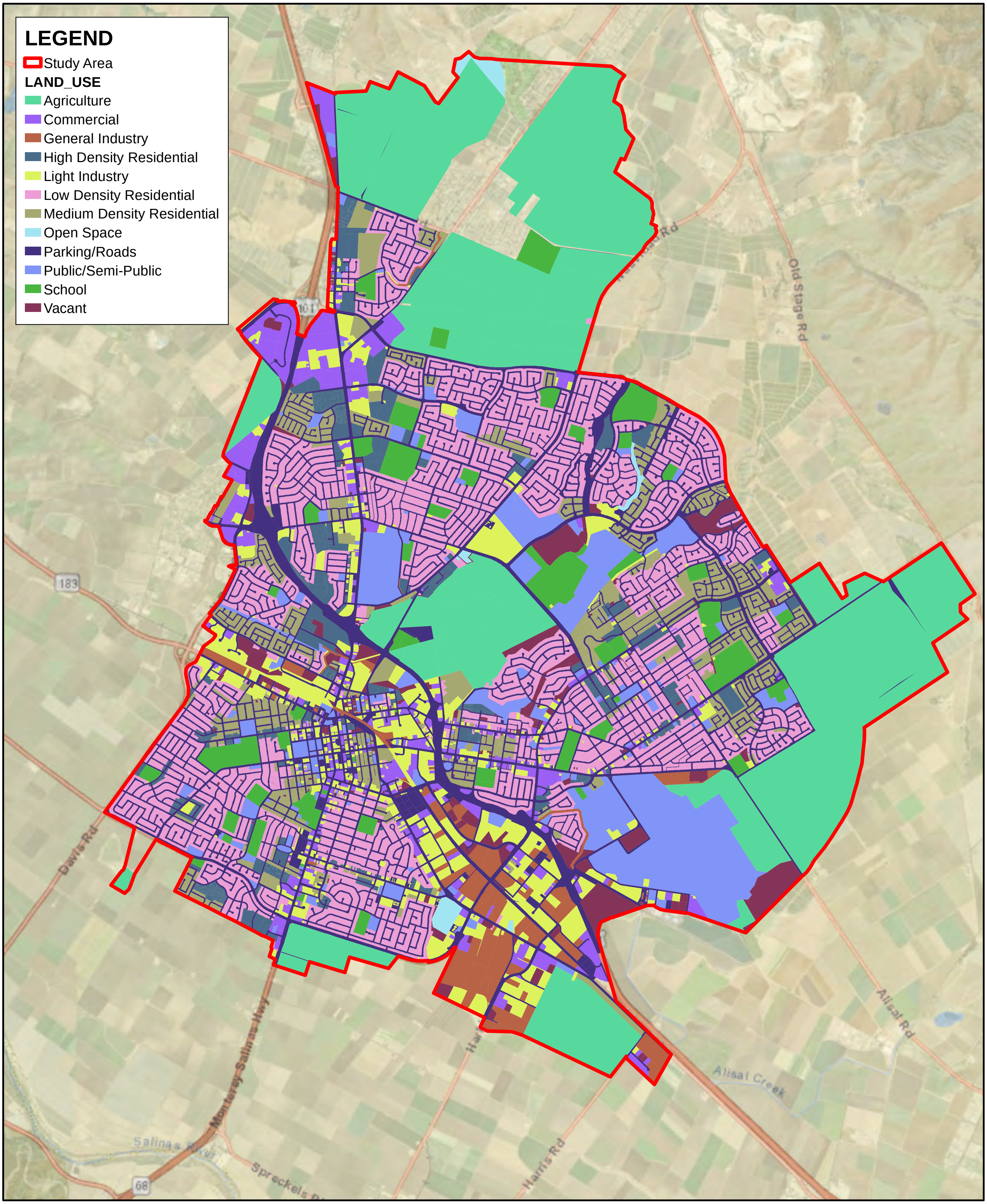

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FIGURE 2-3. EXISTING LAND USE

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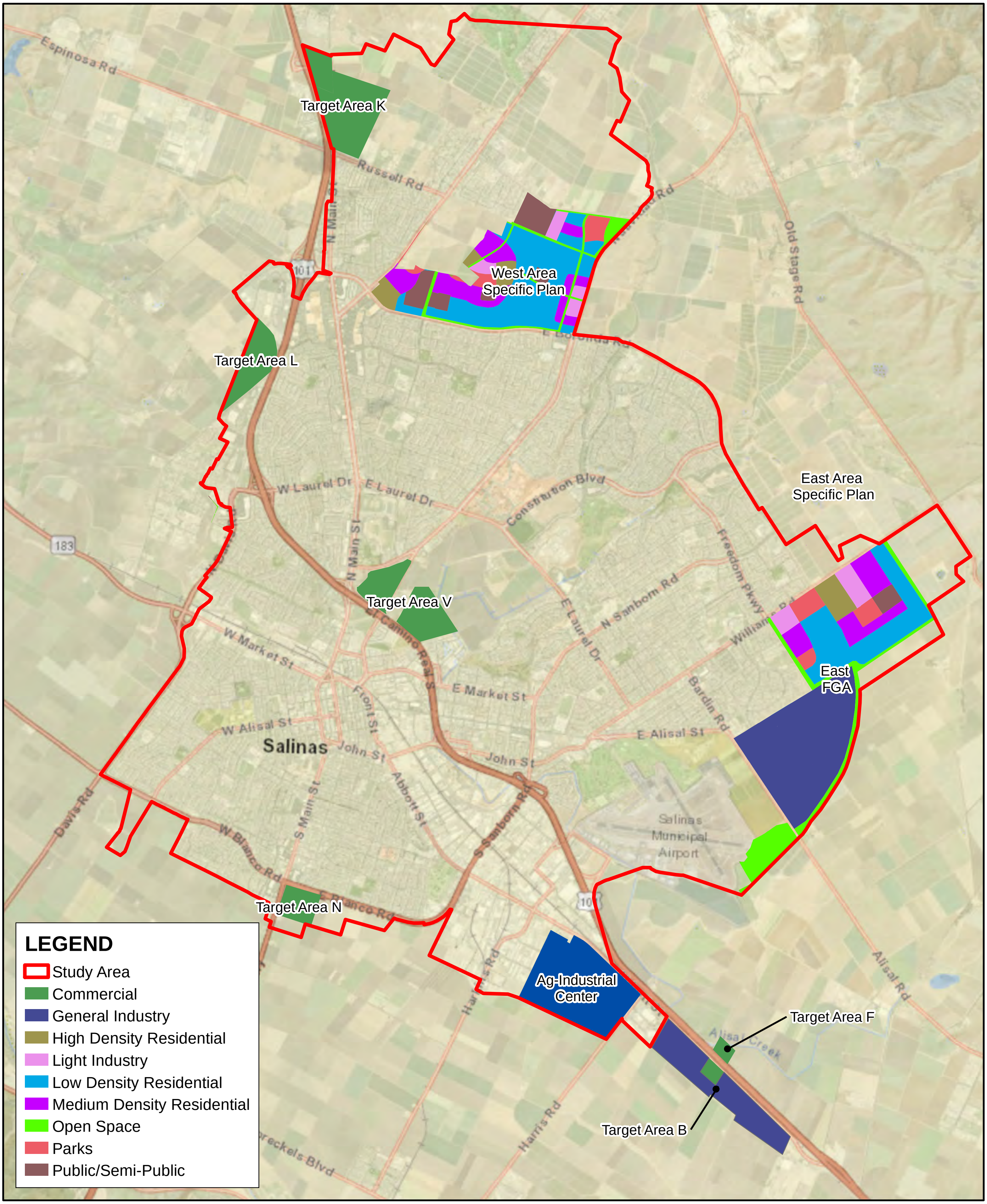

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FIGURE 2-4. FUTURE LAND USE

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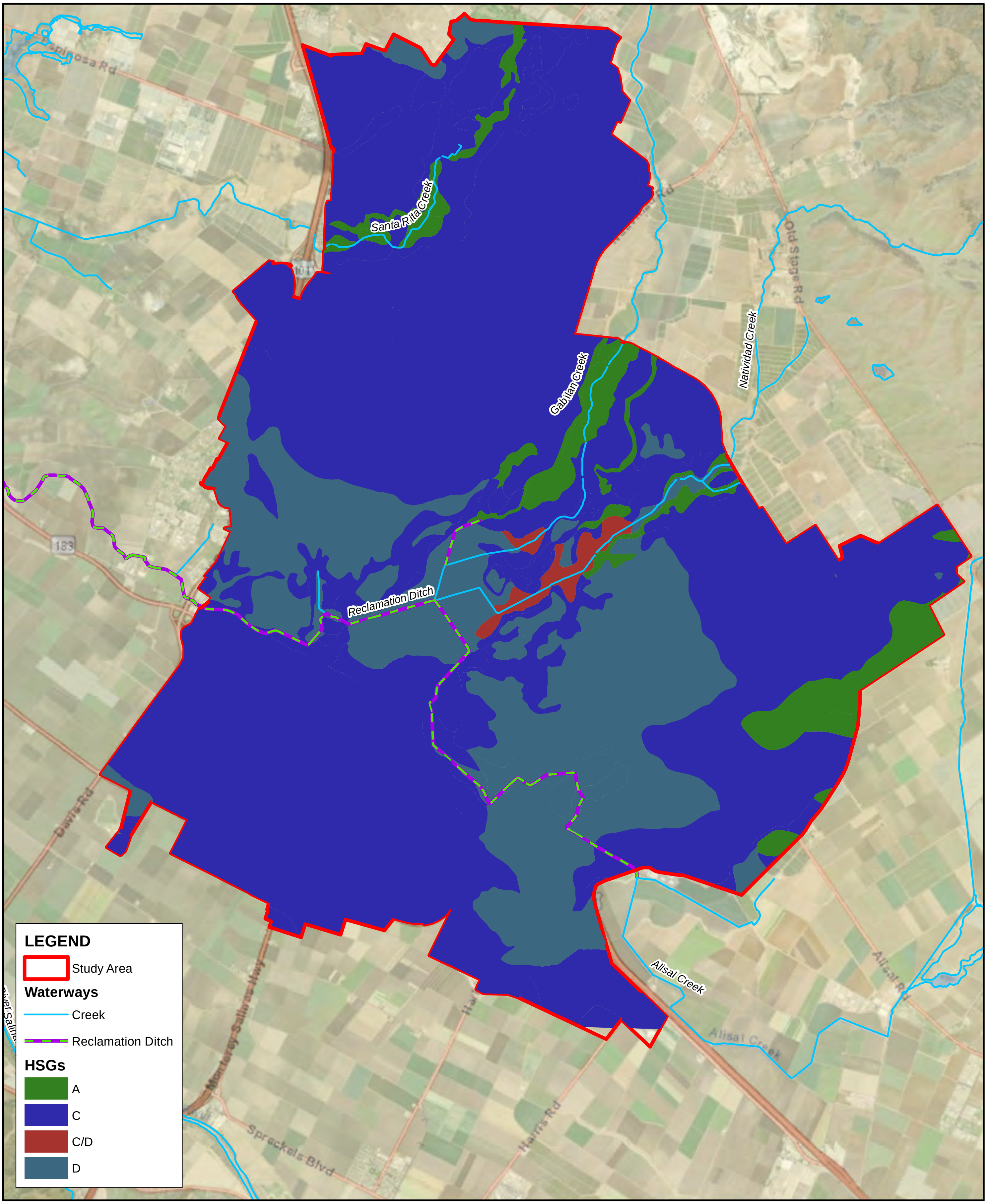

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FIGURE 2-5. HYDROLOGIC SOIL GROUPS

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SALINAS

CHAPTER 3
STORM DRAIN SYSTEM OVERVIEW

This Chapter provides an overview of the City's existing stormwater collection system. All figures are located at the end of this chapter.

DATA SOURCES

The following sources were used to get a complete image of the existing MS4 system:

- 2NFORM Platform
- GIS Data
- Topographic Survey
- Record Drawings

STORM DRAIN SYSTEM OVERVIEW

The City owns and operates an MS4 that conveys stormwater runoff to major receiving waters, which ultimately flow to Monterey Bay. As discussed, the major receiving waters include the reclamation ditch, Carr Lake, Gabilan Creek, Natividad Creek, Santa Rita Creek, Markeley Swamp, and the Salinas River. FIGURE 3-1 at the end of this chapter provides an overview of the City's storm drain system per the City's GIS.

Storm Drain Mapping

The City's existing storm drain system GIS mapping was updated based on field survey and review of existing record drawings and system maps provided by the City. Field Survey efforts conducted by Wallace Group, collected rim elevations of SDMHs and other facilities (outfall or catch basin) and invert elevations of the flow lines and diameter of pipes to be used in the hydraulic modeling effort.

Horizontal measurements were based on the North American Datum (NAD) of 1983 California State Plane Zone 4 Feet Coordinate System. Vertical measurements were based on North American Vertical Datum (NAVD) of 1988. A survey control report is attached in Appendix C.

It is important to note that unforeseen field conditions, such as inaccurate GIS locations of lines, buried manholes, difficulty opening manholes, and dense vegetation, can leave areas of missing survey data. In these instances, as-built drawings of the storm drain system, and the City's GIS have been used to create a comprehensive storm drain network for the model.

Storm Drain Pipes

The Salinas MS4 system consists of approximately 140 miles of pipe, with diameters ranging from 4-inch to 84-inch (TABLE 3-1). A majority of the pipes (58%) are considered to be the City's main trunkline (24-inch or greater). Any pipes with an "unknown" diameter and/or material have been assigned a diameter and/material in the hydraulic model based on upstream and downstream pipes. FIGURE 3-1 shows the entire storm drain system in the City of Salinas.

TABLE 3-1. STORM DRAIN SYSTEM PIPE INVENTORY BY DIAMETER

DIAMETER (IN)	LENGTH (MILES)	% OF STORM DRAIN SYSTEM
UNKNOWN*	8.3	6.1%
4 to 10-INCH	0.3	0.2%
12 & 14-INCH	3.7	2.7%
15-INCH	19.7	14.5%
16 & 18-INCH	20.9	15.4%
20,21 & 22-INCH	4.7	3.5%
24 & 25-INCH	21.6	15.9%
27-INCH	4.0	3.0%
30-INCH	11.6	8.5%
33-INCH	2.3	1.7%
36-INCH	10.4	7.7%
39 & 42-INCH	9.8	7.2%
48-INCH	4.9	3.6%
54 & 55-INCH	5.0	3.7%
60-INCH	3.9	2.9%
66-INCH	1.5	1.1%
72-INCH	1.4	1.0%
78 & 84-INCH	1.8	1.3%
TOTAL	135.8	100%

*Pipes with unknown diameters are primarily laterals (Less than 24in) that were not included in the survey or model

For this SWMPU, only main trunklines were included in the study, with some exceptions for 18- and 21-inch storm drains. Small stand-alone systems of 24-inch pipe that drain directly to an outfall were not included. There are a number of storm drain outfalls that flow to channels or open space that are tributaries to major waterways. The boundary conditions (downstream water surface elevation) for these instances are discussed in Chapter 5.

Storm Drain Manholes

Based on the City's current GIS database, the existing storm drain system contains 2,118 manholes. As part of this SWMPU, over 1,150 SDMHs have been surveyed to date along the City's main storm drain trunk line.

Storm Drain Inlets

According to the City's GIS database, there are 3,815 inlets throughout the City that range in type from siphons to curb or drop inlets and catch basins. Inlet capacity is not analyzed as part of the SWMPU; the storm drain model has assumed 100% inlet efficiency, meaning that all tributary flows are conservatively assumed to enter the pipes.

Flooding areas of concern that have been identified by the City as specific to inlet performance have been considered for the identification of capital improvement projects, however, hydraulic performance of inlets was not evaluated.

Lift Stations

The City's storm drain system includes three small lift stations and one pump station. Two (2) of the lift stations are owned and operated by the City to drain localized low spots at major underpasses. These two (2) lift stations are located at the Alisal Street underpass, and at the intersection of Front and Market Streets. A third small lift station is owned and operated by Caltrans. Similarly, this lift station drains a low spot at an underpass and is located on North Main Street north of Market Street. These small lift stations are not included in the hydraulic model. Stormwater from these catchment areas were assigned to the modeled trunkline tributary to these areas.

The Salinas River Storm Drainage Pump Station and the Blanco Detention Basin are located at the former Wastewater Treatment Plant (TP1) site at the southwest boundary of the City. The pump station receives stormwater from the southwestern part of the City and conveys it to the Salinas River though a 66 inch corrugated metal pipe. During low flow, the water can be conveyed through gravity discharge, but increased flow is pumped to the River. The pump station has two pumps with a peak capacity of 110 cfs. The Blanco Detention Basin can temporarily store water if inflow exceeds the pump station capacity. The Blanco Detention Basin has a capacity of 36 AF with freeboard and up to 50 AF when the basin is completely full. The Salinas River Storm Drainage Pump Station was modeled as an outfall to determine influent peak flows into the pump station. The pump hydraulics of the pump station to the Salinas River are not included in the SWMPU modeling effort.

The 66 inch outfall from the pump station to the Salinas river was installed in 1960, and the last assessment of the pipe was approximately 45 years ago per the 2004 Stormwater Masterplan. A reassessment should be performed to determine its current condition to confirm the need for and timing of rehabilitating (lining) or replacement of the pipe. Based on the last assessment, it is likely that a rehabilitation project will be needed. An assessment of the pump station itself should also be conducted to understand what, if any, rehabilitation is needed for the pumping system as well.

Detention and Retention Basins

A key element of the City’s storm drain system are detention and retention basins. These basins help store and slow stormwater to minimize flooding and erosion downstream. The key difference between detention and retention basins is the presence of an outlet. Retention basins do not have an outlet, and water leaves only by evaporation or percolation into the ground. A detention basin has an outlet, and flow returns to the downstream drainage system at a lowered rate. The following is a list of all the basins within the City. This list notes which basins are not included in this study based on a review of the City’s record drawings. Low Impact Development (LID) features, such as bioretention areas, are not included in this SWMPU.

- Auto Center Detention Basin- detention area near North Davis and Boronda Roads, in the north of the City west of Highway 101.
- Blanco Detention Basin- near the southwest boundary of the City adjacent to the Salinas River Storm Drainage Pump Station.
- Chavez Park Detention Basin- large storage area with three dry basins in Chavez Park surrounding Sanborn Creek just south of Carr Lake. Runoff from Sanborn Creek was modeled as an inflow to Chavez Park Detention Basin. Wallace Group has prepared a preliminary design report for this basin that recommends new storm drain piping and inlets, dry wells, outflow structures, and sediment removal/basin grading.

- El Dorado Park Detention Basin- consists of several bioretention areas and a retention basin in El Dorado Park, located in the northeast of the City. Only the detention component was included in the hydraulic model.
- Harden Ranch Detention Basin- parking lot detention at shopping plaza along North Main Street north of Harden Parkway. Harden Ranch Detention Basin was not included in the hydraulic model since there is insufficient information to model this storage capacity. This results in the conservative assumption that the parking lot does not provide attenuation of peak flows.
- McKinnon Park Detention Basin- detention area at McKinnon Park in the northeast of the City.
- Monte Bella Detention Basin- detention area on the east side of the City near Alisal Road.
- Natividad Creek Detention Area- detention area around Natividad creek, adjacent to and tributary to Carr Lake. The Natividad Creek Detention Area is not included in this hydraulic model as it is not tributary to the City's storm drain system.
- Northgate Park Retention Basin- park detention area just south of Northridge Mall. This location is shown in the City's mapping to be an existing retention basin. However, based on field survey and record drawings, it does not appear to have any existing connection to the City's storm drain system.
- Westridge Detention Basins- two detention areas separated by North Davis Road near West Laurel Drive. These basins have a permanent water level for water quality. Storage for these basins was modeled above the permanent water surface elevation.

In addition to the detention and retention basins, there are also multiple lakes within the City that feed into the Reclamation Ditch: Carr Lake, Heins Lake, Mill Lake, and Markeley Swamp. These lakes are not included in this study.

Reclamation Ditch

The Reclamation Ditch flows east to west, bisecting the City, and collects most of the City's stormwater. Monterey County Water Resources Agency (MCWRA) owns and operates the Reclamation Ditch. City storm drain outfalls for the main trunk lines that are tributary to the Reclamation Ditch were modeled as part of this SWMPU, but the hydraulics of the Reclamation Ditch are not included in this analysis.

HIGH PRIORITY AREAS

The two agencies responsible for flood control within Salinas are the City and the MCWRA. The City is responsible for local flood control facilities and MCWRA is responsible for regional flood control facilities. Floods in residential areas are considered hazardous due to the potential for injury and property damage. Business and commercial activities can be impeded by floods due to facility damage and access related problems.

The City has a significant number of existing issues with flooding during storm events. Flooding in the City has been caused by sediment heavy runoff from adjacent agricultural fields. This tends to occur at the boundary of the City, mainly in the northeast. Agricultural water can overtop the tailwater ditches and either enter the City's storm drain system at inlets at the boundary or flow in City streets to an inlet with capacity. The high sediment content of the agricultural runoff leads to blockages in the system. Another cause of flooding in the City has been the use of siphons that require frequent maintenance. Maintenance needs arise when silt and debris settle in the siphons and can cause localized ponding if not cleaned.

The City provided a list of areas that require frequent storm drain cleaning, siphon cleaning, and stormwater barricade locations. These locations, along with known areas of flooding provided by the City, are compiled in a spreadsheet provided in Appendix B. FIGURE 3-2 identifies the location of these City areas of concern, which have been considered for capital improvement projects in the SWMPU. A field visit with City staff was conducted to investigate some of these areas in depth and help identify recommended projects.

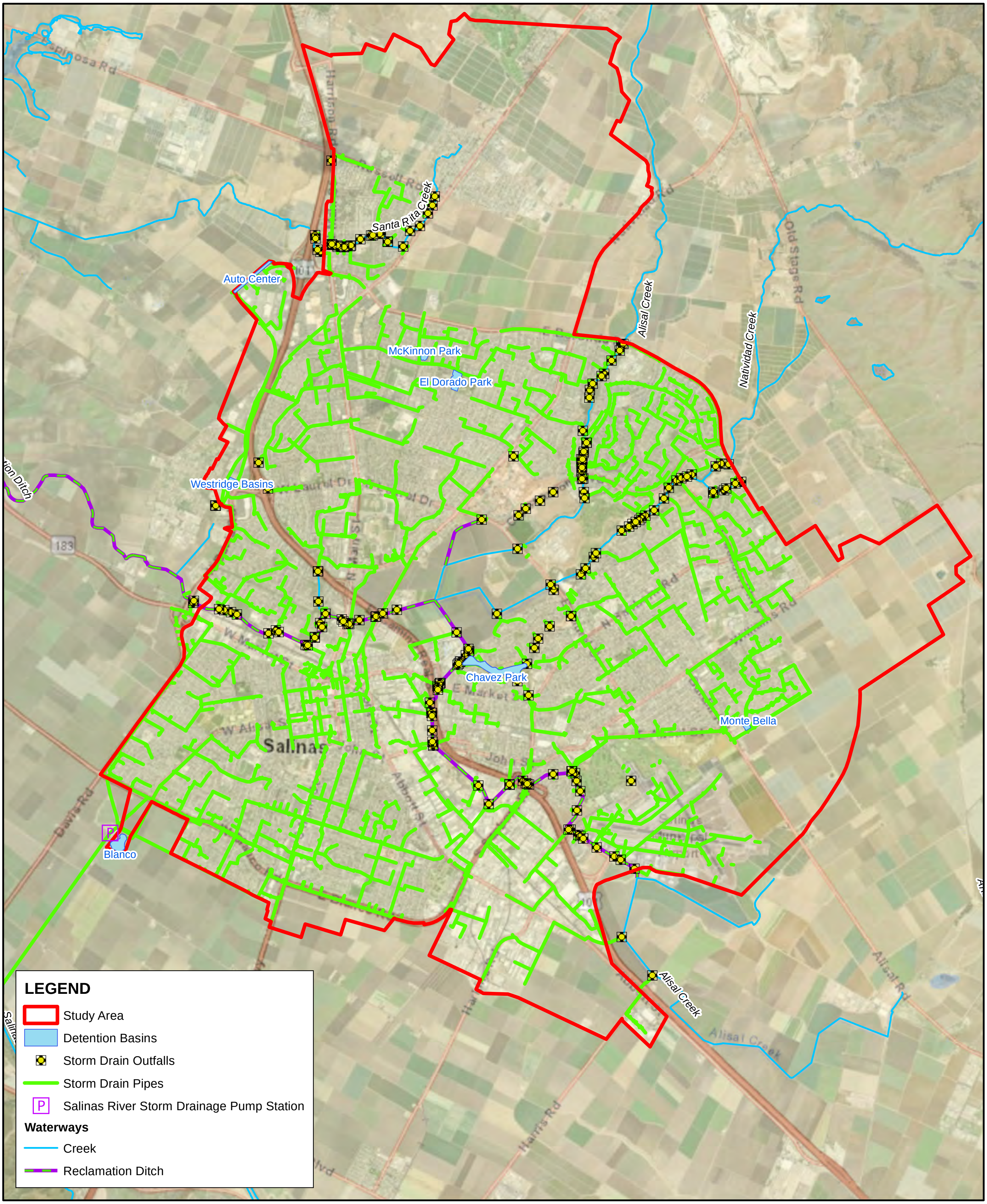

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FIGURE 3-1. STORM DRAIN SYSTEM

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DATE: 09/27/2024

NOTES:
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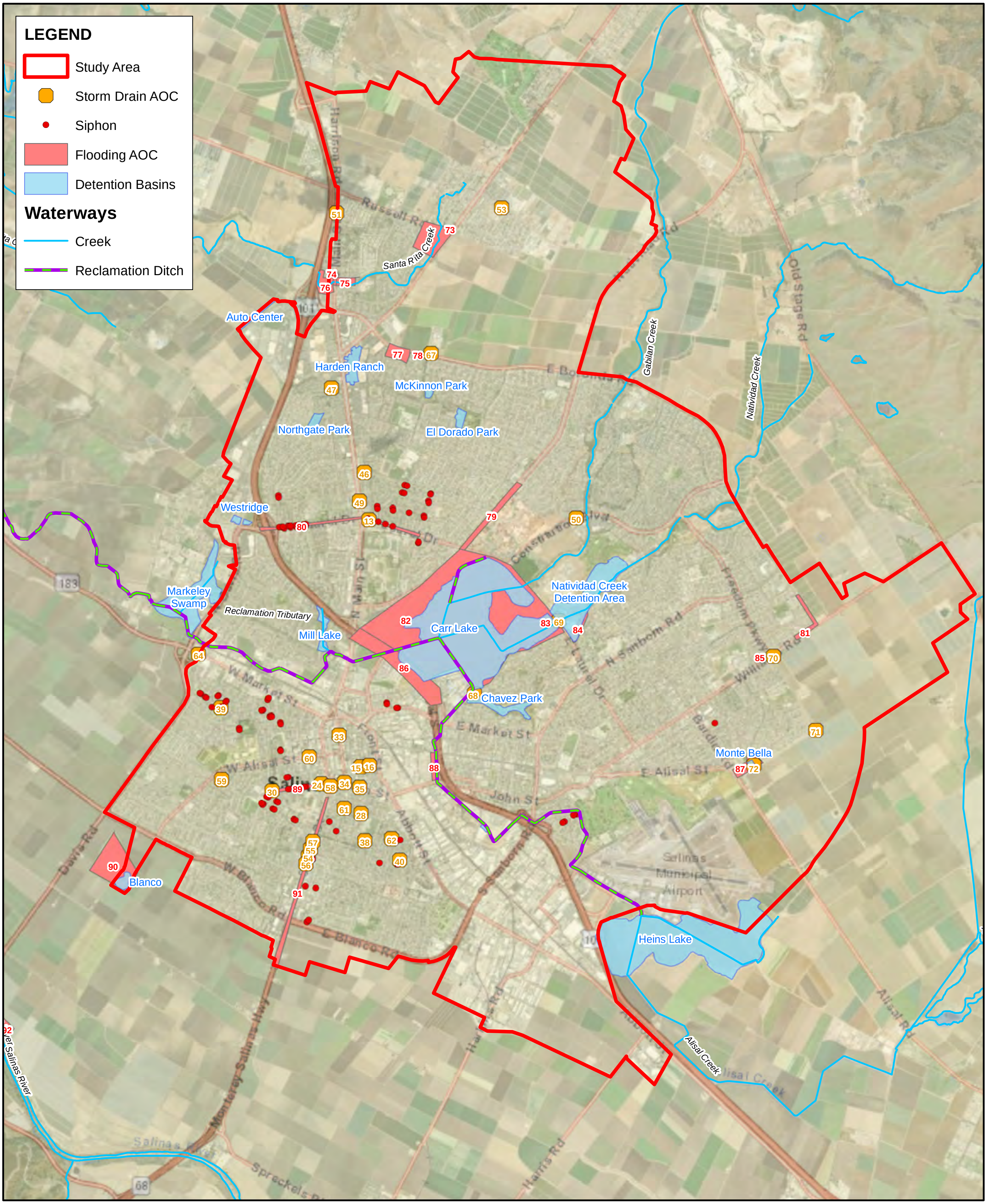

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FIGURE 3-2. STORMWATER AREAS OF CONCERN

JOB NO: 886-022
CREATED BY: AMC/ASK
DATE: 09/27/2024

NOTES:
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CHAPTER 4
HYDROLOGIC ANALYSIS METHODOLOGIES

This Chapter presents the hydrologic considerations, and a review of the City's relevant hydrologic storm drain design standards included in the storm drain system analysis. All figures are located at the end of this chapter.

INTRODUCTION

The City's 2013 SWDS provides information on storm drain design and analysis requirements. The hydrologic design standards were incorporated for this study. The hydrologic data provides the means to determine the runoff draining to each portion of the City's storm drain system.

HYDROLOGY ANALYSIS CRITERIA

This section describes the hydrologic parameters and criteria that were used for this analysis. The hydrologic criteria applied to the storm drain system for this analysis are listed in TABLE 4-1.

TABLE 4-1. HYDROLOGIC CRITERIA FOR EXISTING SYSTEMS

STANDARD	CRITERIA
RETURN INTERVAL	20-year for commercial/industrial areas and main trunk 5-year for residential and local drainage facilities
RAINFALL PATTERN	24-hour: NRCS Type I 6-hour: From 2013 SWDS
RAINFALL DEPTH	Varies by return interval and location, SEE TABLE 4-2
RUNOFF MODEL	EPA-SWMM Method
RUNOFF COEFFICIENT	Percent impervious based on land use
INFILTRATION MODEL	Horton's Method

Design Storm (Flood Protection Levels)

The City's 2013 SWDS states that a 20-year, 6-hour duration design storm shall be used for design of stormwater infrastructure in commercial and industrial areas and for main trunklines, and the 5-year design storm shall be used for residential and local drainage facilities. For this SWMPU, the City has requested hydraulic modeling of the storm drain collection system under existing and future development conditions for the 5-, 10-, 20-, and 100-year 24-hour storms. The 6-hour duration storms presented in Table 5 of the 2013 SWDS was also evaluated to confirm there are no additional storm drain deficiencies compared to the 24-hour storm. The analysis of the storm drain system is focused on trunklines, so the 20-year 24-hour storm is the primary design storm of interest to identify capital improvement projects.

NOAA Atlas 14, Volume, 6, Version 2, Precipitation Frequency Estimates from the Precipitation Frequency Data Server (PFDS) were evaluated to determine rainfall depths across the City. Higher rainfall values are seen in the northern portions of the City than the southern areas, likely due to a difference in topographic conditions. Two (2) rainfall depths were distributed across the study area to account for this difference. A higher rainfall depth was assigned for drainage areas north of Carr Lake and Laurel Drive, and a lower rainfall depth was assigned to the remaining drainage areas. TABLE 4-2 provides the storm depths per NOAA Atlas 14. See the Precipitation Frequency Estimates in Appendix C for more detail on rainfall depths for these locations.

TABLE 4-2. NOAA ATLAS 14 24-HOUR DESIGN STORM PRECIPITATION DEPTH

RETURN PERIOD	NORTHERN SALINAS PRECIPITATION DEPTH (IN)	SOUTHERN SALINAS PRECIPITATION DEPTH (IN)
5-YEAR	2.27	2.06
10-YEAR	2.67	2.41
20-YEAR[a]	3.06	2.76
100-YEAR	4.27	3.88

[a] The 20-year precipitation depth was determined using the NOAA Precipitation Data Server-based depth-duration-frequency curves.

The NRCS Type I rainfall distribution was used to temporally distribute the 24-hour storm events and the 2013 SWDS distribution was used for the 6-hour storm events. See Appendix C for more detail on the 6-hour storm distribution.

Runoff Model

The City's 2013 SWDS allows for use of the Rational Method for peak flow calculations for drainage areas of 10 acres or less. For areas larger than 10 acres and evaluation of detention basin facilities, the City requires computer simulation methods that perform volumetric flow routing. Since a majority of the catchment areas defined by the City are larger than 10 acres, the computer simulation modeling software that was used for the preparation of this SWMPU is Innovyze InfoSWMM. Within InfoSWMM the Environmental Protection Agency (EPA) SWMM method was used to model runoff to the storm drain system.

The EPA SWMM method uses land use (percent impervious) along with catchment slopes, widths, and surface roughness to determine the runoff hydrograph (flow over time) for a catchment. More detail on the inputs for this runoff model can be found later in this chapter.

Infiltration Model

Soil infiltration rates contribute to determining the amount of rainfall that enters the soil and does not become runoff. The Horton Equation is recommended by the 2013 SWDS to represent how infiltration capacity depends on the initial moisture condition of the soil and the intensity of rainfall. The modeled infiltration with the Horton Equation used the infiltration rates in TABLE 4-3 along with a decay rate of 0.00115 per second to account for the decline in infiltration capacity as soils become more saturated, in accordance with the City's 2013 SWDS.

TABLE 4-3. INFILTRATION RATES

Hydrologic Soil Group	Infiltration Rate Maximum (in/hr)	Minimum (in/hr)	Soil Associations Within Study Area
A	6.0	2.0	Sandy xerorthents
B	2.0	0.6	Chualar loams, Elder sandy loam
C	0.6	0.2	Rincon clay loams, Salinas loam, Salinas clay loam
D	0.2	0.06	Antioch very fine sandy loams, Clear Lake clays, Diablo clays, Placentia sandy loams

HYDROLOGY MODEL DATA

This section describes the hydrologic information used to develop the hydrology portion of the storm drain model.

Catchment Areas

Catchments define the storm drain model areas that consider rainfall and route the resulting runoff to the storm drain system. The catchment areas for this analysis were delineated using a combination of the City's storm drain inlet locations and the 2017 USGS aerial lidar data. A total approximate area of 12,220 acres is covered by these catchments. FIGURE 4-1 at the end of this chapter shows these catchments. The USGS topography data was also used to determine catchment area slopes for velocity and time to peak hydrologic calculations.

Percent Impervious

The 2013 SWDS provides a range of percent impervious values by land use. TABLE 4-4 shows this range along with the percent impervious values that were used. For this SWMPU, agriculture and vacant land uses were separated out from the 2013 SWDS parks and open space category.

TABLE 4-4. PERCENT IMPERVIOUS

Land Use	Percent Impervious per 2013 SWDS	Percent Impervious for SWMPU
EXISTING RESIDENTIAL		
LOW DENSITY	30-50	40
MEDIUM DENSITY	50-60	55
HIGH DENSITY	60-80	70
NEW RESIDENTIAL		
LOW DENSITY	50-70	60
MEDIUM DENSITY	60-80	70
HIGH DENSITY	70-90	80
COMMERCIAL	90-100	95
LIGHT INDUSTRY	70-80	75
GENERAL INDUSTRY	90-100	95
SCHOOLS, PUBLIC & SEMIPUBLIC FACILITIES	40-60	50
PARKS AND OPEN SPACE	10-20	15
AGRICULTURE		5
VACANT		5
AGRICULTURE PLASTIC COVER	--	87.5

A plastic cover land use designation was added to represent the agricultural fields that may use impervious plastic for farming purposes, such as strawberry farms and hoop houses. In the offsite drainage analysis prepared by Wallace Group for the East Boronda Road Widening Project, a percent impervious value of 87.5% was assigned for strawberry farming. This number was calculated using a typical section, provided by the City, showing the width of impervious plastic per row of strawberries. Based on Google Earth imagery of the City's agricultural areas, it appears that up to 50% of the agricultural land within the SWMPU study area may use plastic cover at any given time. For the hydrology model it was assumed that 50% of all agricultural land use has plastic cover.

Within the FGAs, future residential development is expected to have more impervious coverage compared to the existing agricultural land. However, it is important to understand that future development will be required to follow the City's SWDS, which requires peak flow management. Therefore, future developed conditions may reduce peak flows compared to agricultural practices that use plastic cover. Percent impervious for future conditions was assigned in the model as the same as existing conditions to represent peak flow management.

Capital improvement projects identified under existing conditions due to runoff from agricultural practices with plastic crop could be considered temporary solutions that may not be needed when future development occurs.

Catchment Surface Roughness

Manning's n roughness values for the ground surface are a factor in the runoff calculation process to determine the velocity and peak flow from a catchment area. For this study two (2) different Manning's n value were used, 0.015 for impervious land cover and 0.12 for pervious. These Manning's n values are typical for sheet flow conditions over concrete/asphalt and pervious land uses.

Depression Storage

A hydrologic consideration for the losses between rainfall and runoff is depression storage. This occurs when low points, such as surface depressions, fill before becoming runoff. This can occur on both pervious and impervious surfaces. Per the City's 2013 SWDS, depression storage values for pervious areas were set to 0.18 inches and impervious area to 0.06 inches.

2NDNATURE CLIMATE CHANGE ANALYSIS

The City has partnered with 2NDNATURE, a stormwater modeling and information management software company, to improve their stormwater management and compliance. 2NDNATURE designed and built the 2NFORM platform for collecting and visualizing stormwater program data. The map-based software is built on ESRI's ArcGIS system and has enabled the City to increase the efficiency and effectiveness of their stormwater program. The City utilizes 2NDNATURE's platform for stormwater information management and asset management.

Climate Resiliency

The team at 2NDNATURE has been researching the effects that climate change resulting from elevated CO2 levels will have on frequency and intensity of rainfall events. Researchers expect that these climate change effects will include greater stormwater volumes, higher peak flow levels, and increased frequency and high intensity storm events. To evaluate the City's stormwater collection system's resiliency to these effects, 2NDNATURE evaluated the outputs from several Global Climate Change Models (GCM) to provide projected precipitation depths corresponding to the 5-, 10-, and 20-year recurrence interval depths at two locations within the City.

Results of Climate Change Analysis

2NDNATURE evaluated changes in rainfall depth for two (2) future climate change scenarios and three (3) storm recurrence intervals (5-, 10-, and 20-year). 2NDNATURE's climate change results from the analysis were provided to the City in a technical memorandum and is attached in Appendix C. Their results for the more severe climate change scenario had percent precipitation depth changes ranging from an 8-11% increase for the different storm levels. An increase of 10% was chosen as a representative and conservative increase in precipitation to account for climate change. The projected rainfall depths are shown in TABLE 4-5. These projected rainfall depths were run through the InfoSWMM storm drain model using the NRCS Type I rainfall distribution.

TABLE 4-5. CLIMATE CHANGE 24-HOUR DESIGN STORM PRECIPITATION DEPTHS

RETURN PERIOD	NORTHERN SALINAS CLIMATE CHANGE PRECIPITATION DEPTH (IN)	SOUTHERN SALINAS CLIMATE CHANGE PRECIPITATION DEPTH (IN)
5-YEAR	2.50	2.27
10-YEAR	2.94	2.65
20-YEAR	3.37	3.04

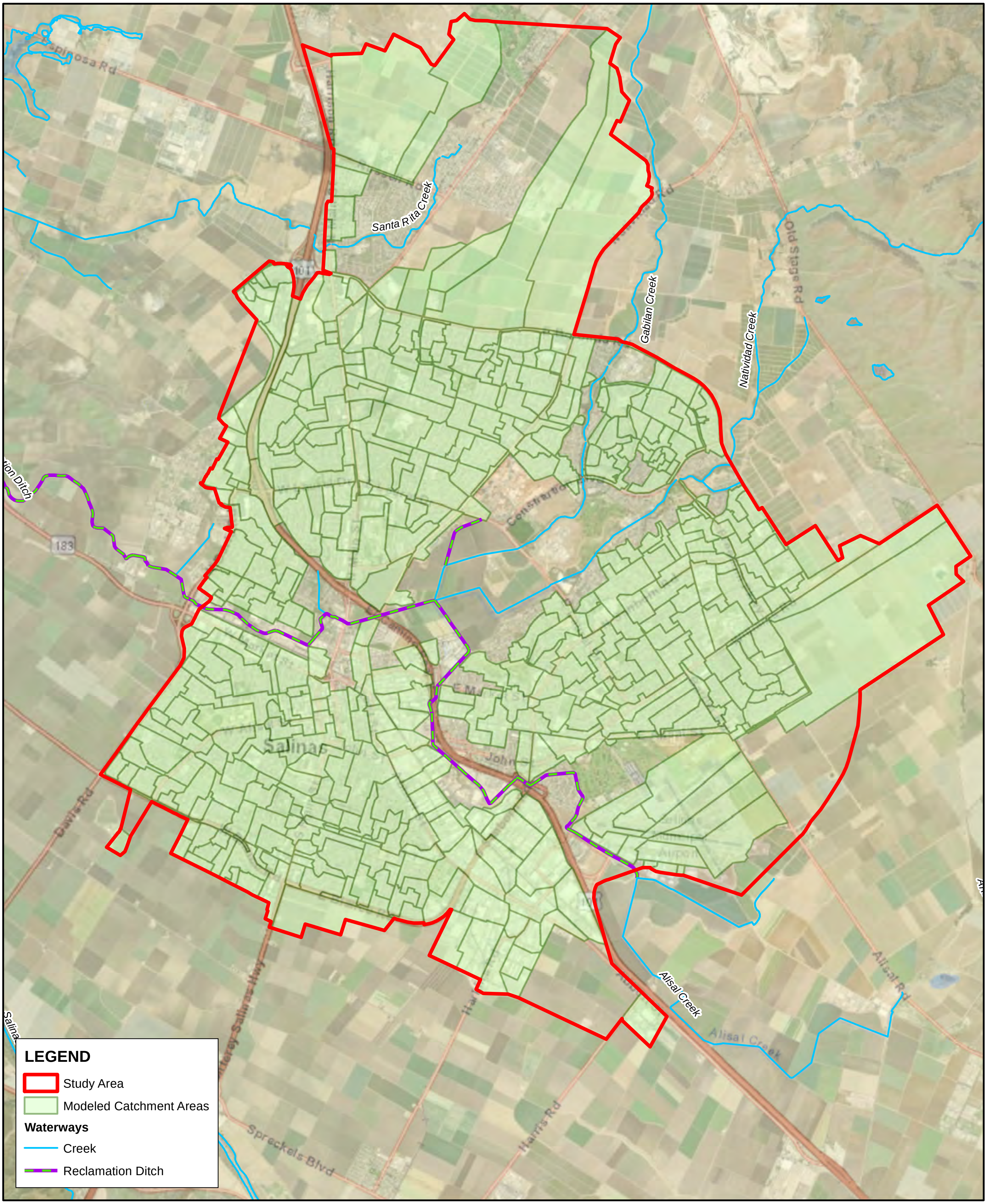

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FIGURE 4-1. MODELED CATCHMENT AREAS

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CREATED BY: AJM
DATE: 09/27/2024

NOTES:
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CHAPTER 5
HYDRAULIC ANALYSIS METHODOLOGIES

This Chapter presents the hydraulic considerations, and a review of the City's relevant hydraulic storm drain design standards included in the storm drain system analysis. All figures are located at the end of this chapter.

INTRODUCTION

The City's 2013 SWDS provides information on storm drain design and analysis requirements. Standard criteria from the 2013 SWDS was used to analyze the model to determine system deficiencies in existing and future conditions. Hydraulic information for the system provides the means to evaluate the performance of pipes and storage basins in the storm drain system under the different hydrologic scenarios. FIGURE 5-1 shows the modeled storm drain system.

HYDRAULIC ANALYSIS CRITERIA

This section describes the hydraulic parameters and criteria that were used for this analysis. The hydraulic criteria applied to the storm drain system are listed in TABLE 5-1.

TABLE 5-1. HYDRAULIC CRITERIA FOR EXISTING SYSTEMS

STANDARD	CRITERIA
VELOCITY	Minimum: 2.0 fps when full Maximum: 8.0 fps
FRICTION FACTOR MANNING'S N	See TABLE 5-2
MINIMUM PIPE SIZE	15-inch for mainline 12-inch for catch basin laterals
SURCHARGING	Acceptable with a minimum freeboard of 1-foot below ground level
PIPE FLOW MODEL	Manning's Equation
PIPE ROUTING MODEL	Dynamic Wave

Allowable Velocities

The 2013 SWDS requires that storm drain slopes provide a velocity of no less than two fps or more than eight fps when flowing full, but improvement projects are not recommended based on these criteria. In general, pipes with lower velocities will require more frequent cleaning.

Minimum Pipe Sizes

The 2013 SWDS requires a minimum mainline pipe diameter of 15-inches, with 12-inch diameters allowed for catch basin laterals, provided they have adequate capacity and have a 1% minimum slope. Pipes less than the minimum size were not considered for this analysis. As maintenance and upgrades are done, the City should use their asset management database to identify and address these minimum pipe size non-conformances.

Surcharging

Storm drains in the hydraulic model were evaluated to convey peak flow with the hydraulic grade line below ground level. Surcharging is when water exceeds the capacity of the storm drain pipe and fills the manholes. Surcharging within the manhole is acceptable with a minimum freeboard of 1-foot below ground level. Pipes were considered deficient if they have less than the minimum of 1-foot freeboard during the associated design storm which would result in water coming out of the manholes and onto the surface.

Pipe Flow Model

Manning's equation was used to calculate pipe velocities and depths for gravity flow in the model. This equation uses Manning's n pipe friction factors, pipe slopes, and pipe sizes to determine the hydraulic capacity of the storm drain system. It will also calculate the flow depth given a specific inflow.

Pipe Routing Model

Dynamic wave analysis was used for flow routing through the storm drain collection system. This method uses St. Venant flow equations, consisting of continuity and momentum equations for conduits and a flow continuity equation at nodes.

HYDRAULICS MODEL DATA

The main trunk storm drain system (24-inch and larger, with some exceptions) was analyzed to evaluate system performance under both existing and future flow conditions. This section describes the information used to develop the hydraulic portion of the storm drain model. FIGURE 5-1 provides an overview of the modeled existing storm drain pipes.

Pipe Geometry

Pipe location, length, diameter, upstream and downstream inverts were assigned from information in the 2NFORM Platform, GIS data, record drawings, or from the topographic survey. All this data is used in hydraulic calculations to determine pipe capacity and deficiencies.

Friction Factors

Consistent with the City's standards, TABLE 5-2 provides the roughness coefficient (n-value) that were used for this analysis.

TABLE 5-2. ROUGHNESS COEFFICIENTS

TYPE OF FACILITY	n
CONCRETE PIPE	
Under 24" diameter	0.015
Over 24" diameter	0.013
PLASTIC PIPE	
HDPE (ADS N-12 or equal)	0.012
Corrugated Metal Storm Drain	0.024

If pipe material is unknown, it was inferred from the upstream and downstream pipes.

Outfall Boundary Conditions

The City's storm drains flow to the major waterbodies, which have the potential to influence hydraulic capacity of the storm drains due to backwater effects. The potential backwater effects of Carr Lake, the Reclamation Ditch and the major creeks were accounted for in the model by assigning the water surface elevations as stated in the Federal Emergency Management Agency (FEMA) Flood Insurance Study (FIS).

In 2017 FEMA released an updated FIS report of Monterey County, California. The FIS report includes flood profiles that were used to determine the flood elevations at outfall locations for the 10-, 50-, and 100-year storms. In 2021, FEMA published a preliminary draft of Monterey County's FIS report that includes additional flood mapping for the City of Salinas. The higher of the flood elevations from both FIS reports was used for outfalls along the major waterways with FEMA defined flood profiles. The FIS reports did not provide data for the 5- and 20-year storms. Linear interpolation between the 10- and 50- year storms were used to calculate the 20-year water surface elevation. The 10-year water surface elevation was assigned to the 5-year storm. Outfalls that are tributary to a waterway but not directly along a FEMA flood profile were assigned a tailwater condition equal to the top of the outfall pipe.

Retention and Detention Basins

The various basins connected to the City's storm drain system were included in the model to represent their contributions to storing and slowing stormwater. The available storage, inlet/outlet elevations, and connected infrastructure were determined from record drawing review and analyzing available topographic data. The basins in the InfoSWMM model can be seen in FIGURE 5-1.

2017 USGS aerial lidar data was used for storage calculations of the basins listed above. As a note, this high-quality elevation data was also used for the National Flood Insurance Program. Percolation in the basins was not accounted for in the model, representing worst case operating conditions.

The 2013 SWDS sets requirements for the design of detention basins. Stormwater detention or retention is required for all new development and redevelopment projects to mitigate increases in stormwater discharges. Storage is to be determined using a 24-hour duration design storm, a discharge rate that does not exceed the available downstream capacity, and in conformance with the Monterey County criteria. Per the 2013 SWDS, basins are required to maintain a minimum of 2 ft of freeboard during the 100-year storm event. Basins were considered deficient if they had less than this minimum freeboard.

Flow Allocation

Storm drain inlets were not included in the computer model. Therefore, an assumption of 100% inlet efficiency is inherent in the flow distribution. Within individual catchment areas, storm drain flow was typically assigned to the most upstream modeled SDMH, with a few exceptions. This combination of assumed inlet efficiency and flow allocation results in a conservative hydraulic analysis.

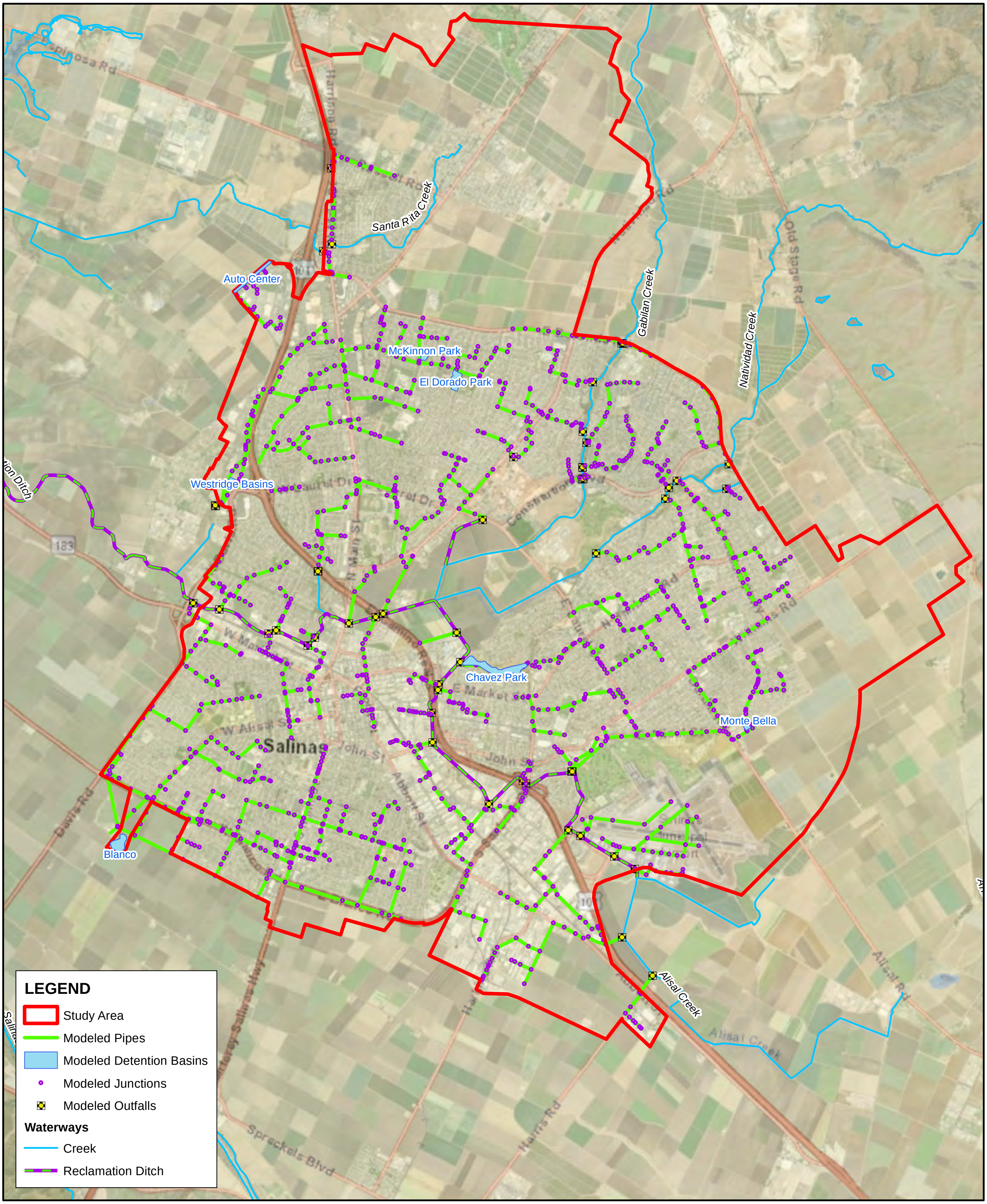

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FIGURE 5-1. MODELED STORM DRAIN SYSTEM

JOB NO: 886-022
CREATED BY: AJM
DATE: 09/27/2024

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Chapter 6
STORM DRAIN SYSTEM ANALYSIS

This chapter presents analysis of the storm drain system for the City of Salinas. All figures are located at the end of this chapter.

INTRODUCTION

The City of Salinas storm drain system consists of multiple networks of inlets, pipes, basins, and lift stations that convey stormwater flow to either the Salinas River, Santa Rita Creek, or the Reclamation Ditch, all of which ultimately flow to Monterey Bay. A computer-based model was created using Innovyze InfoSWMM Version 15.1 hydraulic modeling program to analyze both hydrology and hydraulics of the City's storm drain pipes and basins.

STORM DRAIN SYSTEM ANALYSIS CRITERIA

Refer to Chapters 4 and 5 for a detailed discussion of the hydrologic and hydraulic storm drain system criteria applied in the analysis of the City's storm drain system.

STORM DRAIN MODEL

Wallace Group developed a hydraulic model of the storm drain system in Innovyze InfoSWMM Version 15.1. InfoSWMM utilizes the EPA SWMM Model for surface runoff generation, Manning's Equation for open channel flow (gravity pipes), and dynamic wave analysis for flow routing through the collection system. The hydraulic model results were evaluated to understand where upgrades are needed to meet the City's requirements. See Appendix C for additional model reference data.

Storm Drain Model Extents

As stated previously, the InfoSWMM model only contains the main trunk lines in the City, their contributing drainage areas, and the basins listed in Chapter 3. FIGURE 6-1 provides and overview of the entire storm drain InfoSWMM model.

Storm Drain Network Assumptions

This section describes specific assumptions made to develop the model of the storm drain network.

Inlets

As discussed in Chapter 5, storm drain inlets were not included in the computer model, so there is an inherent assumption that 100% of the runoff is captured in each inlet. Additionally, storm drain flow was typically assigned to the most upstream modeled SDMH, with a few exceptions within individual catchment areas.

Pipes

All pipes in the model are assumed to be fully clean and in working order. This means there are no sediment backups, collapsed pipes, or other obstructions in the model. Also, any pipes with an "unknown" diameter and/or material have been assigned a diameter and/material based on upstream and downstream pipes.

Agricultural Land Cover

It was assumed that 50% of all agricultural land use has plastic cover in the hydrology model.

STORM DRAIN MODEL RESULTS - EXISTING CONDITIONS

This section discusses results of the storm drain model runs representing existing land use conditions. The model results discussed in this section are based on tailwater elevations specific to each return period or equal to the crown of the storm drain outfall (full submergence).

Exhibits illustrating resulting conditions in the existing storm drain system from these various storm events can be found in Appendix E.

Deficient Pipe Velocity

Storm drain lines that do not meet the velocity criteria in the model have been identified, but construction projects were not identified from this requirement. These pipes should be considered for higher frequency cleaning. A map of existing pipes with less than the minimum velocity in the 5-year 6-hour storm can be found in Appendix E and are also included in the Maintenance Priority Project list in Appendix D.

Deficient System Capacity

Based on results of the stormwater model, approximately 37% of the modeled storm drain network does not have capacity to convey 20-year 24-hour storm peak flow. Node locations with less than one (1) foot of freeboard during the 20-year 24-hour storm event and locations with flooding in these storm events are illustrated in Appendix E along with other model result exhibits.

The following basins do not meet the two (2) foot freeboard requirement from the 2013 SWDS. These should be considered for higher frequency maintenance but are not considered for projects:

- Autocenter Basin: Minor flooding that flows to agricultural field.
- El Dorado Basin: Model does not indicate any basin flooding.
- McKinnon Park: Minor flooding that is relieved with addressing maintenance-level CIP projects discussed later in this report.

Refer to Appendix G for detailed outputs from the model.

STORM DRAIN MODEL RESULTS - FUTURE CONDITIONS

Future land use conditions were modeled and analyzed to understand the need for modifications to the existing storm drain system as a result of future development. Additional catchments representing future development were added to the model. The future conditions results were used to understand if additional capacity was needed for the existing conditions CIPs or if additional CIPs were needed as well.

Exhibits illustrating resulting conditions in the existing storm drain system from future development can be found in Appendix F and detailed results are located in Appendix H.

SUMP CONDITIONS

Through the process of topography review and subcatchment delineation, numerous locations with sump conditions were found throughout the City's storm drain network. Some of these locations will experience only minor shallow flooding before stormwater can surface flow; while a few of these locations do not have a means of overland escape and could experience severe flooding if the storm drain system was backed up or the inlets were clogged. These locations should be a high priority for cleaning and maintenance. Table 6-1 lists the locations with sump conditions. This list may not be all-inclusive.

TABLE 6-1. SUMP CONDITION LOCATIONS

NODE	LOCATION
SDCB-K7-037	N Sanborn Rd Adjacent to Walgreens
SDCB-N3-089	Woodside Dr and Redwood Pl
SDCB-O2-020	SW end of Las Cruces Way
SDMH-E3-018	S end of Auto Center Cir
SDMH-E4-010	E Northridge Mall Entrance
SDMH-F4-019	Regency Cir Cul-de-sac
SWMH-F4-038	NE corner of Cherokee Dr and N Main St Intersection
SDMH-F6-020	Arcadia Way and Essex Way
SDMH-F6-026	Wimbledon Ave and Essex Way
SDMH-G4-005	NE corner of E Alvin Dr and N Main St
SWMH-G4-023	SW corner of North Salinas High School
SDMH-G5-009	SE corner of Harden Middle School on McKinnon St
SDMH-G6-013	666 Calaveras Dr
SDMH-I4-008	SE Corner of Laurel Grove Residences
SDMH-J8-004	Del Monte Ave and Elkington Ave
SDMH-J8-006	Rider Ave and Las Casitas Dr
SDMH-K3-003	17 Villa St
SWMH-K3-027	307 W Market St
SWMH-K8-025	Inside Sunset Park Apartments (Del Monte Ave and Sunset St)
SDMH-L2-012	Nacional St and Catalina Ave
SDMH-L3-009	31 Capitol St
SWMH-L3-041	168 W Alisal St
SDMH-L4-002	E Market Street after Railroad Bridge
SDMH-L4-017	W side of E Alisal St and Fron St Intersection
SDMH-L4-031	E Gabilan St and Greenfield Alley
SDMH-L5-013	SE corner of Roosevelt St and N Madeira Ave
SDMH-L5-018	NW corner of empty lot on Wood St
SDMH-L5-021	311 E Alisal St
SDMH-L5-039	W entrance to La Paz Neighborhood Park
SWMH-L5-042	N corner of Ivy St and Griffin St Intersection

SWMH-L5-047	E end of 388 E Alisal St
SDMH-L7-009	Off E Laurel Dr between Midway Ave and 2nd Ave
SDMHM1-008	1164 Loyola Dr
SDMH-M4-031	E end of Summer St
SDMH-M5-005	Back of 50 Summer St
SWMH-N3-031	W Romie Ln near Park Row
SDMH-N5-007	Back lot of 500 Brunken Ave
SDMH-N5-009	Back of 91 Spicer St
SDMH-N7-006	Western most end of Airport Runway
SDMH-O2-007	1274 Los Olivos Dr
SDMH-O2-016	Los Olivos Dr and Kipling St
SWMH-O3-038	E San Joaquin St in front of the St. Ansgar's Lutheran Church
SWMH-O3-048	57 San Miguel Ave
SDMH-O4-020	NW of Katherine Ave and Pajaro Intersection
SDMH-O5-006	N end of Blanco Rd and Abbot St Intersection
SDMH-O5-009	1102 Santa Cruz Ave
SDMH-O6-008	Airport Blvd and Hansen St
SDMH-P5-003	S Parking lot entrance to Social Security Admin Office on Blanco Rd
SDMH-P5-006	1200 Merrill St
SDMH-P6-004	N of Harkins Rd and Abbott St Intersection
SDMH-P7-006	Parking lot entrance south of Eden St to Monterey County Government at Schilling Pl
SDMH-Q6-003	Harkins Rd and Dayton St
SDMH-Q6-007	1353 Dayton St
SDMH-R7-002	9 Harris Pl

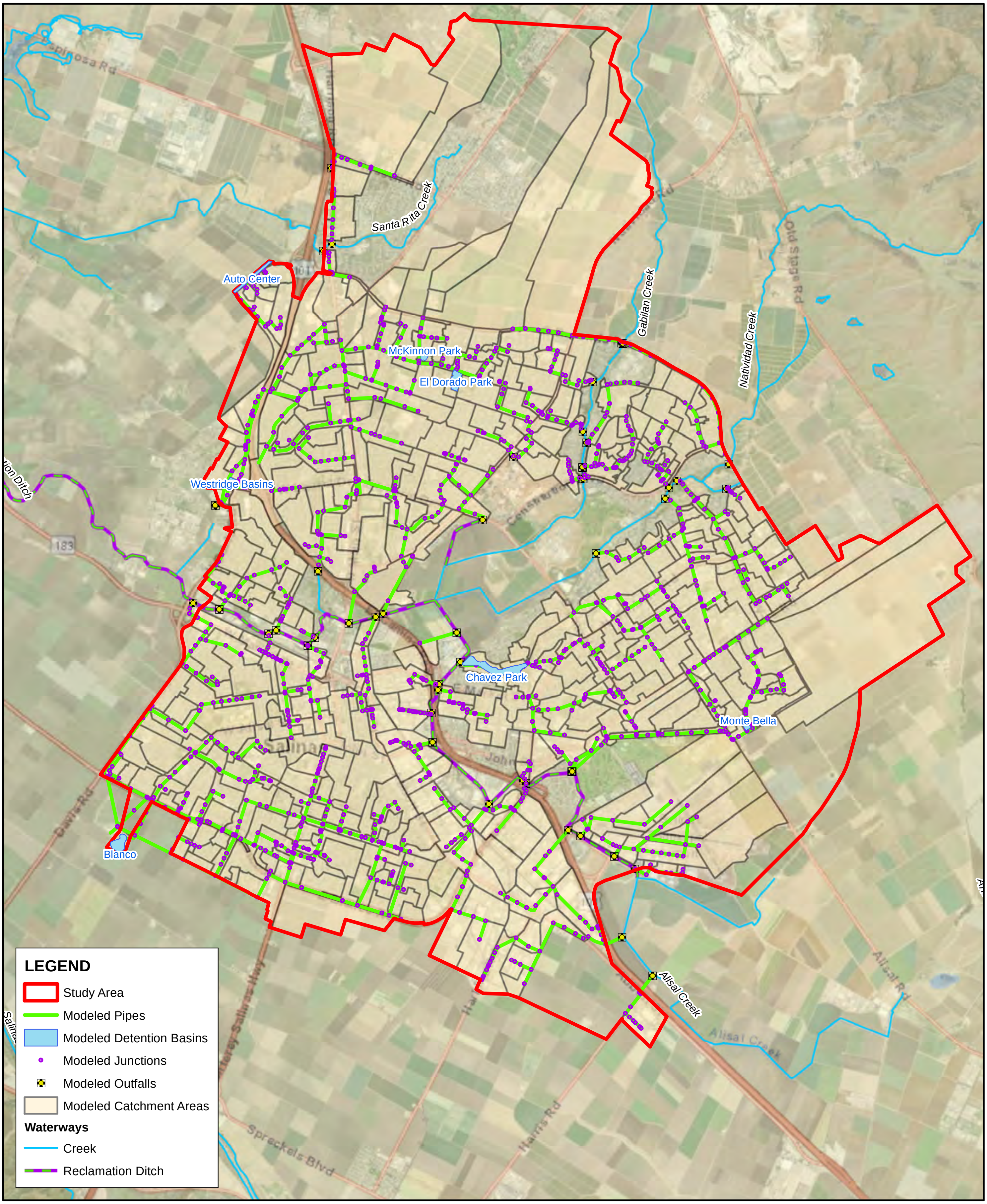

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FIGURE 6-1. STORM DRAIN MODEL

JOB NO: 886-022
CREATED BY: AJM
DATE: 09/27/2024

NOTES:
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CHAPTER 7
CAPITAL IMPROVEMENT PROGRAM

This Chapter presents the proposed CIP, with a brief description of the proposed projects and a preliminary cost estimate for high priority projects. Also included in the CIP recommendations are priorities for the improvements. All figures are located at the end of this chapter.

BASIS OF CAPITAL IMPROVEMENT PROGRAM COSTS

The CIP costs were developed based on engineering judgment, confirmed bid prices for similar work in Monterey County, consultation with vendors and contractors, established budgetary unit prices for the work, and other reliable sources. Hard construction costs are typically escalated by a factor of 1.4 to allow budget for "soft costs" that include preliminary engineering, engineering, administration, construction management and inspection costs. If an Environmental Impact Report is required for the project, this escalated factor should be increased. All CIP costs are expressed in Year 2024 dollars, using the McGraw-Hill Engineering News Record (ENR) Construction Cost Index of 13632 (September 2024). Actual project costs will vary depending on economic conditions at the time of construction and should be escalated to the year or years scheduled for the work. A map of all proposed high, medium, and low priority CIPs is shown in FIGURE 7-1. Pipes with diameters greater than 72 inches have their diameter identified to meet capacity needs and represent an amount of required capacity, not that there should be a pipe of this size. It is assumed that during design, these pipes would be reevaluated to have multiple smaller pipes or use alternative structures such as box culverts. All recommended pipe diameters represent the capacity needed if the existing storm drain is replaced. In some cases, it may be feasible for the existing storm drain to remain in place and a second parallel storm drain constructed. This would reduce the diameter required for the new pipe.

Storm Drain Upgrade Unit Costs

TABLE 7-1 and TABLE 7-2 provide costs for the recommended capital improvement projects. The unit cost for replacement of storm drains includes the proposed pipelines, new manholes, lateral re-connections for existing inlets, storm drain bypassing, and traffic control. Trenching was assumed for all new storm drain main construction. Deep pipes, with inverts greater than nine feet below ground level, were assigned a higher unit cost to account for the additional construction needs. Additionally, the City provided a GIS overlay of the known streets with concrete in the roadway. If the project required trenching in these roads, a unit cost was applied to account for removal of concrete in the roadway.

TABLE 7-1. STORM DRAIN MAIN CONSTRUCTION UPGRADE UNIT COSTS

CONSTRUCTION TYPE	UNIT COST/LINEAL FEET
18-INCH HDPE	$520
24-INCH HDPE	$580
30-INCH HDPE	$650
36-INCH HDPE	$720
18-INCH CONCRETE	$620
24-INCH CONCRETE	$750
30-INCH CONCRETE	$950
36-INCH CONCRETE	$1,020
42-INCH CONCRETE	$1,390
48-INCH CONCRETE	$1,640
54-INCH CONCRETE	$1,920
60-INCH CONCRETE	$2,100
66-INCH CONCRETE	$2,290
72-INCH CONCRETE	$2,600
78-INCH CONCRETE	$2,930
84-INCH CONCRETE	$3,290
96-INCH CONCRETE	$4,080
108-INCH CONCRETE	$4,970
120-INCH CONCRETE	$6,000
CONCRETE IN ROADWAY	$70
CATCH BASIN/SIPHON REPLACEMENT, PER ROAD INTERSECTION*	$200,000
CATCH BASIN/SIPHON REPLACEMENT IN CONCRETE ROADWAY, PER ROAD INTERSECTION*	$225,000

*Each Catch Basin/Siphon replacement project is conservatively estimated to have four catch basins/siphons per intersection

TABLE 7-2. DEEP STORM DRAIN MAIN CONSTRUCTION UPGRADE UNIT COSTS

CONSTRUCTION TYPE	UNIT COST/LINEAL FEET
Deep 30-INCH CONCRETE	$1,330
Deep 36-INCH CONCRETE	$1,430
DEEP 42-INCH CONCRETE	$1,940
DEEP 48-INCH CONCRETE	$2,300
DEEP 54-INCH CONCRETE	$2,680
DEEP 60-INCH CONCRETE	$2,930
DEEP 72-INCH CONCRETE	$3,640
DEEP 78-INCH CONCRETE	$4,100
DEEP 84-INCH CONCRETE	$4,610
DEEP 96-INCH CONCRETE	$5,710
DEEP 108-INCH CONCRETE	$6,950
DEEP 120-INCH CONCRETE	$8,400

CIP RANKING

The existing capital improvement projects were ranked to determine what priority the existing recommended projects should be constructed. These projects include those identified through information from site visits with the City, and the hydraulic model.

TABLE 7-3 evaluates each of the projects in four main categories. With input from the City, each category was provided a weighted score based on the relative importance of the category. The scores for each category are added together to determine each project's final score.

The categories used for ranking are as follows:

- Flooding Frequency: How often the project area floods
- Flooding Severity: How much flooding there is under the 20-year 24-hour storm
- Climate Change: If there is additional flooding from climate change
- Public Safety: How important the project is for roads and/or critical infrastructure

Disadvantaged Community (DAC) areas were not used for the ranking of projects, but project location relative to DAC areas were identified for potential future funding purposes.

It is recommended that the City review these projects periodically to determine if any substantial changes have occurred that may re-prioritize a project to a higher ranking. The future capital improvement projects were not ranked since they are determined by construction of the future developments that were identified for this SWMPU.

TABLE 7-4 is a descriptive list for high priority projects and cutsheets are provided in Appendix A.

Comparison with Identified Problem Areas

All problem areas identified from the City were incorporated into the CIP list and typically rank higher than CIPs identified solely by the hydraulic model. This is due to the frequency rating of these problem areas being the highest value since these are frequently occurring flooding issues.

TIMING OF RECOMMENDED IMPROVEMENTS

The existing capital improvement projects are triggered by existing deficiencies, while the future capital improvement projects are triggered by one or more future developments connecting to the City's storm drain system or climate change impacts. All projects identified as existing deficiencies are based on the hydraulic model or information from the City and are detailed in TABLE 7-3. These existing projects are due to existing stormwater flows, but it is also important for these projects to be completed to accommodate future stormwater flows. The projects are broken into four different priority categories: high, medium, low, and maintenance. High priority projects should be addressed first when the funding is available, followed by medium and low priority projects. The maintenance priority projects are only recommended to be constructed when nearby construction is occurring, or other work is being completed on the storm drain system in the same location.

Future capital improvement projects are triggered by potential future development. Since the timing of these projects has not been finalized, it is recommended that additional modeling be performed during the planning and design phases of these future developments. Improvements required to support future development should be completed before the development is brought online.

Recommended projects have not been evaluated for potential environmental impacts as a part of this study. Projects will be subject to the requirements of CEQA prior to approval and funding.

POTENTIAL STRATEGIC GREEN INFRASTRUCTURE

Refer to the City of Salinas Green City Master Plan for potential green infrastructure implementation in City right-of-way. A few potential strategic green infrastructure projects posed in this master plan are:

- Converting Northgate Park to a detention or retention basin.
- Adding retention basins on the upstream end of the City in multiple locations, providing flow and water quality (sediment from agricultural runoff) control, and opportunity for infiltration
- Constructing a stormwater system overflow discharging to the Golf course on the southern side of the City. This would provide opportunity for infiltration as well as mitigate flooding in the storm drain system.

Additional opportunities could include converting other City parks or City owned parcels with adequate open space to small detention or retention facilities where feasible to do so.

FUNDING

The City of Salinas has worked to provide funding mechanisms for stormwater system improvements, operation, maintenance, and compliance with regulatory requirements such as NPDES stormwater quality requirements. The City collects development fees for all construction requiring a building permit. In addition, the City requires that new development construct the storm drain improvements that are required to serve their development, including required off-site improvements.

Opportunities for funding include:

- Implementing a stormwater discharge fee
- Allocations from the City's General Fund or other internal funds from fees and taxes
- Various Federal/State/County Grants and Loans

Grant Funding

Climate resiliency and reducing impacts from climate change is a large concern for many state and federal agencies and thus these agencies have dedicated grant funds that support projects with a focus on climate resiliency. There are opportunities for the City to apply for grants that support green infrastructure or low impact development improvements especially in blighted areas or areas with minimal green space. Low impact development should also continue to be an emphasis in areas of new construction and re-development areas.

Grant funding opportunities are changing annually; thus, the City should continue to monitor these funding sources to identify grants. The City should identify key projects that would be highly ranked for grant funding such as the Closter Park project currently underway. Matching funds are often a requirement of grant funded projects. It will be critical that the City has the flexibility to utilize City funds as matching funds when these grants are made available.

TABLE 7-3.
CITY OF SALINAS SWMPU
STORM DRAIN CIP RANKING MATRIX

Project Location	Project Description	Flooding Frequency	Flooding Severity	Climate Change	Public Safety	Total Score	DAC Area	Total Cost ($)	Project Number
		Area of Concern = 5 5-yr and 10-yr storm = 3 20-yr storm = 1	Widespread flooding = 5 Localized flooding = 3 Minimal flooding = 1	Climate Change Impact = 5 No Climate Change Impact = 0	Critical Facility or Evac Route = 5 Major Arterial or Freeway = 5 Minor Arterial or Collector = 3 Local or Private = 1				
John St & Monterey St	Replace undersized inlets	5	5	5	5	20	YES	$960,000	1-1
Natividad Creek E Laurel Crossing	Stabilize and restore the culvert banks	5	5	5	5	20	YES	$500,000	1-2
E Romie Ln & S Main St	Replace undersized inlets	5	5	5	5	20	NO	$1,590,000	1-3
Madrid Entrance to Northridge Mall Nearest to Big 5	Replace undersized inlets	5	5	5	5	20	YES	$710,000	1-4
Williams and Freedom Parkway Silt Basin	Construct larger basin (property acquisition)	5	5	5	5	20	NO	$100,000	1-5
Monte Bella Basin	Remove sediment from existing basin and lower outlet invert	5	5	5	5	20	YES	$510,000	1-6
Monterey St & E Gabilan St	Replace undersized inlets	5	5	5	5	20	YES	$720,000	1-7
Northgate Park	New detention storage at existing park	5	5	5	5	20	YES	$490,000	1-8
Salinas Fairways Golf Course	Study to evaluate feasibility of relief flow to golf course	5	5	5	5	20	YES	$100,000	1-9
Tyler St	Replace existing siphons	5	5	5	5	20	YES	$1,500,000	1-10
E Boronda and Williams Corner	Improve ditch and construct new basin (property acquisition)	5	5	5	5	20	NO	$100,000	1-11
Natividad Rd from E Alvin to E Laurel	New inlets, stabilize ROW with vegetation	5	5	5	5	20	NO	$1,260,000	1-12
Blanco Basin	Study to evaluate necessary maintenance and inlet repairs	5	5	5	5	20	YES	$100,000	1-13
Cesar Chavez Basin	Perform Basin Improvements per Preliminary Design Report	5	5	5	5	20	YES	$2,010,000	1-14
Salinas River Pump Station and Outfall	Condition Assessment of the Salinas River Pump Station and associated outfall pipe to understand the need for and level of rehabilitation necessary	5	3	5	5	18	YES	$200,000	1-15
E Boronda East of Independence Blvd	Study to evaluate floodplain storage (property acquisition)	5	1	5	5	16	NO	$100,000	1-16
Monte Bella Ditch	Establish sediment removal program	5	1	5	5	16	YES	$700,000	1-17
Santa Rita Creek - San Juan Grade and Russell Rd	Study to evaluate floodplain storage (property acquisition)	5	3	5	1	14	YES	$200,000	1-18
1322 Adams St	Replace existing siphons	5	5	5	3	18	YES	$630,000	2-1
E Alisal St	Pipe Upgrades	3	5	5	5	18	NO	$4,330,000	2-2
E Market St	Pipe Upgrades	3	5	5	5	18	YES	$7,840,000	2-3
E Blanco Rd	Pipe Upgrades	3	5	5	5	18	NO	$19,160,000	2-4
Maryal Dr	Pipe Upgrades	3	5	5	5	18	YES	$5,510,000	2-5
Russell Rd	Pipe Upgrades	3	5	5	5	18	NO	$3,210,000	2-6
Acosta Plz	Pipe Upgrades	3	5	5	5	18	YES	$8,640,000	2-7
Eucalyptus Dr	Pipe Upgrades	3	5	5	5	18	YES	$14,190,000	2-8
Chaparral St	Pipe Upgrades	3	5	5	5	18	YES	$16,520,000	2-9
Constitiution Blvd	Pipe Upgrades	3	5	5	5	18	NO	$7,480,000	2-10
Airport	Pipe Upgrades	3	5	5	5	18	NO	$14,970,000	2-11
Sherwood Dr	Pipe Upgrades	3	5	5	5	18	YES	$19,740,000	2-12
La Mancha Way	Pipe Upgrades	3	5	5	5	18	NO	$15,490,000	2-13
Rosarita Dr	Pipe Upgrades	3	5	5	5	18	YES	$22,530,000	2-14
W Market St	Pipe Upgrades	3	5	5	5	18	YES	$16,930,000	2-15
283 Chaparral St	Replace existing siphons	5	5	5	3	18	YES	$5,460,000	2-16
Tuscany Blvd	Pipe Upgrades	3	5	5	5	18	YES	$5,910,000	2-17
Iverson St & Clay St	Extend storm drain, new inlets	5	5	5	3	18	NO	$670,000	2-18
Lincoln Ave & Clay St	Replace undersized inlets	5	5	5	3	18	YES	$2,650,000	2-19
55 Santa Lucia Ave	Replace undersized inlets	5	3	5	5	18	NO	$670,000	2-20
North Bound Off-Ramp to W Market St. from Davis Rd	Replace undersized inlets	5	3	5	5	18	YES	$360,000	2-21
Salinas River Outfall	Rehabilitation (relining) of 66in CMP outfall pipe along with removal of debris impacting flap gate at the Salinas River	5	3	5	5	18	YES	$10,770,000	2-22
East Market St	Pipe Upgrades	3	3	5	5	16	YES	$3,520,000	3-1
E San Luis St & Soledad St	Replace existing siphons	5	3	5	3	16	YES	$1,950,000	3-2
603 Carriage Ct	Replace existing siphons	5	5	5	1	16	YES	$690,000	3-3
Rico St	Pipe Upgrades	3	3	5	5	16	NO	$4,200,000	3-4
E Laurel Dr & Noice Dr	Replace undersized inlets	5	1	5	5	16	YES	$1,120,000	3-5
Chaparral St & Noice Dr	Replace undersized inlets	5	1	5	5	16	YES	$600,000	3-6
N Davis Rd	Pipe Upgrades	3	3	5	5	16	YES	$6,230,000	3-7
N Main St at Harley Shop	Replace undersized inlets	5	1	5	5	16	YES	$630,000	3-8

TABLE 7-3.
CITY OF SALINAS SWMPU
STORM DRAIN CIP RANKING MATRIX

Project Location	Project Description	Flooding Frequency	Flooding Severity	Climate Change	Public Safety	Total Score	DAC Area	Total Cost ($)	Project Number
		Area of Concern = 5 5-yr and 10-yr storm = 3 20-yr storm = 1	Widespread flooding = 5 Localized flooding = 3 Minimal flooding = 1	Climate Change Impact = 5 No Climate Change Impact = 0	Critical Facility or Evac Route = 5 Major Arterial or Freeway = 5 Minor Arterial or Collector = 3 Local or Private = 1				
Manchester Cir & Constitution Blvd	Replace undersized inlets	5	1	5	5	16	NO	$360,000	3-9
W Curtis St	Pipe Upgrades	3	3	5	5	16	NO	$6,400,000	3-10
Freedom Parkway	Pipe Upgrades	3	3	5	5	16	NO	$11,300,000	3-11
E Gabilan St	Pipe Upgrades	3	5	5	3	16	YES	$1,290,000	3-12
California St	Pipe Upgrades	3	3	5	5	16	YES	$2,780,000	3-13
Cortez St	Pipe Upgrades	3	5	5	3	16	YES	$6,070,000	3-14
Towt St	Pipe Upgrades	3	3	5	5	16	YES	$6,720,000	3-15
Cape Cod Way	Pipe Upgrades	3	3	5	5	16	NO	$8,990,000	3-16
W Market St	Pipe Upgrades	3	3	5	5	16	NO	$29,430,000	3-17
Work St	Pipe Upgrades	3	3	5	5	16	NO	$6,890,000	3-18
174 Rosarita Dr	Replace existing siphons	5	5	5	1	16	NO	$1,150,000	3-19
211 Riker Ter	Replace existing siphons	5	5	5	1	16	YES	$1,010,000	3-20
559 Iverson St	Replace existing siphons	5	3	5	3	16	NO	$1,660,000	3-21
229 Maple St	Replace existing siphons	5	3	5	3	16	NO	$1,740,000	3-22
El Dorado Park Bioretention	Restore bioretention basin	5	3	5	3	16	NO	$360,000	3-23

TABLE 7-4.
CITY OF SALINAS SWMPU
HIGH PRIORITY STORM DRAIN CAPITAL IMPROVEMENT PROGRAM (CIP)

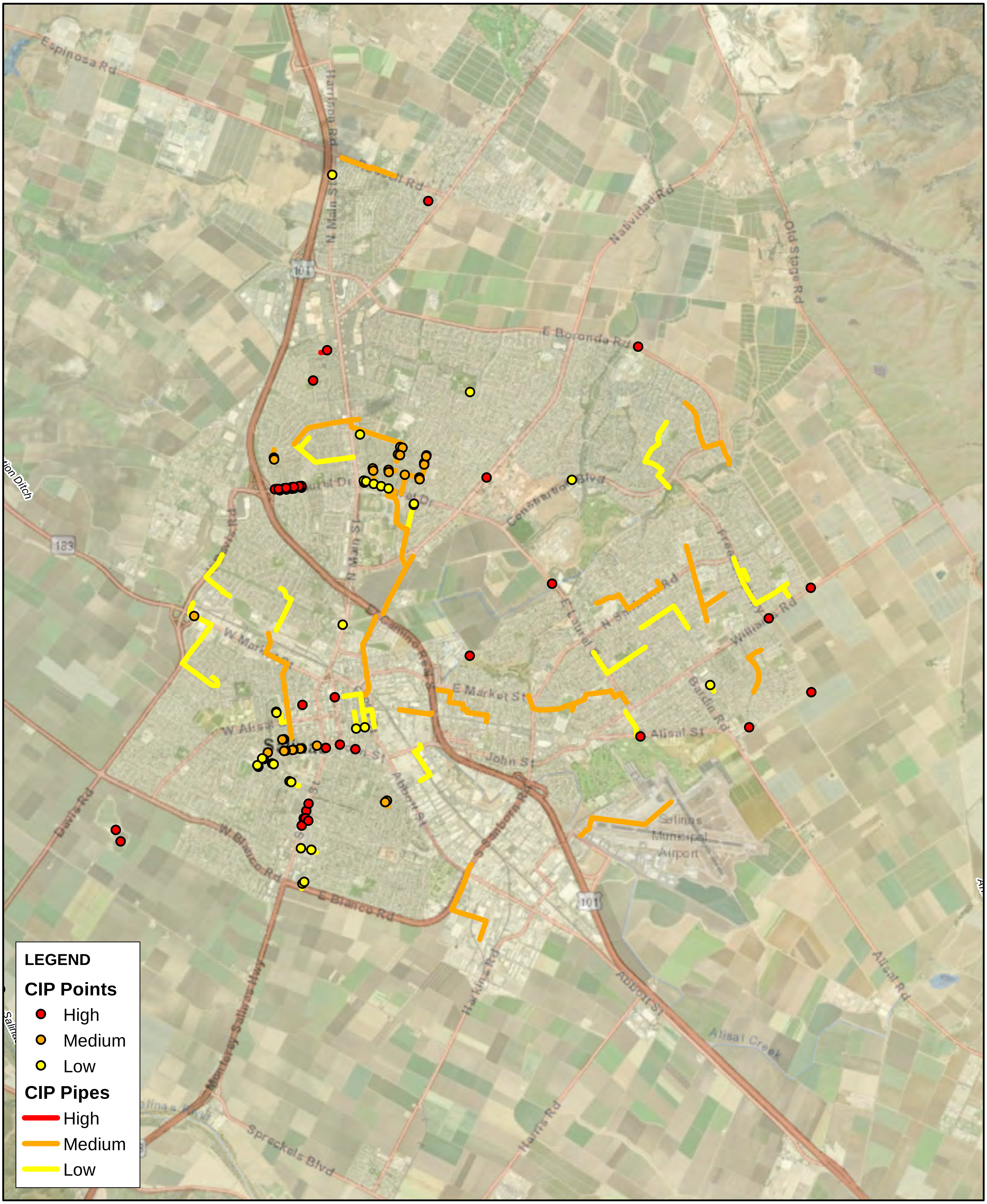
Project #	Title	Description	Location	Construction Cost ($)	Soft Cost ($)*	Total Project Cost ($)**
1-1	**John St & Monterey St**	Replace nine undersized curb inlets	1. Intersection of S Main St and Winham St/Clay St: 4 inlets 2. Intersection of John St and Monterey St: 2 inlets 3. Intersection of John St and Soledad St: 3 inlets	$680,000	$280,000	**$960,000**
1-2	**Natividad Creek E Laurel Crossing**	Existing culverts have experienced erosion due to scour. Stabilize and restore culvert banks	Natividad Creek, E Laurel Crossing	$275,000	$225,000	**$500,000**
1-3	**E Romie Ln & S Main St**	Replace eight undersized curb inlets	1. Intersection of S Main St and East Acacia St: 1 inlet 2. Intersection of S Main St and Hawthorne St: 2 inlets 3. Intersection of S Main St and East Romie Ln: 3 inlets 4. Intersection of S Main St and Katherine St: 2 inlets	$1,130,000	$460,000	**$1,590,000**
1-4	**Madrid Entrance to Northridge Mall Nearest to Big 5**	Replace three undersized curb inlets and add 300 feet of pipe	Madrid St entrance to Northridge Mall nearest to Big 5: 3 inlets	$390,000	$320,000	**$710,000**
1-5	**Williams and Freedom Parkway Silt Basin**	The current silt basin is undersized. acquire additional property and construct a larger silt basin	Corner of Williams Rd and Freedom Pkwy	$0	$100,000	**$100,000**
1-6	**Monte Bella Basin**	Remove excess sediment from basin, lower invert by approx 2 feet, and reconstruct 100 feet of downstream pipe	Corner of Monte Bella Pkwy and Sconberg Pkwy	$280,000	$230,000	**$510,000**
1-7	**Monterey St & E Gabilan St**	Replace five undersized inlets	1. Intersection of E Monterey St and E Gabilan St: 4 inlets 2. South of intersection of W Gabilan St and Church St: 1 inlet	$400,000	$320,000	**$720,000**
1-8	**Northgate Park**	Northgate Park does not act as a detention basin because it is not connected into the City's storm drain system. Connect the park to the storm drain system with a new pipe and overflow grate	Between Cherokee Dr and Sepulveda Dr	$270,000	$220,000	**$490,000**
1-9	**Salinas Fairway Golf Course**	Perform feasibility study to diverting stormwater to the golf course to reduce flooding along Alisal St	South of E Alisal St	$0	$100,000	**$100,000**
1-10	**Tyler St**	Replace fourteen siphons/undersized curb inlets	1. Intersection of W Laurel Dr and Tyler St: 3 inlets/siphons 2. Intersection of W Laurel Dr and Polk St: 4 inlets/siphons 3. Intersection of W Laurel Dr and Monroe St: 3 inlets/siphons 4. Intersection of W Laurel Dr and Adams St: 4 inlets/siphons	$1,070,000	$430,000	**$1,500,000**
1-11	**E Boronda and Williams Corner**	Perform a study to evaluate the potential for a new sediment basin and basin/ditch configurations at this intersection to reduce flooding and heavy sedimentation	Along Williams Rd, west of corner with E Boronda Rd	$0	$100,000	**$100,000**

***Soft costs include a 40% escalation of the construction costs for planning, engineering, CM, legal/admin for project with more than $400,000 in construction costs and a 80% escalation factor for projects with less than $400,000 in construction costs.**
****All CIP costs are expressed in May 2024 dollars, using McGraw-Hill ENR Construction Cost Index of 13532, and will need to be escalated to the year or years scheduled for the work.**

TABLE 7-4.
CITY OF SALINAS SWMPU
HIGH PRIORITY STORM DRAIN CAPITAL IMPROVEMENT PROGRAM (CIP)

Project #	Title	Description	Location	Construction Cost ($)	Soft Cost ($)*	Total Project Cost ($)**
1-12	**Natividad Rd from E Alvin to E Laurel**	Replace eight undersized curb inlets and stabilize City ROW with vegetation	1. Intersection of Natividad Rd and E Alvin Dr : 3 inlets 2. Intersection of Natividad Rd and Rainier Dr/Chaparral St: 3 inlets 3. Intersection of Natividad Rd and Pacheco St: 2 inlets 4. Intersection of Natividad Rd and E Laurel Dr: 1 inlets 5. Replace vegetation in City ROW along Natividad Rd, between E Alvin Dr to E Laurel Dr	$900,000	$360,000	**$1,260,000**
1-13	**Blanco Basin**	Study to evaluate necessary maintenance and inlet repairs	Blanco Basin, southwest of Blanco Rd	$0	$100,000	**$100,000**
1-14	**Cesar Chavez Basin**	Perform Basin Improvements per Preliminary Design Report	Cesar Chavez Bain, Cesar Chavez Park	$1,430,000	$580,000	**$2,010,000**
1-15	**Salinas River Pump Station and Outfall**	Condition Assessment of the Salinas River Pump Station and associated outfall pipe to understand the need for and level of rehabilitation necessary	Salinas River Pump Station and Outfall, southwest of Blanco Rd	$0	$200,000	**$200,000**
1-16	**E Boronda East of Independence Blvd**	Perform a study to evaluate additional stormwater storage north of Boronda Rd	North of E Boronda Rd, east of Independence Blvd	$0	$100,000	**$100,000**
1-17	**Monte Bella Ditch**	Establish a sediment removal program for Monte Bella Ditch	Monte Bella Ditch, east of Sconberg Pkwy	$500,000	$200,000	**$700,000**
1-18	**Santa Rita Creek - San Juan Grade and Russell Rd**	Identify opportunities to reduce surface flooding in Santa Rita Creek	Santa Rita Creek, between Russell Rd and North Main St	$0	$200,000	**$200,000**
					HIGH PRIORITY STORM DRAIN CIP	**$11.8+ million**

***Soft costs include a 40% escalation of the construction costs for planning, engineering, CM, legal/admin for project with more than $400,000 in construction costs and a 80% escalation factor for projects with less than $400,000 in construction costs.**
****All CIP costs are expressed in May 2024 dollars, using McGraw-Hill ENR Construction Cost Index of 13532, and will need to be escalated to the year or years scheduled for the work.**



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N

1 in = 5,000 Feet

SWMPU

FIGURE 7-1. STORM DRAIN CIP MAP

JOB NO: 886-022
CREATED BY: AJM
DATE: 09/27/2024

NOTES:
WALLACE GROUP DID NOT PERFORM SURVEY SERVICES FOR THIS MAP. NOT A LEGAL DOCUMENT.

SALINAS

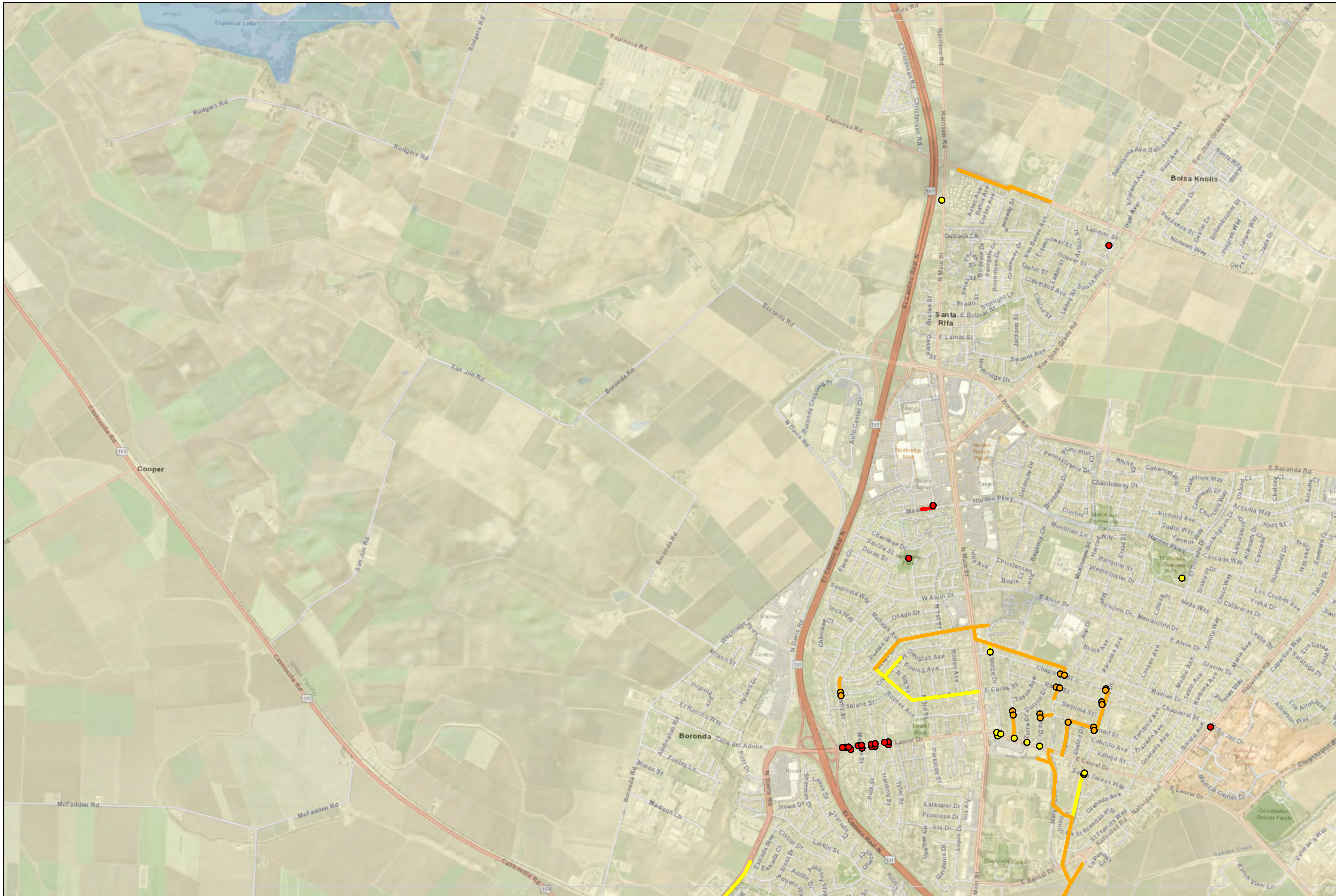


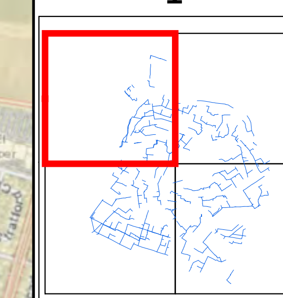
FIGURE 7-1. STORM DRAIN CIP MAP

Legend

CIP Points
- High
- Medium
- Low

CIP Pipes
- High
- Medium
- Low

SHEET: 1



1 inch = 2,000 Feet

SALINAS

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PROJECT NOTES:
ESRI BASEMAP. MAP DEVELOPED FOR STORM DRAIN FACILITY MANAGEMENT. NOT TO BE USED FOR DESIGN OR CONSTUCTION.
PUBLISHED MAY 2024.

FIGURE 7-1. STORM DRAIN CIP MAP

Legend

CIP Points
- High
- Medium
- Low

CIP Pipes
- High
- Medium
- Low

SHEET: 2

1 inch = 2,000 Feet

PROJECT NOTES:
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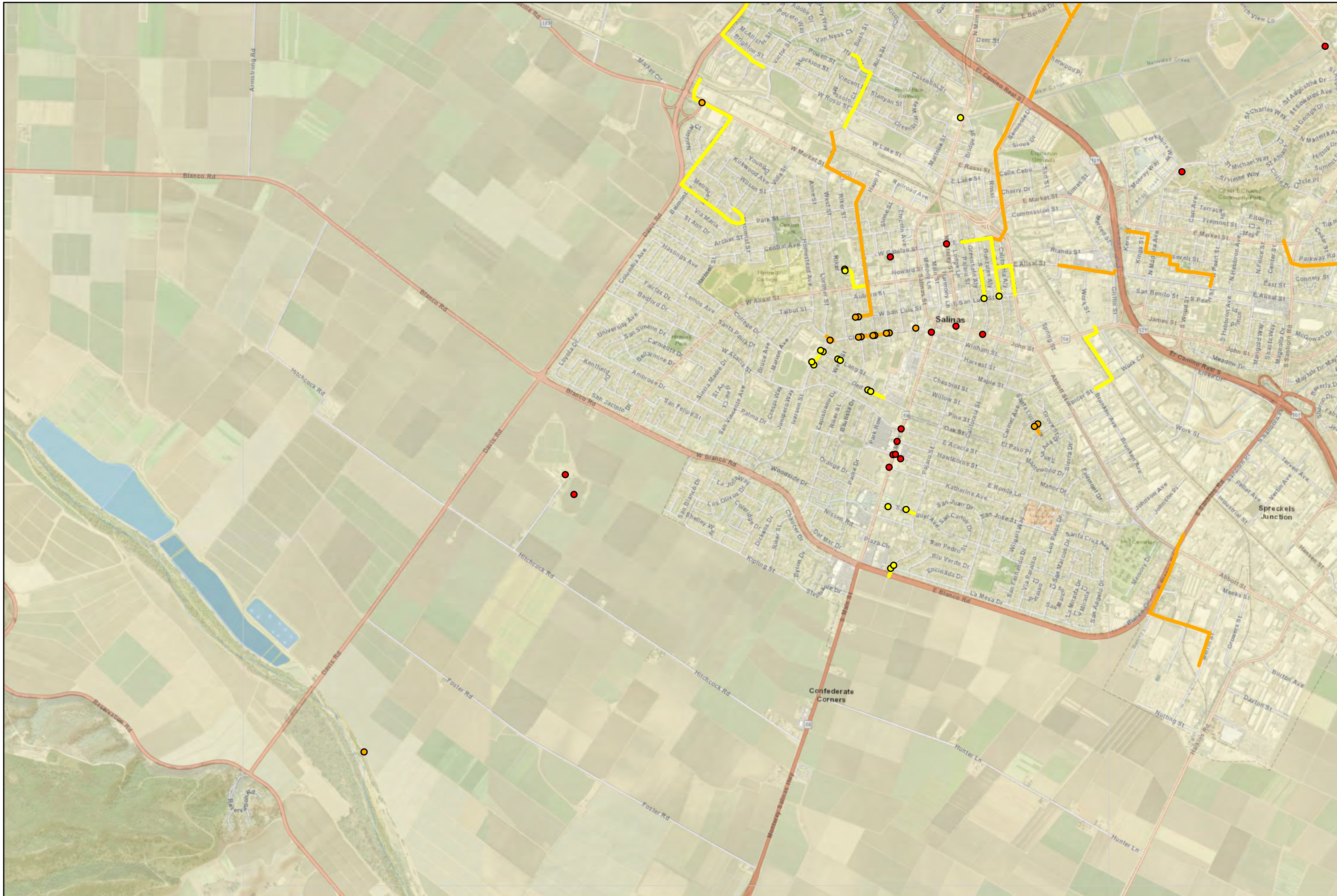


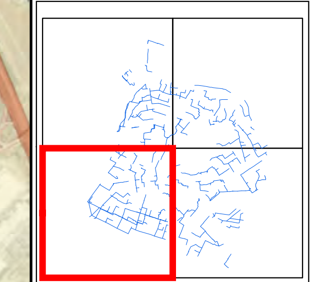
FIGURE 7-1. STORM DRAIN CIP MAP

Legend

CIP Points
- High
- Medium
- Low

CIP Pipes
- High
- Medium
- Low

SHEET:
3



1 inch = 2,000 Feet

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PROJECT NOTES:
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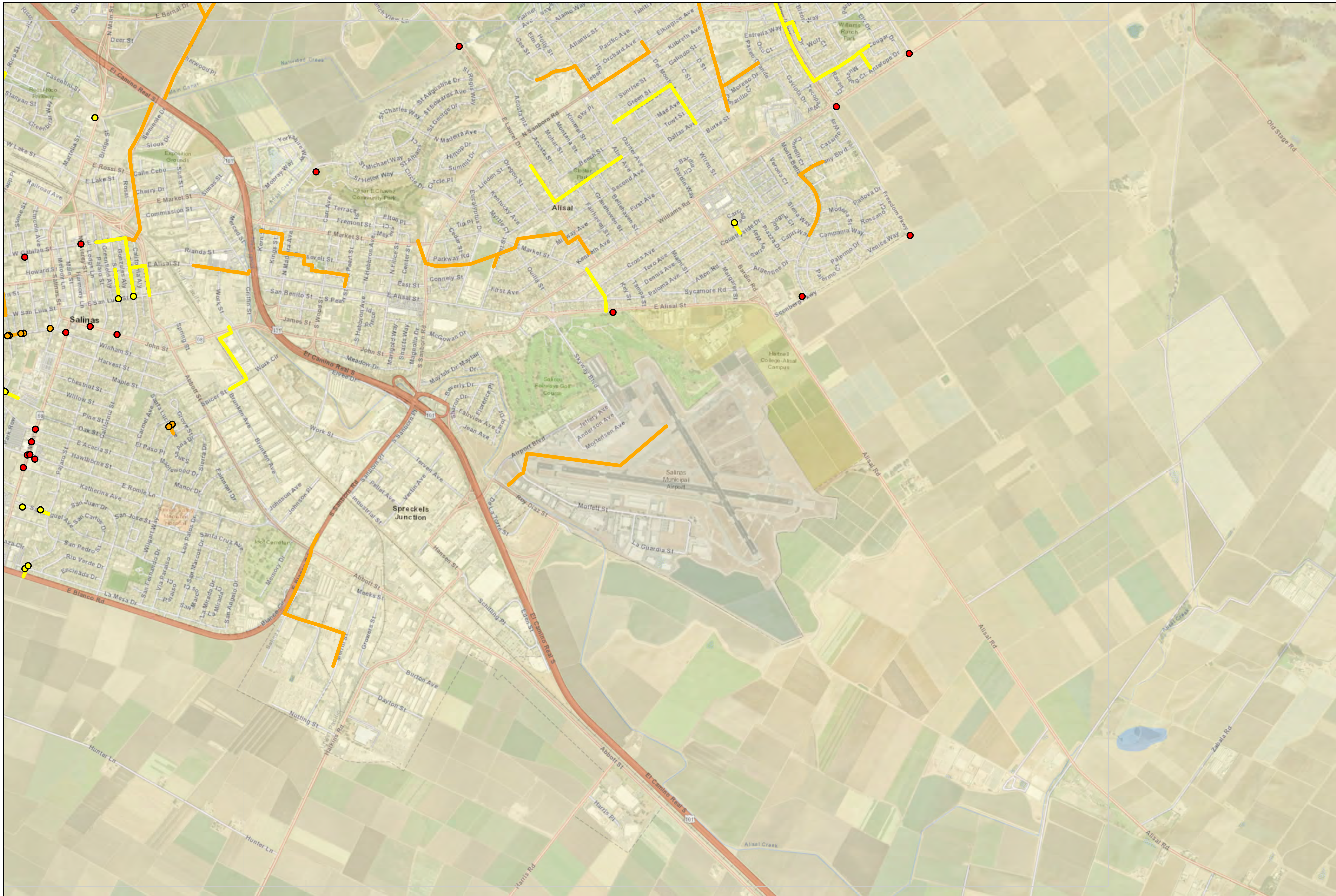
PUBLISHED MAY 2024.



SALINAS

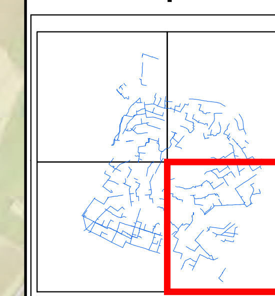
**FIGURE 7-1.
STORM DRAIN
CIP MAP**

Legend

CIP Points
- High
- Medium
- Low

CIP Pipes
- High
- Medium
- Low

**SHEET:
4**



N

1 inch = 2,000 Feet

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PROJECT NOTES:
ESRI BASEMAP. MAP DEVELOPED FOR STORM DRAIN FACILITY MANAGEMENT. NOT TO BE USED FOR DESIGN OR CONSTUCTION.
PUBLISHED MAY 2024.

APPENDICES

APPENDIX A: High Priority Project Cutsheets

CIP 1-1: John St & Monterey St

City of Salinas Capital Improvement Project Information Sheet

2024 Stormwater Master Plan Update

Project Trigger

- ☑ Existing Condition
- ☐ Future Condition

Project Components

- ☐ Upgrade Gravity Pipeline
- ☐ New Gravity Pipeline
- ☑ New Curb Inlet(s)
- ☐ Sediment Removal
- ☐ Detention Facility
- ☐ Inspection and/or study
- ☐ New Barrier

Project Need

- ☑ Existing surface flooding
- ☑ Public Safety Concern
- ☐ Sediment and/or debris

DAC Area

- ☑ Yes
- ☐ No

Project Cost Breakdown

Construction Cost[1]	$680,000
Planning, Engineering, CM, Legal/Admin (40%/80%)[2]	$280,000
Total Project Cost	**$960,000**

Project Description

Various inlets throughout the City are undersized and contribute to flooding. Replace nine undersized inlets at the following locations:

- The intersection of South Main Street and Winham Street/Clay Street: 4 inlets
- The intersection of John Street and Monterey Street: 2 inlets
- The intersection of John Street and Soledad Street: 3 inlets

1. Construction costs are expressed in Year 2024 dollars, using an ENR construction Cost Index of 13632, and will need to be escalated to the year or years scheduled for the work.
2. Soft costs include a 40% escalation of the construction costs for planning, engineering, CM, legal/admin for project with more than $400,000 in construction costs and a 80% escalation factor for projects with less than $400,000 in construction costs.

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CIP 1-2: Natividad Creek E Laurel Crossing

City of Salinas Capital Improvement Project Information Sheet

2024 Stormwater Master Plan Update

Project Trigger

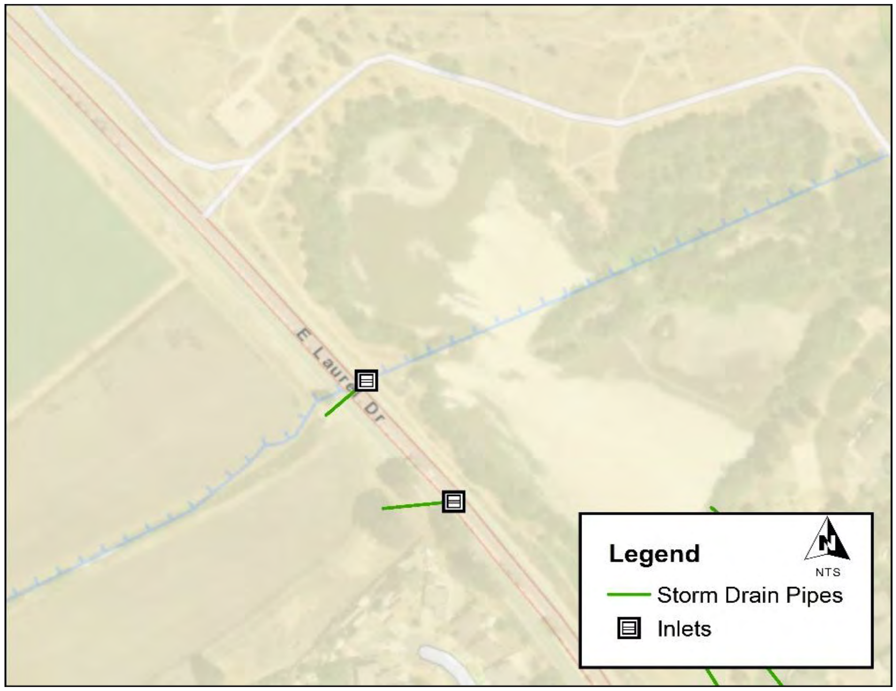
- ☑ Existing Condition
- ☐ Future Condition

Project Components

- ☐ Upgrade Gravity Pipeline
- ☐ New Gravity Pipeline
- ☐ New Curb Inlet(s)
- ☐ Sediment Removal
- ☐ Detention Facility
- ☐ Inspection and/or study
- ☑ Erosion Mitigation

Project Need

- ☐ Existing surface flooding
- ☑ Public Safety Concern
- ☑ Sediment and/or debris



DAC Area

- ☑ Yes
- ☐ No

Project Cost Breakdown

Construction Cost[1]	$275,000
Planning, Engineering, CM, Legal/Admin (40%/80%)[2]	$225,000
Total Project Cost	**$500,000**

Project Description

There are existing culverts in Natividad Creek under East Laurel Drive that have experienced erosion due to scour. Stabilize and restore the culvert banks to address these impacts.

1. Construction costs are expressed in Year 2024 dollars, using an ENR construction Cost Index of 13632, and will need to be escalated to the year or years scheduled for the work.
2. Soft costs include a 40% escalation of the construction costs for planning, engineering, CM, legal/admin for project with more than $400,000 in construction costs and a 80% escalation factor for projects with less than $400,000 in construction costs.

CIP 1-3: E Romie Ln & S Main St

City of Salinas Capital Improvement Project Information Sheet

2024 Stormwater Master Plan Update

Project Trigger

- ☑ Existing Condition
- ☐ Future Condition

Project Components

- ☐ Upgrade Gravity Pipeline
- ☐ New Gravity Pipeline
- ☑ New Curb Inlet(s)
- ☐ Sediment Removal
- ☐ Detention Facility
- ☐ Inspection and/or study
- ☐ New Barrier

Project Need

- ☑ Existing surface flooding
- ☑ Public Safety Concern
- ☐ Sediment and/or debris

DAC Area

- ☐ Yes
- ☑ No

Project Cost Breakdown

Construction Cost[1]	$1,130,000
Planning, Engineering, CM, Legal/Admin (40%/80%)[2]	$460,000
Total Project Cost	**$1,590,000**

Project Description

Various inlets throughout the City are undersized and contribute to flooding. Replace eight undersized inlets:
- The intersection of South Main Street and East Acacia Street: 1 inlet
- The intersection of South Main Street and Hawthorne Street: 2 inlets
- The intersection of South Main Street and East Romie Lane: 3 inlets
- The intersection of South Main Street and Katherine Avenue: 2 inlets

1. Construction costs are expressed in Year 2024 dollars, using an ENR construction Cost Index of 13632, and will need to be escalated to the year or years scheduled for the work.
2. Soft costs include a 40% escalation of the construction costs for planning, engineering, CM, legal/admin for project with more than $400,000 in construction costs and a 80% escalation factor for projects with less than $400,000 in construction costs.

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CIP 1-4: Madrid Entrance to Northridge Mall Nearest to Big 5

City of Salinas Capital Improvement Project Information Sheet

2024 Stormwater Master Plan Update

Project Trigger

- ☑ Existing Condition
- ☐ Future Condition

Project Components

- ☐ Upgrade Gravity Pipeline
- ☐ New Gravity Pipeline
- ☑ New Curb Inlet(s)
- ☐ Sediment Removal
- ☐ Detention Facility
- ☐ Inspection and/or study
- ☐ New Barrier

Project Need

- ☑ Existing surface flooding
- ☑ Public Safety Concern
- ☐ Sediment and/or debris

DAC Area

- ☑ Yes
- ☐ No

Project Cost Breakdown

Construction Cost[1]	$390,000
Planning, Engineering, CM, Legal/Admin (40%/80%)[2]	$320,000
Total Project Cost	**$710,000**

Project Description

Various inlets throughout the City are undersized and contribute to flooding. Replace three undersized inlets at the Madrid Street entrance to Northridge Mall nearest to Big 5 and add 300 feet of 18 inch pipe.

1. Construction costs are expressed in Year 2024 dollars, using an ENR construction Cost Index of 13632, and will need to be escalated to the year or years scheduled for the work.
2. Soft costs include a 40% escalation of the construction costs for planning, engineering, CM, legal/admin for project with more than $400,000 in construction costs and a 80% escalation factor for projects with less than $400,000 in construction costs.

CIP 1-5: Williams and Freedom Parkway Silt Basin

City of Salinas Capital Improvement Project Information Sheet

2024 Stormwater Master Plan Update

Project Trigger

- [x] Existing Condition
- [ ] Future Condition

Project Components

- [ ] Upgrade Gravity Pipeline
- [ ] New Gravity Pipeline
- [ ] New Curb Inlet(s)
- [ ] Sediment Removal
- [x] Detention Facility
- [ ] Inspection and/or study
- [ ] New Barrier

Project Need

- [x] Existing surface flooding
- [ ] Public Safety Concern
- [ ] Sediment and/or debris

DAC Area

- [ ] Yes
- [x] No

Project Cost Breakdown

Construction Cost[1]	$0
Planning, Engineering, CM, Legal/Admin (40%/80%)[2]	$100,000
Total Project Cost	**$100,000**

Project Description

This project is a focused study. The current silt basin is undersized. This project would acquire additional property and construct a larger silt basin to mitigate offsite flows and sediment transport. This project will require coordination and discussions on cost sharing between the City and adjacent agricultural operations and is anticipated to provide benefits to stakeholders. Project costs include studies to determine feasibility and costs. This project may result in identification of additional improvement project(s); project description and cost are unknown at this time. Once the study is complete, any identified projects should be added to the Capital Improvement Program.

1. Construction costs are expressed in Year 2024 dollars, using an ENR construction Cost Index of 13632, and will need to be escalated to the year or years scheduled for the work.
2. Soft costs include a 40% escalation of the construction costs for planning, engineering, CM, legal/admin for project with more than $400,000 in construction costs and a 80% escalation factor for projects with less than $400,000 in construction costs.

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CIP 1-6: Monte Bella Basin

City of Salinas Capital Improvement Project Information Sheet

2024 Stormwater Master Plan Update

Project Trigger

- [x] Existing Condition
- [ ] Future Condition

Project Components

- [ ] Upgrade Gravity Pipeline
- [ ] New Gravity Pipeline
- [ ] New Curb Inlet(s)
- [ ] Sediment Removal
- [x] Detention Facility
- [ ] Inspection and/or study
- [ ] New Barrier

Project Need

- [ ] Existing surface flooding
- [ ] Public Safety Concern
- [x] Sediment and/or debris

DAC Area

- [x] Yes
- [ ] No

Project Cost Breakdown

Construction Cost[1]	$280,000
Planning, Engineering, CM, Legal/Admin (40%/80%)[2]	$230,000
Total Project Cost	**$510,000**

Project Description

Monte Bella Basin has significant sediment build-up, hindering the performance of the basin. Remove excess sediment from the basin provide flood storage. Additionally, lower the outlet pipe by approximately two feet to provide additional storage. Reconstruct approximately 100 feet of storm drain pipe to connect the lowered outlet to the existing storm drain in Sconberg Parkway. This reduction in retention area (which is currently full of sediment) helps reduce upstream flooding in the storm drain system. The City anticipates funding this project through an existing Assessment District.

1. Construction costs are expressed in Year 2024 dollars, using an ENR construction Cost Index of 13632, and will need to be escalated to the year or years scheduled for the work.
2. Soft costs include a 40% escalation of the construction costs for planning, engineering, CM, legal/admin for project with more than $400,000 in construction costs and a 80% escalation factor for projects with less than $400,000 in construction costs.

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CIP 1-7: Monterey St & E Gabilan St

City of Salinas Capital Improvement Project Information Sheet

2024 Stormwater Master Plan Update

Project Trigger

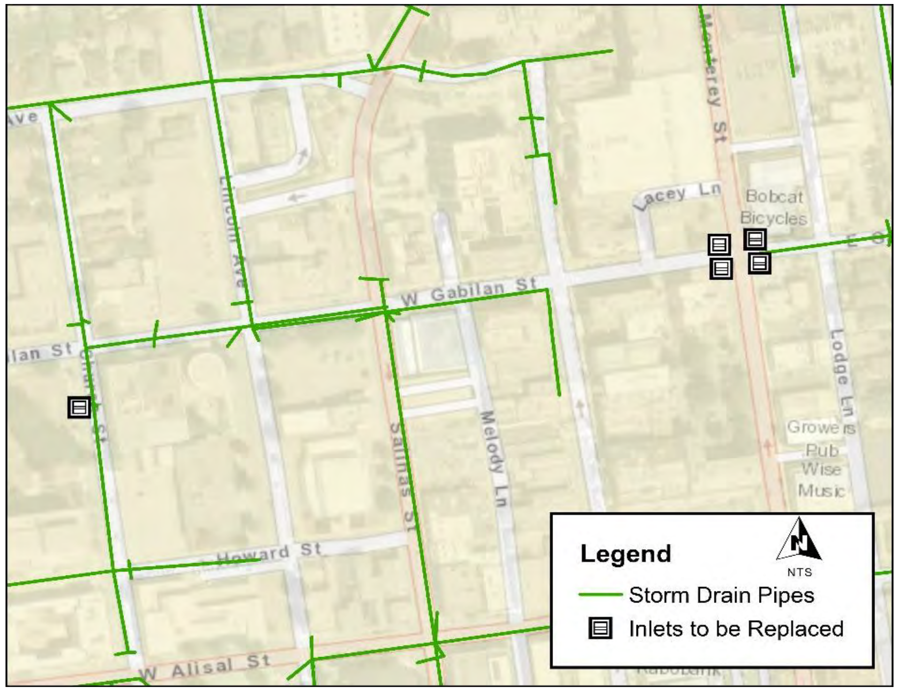
- [x] Existing Condition
- [ ] Future Condition

Project Components

- [ ] Upgrade Gravity Pipeline
- [ ] New Gravity Pipeline
- [x] New Curb Inlet(s)
- [ ] Sediment Removal
- [ ] Detention Facility
- [ ] Inspection and/or study
- [ ] New Barrier

Project Need

- [x] Existing surface flooding
- [ ] Public Safety Concern
- [ ] Sediment and/or debris



DAC Area

- [x] Yes
- [ ] No

Project Cost Breakdown

Construction Cost[1]	$400,000
Planning, Engineering, CM, Legal/Admin (40%/80%)[2]	$320,000
Total Project Cost	**$720,000**

Project Description

Various inlets throughout the City are undersized and contribute to flooding. Replace five undersized inlets:
- The intersection of East Monterey Street and East Gabilan Street: 4 inlets
- South of the intersection of West Gabilan Street and Church Street: 1 inlet

1. Construction costs are expressed in Year 2024 dollars, using an ENR construction Cost Index of 13632, and will need to be escalated to the year or years scheduled for the work.
2. Soft costs include a 40% escalation of the construction costs for planning, engineering, CM, legal/admin for project with more than $400,000 in construction costs and a 80% escalation factor for projects with less than $400,000 in construction costs.

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CIP 1-8: Northgate Park

City of Salinas Capital Improvement Project Information Sheet

2024 Stormwater Master Plan Update

Project Trigger

- ☑ Existing Condition
- ☐ Future Condition

Project Components

- ☐ Upgrade Gravity Pipeline
- ☐ New Gravity Pipeline
- ☐ New Curb Inlet(s)
- ☐ Sediment Removal
- ☑ Detention Facility
- ☐ Inspection and/or study
- ☐ New Barrier

Project Need

- ☑ Existing surface flooding
- ☐ Public Safety Concern
- ☐ Sediment and/or debris

DAC Area

- ☑ Yes
- ☐ No

Project Cost Breakdown

Construction Cost[1]	$270,000
Planning, Engineering, CM, Legal/Admin (40%/80%)[2]	$220,000
Total Project Cost	**$490,000**

Project Description

Currently, this park does not act as a detention basin because it is not connected into the City's storm drain system. This project would connect the park to the storm drain system and allow for existing detention storage to be utilized. This connection could be achieved with a new pipe and overflow grate.

1. Construction costs are expressed in Year 2024 dollars, using an ENR construction Cost Index of 13632, and will need to be escalated to the year or years scheduled for the work.
2. Soft costs include a 40% escalation of the construction costs for planning, engineering, CM, legal/admin for project with more than $400,000 in construction costs and a 80% escalation factor for projects with less than $400,000 in construction costs.

CIP 1-9: Salinas Fairway Golf Course

City of Salinas Capital Improvement Project Information Sheet

2024 Stormwater Master Plan Update

Project Trigger

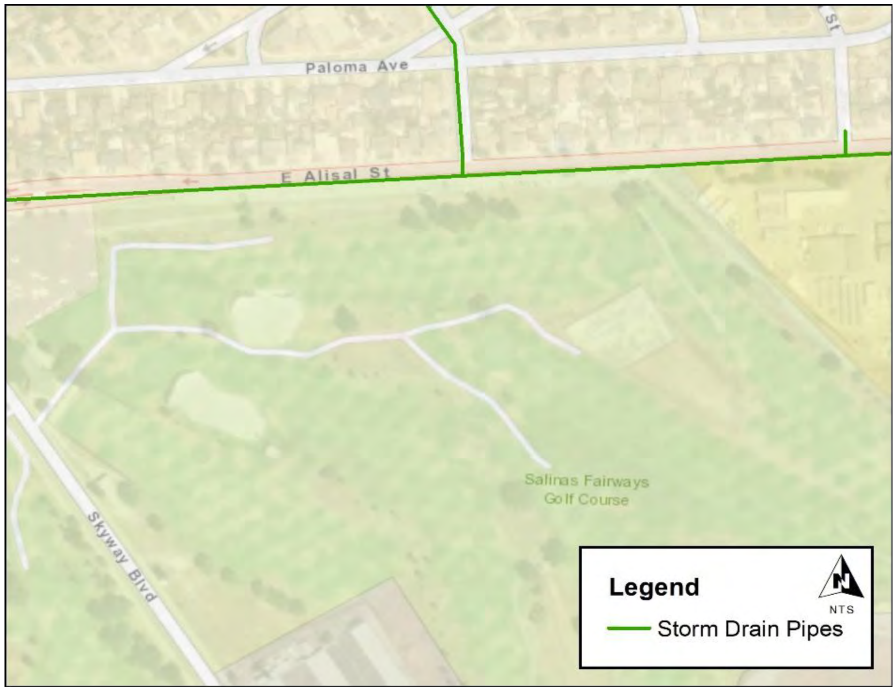
- ☑ Existing Condition
- ☐ Future Condition

Project Components

- ☐ Upgrade Gravity Pipeline
- ☐ New Gravity Pipeline
- ☐ New Curb Inlet(s)
- ☐ Sediment Removal
- ☐ Detention Facility
- ☑ Inspection and/or study
- ☐ New Barrier

Project Need

- ☑ Existing surface flooding
- ☐ Public Safety Concern
- ☐ Sediment and/or debris



DAC Area

- ☑ Yes
- ☐ No

Project Cost Breakdown

Construction Cost[1]	$0
Planning, Engineering, CM, Legal/Admin (40%/80%)[2]	$100,000
Total Project Cost	**$100,000**

Project Description

This project is a focused study. Currently the storm drain system along East Alisal Street is overwhelmed in the 20-year storm. This project is to evaluate the feasibility of diverting stormwater flow to the golf course and reduce flooding along East Alisal Street. This project will require coordination between the City and Salinas Fairways Golf Couse and is anticipated to provide benefits to stakeholders. This project may result in identification of additional improvement project(s); project description and cost are unknown at this time. Once the study is complete, any identified projects should be added to the Capital Improvement Program.

1. Construction costs are expressed in Year 2024 dollars, using an ENR construction Cost Index of 13632, and will need to be escalated to the year or years scheduled for the work.
2. Soft costs include a 40% escalation of the construction costs for planning, engineering, CM, legal/admin for project with more than $400,000 in construction costs and a 80% escalation factor for projects with less than $400,000 in construction costs.

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CIP 1-10: Tyler St

City of Salinas Capital Improvement Project Information Sheet

2024 Stormwater Master Plan Update

Project Trigger

- ☑ Existing Condition
- ☐ Future Condition

Project Components

- ☐ Upgrade Gravity Pipeline
- ☐ New Gravity Pipeline
- ☑ New Curb Inlet(s)
- ☐ Sediment Removal
- ☐ Detention Facility
- ☐ Inspection and/or study
- ☐ New Barrier

Project Need

- ☑ Existing surface flooding
- ☐ Public Safety Concern
- ☐ Sediment and/or debris

DAC Area

- ☑ Yes
- ☐ No

Project Cost Breakdown

Construction Cost[1]	$1,070,000
Planning, Engineering, CM, Legal/Admin (40%/80%)[2]	$430,000
Total Project Cost	**$1,500,000**

Project Description

Various inlets throughout the City are undersized and contribute to flooding. Replace fourteen existing inlets and siphons with new catch basins and laterals to storm drain system:
- The intersection of West Laurel Drive and Tyler Street: 3 inlets/siphons
- The intersection of West Laurel Drive and Polk Street: 4 inlets/siphons
- The intersection of West Laurel Drive and Monroe Street: 3 inlets/siphons
- The intersection of West Laurel Drive and Adams Street: 4 inlets/siphons

1. Construction costs are expressed in Year 2024 dollars, using an ENR construction Cost Index of 13632, and will need to be escalated to the year or years scheduled for the work.
2. Soft costs include a 40% escalation of the construction costs for planning, engineering, CM, legal/admin for project with more than $400,000 in construction costs and a 80% escalation factor for projects with less than $400,000 in construction costs.

CIP 1-11: E Boronda and Williams Corner

City of Salinas Capital Improvement Project Information Sheet

2024 Stormwater Master Plan Update

Project Trigger

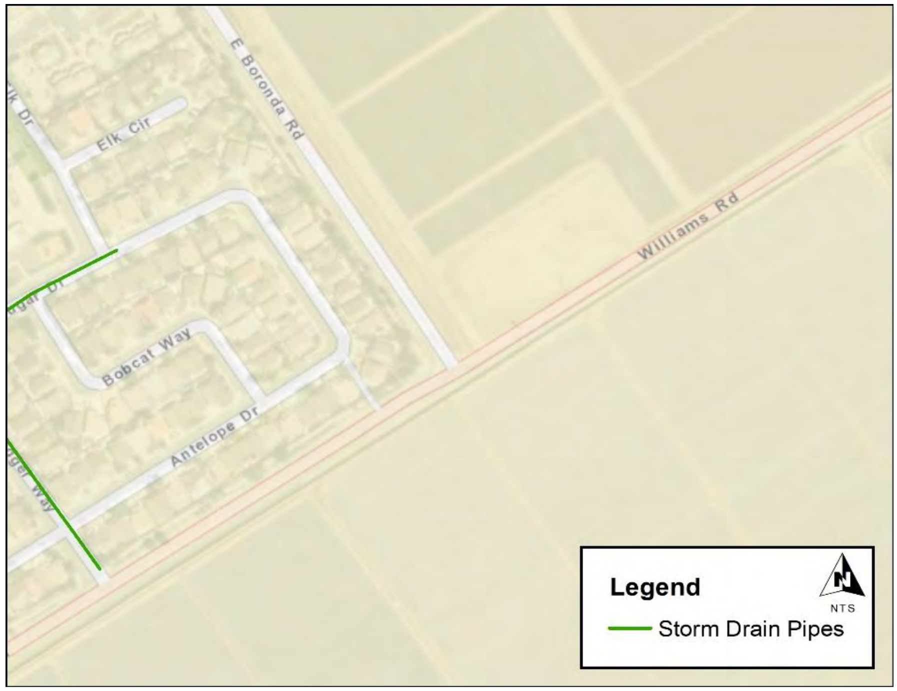
- ☑ Existing Condition
- ☐ Future Condition

Project Components

- ☐ Upgrade Gravity Pipeline
- ☐ New Gravity Pipeline
- ☐ New Curb Inlet(s)
- ☑ Sediment Removal
- ☑ Detention Facility
- ☐ Inspection and/or study
- ☐ New Barrier

Project Need

- ☑ Existing surface flooding
- ☐ Public Safety Concern
- ☐ Sediment and/or debris



DAC Area

- ☐ Yes
- ☑ No

Project Cost Breakdown

Construction Cost[1]	$0
Planning, Engineering, CM, Legal/Admin (40%/80%)[2]	$100,000
Total Project Cost	**$100,000**

Project Description

This project is a focused study. The ditch along Williams Road between East Boronda Road and Freedom Parkway experiences flooding and heavy sediment. This project is to evaluate the potential for a new sediment basin at this intersection and to provide recommendations for basin and ditch configurations. This project will require coordination and discussions on cost sharing between the City and adjacent agricultural operations and is anticipated to provide benefits to stakeholders. Project costs include studies to determine feasibility and costs. This project may result in identification of additional improvement project(s); project description and cost are unknown at this time. Once the study is complete, any identified projects should be added to the Capital Improvement Program.

1. Construction costs are expressed in Year 2024 dollars, using an ENR construction Cost Index of 13632, and will need to be escalated to the year or years scheduled for the work.
2. Soft costs include a 40% escalation of the construction costs for planning, engineering, CM, legal/admin for project with more than $400,000 in construction costs and a 80% escalation factor for projects with less than $400,000 in construction costs.

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CIP 1-12: Natividad Rd from E Alvin to E Laurel

City of Salinas Capital Improvement Project Information Sheet

2024 Stormwater Master Plan Update

Project Trigger

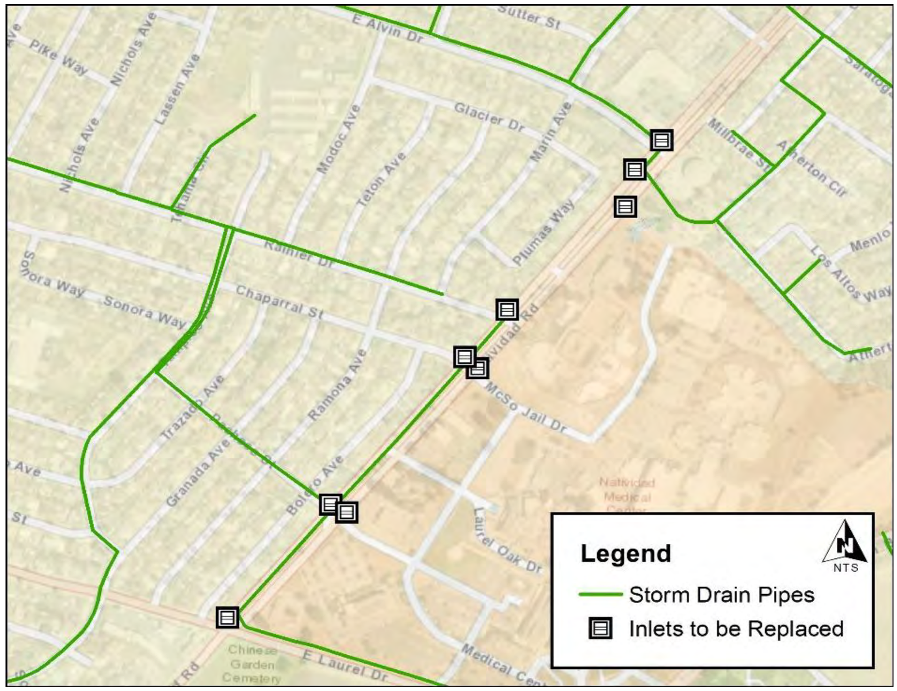
- [x] Existing Condition
- [ ] Future Condition

Project Components

- [ ] Upgrade Gravity Pipeline
- [ ] New Gravity Pipeline
- [x] New Curb Inlet(s)
- [ ] Sediment Removal
- [ ] Detention Facility
- [ ] Inspection and/or study
- [ ] New Barrier

Project Need

- [x] Existing surface flooding
- [ ] Public Safety Concern
- [ ] Sediment and/or debris



DAC Area

- [ ] Yes
- [x] No

Project Cost Breakdown

Construction Cost[1]	$900,000
Planning, Engineering, CM, Legal/Admin (40%/80%)[2]	$360,000
Total Project Cost	**$1,260,000**

Project Description

Various inlets throughout the City are undersized and contribute to flooding. Replace nine undersized inlets at the following locations:

- Natividad Road and East Alvin Drive: 3 inlets
- Natividad Road and Rainier Drive/Chaparral Street: 3 inlets
- Natividad Road and Pacheco St: 2 inlets
- Natividad Road and East Laurel Drive: 1 inlet

Additionally, there is debris in the street from runoff from the City right-of-way. The City right-of-way along Natividad Road needs to be stabilized with vegetation.

1. Construction costs are expressed in Year 2024 dollars, using an ENR construction Cost Index of 13632, and will need to be escalated to the year or years scheduled for the work.
2. Soft costs include a 40% escalation of the construction costs for planning, engineering, CM, legal/admin for project with more than $400,000 in construction costs and a 80% escalation factor for projects with less than $400,000 in construction costs.

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CIP 1-13: Blanco Basin

City of Salinas Capital Improvement Project Information Sheet

2024 Stormwater Master Plan Update

Project Trigger

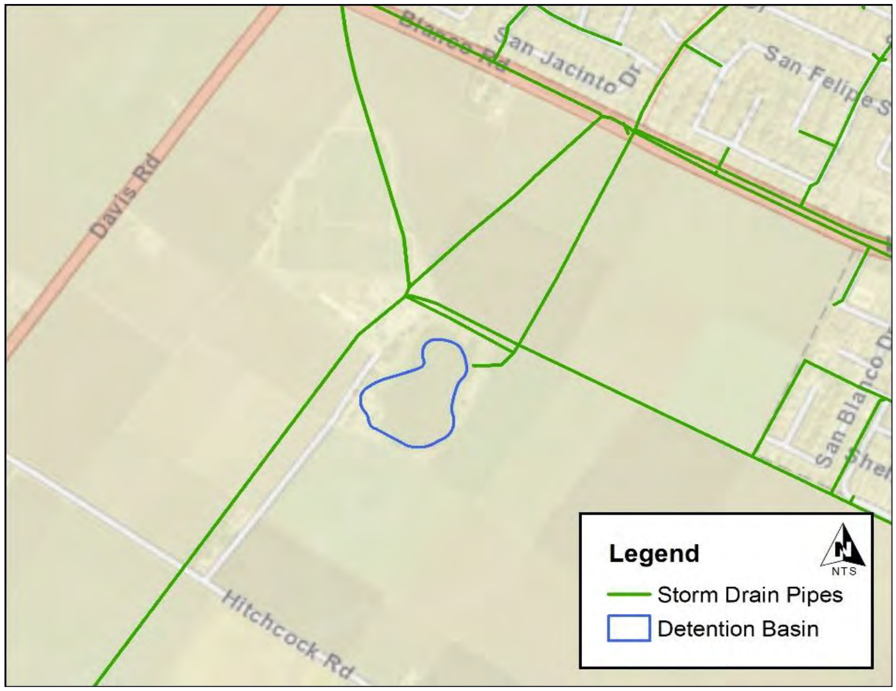
- ☑ Existing Condition
- ☐ Future Condition

Project Components

- ☐ Upgrade Gravity Pipeline
- ☐ New Gravity Pipeline
- ☐ New Curb Inlet(s)
- ☐ Sediment Removal
- ☑ Detention Facility
- ☑ Inspection and/or study
- ☐ New Barrier

Project Need

- ☑ Existing surface flooding
- ☐ Public Safety Concern
- ☑ Sediment and/or debris



DAC Area

- ☑ Yes
- ☐ No

Project Cost Breakdown

Construction Cost[1]	$0
Planning, Engineering, CM, Legal/Admin (40%/80%)[2]	$100,000
Total Project Cost	**$100,000**

Project Description

This project is a focused study. Blanco basin has debris clogging inlets into and out of the basin and requires repair. This project is to perform a study to understand what is required for inlet repair as well as other general maintenance for the basin. This project may result in identification of additional improvement project(s); project description and cost are unknown at this time. Once the study is complete, any identified projects should be added to the Capital Improvement Program.

1. Construction costs are expressed in Year 2024 dollars, using an ENR construction Cost Index of 13632, and will need to be escalated to the year or years scheduled for the work.
2. Soft costs include a 40% escalation of the construction costs for planning, engineering, CM, legal/admin for project with more than $400,000 in construction costs and a 80% escalation factor for projects with less than $400,000 in construction costs.

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CIP 1-14: Cesar Chavez Basin

City of Salinas Capital Improvement Project Information Sheet

2024 Stormwater Master Plan Update

Project Trigger

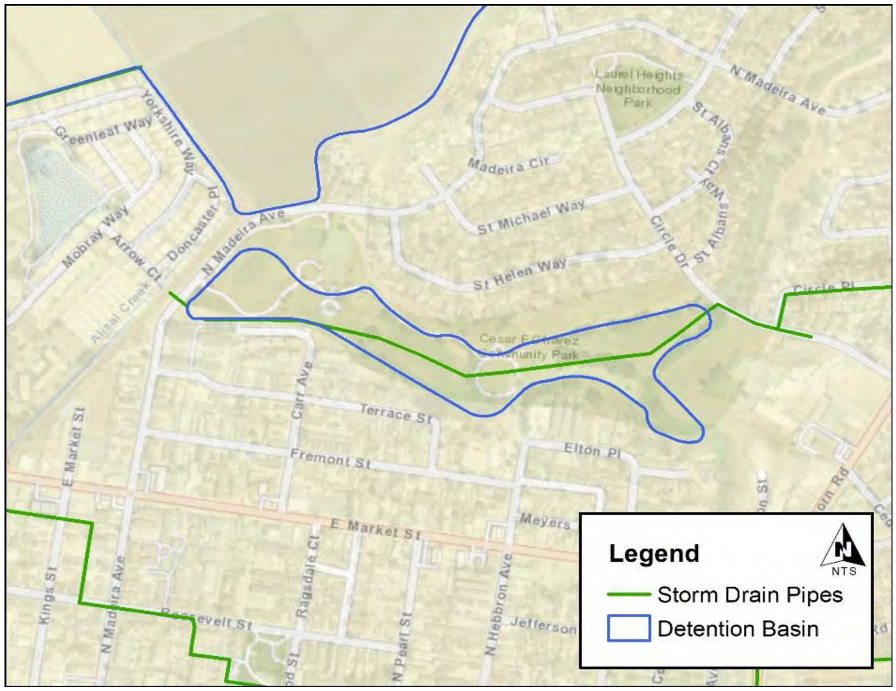
- ☑ Existing Condition
- ☐ Future Condition

Project Components

- ☐ Upgrade Gravity Pipeline
- ☑ New Gravity Pipeline
- ☐ New Curb Inlet(s)
- ☑ Sediment Removal
- ☑ Detention Facility
- ☐ Inspection and/or study
- ☐ New Barrier

Project Need

- ☑ Existing surface flooding
- ☐ Public Safety Concern
- ☑ Sediment and/or debris



DAC Area

- ☑ Yes
- ☐ No

Project Cost Breakdown

Construction Cost[1]	$1,430,000
Planning, Engineering, CM, Legal/Admin (40%/80%)[2]	$580,000
Total Project Cost	**$2,010,000**

Project Description

Perform the improvements to Cesar Chavez Basin recommended in the Preliminary Design Report prepared by Wallace Group. Recommendations include new storm drain piping and inlets, dry wells, outflow structures, and sediment removal/basin grading.

1. Construction costs are expressed in Year 2024 dollars, using an ENR construction Cost Index of 13632, and will need to be escalated to the year or years scheduled for the work.
2. Soft costs include a 40% escalation of the construction costs for planning, engineering, CM, legal/admin for project with more than $400,000 in construction costs and a 80% escalation factor for projects with less than $400,000 in construction costs.

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CIP 1-15: Salinas River Pump Station

City of Salinas Capital Improvement Project Information Sheet

2024 Stormwater Master Plan Update

Project Trigger

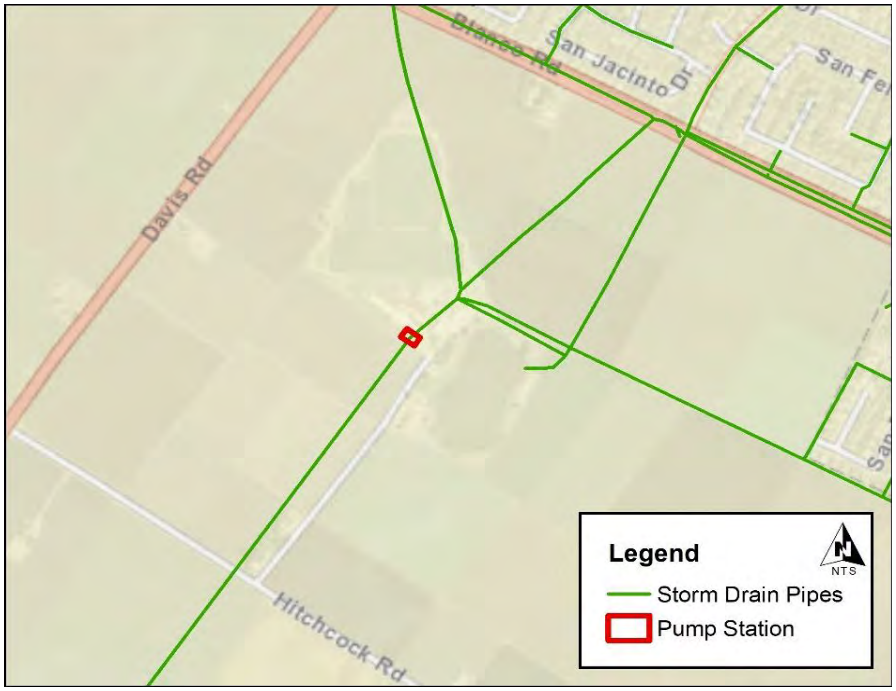
- ☑ Existing Condition
- ☐ Future Condition

Project Components

- ☐ Upgrade Gravity Pipeline
- ☐ New Gravity Pipeline
- ☐ New Curb Inlet(s)
- ☐ Sediment Removal
- ☐ Detention Facility
- ☑ Inspection and/or study
- ☐ New Barrier

Project Need

- ☑ Existing surface flooding
- ☐ Public Safety Concern
- ☐ Sediment and/or debris



DAC Area

- ☑ Yes
- ☐ No

Project Cost Breakdown

Construction Cost[1]	$0
Planning, Engineering, CM, Legal/Admin (40%/80%)[2]	$200,000
Total Project Cost	**$200,000**

Project Description

The Salinas River Pump Station is a critical stormwater facility, and if it fails, a large portion of the City will flood. This project is to perform a condition assessment for the Salinas River Pump Station and 7,500 foot long 66 inch outfall pipe to determine if and what rehabilitation or maintenance is required for the facility. This project may result in identification of additional improvement project(s); project description and cost are unknown at this time. Once the study is complete, any identified projects should be added to the Capital Improvement Program.

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2. Soft costs include a 40% escalation of the construction costs for planning, engineering, CM, legal/admin for project with more than $400,000 in construction costs and a 80% escalation factor for projects with less than $400,000 in construction costs.

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CIP 1-16: E Boronda East of Independence Blvd

City of Salinas Capital Improvement Project Information Sheet

2024 Stormwater Master Plan Update

Project Trigger

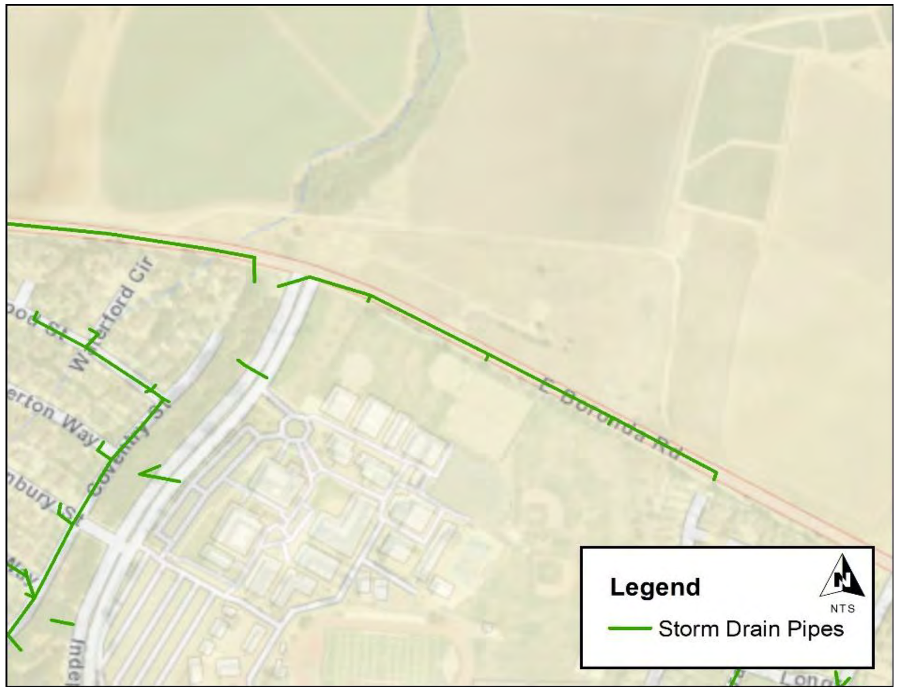
- ☑ Existing Condition
- ☐ Future Condition

Project Components

- ☐ Upgrade Gravity Pipeline
- ☐ New Gravity Pipeline
- ☐ New Curb Inlet(s)
- ☐ Sediment Removal
- ☑ Detention Facility
- ☑ Inspection and/or study
- ☐ New Barrier

Project Need

- ☑ Existing surface flooding
- ☐ Public Safety Concern
- ☐ Sediment and/or debris



DAC Area

- ☐ Yes
- ☑ No

Project Cost Breakdown

Construction Cost[1]	$0
Planning, Engineering, CM, Legal/Admin (40%/80%)[2]	$100,000
Total Project Cost	**$100,000**

Project Description

This project is a focused study. Currently, the storm drain system south of East Boronda Road is overwhelmed in the 20-year storm. This project is to evaluate upstream stormwater runoff storage North of E Boronda Way. This storage would require property acquisition, but would assist in mitigating offsite flows and sediment transport. This project will require coordination between the City and adjacent agricultural operations and is anticipated to provide benefits to stakeholders. This project may result in identification of additional improvement project(s); project description and cost are unknown at this time. Once the study is complete, any identified projects should be added to the Capital Improvement Program.

1. Construction costs are expressed in Year 2024 dollars, using an ENR construction Cost Index of 13632, and will need to be escalated to the year or years scheduled for the work.
2. Soft costs include a 40% escalation of the construction costs for planning, engineering, CM, legal/admin for project with more than $400,000 in construction costs and a 80% escalation factor for projects with less than $400,000 in construction costs.

CIP 1-17: Monte Bella Ditch

City of Salinas Capital Improvement Project Information Sheet

2024 Stormwater Master Plan Update

Project Trigger

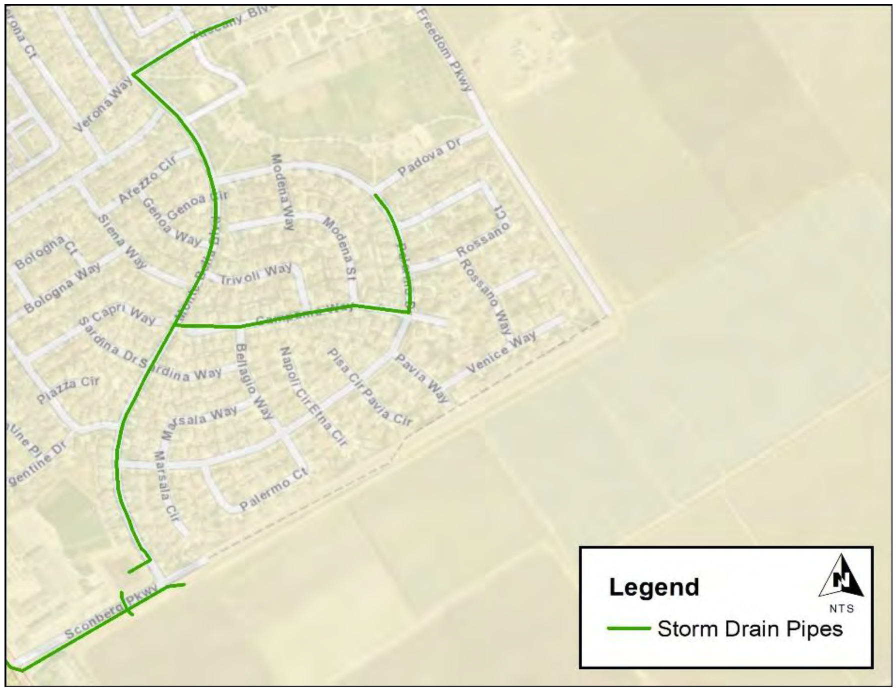
- ☑ Existing Condition
- ☐ Future Condition

Project Components

- ☐ Upgrade Gravity Pipeline
- ☐ New Gravity Pipeline
- ☐ New Curb Inlet(s)
- ☑ Sediment Removal
- ☐ Detention Facility
- ☐ Inspection and/or study
- ☐ New Barrier

Project Need

- ☑ Existing surface flooding
- ☐ Public Safety Concern
- ☑ Sediment and/or debris



DAC Area

- ☑ Yes
- ☐ No

Project Cost Breakdown

Construction Cost[1]	$500,000
Planning, Engineering, CM, Legal/Admin (40%/80%)[2]	$200,000
Total Project Cost	**$700,000**

Project Description

Monte Bella Ditch experiences excessive sediment build-up contributing to flooding in Sconberg Parkway. This project would establish a sediment removal program, including frequency of maintenance, opportunities for sediment disposal, and anticipated annual cost of maintenance. The cost of this project includes ten sediment removal cycles costed at $50k each.

1. Construction costs are expressed in Year 2024 dollars, using an ENR construction Cost Index of 13632, and will need to be escalated to the year or years scheduled for the work.
2. Soft costs include a 40% escalation of the construction costs for planning, engineering, CM, legal/admin for project with more than $400,000 in construction costs and a 80% escalation factor for projects with less than $400,000 in construction costs.

PREPARED BY: AC/AJM

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CIP 1-18: Santa Rita Creek - San Juan Grade and Russell Rd

City of Salinas Capital Improvement Project Information Sheet

2024 Stormwater Master Plan Update

Project Trigger

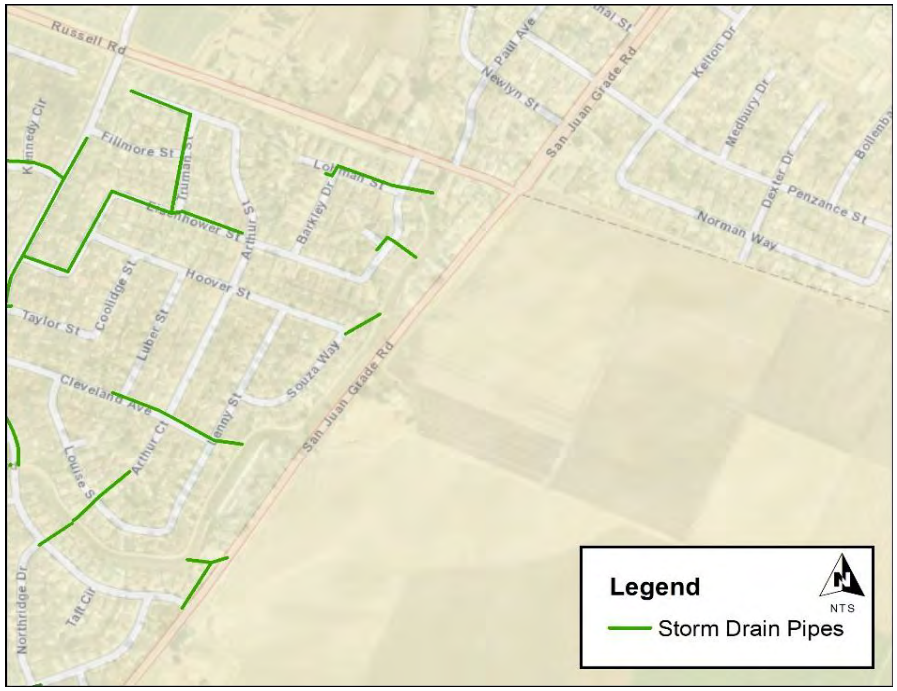
- ☑ Existing Condition
- ☐ Future Condition

Project Components

- ☐ Upgrade Gravity Pipeline
- ☐ New Gravity Pipeline
- ☐ New Curb Inlet(s)
- ☐ Sediment Removal
- ☐ Detention Facility
- ☑ Inspection and/or study
- ☐ New Barrier

Project Need

- ☑ Existing surface flooding
- ☐ Public Safety Concern
- ☐ Sediment and/or debris



DAC Area

- ☑ Yes
- ☐ No

Project Cost Breakdown

Construction Cost[1]	$0
Planning, Engineering, CM, Legal/Admin (40%/80%)[2]	$200,000
Total Project Cost	**$200,000**

Project Description

The purpose of this study is to identify potential locations for floodplain storage to reduce surface flooding in Santa Rita Creek, between Russell Road and North Main Street. Storage options could include new detention basins or increased capacity in the creek achieved by grading the creek channel to create new floodplain benches. Floodplain benches or creek widening could potentially be in the Santa Rita neighborhood park, which would also provide opportunities for public education and outreach. New basins would assist in mitigating offsite flows and sediment transport. The project would require property acquisition as well as coordination between the City and adjacent agricultural operations. This project may result in identification of additional improvement project(s); project description and cost are unknown at this time. Once the study is complete, any identified projects should be added to the Capital Improvement Program.

1. Construction costs are expressed in Year 2024 dollars, using an ENR construction Cost Index of 13632, and will need to be escalated to the year or years scheduled for the work.
2. Soft costs include a 40% escalation of the construction costs for planning, engineering, CM, legal/admin for project with more than $400,000 in construction costs and a 80% escalation factor for projects with less than $400,000 in construction costs.

PREPARED BY: AC/AJM

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San Luis Obispo, CA

APPENDIX B: Areas of Concern Summary Spreadsheet from City of Salinas

CITY OF SALINAS
STORMWATER AREAS OF CONCERN

2022 Storm Drain & Siphons

	North Salinas	Siphon?	Inlet Issue?	Storm Drain Issue?	Sediment in Storm Drain?	Debris Clogs Inlet?	Other/Notes
1	E. Laurel Dr. @ Tyler St.	☑	☐	☐	☐	☐	N/E corner W. Laurel Dr./ Tyler St. (2)
2	E. Laurel Dr. @ Polk St.	☑	☐	☐	☐	☐	
3	E. Laurel Dr. @ Monroe St.	☑	☐	☐	☐	☐	
4	E. Laurel Dr. @ Adams St.	☑	☐	☐	☐	☐	
5	Chaparral St. @ Linwood Dr. (2)	☑	☐	☐	☐	☐	
6	Reata St. @ Linwood Dr.	☑	☐	☐	☐	☐	
7	Elwood Dr.@ Linwood Dr.	☑	☐	☐	☐	☐	
8	Elwood Dr. @ Loma Dr.	☑	☐	☐	☐	☐	N/E & S/E corners Elwood Dr. / Loma Dr. (2)
9	Elwood Dr. @ Angelus Dr.	☑	☐	☐	☐	☐	
10	Cresent Way @ Adams St.	☑	☐	☐	☐	☐	N/E & S/E corners Cresent Way and Adams St. (2)
11	Tapedero Dr. @ Dororo Dr.	☑	☐	☐	☐	☐	
12	Maryal St. @ Reata St.	☑	☐	☐	☐	☐	N/E & N/W corners Maryal Dr./ Reata St.
13	E. Laurel Dr. @ Noice Dr.	☐	☑	☑	☐	☑	Inlets and Pipes need to be bigger
14	Santa Teresa St. @ Rosarita Dr.	☑	☐	☐	☐	☐	
	South/West Salinas	**Siphon?**	**Inlet Issue?**	**Storm Drain Issue?**	**Sediment in Storm Drain?**	**Debris Clogs Inlet?**	**Other/Notes**
15	Soledad St. @ E. San Luis St.	☐	☑	☑	☐	☑	1 Inlet and 3 half pipes on surface (under sidewalk) that carry water from one side of the corner to the other.
16	California St. @ E. San Luis St. (4 drains)	☐	☑	☑	☐	☑	Half pipes that convey water from one side of the street to another (no Inlets)
17	Cherry St. @ Peach St. (2)	☑	☐	☐	☐	☐	
18	Geil St. @ Capital St. (2)	☑	☐	☐	☐	☐	
19	Geil St. @ West St. (2) North and South sides	☑	☐	☐	☐	☐	
20	Lang St. @ Iverson St. (2) North side and Southside across from each other	☑	☐	☐	☐	☐	
21	IversonSt. @ Geil St. (1)	☑	☐	☐	☐	☐	
22	Capital St. @ Clay St. (4 drains)	☑	☐	☐	☐	☐	
23	Clay St. @ Riker St.	☑	☐	☐	☐	☐	
24	Clay St. @ Lincoln St. (2) Next to and across liquor store	☐	☐	☐	☐	☑	Leaves
25	Nacional St. @ Santa Rosa Ave. (2)	☑	☐	☐	☐	☐	
26	Nacional St. @ San Clemente Ave. (2)	☑	☐	☐	☐	☐	
27	Lang St. @ West St. (2)	☑	☐	☐	☐	☐	
28	Maple St. @ California St. (2)	☐	☐	☐	☐	☑	Leaves
29	Maple St. @ Front St. (2)	☑	☐	☐	☐	☐	
30	Clay St. @ Iverson St.	☐	☑	☑	☐	☐	There is no Inlets at this location. This is a area of HIGH concern due to flooding over the sidewalk.
31	Archer St. @ Villa St.	☑	☐	☐	☐	☐	
32	Park St. @ West St. (4 drains)	☑	☐	☐	☐	☐	
33	Gabilan St. @ Monterey St. (1)	☐	☐	☐	☐	☑	Leaves, Undersized Inlets and Pipes
34	Monterey St. @ John St. (2) At gas station driveway and across Tabacchis restaurant	☐	☐	☐	☐	☑	Leaves, Inlets Upgraded by Caltrans
35	Soledad St. @ John St.	☐	☐	☐	☐	☑	Inlets Upgraded by Caltrans
36	Clay St. @ Cayuga St.	☑	☐	☐	☐	☐	
37	Archer St. @ Riker St.	☑	☐	☐	☐	☐	
38	Avelar St. @ Pine St.	☐	☐	☐	☐	☑	Leaves
39	Santa Barbara St. @ Coronado Ave.	☐	☐	☐	☐	☑	Leaves
40	Grove St. @ Santa Ana St.	☐	☐	☐	☐	☑	Leaves
	East Salinas	**Siphon?**	**Inlet Issue?**	**Storm Drain Issue?**	**Sediment in Storm Drain?**	**Debris Clogs Inlet?**	**Other/Notes**
41	Sharon Dr.@ Beverly Dr.	☑	☐	☐	☐	☐	
42	Carriage Dr. @ Carriage Ct.	☑	☐	☐	☐	☐	
43	Sharon Dr. @ Barbara Pl.	☑	☐	☐	☐	☐	
44	Beverly Dr. @ Florence Pl.	☑	☐	☐	☐	☐	

Barricade Locations

	North Salinas	Siphon?	Inlet Issue?	Storm Drain Issue?	Sediment in Storm Drain?	Debris Clogs Inlet?	Other/Notes
45	N/Side W. Laurel Dr. between .Adams/101 on ramp (1)	☑	☐	☐	☐	☐	
46	N & S sides of Chaparral at Noice Ditch (2)	☐	☐	☐	☐	☑	Leaves
47	Madrid entrance to Northridge Mall nearest to Big 5 (2)	☐	☐	☐	☐	☑	Leaves
48	E. Laurel Dr. between Maryal Dr. & N. Main St. (6)	☑	☐	☐	☐	☐	
49	N. Main St. at Harley Shop (2)	☐	☑	☐	☐	☑	2 small inlets should be replaced with 1 large inlet and larger pipe size.
50	Constitution Blvd. at Manchester St .(2)	☐	☐	☐	☐	☑	Leaves
51	2369 N. Main St. at Townhomes (1)	☐	☐	☐	☐	☑	Leaves
52	Linwood Dr. & Sequoia Dr. (2)	☑	☐	☐	☐	☐	
53	Rogge Rd. at Elementry School (1)	☐	☐	☐	☐	☑	Old beehive style inlet that should be upgraded to standard inlet
	South Salinas	**Siphon?**	**Inlet Issue?**	**Storm Drain Issue?**	**Sediment in Storm Drain?**	**Debris Clogs Inlet?**	**Other/Notes**
54	S. Main St. & Romie Ln. (2)	☐	☐	☐	☐	☑	Leaves-Inlets Upgraded by Caltrans
55	S. Main St. & Hawthorne St. (1) Next to Burger King	☐	☐	☐	☐	☑	Leaves-Inlets Upgraded by Caltrans
56	S. Main St. & Katherine St. (1) On Southwest corner (as needed)	☐	☐	☐	☐	☑	Leaves-Inlets Upgraded by Caltrans
57	S. Main St. & Acacia St. (1) (Southeast side)	☐	☐	☐	☐	☑	Leaves-Inlets Upgraded by Caltrans
58	S. Main St. & Winham St. (2)	☐	☐	☐	☐	☑	Leaves-Inlets Upgraded by Caltrans
59	College Dr. & Amherst Dr. (1)	☐	☐	☐	☐	☑	Leaves
60	Alisal St. & Church St. (1)	☐	☑	☐	☐	☐	Leaves

CITY OF SALINAS
STORMWATER AREAS OF CONCERN

	South Salinas	Siphon?	Inlet Issue?	Storm Drain Issue?	Sediment in Storm Drain?	Debris Clogs Inlet?	Other/Notes
61	Pajaro St. & Maple St.(2)	☑	☑	☐	☐	☐	Undersized Inlets and Pipes
62	55 Santa Lucia Dr. (1)	☐	☐	☐	☐	☑	Leaves
63	Front St. & Harvest St. (2)	☑	☐	☐	☐	☐	
64	North Bound Off-Ramp to West Market St. from Davis Rd. (1)	☐	☐	☐	☐	☑	Undersized Inlet and Pipe
	Ditch Locations to check	**Siphon?**	**Inlet Issue?**	**Storm Drain Issue?**	**Sediment in Storm Drain?**	**Debris Clogs Inlet?**	**Other/Notes**
65	Santa Rita Ditch	☐	☐	☐	☐	☑	
66	Airport Ditch	☐	☐	☐	☐	☑	
67	Ditch at Boronda and McKinnon	☐	☐	☐	☐	☑	Farming activities causing flooding (currently undercontrol)
68	Holding basins in Park at end of Maderia St.	☐	☐	☐	☐	☑	
69	Laurel Detention Basins	☐	☐	☐	☐	☑	Check Flood Gates for Debris
70	Monte bello and Williams Road Silt Basin on corner	☐	☐	☐	☐	☑	Debris on Behive Inlet and Sediment
71	Monte Bello Ditch	☐	☐	☐	☐	☑	
72	Sconberg Basin Beehives	☐	☐	☐	☐	☑	Debris on Behive Inlet and Sediment

	Flooding Area of Concern (shapefile received from 2N)	Notes
73	Santa Rita Creek at Russel Rd and San Juan Grade Rd intersection	Flooding
74	Santa Rita Creek at N Main St and Bolivar St	Concrete channel if not cleaned can flood lower concrete channel area
75	Santa Rita Creek at N Main St and Bolivar St	Flooding Area
76	Santa Rita Creek at N Main St and Bolivar St	Concrete channel if not cleaned can flood lower concrete channel area
77	E Boronda near San Juan Grade Rd	Flooding when sediment from ag field blocks system
78	E Boronda Rd and Mckinnon St	Flooding from channel overflow
79	Along Natividad Rd between E Laurel and Milbrae St	Flooding due to lack of CBs
80	W Laurel Dr bewtween the 101 and Linwood Dr	High traffic area, flooding as a safety concern
81	Williams Rd and E Boronda	Flooding
82	Carr Lake	Seasonal Flooding
83	Natividad Creek crossing E Laurel Dr	High priority structure and road undercrossing
84	Near/associated with 83	Flooding
85	Williams Rd and Freedom Pkwy	Flooding from basin overflow
86	On 101 below Carr Lake	Seasonal Flooding
87	Around Monte Bella Detention Basin	Flooding
88	Alisal Creek south of E Alisal St	Rec Ditch will overflow onto streets if constricted under Alisal
89	Along Clay St from Lincoln Ave to Homestead Ave	Flooding due to siphons
90	Around Blanco Detention Basin	Pump station, if failed would impact a huge area of the city
91	Long section S Main St from City boundary to Harvest St	Flooding
92	At Salinas River	Outfall has a flapgate. If it gets blocked, it will block upstream

APPENDIX C: Model Reference Data

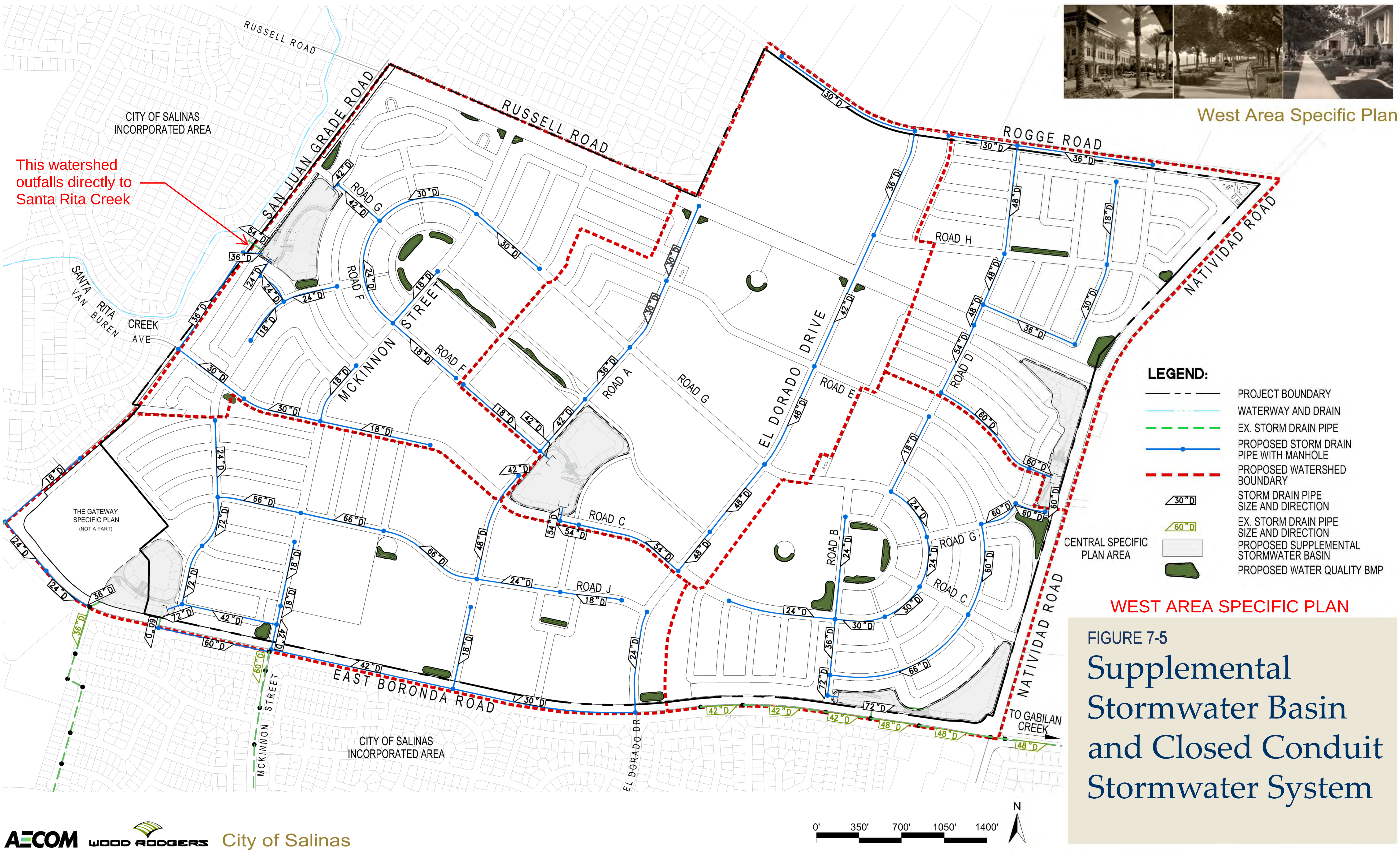

FIGURE 7-5
Supplemental Stormwater Basin and Closed Conduit Stormwater System

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SURVEYING / GIS SOLUTIONS

WATER RESOURCES

SURVEY CONTROL REPORT

FOR: CITY OF SALINAS

PREPARED AT THE DIRECTION OF:

LICENSED LAND SURVEYOR
Clayton L. Bradshaw
No. 8298
STATE OF CALIFORNIA

CLAYTON BRADSHAW, PLS 8298

DATE SIGNED: 6/17/2024

WALLACE GROUP
A California Corporation

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CALIFORNIA 93401

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1. THIS SURVEY IS CONSTRAINED TO THE CITY OF SALINAS G.P.S. CONTROL NETWORK ACCORDING TO THE RECORD OF SURVEY FILED IN VOLUME 24 OF SURVEYS AT PAGE 94 IN THE COUNTY OF MONTEREY'S RECORDER'S OFFICE. ACCORDING TO SAID RECORD OF SURVEY THE HORIZONTAL DATUM IS THE NORTH AMERICAN DATUM OF 1983, (1992 HPGN EPOCH 1991.35) AND THE PROJECTION USED IS THE CALIFORNIA COORDINATE SYSTEM OF 1983 (CCS83), ZONE 4 PROJECTION.

2. THIS SURVEY TIED TO FOUR (4) CONTROL STATIONS AS SHOWN ON SAID RECORD OF SURVEY AND TABULATED BELOW SHOWING THE PUBLISHED RECORD (R) COORDINATES AND THE FIELD MEASURED (M) COORDINATES:

RECORD STATION NAME	NORTHING	EASTING	OVERALL Δ	OVERALL Δ BEARING
5050 (M)	2,153,791.49’	5,794,845.83’		
5050 (R)	2,153,791.49'	5,794,845.83’		
Δ (M TO R)	0.00’	0.00’	0.00’	N 0°00’00” W
5024 (M)	2,156,775.98’	5,782,440.91’		
5024 (R)	2,156,776.17’	5,782,440.97’		
Δ (M TO R)	-0.19’	-0.06’	0.20’	N 18° 15’ 07” E
5010 (M)	2,132,244.23’	5,774,768.63’		
5010 (R)	2,132,244.33’	5,774,768.18’		
Δ (M TO R)	-0.10’	+0.45’	0.46’	N 77° 02’ 33” W
5 (M)	2,134,732.87’	5,801,377.53’		
5 (R)	2,134,732.71’	5,801,377.21’		
Δ (M TO R)	+0.16’	+0.35’	0.38’	S 65° 23’ 37” W

3. ALL MEASUREMENTS LISTED, SHOWN AND REPRESENTED HEREON ARE BASED ON GRID DISTANCES OF THE CALIFORNIA COORDINATE SYSTEM OF 1983 ZONE 4 PROJECTION. THE COMBINED SCALE FACTOR FOR THE PROJECT IS 0.9999423 THIS SCALE FACTOR WAS CALCULATED USING AN ELEVATION OF 102.73 FEET FOR PT. NO. 5050. DIVIDE THE DISTANCES HEREON BY THE COMBINED SCALE FACTOR TO OBTAIN GROUND DISTANCES. ALL DISTANCES SHOWN ARE U.S. SURVEY FEET.

4. THE CONVERGENCE ANGLE IS: - 1° 33' 39.5899" AT PT. NO. 5050.

5. THE ORTHOMETRIC HEIGHTS (ELEVATIONS) OF THIS SURVEY ARE CONSTRAINED TO THE CITY OF SALINAS G.P.S. CONTROL NETWORK ACCORDING TO THE RECORD OF SURVEY FILED IN VOLUME 24 OF SURVEYS AT PAGE 94 IN THE COUNTY OF MONTEREY'S RECORDER'S OFFICE AND ACCORDING TO SAID RECORD OF SURVEY ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88). THIS SURVEY TIED TO THE POINT DESIGNATED AS PT. NO 5050 AS SHOWN ON SAID RECORD OF SURVEY, HAVING A PUBLISHED ELEVATION OF 102.73 FEET.

NORTH

NOAA Atlas 14, Volume 6, Version 2
Location name: Salinas, California, USA*
Latitude: 36.7193°, Longitude: -121.6474°
Elevation: 102.58 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.105 (0.090-0.123)	0.125 (0.108-0.147)	0.155 (0.133-0.182)	0.182 (0.154-0.216)	0.223 (0.182-0.276)	0.259 (0.206-0.329)	0.300 (0.232-0.393)	0.348 (0.260-0.471)	0.422 (0.300-0.599)	0.488 (0.333-0.722)
10-min	0.150 (0.130-0.176)	0.179 (0.154-0.210)	0.222 (0.190-0.261)	0.260 (0.221-0.309)	0.320 (0.261-0.396)	0.372 (0.296-0.472)	0.431 (0.333-0.563)	0.499 (0.373-0.675)	0.605 (0.430-0.859)	0.699 (0.477-1.03)
15-min	0.182 (0.157-0.213)	0.217 (0.186-0.254)	0.268 (0.230-0.315)	0.315 (0.267-0.374)	0.387 (0.315-0.479)	0.450 (0.358-0.571)	0.521 (0.402-0.681)	0.603 (0.451-0.816)	0.731 (0.520-1.04)	0.845 (0.577-1.25)
30-min	0.252 (0.218-0.296)	0.301 (0.259-0.353)	0.372 (0.319-0.438)	0.437 (0.371-0.520)	0.537 (0.438-0.665)	0.624 (0.497-0.793)	0.723 (0.559-0.946)	0.838 (0.626-1.13)	1.01 (0.722-1.44)	1.17 (0.801-1.74)
60-min	0.343 (0.296-0.402)	0.409 (0.352-0.480)	0.506 (0.434-0.596)	0.594 (0.505-0.707)	0.730 (0.596-0.904)	0.849 (0.675-1.08)	0.984 (0.760-1.29)	1.14 (0.851-1.54)	1.38 (0.982-1.96)	1.60 (1.09-2.36)
2-hr	0.508 (0.438-0.596)	0.607 (0.522-0.712)	0.749 (0.643-0.882)	0.876 (0.744-1.04)	1.07 (0.871-1.32)	1.23 (0.979-1.56)	1.41 (1.09-1.85)	1.62 (1.21-2.19)	1.93 (1.37-2.75)	2.20 (1.51-3.26)
3-hr	0.636 (0.548-0.745)	0.760 (0.654-0.892)	0.938 (0.805-1.11)	1.10 (0.932-1.30)	1.33 (1.09-1.65)	1.53 (1.22-1.95)	1.76 (1.36-2.30)	2.00 (1.50-2.71)	2.38 (1.69-3.38)	2.70 (1.84-3.99)
6-hr	0.869 (0.749-1.02)	1.04 (0.898-1.22)	1.29 (1.11-1.52)	1.51 (1.28-1.80)	1.83 (1.50-2.27)	2.11 (1.68-2.67)	2.40 (1.86-3.14)	2.74 (2.04-3.70)	3.23 (2.29-4.58)	3.65 (2.49-5.40)
12-hr	1.14 (0.978-1.33)	1.37 (1.18-1.61)	1.70 (1.46-2.00)	2.00 (1.70-2.37)	2.43 (1.98-3.01)	2.79 (2.22-3.54)	3.19 (2.46-4.17)	3.63 (2.71-4.90)	4.28 (3.04-6.08)	4.84 (3.30-7.16)
24-hr	1.49 (1.37-1.67)	1.81 (1.66-2.03)	2.27 (2.07-2.54)	2.67 (2.41-3.01)	3.25 (2.86-3.77)	3.74 (3.24-4.41)	4.27 (3.62-5.15)	4.87 (4.03-6.00)	5.74 (4.59-7.33)	6.48 (5.03-8.52)
2-day	1.87 (1.71-2.09)	2.30 (2.10-2.56)	2.89 (2.63-3.23)	3.40 (3.08-3.83)	4.14 (3.65-4.80)	4.76 (4.11-5.61)	5.42 (4.59-6.52)	6.14 (5.08-7.57)	7.19 (5.75-9.19)	8.07 (6.27-10.6)
3-day	2.12 (1.94-2.37)	2.63 (2.40-2.94)	3.32 (3.03-3.72)	3.92 (3.54-4.41)	4.77 (4.20-5.53)	5.46 (4.73-6.45)	6.21 (5.26-7.47)	7.01 (5.80-8.64)	8.16 (6.52-10.4)	9.11 (7.07-12.0)
4-day	2.33 (2.13-2.60)	2.90 (2.65-3.24)	3.67 (3.35-4.11)	4.33 (3.92-4.88)	5.27 (4.64-6.11)	6.03 (5.21-7.11)	6.83 (5.79-8.22)	7.69 (6.37-9.48)	8.92 (7.13-11.4)	9.93 (7.71-13.1)
7-day	2.85 (2.60-3.18)	3.55 (3.24-3.96)	4.49 (4.09-5.02)	5.28 (4.78-5.95)	6.39 (5.63-7.41)	7.29 (6.31-8.60)	8.23 (6.98-9.91)	9.24 (7.65-11.4)	10.7 (8.53-13.6)	11.8 (9.19-15.6)
10-day	3.22 (2.95-3.60)	4.02 (3.67-4.49)	5.08 (4.63-5.69)	5.97 (5.40-6.73)	7.21 (6.35-8.36)	8.19 (7.09-9.66)	9.22 (7.82-11.1)	10.3 (8.54-12.7)	11.9 (9.47-15.1)	13.1 (10.2-17.2)
20-day	4.16 (3.80-4.64)	5.23 (4.77-5.84)	6.61 (6.03-7.41)	7.74 (7.01-8.73)	9.27 (8.16-10.7)	10.4 (9.04-12.3)	11.7 (9.88-14.0)	12.9 (10.7-15.9)	14.6 (11.7-18.7)	16.0 (12.4-21.0)
30-day	5.07 (4.64-5.66)	6.41 (5.85-7.16)	8.11 (7.39-9.08)	9.46 (8.56-10.7)	11.3 (9.91-13.0)	12.6 (10.9-14.9)	14.0 (11.8-16.8)	15.4 (12.7-18.9)	17.2 (13.8-22.0)	18.7 (14.5-24.6)
45-day	6.27 (5.73-7.00)	7.95 (7.26-8.88)	10.0 (9.15-11.2)	11.7 (10.6-13.2)	13.8 (12.1-16.0)	15.3 (13.3-18.1)	16.9 (14.3-20.3)	18.4 (15.2-22.7)	20.4 (16.3-26.0)	21.9 (17.0-28.8)
60-day	7.41 (6.77-8.27)	9.40 (8.59-10.5)	11.8 (10.8-13.3)	13.7 (12.4-15.5)	16.1 (14.2-18.7)	17.8 (15.4-21.0)	19.5 (16.5-23.5)	21.1 (17.5-26.1)	23.3 (18.6-29.7)	24.9 (19.3-32.7)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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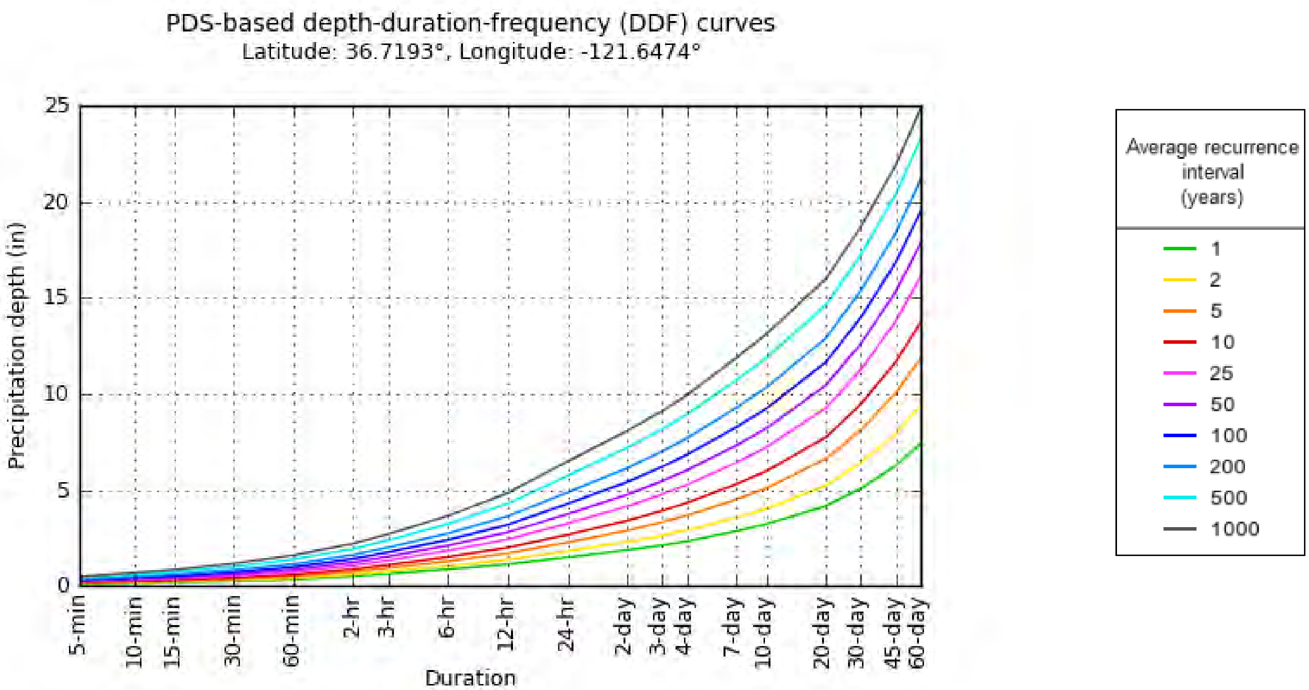
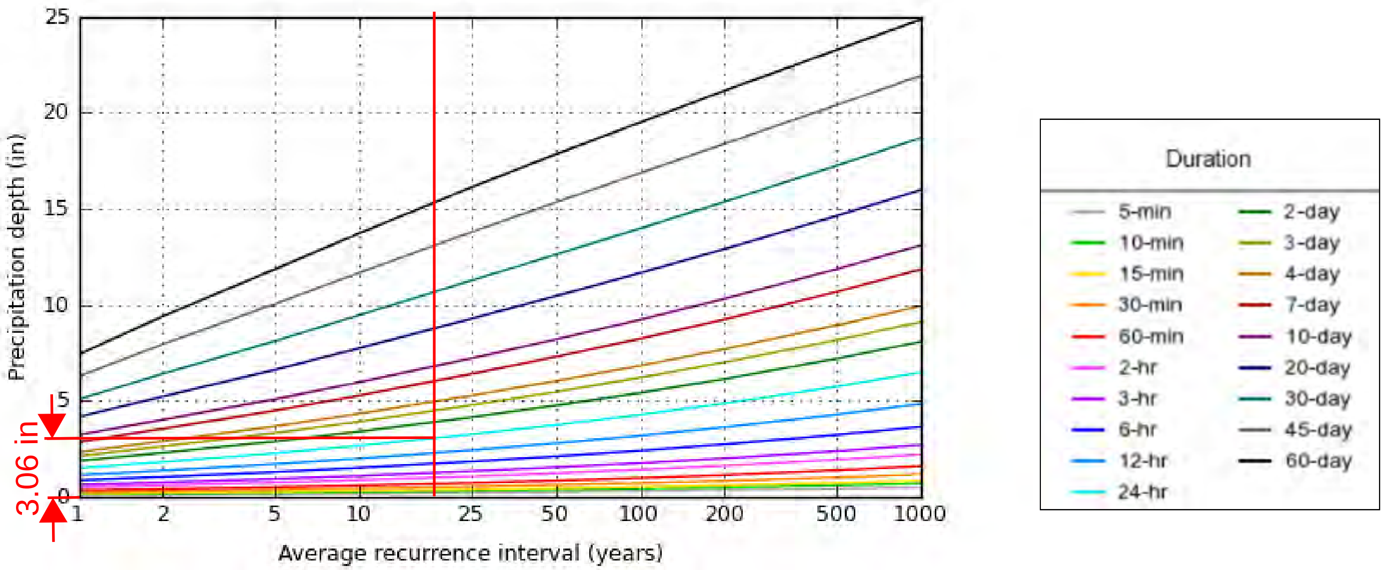
PF graphical

NORTH





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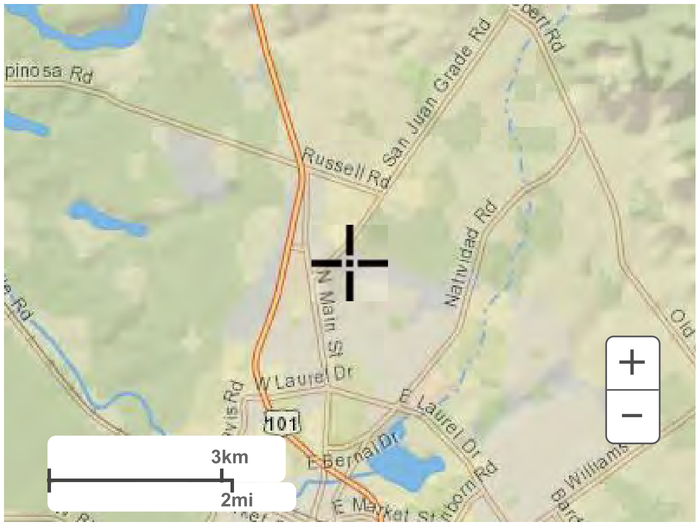
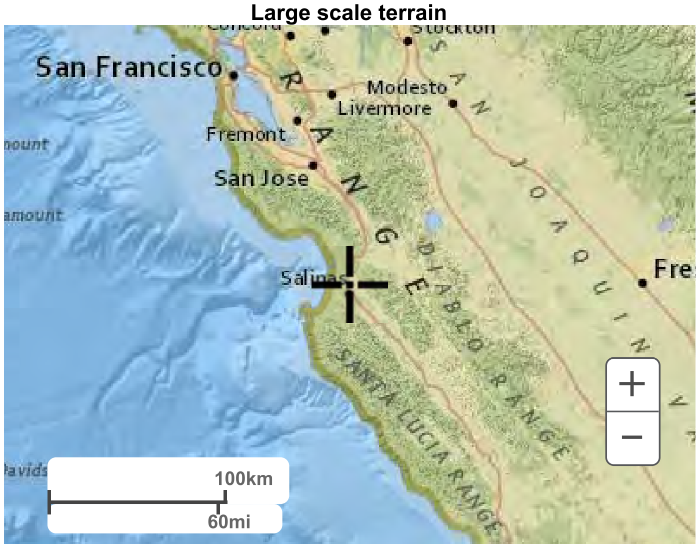
Maps & aerials

Small scale terrain

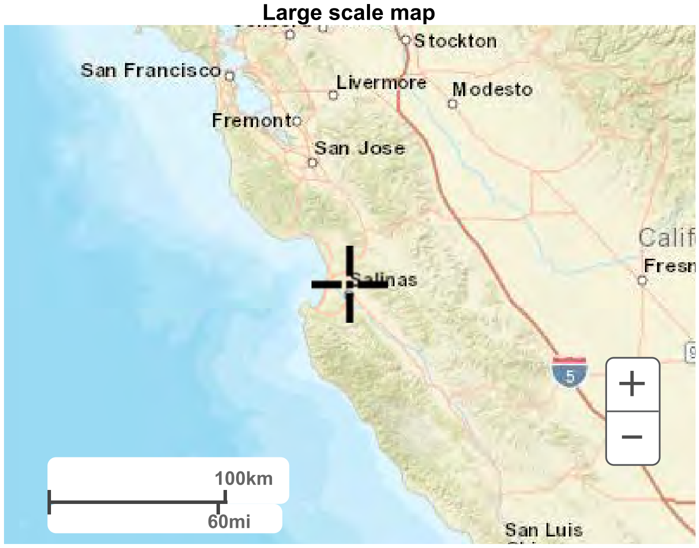
NORTH



Large scale terrain



Large scale map



Large scale aerial

NORTH

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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

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NOAA Atlas 14, Volume 6, Version 2
Location name: Salinas, California, USA*
Latitude: 36.6886°, Longitude: -121.6378°
Elevation: 33.12 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.097** (0.084-0.113)	**0.115** (0.100-0.134)	**0.142** (0.123-0.166)	**0.167** (0.143-0.198)	**0.206** (0.169-0.253)	**0.239** (0.191-0.302)	**0.278** (0.216-0.361)	**0.322** (0.242-0.433)	**0.391** (0.279-0.553)	**0.453** (0.310-0.667)
10-min	**0.139** (0.121-0.162)	**0.165** (0.143-0.193)	**0.204** (0.176-0.239)	**0.240** (0.205-0.283)	**0.295** (0.242-0.363)	**0.343** (0.274-0.433)	**0.398** (0.309-0.518)	**0.462** (0.346-0.621)	**0.560** (0.400-0.793)	**0.649** (0.445-0.956)
15-min	**0.168** (0.146-0.196)	**0.200** (0.173-0.233)	**0.247** (0.213-0.289)	**0.290** (0.248-0.342)	**0.356** (0.292-0.439)	**0.415** (0.332-0.524)	**0.481** (0.374-0.626)	**0.558** (0.419-0.751)	**0.678** (0.484-0.958)	**0.784** (0.538-1.16)
30-min	**0.234** (0.203-0.272)	**0.277** (0.240-0.324)	**0.343** (0.296-0.401)	**0.402** (0.344-0.476)	**0.495** (0.406-0.609)	**0.576** (0.461-0.728)	**0.668** (0.519-0.869)	**0.775** (0.582-1.04)	**0.941** (0.672-1.33)	**1.09** (0.747-1.61)
60-min	**0.317** (0.275-0.369)	**0.376** (0.326-0.439)	**0.465** (0.401-0.543)	**0.546** (0.466-0.645)	**0.671** (0.550-0.826)	**0.781** (0.625-0.986)	**0.906** (0.704-1.18)	**1.05** (0.789-1.41)	**1.28** (0.912-1.81)	**1.48** (1.01-2.18)
2-hr	**0.468** (0.406-0.545)	**0.557** (0.482-0.649)	**0.686** (0.593-0.803)	**0.803** (0.686-0.949)	**0.980** (0.804-1.21)	**1.13** (0.905-1.43)	**1.30** (1.01-1.69)	**1.49** (1.12-2.01)	**1.78** (1.27-2.52)	**2.03** (1.39-3.00)
3-hr	**0.584** (0.507-0.680)	**0.697** (0.603-0.812)	**0.859** (0.742-1.00)	**1.00** (0.858-1.19)	**1.22** (1.00-1.50)	**1.41** (1.13-1.78)	**1.61** (1.25-2.10)	**1.84** (1.38-2.48)	**2.19** (1.56-3.10)	**2.49** (1.71-3.66)
6-hr	**0.798** (0.693-0.930)	**0.955** (0.827-1.11)	**1.18** (1.02-1.38)	**1.38** (1.18-1.63)	**1.68** (1.38-2.06)	**1.93** (1.54-2.43)	**2.20** (1.71-2.86)	**2.51** (1.88-3.37)	**2.96** (2.12-4.19)	**3.35** (2.30-4.94)
12-hr	**1.04** (0.903-1.21)	**1.25** (1.08-1.46)	**1.55** (1.34-1.81)	**1.81** (1.55-2.14)	**2.20** (1.81-2.71)	**2.53** (2.03-3.20)	**2.90** (2.25-3.77)	**3.30** (2.48-4.45)	**3.91** (2.79-5.53)	**4.43** (3.03-6.52)
24-hr	**1.37** (1.25-1.53)	**1.65** (1.51-1.84)	**2.06** (1.88-2.30)	**2.41** (2.19-2.71)	**2.94** (2.59-3.40)	**3.39** (2.93-3.99)	**3.88** (3.29-4.66)	**4.42** (3.66-5.44)	**5.23** (4.18-6.67)	**5.92** (4.60-7.78)
2-day	**1.71** (1.56-1.90)	**2.08** (1.90-2.32)	**2.61** (2.38-2.92)	**3.07** (2.78-3.45)	**3.74** (3.30-4.33)	**4.30** (3.73-5.07)	**4.91** (4.17-5.90)	**5.58** (4.62-6.87)	**6.56** (5.25-8.36)	**7.38** (5.73-9.69)
3-day	**1.94** (1.78-2.16)	**2.40** (2.19-2.67)	**3.02** (2.76-3.38)	**3.57** (3.23-4.01)	**4.35** (3.83-5.03)	**4.99** (4.32-5.88)	**5.68** (4.82-6.82)	**6.42** (5.32-7.91)	**7.50** (6.00-9.57)	**8.39** (6.52-11.0)
4-day	**2.14** (1.96-2.38)	**2.65** (2.43-2.96)	**3.36** (3.07-3.76)	**3.97** (3.59-4.46)	**4.83** (4.26-5.59)	**5.54** (4.80-6.52)	**6.29** (5.34-7.56)	**7.10** (5.88-8.74)	**8.26** (6.61-10.5)	**9.21** (7.16-12.1)
7-day	**2.62** (2.40-2.92)	**3.26** (2.98-3.63)	**4.12** (3.76-4.61)	**4.86** (4.41-5.47)	**5.91** (5.21-6.84)	**6.75** (5.85-7.95)	**7.64** (6.48-9.19)	**8.60** (7.13-10.6)	**9.96** (7.97-12.7)	**11.1** (8.60-14.5)
10-day	**2.97** (2.72-3.31)	**3.71** (3.39-4.14)	**4.70** (4.29-5.25)	**5.53** (5.01-6.23)	**6.71** (5.91-7.76)	**7.64** (6.62-9.00)	**8.63** (7.32-10.4)	**9.68** (8.02-11.9)	**11.2** (8.92-14.2)	**12.4** (9.60-16.2)
20-day	**3.86** (3.54-4.30)	**4.86** (4.44-5.42)	**6.17** (5.63-6.89)	**7.24** (6.56-8.15)	**8.71** (7.68-10.1)	**9.85** (8.53-11.6)	**11.0** (9.35-13.2)	**12.2** (10.1-15.1)	**13.9** (11.1-17.7)	**15.2** (11.8-20.0)
30-day	**4.72** (4.32-5.26)	**5.97** (5.46-6.66)	**7.58** (6.91-8.47)	**8.87** (8.04-9.98)	**10.6** (9.34-12.3)	**11.9** (10.3-14.0)	**13.2** (11.2-15.9)	**14.6** (12.1-18.0)	**16.4** (13.2-21.0)	**17.9** (13.9-23.5)
45-day	**5.84** (5.35-6.51)	**7.41** (6.78-8.27)	**9.39** (8.57-10.5)	**11.0** (9.93-12.3)	**13.0** (11.5-15.0)	**14.5** (12.6-17.1)	**16.0** (13.6-19.2)	**17.5** (14.5-21.5)	**19.5** (15.6-24.8)	**21.0** (16.3-27.5)
60-day	**6.92** (6.34-7.71)	**8.80** (8.05-9.81)	**11.1** (10.1-12.4)	**12.9** (11.7-14.5)	**15.2** (13.4-17.6)	**16.9** (14.6-19.9)	**18.5** (15.7-22.3)	**20.1** (16.7-24.8)	**22.2** (17.8-28.4)	**23.8** (18.5-31.2)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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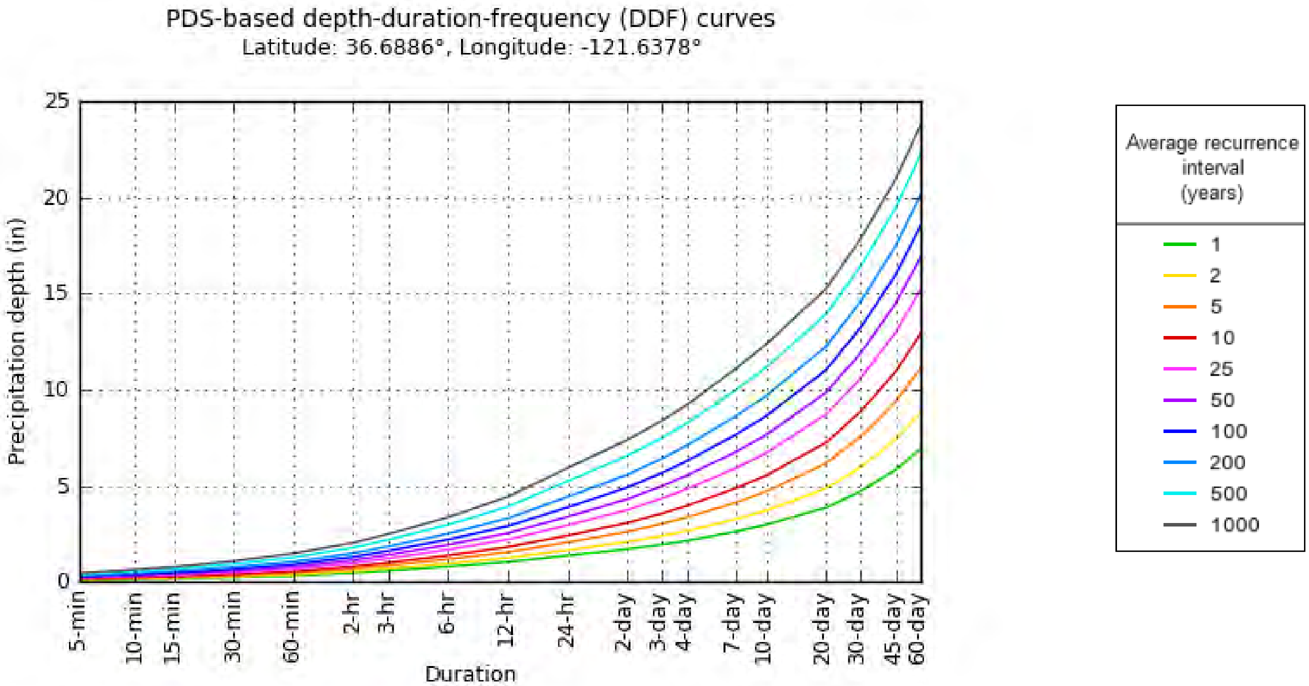
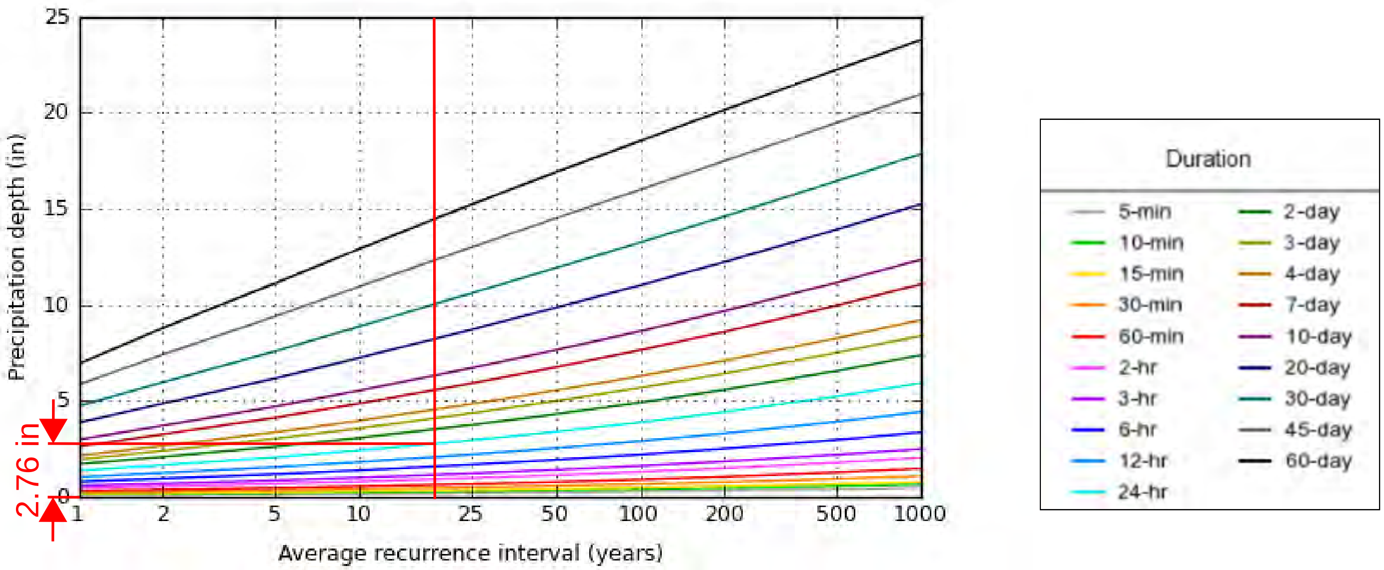
PF graphical

SOUTH





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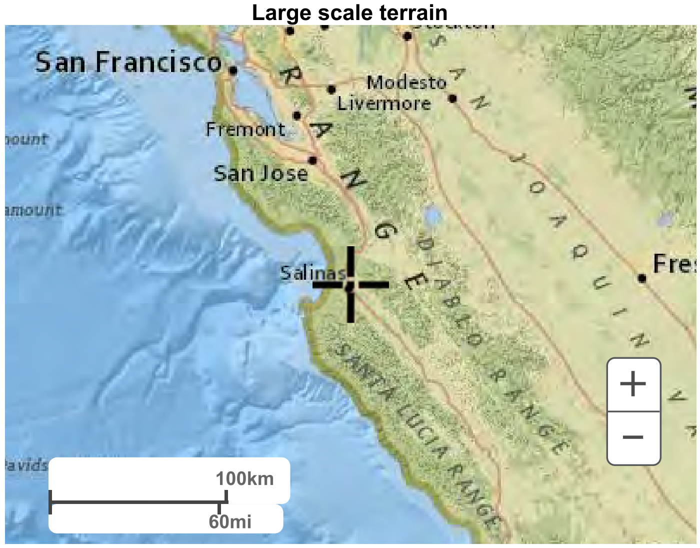
Maps & aerials

Small scale terrain

SOUTH

Large scale terrain



Large scale map

Large scale aerial

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National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

Table 5: 6-Hour Duration Storm for Storm Drains

	5-Year Storm		10-Year Storm		20-Year Storm	
Time Interval (h:mm)	Cumulative Rainfall Amount (inches)	Rainfall Intensity (in/hrs)	Cumulative Rainfall Amount (inches)	Rainfall Intensity (in/hrs)	Cumulative Rainfall Amount (inches)	Rainfall Intensity (in/hrs)
0:00-0:15	0.02	0.07	0.02	0.08	0.02	0.09
0:15-0:30	0.03	0.07	0.04	0.08	0.05	0.09
0:30-0:45	0.06	0.10	0.07	0.12	0.08	0.14
0:45-1:00	0.09	0.10	0.10	0.12	0.11	0.14
1:00-1:15	0.11	0.10	0.13	0.12	0.15	0.14
1:15-1:30	0.15	0.14	0.17	0.16	0.19	0.18
1:30-1:45	0.18	0.14	0.21	0.16	0.24	0.18
1:45-2:00	0.21	0.14	0.25	0.16	0.29	0.18
2:00-2:15	0.26	0.17	0.30	0.20	0.34	0.23
2:15-2:30	0.30	0.17	0.35	0.20	0.40	0.23
2:30-2:45	0.35	0.21	0.41	0.24	0.47	0.27
2:45-3:00	0.40	0.21	0.47	0.24	0.54	0.27
3:00-3:15	0.46	0.24	0.54	0.28	0.62	0.32
3:15-3:30	0.57	0.43	0.67	0.50	0.76	0.57
3:30-3:45	0.74	0.70	0.89	0.90	1.02	1.05
3:45-4:00	0.87	0.50	1.02	0.50	1.16	0.57
4:00-4:15	0.98	0.43	1.14	0.50	1.30	0.55
4:15-4:30	1.03	0.21	1.20	0.24	1.37	0.27
4:30-4:45	1.07	0.17	1.25	0.20	1.43	0.23
4:45-5:00	1.11	0.17	1.30	0.20	1.49	0.23
5:00-5:15	1.15	0.14	1.34	0.16	1.53	0.18
5:15-5:30	1.17	0.10	1.37	0.12	1.57	0.14
5:30-5:45	1.19	0.07	1.39	0.08	1.59	0.12
5:45-6:00	1.20	0.03	1.40	0.04	1.60	0.08

Source: City of Salinas Design Standards, 2004 Edition.

Soil infiltration rates are used as a parameter to calculate the amount of rainfall that does not runoff due to percolation of rainfall into the soil. The infiltration rates of the major soils within the City, as shown below, shall be used for the calculation of runoff using computer simulations to be consistent with the City's Stormwater Master Plan. Information on soil types within the development shall be

5-YEAR OUTFALL HYDRAULIC MODELING DATA

* OFALL_SET_100 *		Outfall ID (Char)	TYPE (Int)	Invert Elevation (ft)	Fixed Outfall Stage (Double)	Tidal Gate Installed (Boolean)
1		AC200	2: Fixed	51.92	57.50	No
2		AC210	2: Fixed	44.94	54.75	No
3		AC220	2: Fixed	48.81	55.00	No
4		AC240	2: Fixed	47.75	54.00	No
5		AC260	2: Fixed	49.58	54.00	No
6		AC290	2: Fixed	46.76	53.25	No
7		AC330	2: Fixed	48.33	52.00	No
8		AC340	2: Fixed	50.89	52.00	No
9		AC350	2: Fixed	50.97	52.00	No
10		AC370	2: Fixed	45.64	49.20	No
11		AC380	2: Fixed	43.65	49.00	No
12		AC390	2: Fixed	37.88	48.50	No
13		AC410	2: Fixed	39.06	48.00	No
14		AC450	2: Fixed	40.22	47.50	No
15		AC470	2: Fixed	39.18	44.00	No
16		AC490	2: Fixed	36.47	43.50	No
17		AG_OFALL	0: Free	80.08	81.83	No
18		CL433	2: Fixed	37.86	43.30	No
19		GAB200	2: Fixed	92.64	96.00	No
20		GAB210	2: Fixed	93.41	96.00	No
21		GAB260	2: Fixed	88.17	89.50	No
22		GAB290	2: Fixed	69.76	69.00	No
23		GAB320	2: Fixed	64.68	66.50	No
24		GAB360	2: Fixed	56.63	60.00	No
25		GAB370	2: Fixed	56.56	60.00	No
26		GAB385	2: Fixed	73.63	77.63	No
27		GAB390	2: Fixed	56.13	58.25	No
28		GAB400	2: Fixed	55.63	58.25	No
29		MS210	2: Fixed	30.98	37.98	No
30		MS220	2: Fixed	31.47	37.47	No
31		NAD200	2: Fixed	69.84	64.70	No
32		NAD215	2: Fixed	91.46	71.30	No
33		NAD260	2: Fixed	56.68	58.00	No
34		NAD270	2: Fixed	54.84	54.80	No
35		NAD280	2: Fixed	48.85	52.50	No
36		NAD320	2: Fixed	35.95	42.50	No
37		OFALL_10	0: Free	29.08	0.00	No
38		RD510	2: Fixed	35.04	43.30	No
39		RD570	2: Fixed	35.56	42.50	No
40		RD590	2: Fixed	33.69	42.50	No
41		RD600	2: Fixed	37.57	42.50	No
42		RD633	2: Fixed	31.66	35.16	No
43		RD635	2: Fixed	31.87	35.37	No
44		RD637	2: Fixed	32.05	35.55	No
45		RD680	2: Fixed	36.76	41.75	No
46		RD690	2: Fixed	34.56	41.50	No

5-YEAR OUTFALL HYDRAULIC MODELING DATA

* OFALL_SET_100 *		Outfall ID (Char)	TYPE (Int)	Invert Elevation (ft)	Fixed Outfall Stage (Double)	Tidal Gate Installed (Boolean)
47	☐	RD720	2: Fixed	37.22	40.50	No
48	☐	RD730	2: Fixed	36.53	40.00	No
49	☐	RD770	2: Fixed	30.94	38.50	Yes
50	☐	RD780	2: Fixed	30.04	38.50	No
51	☐	RD814	2: Fixed	35.74	44.00	Yes
52	☐	SR426	2: Fixed	22.00	38.80	Yes
53	☐	SRC370	2: Fixed	73.87	74.75	No
54	☐	SRC390	2: Fixed	72.18	72.25	No
55	☐	SRC425	2: Fixed	98.29	0.00	No

20-YEAR OUTFALL HYDRAULIC MODELING DATA

* OFALL_SET_102 *		Outfall ID (Char)	TYPE (Int)	Invert Elevation (ft)	Fixed Outfall Stage (Double)	Tidal Gate Installed (Boolean)
1	☐	AC200	2: Fixed	51.92	58.38	No
2	☐	AC210	2: Fixed	44.94	56.50	No
3	☐	AC220	2: Fixed	48.81	55.88	No
4	☐	AC240	2: Fixed	47.75	55.00	No
5	☐	AC260	2: Fixed	49.58	55.00	No
6	☐	AC290	2: Fixed	46.76	54.19	No
7	☐	AC330	2: Fixed	48.33	53.25	No
8	☐	AC340	2: Fixed	50.89	53.25	No
9	☐	AC350	2: Fixed	50.97	53.25	No
10	☐	AC370	2: Fixed	45.64	50.40	No
11	☐	AC380	2: Fixed	43.65	50.25	No
12	☐	AC390	2: Fixed	37.88	49.38	No
13	☐	AC410	2: Fixed	39.06	48.88	No
14	☐	AC450	2: Fixed	40.22	48.33	No
15	☐	AC470	2: Fixed	39.18	44.63	No
16	☐	AC490	2: Fixed	36.47	44.00	No
17	☐	AG_OFALL	2: Fixed	80.08	81.83	No
18	☐	CL433	2: Fixed	37.86	43.90	No
19	☐	GAB200	2: Fixed	92.64	96.44	No
20	☐	GAB210	2: Fixed	93.41	96.44	No
21	☐	GAB260	2: Fixed	88.17	89.81	No
22	☐	GAB290	2: Fixed	69.76	69.44	No
23	☐	GAB320	2: Fixed	64.68	67.00	No
24	☐	GAB360	2: Fixed	56.63	60.50	No
25	☐	GAB370	2: Fixed	56.56	60.50	No
26	☐	GAB385	2: Fixed	73.63	77.63	No
27	☐	GAB390	2: Fixed	56.13	58.75	No
28	☐	GAB400	2: Fixed	55.63	58.75	No
29	☐	MS210	2: Fixed	30.98	38.32	No
30	☐	MS220	2: Fixed	31.47	37.86	No
31	☐	NAD200	2: Fixed	69.84	67.53	No
32	☐	NAD215	2: Fixed	91.46	71.30	No
33	☐	NAD260	2: Fixed	56.68	58.50	No
34	☐	NAD270	2: Fixed	54.84	55.20	No
35	☐	NAD280	2: Fixed	48.85	52.94	No
36	☐	NAD320	2: Fixed	35.95	43.19	No
37	☐	OFALL_10	0: Free	29.08	0.00	No
38	☐	RD510	2: Fixed	35.04	43.93	Yes
39	☐	RD570	2: Fixed	35.56	43.18	No
40	☐	RD590	2: Fixed	33.69	43.18	No
41	☐	RD600	2: Fixed	37.57	43.13	No
42	☐	RD633	2: Fixed	31.66	36.14	No
43	☐	RD635	2: Fixed	31.87	36.33	No
44	☐	RD637	2: Fixed	32.05	36.49	No
45	☐	RD680	2: Fixed	36.76	42.09	No
46	☐	RD690	2: Fixed	34.56	41.63	No

20-YEAR OUTFALL HYDRAULIC MODELING DATA

* OFALL_SET_102 *		Outfall ID (Char)	TYPE (Int)	Invert Elevation (ft)	Fixed Outfall Stage (Double)	Tidal Gate Installed (Boolean)
47	☐	RD720	2: Fixed	37.22	40.88	No
48	☐	RD730	2: Fixed	36.53	40.44	No
49	☐	RD770	2: Fixed	30.94	38.88	Yes
50	☐	RD780	2: Fixed	30.04	38.88	No
51	☐	RD814	2: Fixed	35.74	44.94	Yes
52	☐	SR426	2: Fixed	22.00	39.75	Yes
53	☐	SRC370	2: Fixed	73.87	75.13	No
54	☐	SRC390	2: Fixed	72.18	72.81	No
55	☐	SRC425	2: Fixed	98.29	0.00	No

100-YEAR OUTFALL HYDRAULIC MODELING DATA

* OFALL_SET_104 *		Outfall ID (Char)	TYPE (Int)	Invert Elevation (ft)	Fixed Outfall Stage (Double)	Tidal Gate Installed (Boolean)
1	☐	AC200	2: Fixed	51.92	62.00	No
2	☐	AC210	2: Fixed	44.94	60.00	No
3	☐	AC220	2: Fixed	48.81	59.80	No
4	☐	AC240	2: Fixed	47.75	59.50	No
5	☐	AC260	2: Fixed	49.58	59.50	No
6	☐	AC290	2: Fixed	46.76	58.50	No
7	☐	AC330	2: Fixed	48.33	58.10	No
8	☐	AC340	2: Fixed	50.89	58.10	No
9	☐	AC350	2: Fixed	50.97	58.10	No
10	☐	AC370	2: Fixed	45.64	55.00	No
11	☐	AC380	2: Fixed	43.65	55.00	No
12	☐	AC390	2: Fixed	37.88	52.50	No
13	☐	AC410	2: Fixed	39.06	52.00	No
14	☐	AC450	2: Fixed	40.22	51.00	No
15	☐	AC470	2: Fixed	39.18	46.80	No
16	☐	AC490	2: Fixed	36.47	46.80	No
17	☐	AG_OFALL	2: Fixed	80.08	81.83	No
18	☐	CL433	2: Fixed	37.86	46.90	No
19	☐	GAB200	2: Fixed	92.64	98.50	No
20	☐	GAB210	2: Fixed	93.41	98.50	No
21	☐	GAB260	2: Fixed	88.17	90.75	No
22	☐	GAB290	2: Fixed	69.76	71.50	No
23	☐	GAB320	2: Fixed	64.68	69.00	No
24	☐	GAB360	2: Fixed	56.63	62.90	No
25	☐	GAB370	2: Fixed	56.56	62.90	No
26	☐	GAB385	2: Fixed	73.63	77.63	No
27	☐	GAB390	2: Fixed	56.13	61.25	No
28	☐	GAB400	2: Fixed	55.63	61.25	No
29	☐	MS210	2: Fixed	30.98	41.00	No
30	☐	MS220	2: Fixed	31.47	41.00	No
31	☐	NAD200	2: Fixed	69.84	76.50	No
32	☐	NAD215	2: Fixed	91.46	71.30	No
33	☐	NAD260	2: Fixed	56.68	61.00	No
34	☐	NAD270	2: Fixed	54.84	57.00	No
35	☐	NAD280	2: Fixed	48.85	54.75	No
36	☐	NAD320	2: Fixed	35.95	47.25	No
37	☐	OFALL_10	0: Free	29.08	0.00	No
38	☐	RD510	2: Fixed	35.04	47.00	No
39	☐	RD570	2: Fixed	35.56	46.30	No
40	☐	RD590	2: Fixed	33.69	46.30	No
41	☐	RD600	2: Fixed	37.57	46.00	No
42	☐	RD633	2: Fixed	31.66	44.00	No
43	☐	RD635	2: Fixed	31.87	44.00	No
44	☐	RD637	2: Fixed	32.05	44.00	No
45	☐	RD680	2: Fixed	36.76	43.80	No
46	☐	RD690	2: Fixed	34.56	43.50	No

100-YEAR OUTFALL HYDRAULIC MODELING DATA

* OFALL_SET_104 *		Outfall ID (Char)	TYPE (Int)	Invert Elevation (ft)	Fixed Outfall Stage (Double)	Tidal Gate Installed (Boolean)
47	☐	RD720	2: Fixed	37.22	43.00	No
48	☐	RD730	2: Fixed	36.53	42.50	No
49	☐	RD770	2: Fixed	30.94	41.00	Yes
50	☐	RD780	2: Fixed	30.04	41.00	No
51	☐	RD814	2: Fixed	35.74	48.00	Yes
52	☐	SR426	2: Fixed	22.00	44.90	Yes
53	☐	SRC370	2: Fixed	73.87	76.75	No
54	☐	SRC390	2: Fixed	72.18	74.75	No
55	☐	SRC425	2: Fixed	98.29	0.00	No

Technical Memo

Project Name: City of Salinas Stormwater Master Plan Support

Date: August 1, 2023
Presented to: Heidi Niggemeyer, NPDES Compliance Manager City of Salinas and Kari Wagner, Principal, Wallace Group
Prepared by: Tyler Nodine, Senior Scientist, 2NDNATURE

Both model projections and observational data show that atmospheric changes resulting from elevated CO_2 levels will bring more frequent, high-intensity rainfall events to many parts of the United States.[1] Shifts in precipitation may degrade the future performance of urban stormwater infrastructure designed to prevent flooding and reduce pollution, because local and state design specifications are based on historic, not future, rainfall patterns. Expected hydrologic changes include greater stormwater volumes, higher peak flow levels, and increased frequency of events that exceed the capacity of stormwater systems. Coupled with the increased surface runoff and flashier hydrologic responses associated with ongoing urban development, these hydrologic changes may lead to more frequent urban flooding, increased infrastructure stress, and elevated pollutant loads reaching streams and waterbodies. Incorporation of expected changes to precipitation and runoff patterns within the City of Salinas can help to ensure that their stormwater planning and design will be resilient to those changes.

To support hydrologic and hydraulic modeling performed by Wallace Group, 2NDNATURE has developed estimates of the percent change by mid-century in precipitation event magnitudes for two climate scenarios. The results will inform recommendations for locations and design of stormwater infrastructure improvements throughout Salinas included in the Stormwater Master Plan. This work will help to ensure that the Stormwater Master Plan includes recommendations consistent with the goals of the Salinas Stormwater Program to build in climate change resiliency to their stormwater planning processes. The work is based on 2NDNATURE research currently in review at *Nature Scientific Reports.*[2]

Methods

Using the steps described below, 2NDNATURE estimated the percent change in 5-, 10-, and 20-year storm events for two different climate change scenarios. These percentages can be applied to the historic precipitation estimates used for hydraulic modeling by Wallace Group to determine comparable future precipitation values. With this approach, Wallace Group will have

[1] USGCRP, 2018, *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II* [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]: U.S. Global Change Research Program, Washington, DC, USA, 1515 p. doi: 10.7930/NCA4.2018.

[2] Nodine, T., Conley G., Riihimaki, C., Holland, C., Beck, N., in review, Confronting the impact of climate change on urban stormwater infrastructure. *Nature Scientific Reports*.

12 new modeling parameters: two baseline precipitation locations (northern and southern Salinas) at the three recurrence intervals projected to two different climate change outcomes.

Data Gathering

Daily precipitation projections from a suite of global climate models (GCMs) included in the Coupled Model Intercomparison Project Phase 6 (CMIP6) were synthesized and used to estimate changes in future precipitation for specified recurrence intervals for the City of Salinas. The GCMs included in CMIP support the Intergovernmental Panel on Climate Change Assessment Reports and the US National Climate Assessment and are widely used in climate research. Precipitation outputs from 34 GCMs included in CMIP6 were obtained from the NASA Earth Exchange (NEX) Global Daily Downscaled Projections (GDDP) dataset and processed through the Google Earth Engine platform.

Geospatial Data Processing

The NEX-GDDP climate projections come spatially downscaled to 27,830 meters using the Bias-Correction Spatial Disaggregation method[3,4]. Due to the coarse resolution of the GCM models, one grid cell spans the City's area (Figure 1). GCM precipitation outputs were therefore extracted for one location in the downtown area of the City of Salinas (-121.65671, 36.67491) to represent the spatial average of precipitation depths falling across the city. This location was also used for comparison with Atlas 14 data.

Precipitation Scenarios

To estimate changes in recurrence interval depths, we compared precipitation scenarios for historic (October 1, 1975-September 30, 2005) and future (October 1, 2025-September 30, 2055) timeframes. Periods of 30 years were selected to represent long-term climate patterns required for stormwater modeling. The historic 30-year time frame was selected to represent the recent past and correspond with the historic time frames on which design standards are relevant to the lifespan of stormwater infrastructure currently in the ground or being planned. We incorporate precipitation projections for two future greenhouse gas emissions scenarios known as representative concentration pathways (RCPs): RCP 4.5 and RCP 8.5. RCP 4.5 commonly serves as a "best-case scenario" in which anthropogenic CO_2 emissions level off until 2050 before decreasing. Conversely, RCP 8.5 represents a pathway in which emissions continue to increase along the current trajectory through 2050. We compare future GCM projections with hindcasted outputs from the same suite of models for the historic period to ensure the final estimates provided reflect changes associated with climate change rather than differences between models or between observed and simulated outputs.

---

[3] NASA Earth Exchange Global Daily Downscaled Projections (NEX-GDDP-CMIP6) | NASA Center for Climate Simulation. (n.d.). Retrieved July 26, 2024, from https://www.nccs.nasa.gov/services/data-collections/land-based-products/nex-gddp-cmip6.

[4] Thrasher, B., Maurer, E. P., McKellar, C., & Duffy, P. B., 2012, Technical Note: Bias correcting climate model simulated daily temperature extremes with quantile mapping: Hydrology and Earth System Sciences, v. 16(9), p. 3309–3314, doi:10.5194/hess-16-3309-2012.

Figure 1. City of Salinas MS4 boundary with GCM model grid overlaid in gray. The sample location used for data extraction and validation with NOAA ATLAS 14 is shown in red.

Climate Change Projections Ensembling

GCM ensembling entails statistically summarizing outputs from multiple models, compensating for any errors in individual models and improving statistical confidence in the results. For this analysis, we use a mean GCM ensemble, which is common in climate research and used in analyses informing International Panel on Climate Change (IPCC) assessments and US National Climate Assessment (NCA) reports.

Calculation of Recurrence Interval Change

Daily precipitation depths for the three scenarios (historic, RCP 4.5, and RCP 8.5) were extracted for each of the 22 CMIP6 GCMs. Recurrence interval depths were calculated for 5-, 10-, and 20 year rainfall from the daily data for each scenario and model using the following formula:

$T = (n+1)/rank$

where T is the return interval, n is the number of years, and rank is the ranking of 24-hr event depths. We used a partial duration time series approach in which all rainfall events in a given year greater than 0.01 inch were included in the analysis. Outputs from each model were ensembled to generate a single mean depth for each recurrence interval. Linear regression was used to estimate depths for specified recurrence intervals that did not align with the outputs of the formula above. Finally, percent difference between the historic scenario and the two future scenarios was calculated for each recurrence interval.

Results

Precipitation Outputs to Inform Runoff Modeling
Climate change precipitation metrics generated to support event-based runoff modeling include the projected percent change in 24-hr depths corresponding to the 5-, 10-, and 20 year recurrence interval (Table 1). To estimate future precipitation depths for a given recurrence interval, the percentages of change provided are intended to be applied to baseline depth values for the two parts of Salinas used by Wallace Group in event-based runoff modeling for the City. Percent change metrics for the specified return interval event depths rather than absolute values are provided in order to avoid misalignment in baseline or reference period data.

Table 1. Projected change in precipitation depths

Recurrence Interval (yrs)	Historic precipitation (in)	RCP 4.5 precipitation (in)	RCP 8.5 precipitation (in)	% Change RCP 4.5	% Change RCP 8.5
5	2.4035	2.5266	2.6148	5.12%	8.79%
10	2.6894	2.8227	2.8988	4.95%	7.79%
20	2.8457	2.996	3.1489	5.28%	10.65%

Discussion

Validation
Precipitation metrics from the GCMs for the historic time frame were compared with NOAA Atlas 14[5] precipitation frequency estimates to ensure the hindcasted outputs from the model ensemble reflect historic observed data. Modeled 24-hr depths for 5 recurrence interval events (2- to 50 yrs) for the historic time frame aligned well with Atlas 14 with an r^2 of 0.96 and percent bias of 16.4%, with the GCM ensemble estimating larger event depths than Atlas 14 (Figure 2). This alignment suggests the model ensemble is suited to represent future climate conditions for the City of Salinas, but the percent bias indicates the importance of using percent change provided in Table 1, rather than absolute values.

[5] https://hdsc.nws.noaa.gov/pfds/

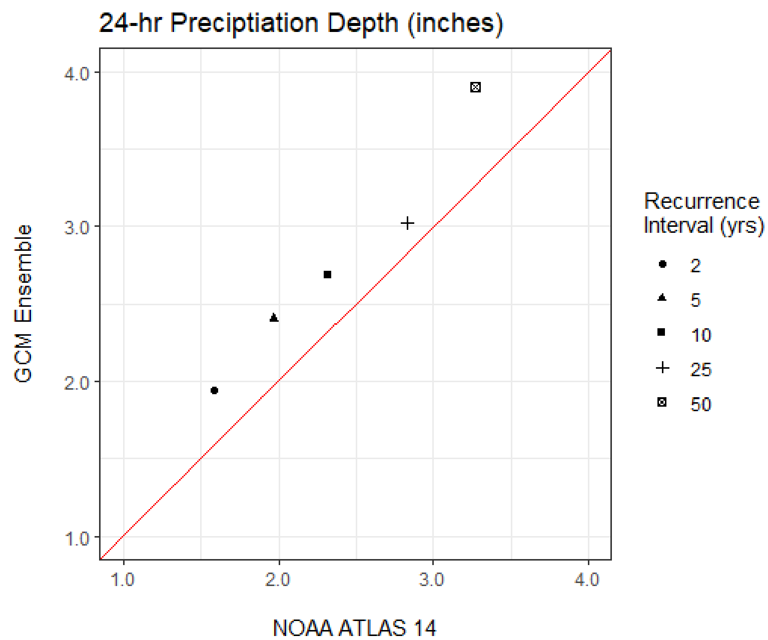


Figure 2. Comparison of 24-hr precipitation depths from the GCM ensemble historic scenario and NOAA ATLAS 14 estimates. Selection of recurrence intervals for validation was based upon available event estimates from ATLAS 14. The one-to-one line is shown in red.

Our projected changes in recurrence interval event depths ranged from 5.0 to 5.3% for RCP 4.5 and 7.8 to 10.7% for RCP 8.5. Despite some differences in spatial scale of output summarization and time periods compared, these outputs largely agree with findings reported by the National Climate Assessment (NCA). The Climate Science Special Report for the Fourth NCA[6] predicts a 10% and 12% mid-century increase in the 20-yr precipitation event for the Pacific Southwest region for RCP 4.5 and RCP 8.5. Meanwhile, the previous Climate Assessment[7] projects that annual maximum rainfall event depth will increase by 0-20% under both emissions scenarios by the end of the century. These findings suggest that our estimates of recurrence interval event depths for both small (5 yr) and large (20 yr) events fall within the range of changes anticipated by authoritative assessments of climate change science.

Caveats & Limitations

As with all analyses based on future climate projections, this analysis has important caveats and limitations:

- The results are based on projections of future climate conditions as driven by specific representative greenhouse gas concentration pathways (RCPs). Actual concentration

[6] USGCRP, 2017, Climate Science Special Report: Fourth National Climate Assessment, Volume I [Wuebbles, D.J., D.W. Fahey, K.A. Hibbard, D.J. Dokken, B.C. Stewart, and T.K. Maycock (eds.)]: U.S. Global Change Research Program, Washington, DC, USA, 470 p, doi: 10.7930/J0J964J6.

[7] USGCRP, 2014, Climate Change Impacts in the United States: The Third National Climate Assessment [Melillo, J.M., T.C. Richmond and G.W. Yohe (eds.): U.S. Global Change Research Program, 841 pp., doi:10.7930/J0Z31WJ2.

pathways may differ from the ones assumed here. Therefore, even models that are perfectly accurate for a given RCP may not accurately predict future climate if the RCP does not match the concentrations that actually occur.

- Global climate models have inherent uncertainty in how greenhouse gas concentrations impact precipitation amounts and rates in any given area. The model ensemble approach used has the benefit of compensating errors in individual models and typically performs better than individual models across different regions and rainfall metrics. Certain individual models may perform better than the ensemble for single locations and specific rainfall metrics. However, preliminary analysis to identify the most appropriate models for use in the City of Salinas was beyond the scope of this work.

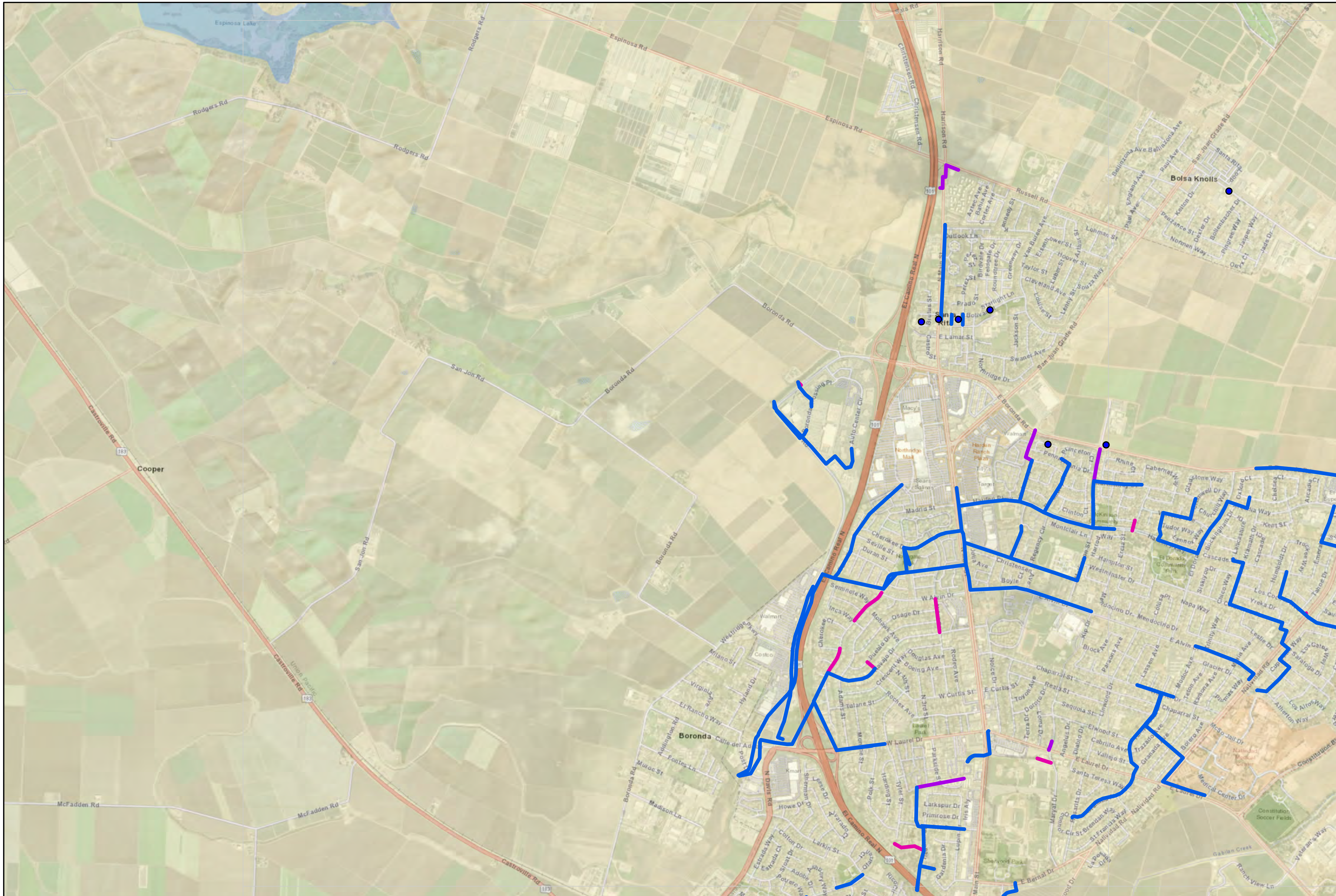
- There are multiple statistical approaches that could be used to determine the magnitude of precipitation for different recurrence intervals. While the partial duration recurrence interval calculation we employed is the standard approach used in climate science, there are more sophisticated methods which may better deal with the strong influence of outlier values and data non-normality, such as the approach followed by NOAA Atlas 14[8]. Because our results for the historic period align well with NOAA's estimates and our projected changes fall within ranges expected by the NCA[9,10], we do not see sufficient benefit for employing a more complex approach.

[8] Perica, S., et al., 2011, NOAA Atlas 14 Volume 6 Version 2.0, Precipitation-Frequency Atlas of the United States, California: NOAA, National Weather Service, Silver Spring, MD.

[9] USGCRP, 2017, Climate Science Special Report: Fourth National Climate Assessment, Volume I [Wuebbles, D.J., D.W. Fahey, K.A. Hibbard, D.J. Dokken, B.C. Stewart, and T.K. Maycock (eds.)]: U.S. Global Change Research Program, Washington, DC, USA, 470 p, doi: 10.7930/J0J964J6.

[10] USGCRP, 2014, Climate Change Impacts in the United States: The Third National Climate Assessment [Melillo, J.M., T.C. Richmond and G.W. Yohe (eds.): U.S. Global Change Research Program, 841 p., doi:10.7930/J0Z31WJ2.

APPENDIX D: Maintenance Priority Projects



STORM DRAIN MAINTENANCE PRIORITY CIP MAP

Legend

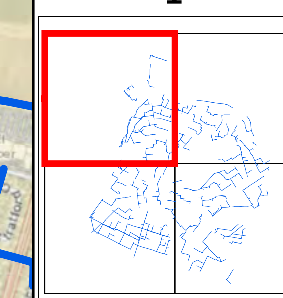
CIP Points

- Maintenance

CIP Pipes

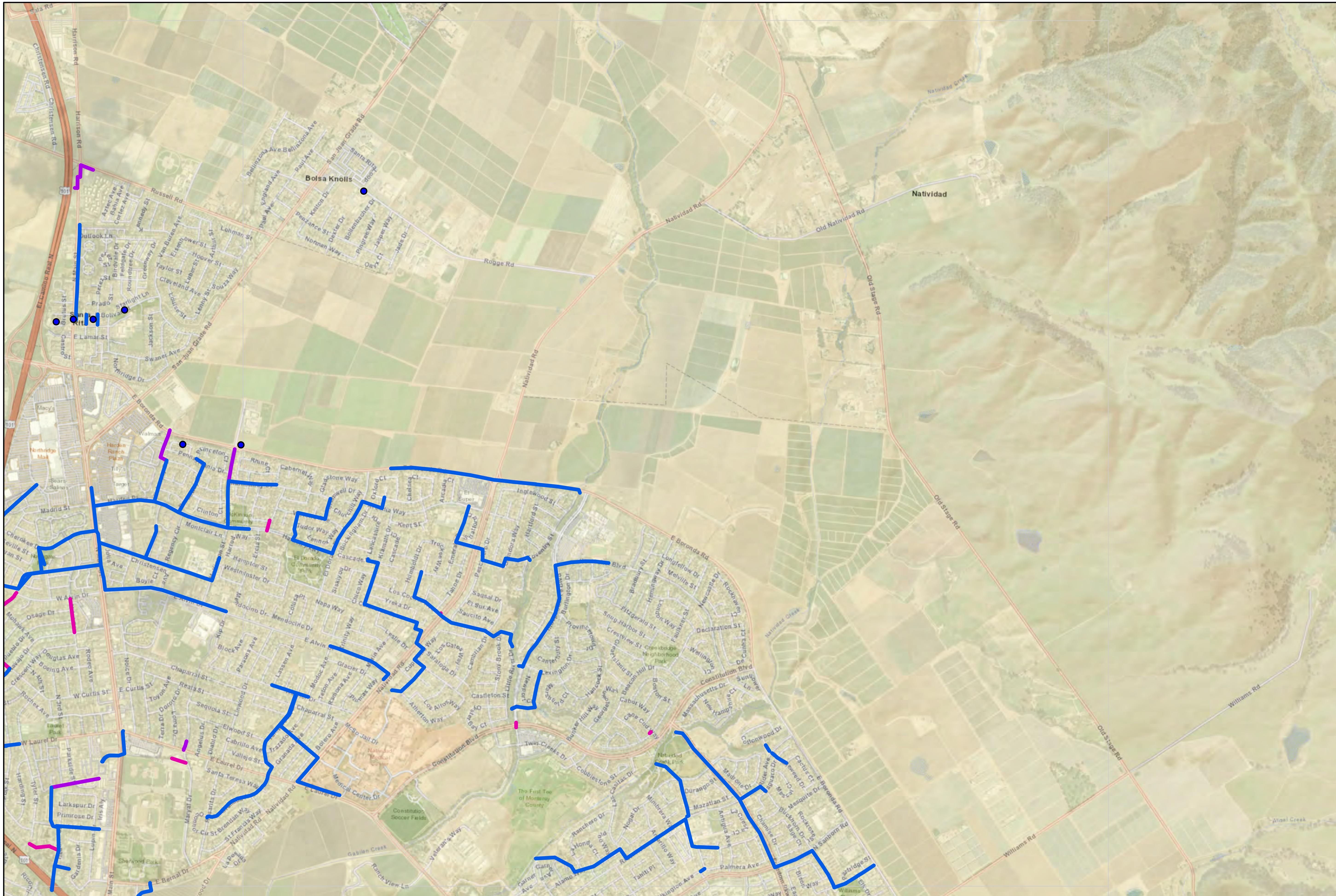
- Maintenance
- Future and Climate Change Projects
- Low Velocity Pipes

SHEET: 1



1 inch = 2,000 Feet

PROJECT NOTES:
ESRI BASEMAP. MAP DEVELOPED FOR STORM DRAIN FACILITY MANAGEMENT. NOT TO BE USED FOR DESIGN OR CONSTUCTION.
PUBLISHED MAY 2024.



SALINAS

STORM DRAIN MAINTENANCE PRIORITY CIP MAP

Legend

CIP Points

- Maintenance

CIP Pipes

- Maintenance
- Future and Climate Change Projects
- Low Velocity Pipes

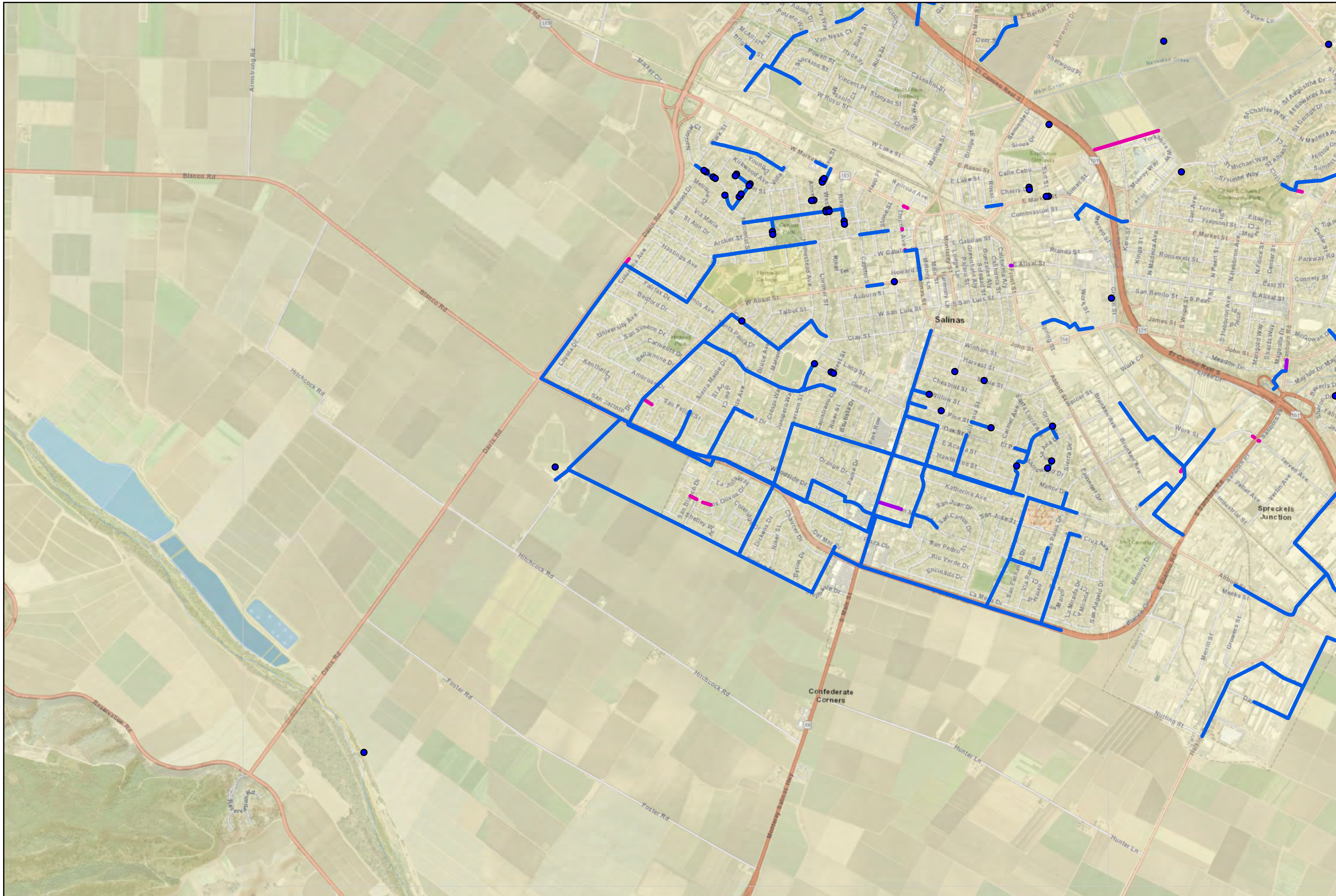
SHEET:
2

N

1 inch = 2,000 Feet

WALLACE GROUP

PROJECT NOTES:
ESRI BASEMAP. MAP DEVELOPED FOR STORM DRAIN FACILITY MANAGEMENT. NOT TO BE USED FOR DESIGN OR CONSTUCTION.
PUBLISHED MAY 2024.



SALINAS

STORM DRAIN MAINTENANCE PRIORITY CIP MAP

Legend

CIP Points

- Maintenance

CIP Pipes

- Maintenance
- Future and Climate Change Projects
- Low Velocity Pipes

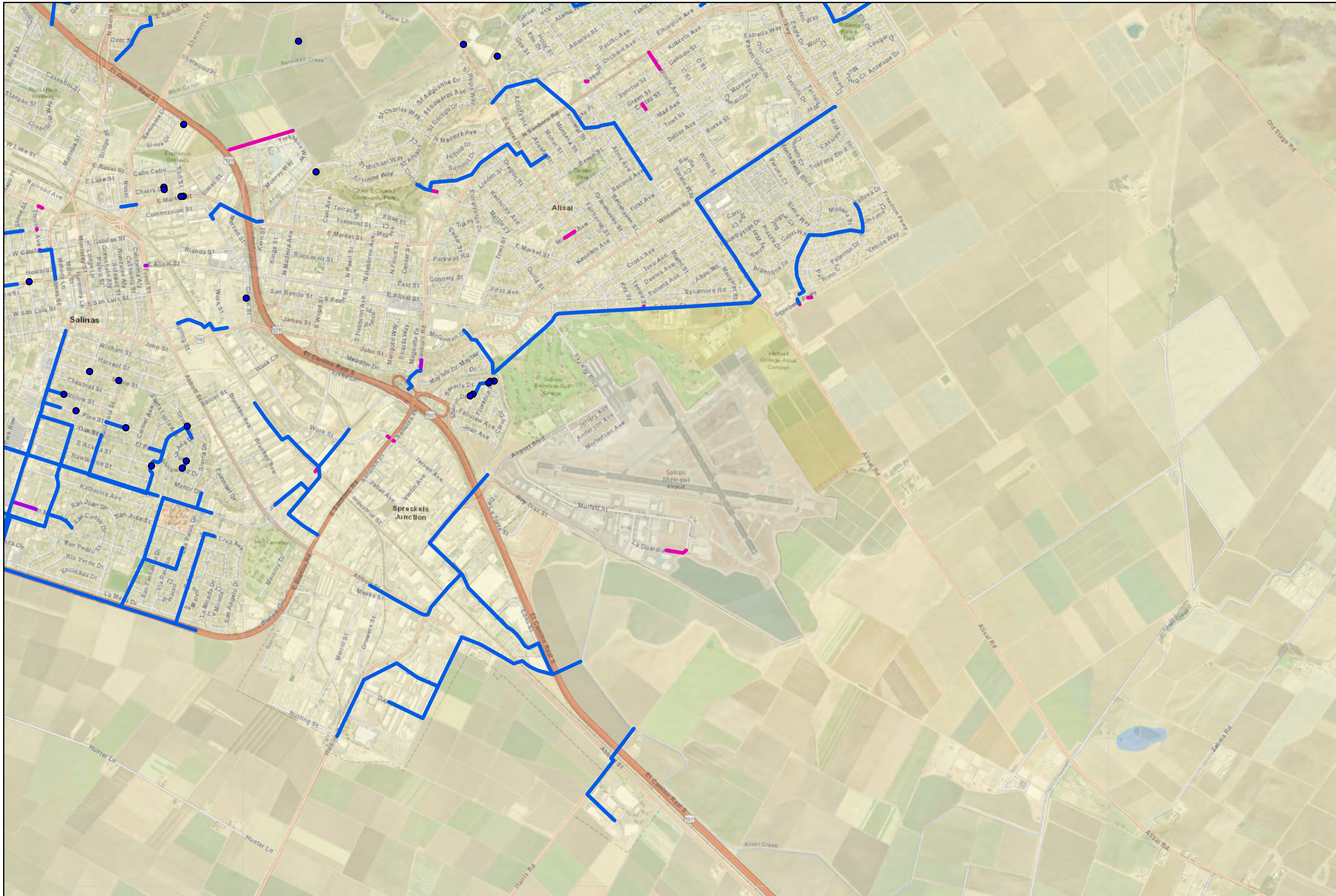
SHEET: 3

N

1 inch = 2,000 Feet

WALLACE GROUP

PROJECT NOTES:
ESRI BASEMAP. MAP DEVELOPED FOR STORM DRAIN FACILITY MANAGEMENT. NOT TO BE USED FOR DESIGN OR CONSTUCTION.
PUBLISHED MAY 2024.



SALINAS

STORM DRAIN MAINTENANCE PRIORITY CIP MAP

Legend

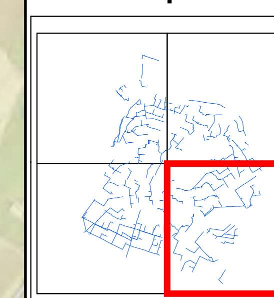
CIP Points

- Maintenance

CIP Pipes

- Maintenance
- Future and Climate Change Projects
- Low Velocity Pipes

SHEET: 4



N

1 inch = 2,000 Feet

WALLACE GROUP

PROJECT NOTES:
ESRI BASEMAP. MAP DEVELOPED FOR STORM DRAIN FACILITY MANAGEMENT. NOT TO BE USED FOR DESIGN OR CONSTUCTION.
PUBLISHED MAY 2024.

APPENDIX D-2
CITY OF SALINAS SWMPU
MAINTENANCE PRIORITY PROJECTS

Project Location	Project Description	Flooding Frequency	Flooding Severity	Climate Change	Public Safety	Total Score	DAC Area	Total Cost ($)	Project Number
		Area of Concern = 5 5-yr and 10-yr storm = 3 20-yr storm = 1	Widespread flooding = 5 Localized flooding = 3 Minimal flooding = 1	Climate Change Impact = 5 No Climate Change Impact = 0	Critical Facility or Evac Route = 5 Major Arterial or Freeway = 5 Minor Arterial or Collector = 3 Local or Private = 1				
East side of Natividad Creek Detention	Remove sediment from existing basin (jurisdictional waters)	5	5	5	0	15	NO	$360,000	MAINTENANCE-1
Clark St	Pipe Upgrades	3	3	5	3	14	NO	$6,430,000	MAINTENANCE-2
Delancey Dr	Pipe Upgrades	3	3	5	3	14	YES	$35,510,000	MAINTENANCE-3
Tampico Ave	Pipe Upgrades	3	5	5	1	14	NO	$9,890,000	MAINTENANCE-4
Santa Barbara Ave & Coronado Ave	Replace existing siphons	5	3	5	1	14	NO	$3,780,000	MAINTENANCE-5
14 West St	Replace existing siphons	5	3	5	1	14	YES	$4,720,000	MAINTENANCE-6
California St & Maple St	Replace undersized inlets	5	1	5	3	14	NO	$1,740,000	MAINTENANCE-7
90 Carmel Ave	Replace existing siphons	5	3	5	1	14	NO	$1,100,000	MAINTENANCE-8
Santa Ana Dr & Grove St	Replace existing siphons	5	3	5	1	14	NO	$1,500,000	MAINTENANCE-9
Santa Rita Creek- Santa Rita St to N Main	Replace undersized inlets	5	3	5	1	14	YES	$960,000	MAINTENANCE-10
W Laurel Dr	Pipe Upgrades	3	5	0	5	13	YES	$3,690,000	MAINTENANCE-11
E Alisal St	Pipe Upgrades	3	5	0	5	13	YES	$28,190,000	MAINTENANCE-12
Iverson St	Pipe Upgrades	3	5	0	5	13	YES	$7,520,000	MAINTENANCE-13
E San Joaquin St	Pipe Upgrades	3	5	0	5	13	NO	$2,400,000	MAINTENANCE-14
Ivy St	Pipe Upgrades	3	5	0	5	13	YES	$6,150,000	MAINTENANCE-15
N Davis Rd	Pipe Upgrades	3	5	0	5	13	NO	$9,710,000	MAINTENANCE-16
Burton Ave	Pipe Upgrades	3	5	0	5	13	NO	$17,250,000	MAINTENANCE-17
Airport Blvd	Pipe Upgrades	3	5	0	5	13	NO	$21,160,000	MAINTENANCE-18
El Camino Real N	Pipe Upgrades	3	5	0	5	13	YES	$35,510,000	MAINTENANCE-19
McKinnon St	Pipe Upgrades	3	5	0	5	13	NO	$5,440,000	MAINTENANCE-20
Cherokee Dr	Pipe Upgrades	3	5	0	5	13	YES	$10,450,000	MAINTENANCE-21
E Alvin Dr	Pipe Upgrades	3	5	0	5	13	YES	$7,480,000	MAINTENANCE-22
N Main St	Pipe Upgrades	3	5	0	5	13	YES	$7,380,000	MAINTENANCE-23
Cherokee Dr	Pipe Upgrades	3	5	0	5	13	YES	$12,380,000	MAINTENANCE-24
Harden Pkwy	Pipe Upgrades	3	5	0	5	13	YES	$21,690,000	MAINTENANCE-25
Santa Cruz Ave	Pipe Upgrades	3	5	0	5	13	YES	$22,470,000	MAINTENANCE-26
Tampico Ave	Pipe Upgrades	3	5	0	5	13	NO	$10,630,000	MAINTENANCE-27
Bardin Rd	Pipe Upgrades	3	5	0	5	13	YES	$16,340,000	MAINTENANCE-28
Williams Rd	Pipe Upgrades	3	5	0	5	13	YES	$12,690,000	MAINTENANCE-29
W Alisal St	Pipe Upgrades	3	5	0	5	13	YES	$11,860,000	MAINTENANCE-30
Marion Ave	Pipe Upgrades	3	5	0	5	13	YES	$7,980,000	MAINTENANCE-31
Sierra Madre Dr	Pipe Upgrades	3	5	0	5	13	YES	$1,890,000	MAINTENANCE-32
Palma Dr	Pipe Upgrades	3	5	0	5	13	YES	$2,370,000	MAINTENANCE-33
Blanco Rd	Pipe Upgrades	3	5	0	5	13	YES	$28,650,000	MAINTENANCE-34
Iverson St	Pipe Upgrades	3	5	0	5	13	YES	$28,650,000	MAINTENANCE-35
Kipling St	Pipe Upgrades	3	5	0	5	13	NO	$26,700,000	MAINTENANCE-36
Pasatiempo Way	Pipe Upgrades	3	5	0	5	13	NO	$8,110,000	MAINTENANCE-37
Blanco Rd	Pipe Upgrades	3	5	0	5	13	NO	$33,870,000	MAINTENANCE-38
Summer St	Pipe Upgrades	3	5	0	5	13	NO	$2,010,000	MAINTENANCE-39
Schilling Pl	Pipe Upgrades	3	5	0	5	13	NO	$12,940,000	MAINTENANCE-40
Heather Cir	Pipe Upgrades	0	3	5	5	13	YES	$13,050,000	MAINTENANCE-41
Palmero Dr	Pipe Upgrades	3	3	5	1	12	NO	$3,320,000	MAINTENANCE-42
35 Sharon Dr	Replace existing siphons	5	1	5	1	12	YES	$1,180,000	MAINTENANCE-43
269 Cherry Dr	Replace existing siphons	5	1	5	1	12	YES	$720,000	MAINTENANCE-44
W Market St	Pipe Upgrades	3	3	0	5	11	NO	$580,000	MAINTENANCE-45
Santa Cruz Ave	Pipe Upgrades	3	3	0	5	11	NO	$3,980,000	MAINTENANCE-46
Nissen Rd	Pipe Upgrades	3	3	0	5	11	NO	$15,400,000	MAINTENANCE-47
Tudor Way	Pipe Upgrades	3	3	0	5	11	NO	$3,110,000	MAINTENANCE-48

APPENDIX D-2
CITY OF SALINAS SWMPU
MAINTENANCE PRIORITY PROJECTS

Project Location	Project Description	Flooding Frequency	Flooding Severity	Climate Change	Public Safety	Total Score	DAC Area	Total Cost ($)	Project Number
		Area of Concern = 5 5-yr and 10-yr storm = 3 20-yr storm = 1	Widespread flooding = 5 Localized flooding = 3 Minimal flooding = 1	Climate Change Impact = 5 No Climate Change Impact = 0	Critical Facility or Evac Route = 5 Major Arterial or Freeway = 5 Minor Arterial or Collector = 3 Local or Private = 1				
Essex Cir	Pipe Upgrades	3	3	0	5	11	NO	$5,140,000	MAINTENANCE-49
Falcon Dr	Pipe Upgrades	3	3	0	5	11	NO	$8,660,000	MAINTENANCE-50
S Main St	Pipe Upgrades	3	3	0	5	11	YES	$7,230,000	MAINTENANCE-51
S Sanborn Rd	Pipe Upgrades	3	3	5	0	11	YES	$1,420,000	MAINTENANCE-52
Harris Pl	Pipe Upgrades	3	3	0	5	11	NO	$2,480,000	MAINTENANCE-53
N Davis Rd	Pipe Upgrades	3	3	0	5	11	NO	$2,820,000	MAINTENANCE-54
E Laurel Dr	Pipe Upgrades	3	3	0	5	11	YES	$11,740,000	MAINTENANCE-55
Abbott St	Pipe Upgrades	3	5	0	3	11	NO	$10,410,000	MAINTENANCE-56
Calaveras Dr	Pipe Upgrades	3	3	0	5	11	NO	$14,210,000	MAINTENANCE-57
Broadway Dr	Pipe Upgrades	3	3	0	5	11	NO	$2,060,000	MAINTENANCE-58
N Main St	Pipe Upgrades	3	3	0	5	11	YES	$13,250,000	MAINTENANCE-59

Appendix D-3

City of Salinas SWMPU

Locations Identified by City with Debris Clogging Inlets

Number	Location
1	W Market St. @ Riker St.
2	Oak St. between S Main St. and Pajaro St.
3	Clay St. @ Lincoln St. Next to and across liquor store
4	Maple St. @ California St.
5	Gabilan St. @ Monterey St.
6	Monterey St. @ John St. At gas station driveway and across Tabacchis restaurant
7	Soledad St. @ John St.
8	Avelar St. @ Pine St.
9	Santa Barbara St. @ Coronado Ave.
10	Grove St. @ Santa Ana St.
11	Constitution Blvd. at Manchester St.
12	2369 N. Main St. at Townhomes
13	S. Main St. & Romie Ln.
14	S. Main St. & Hawthorne St. Next to Burger King
15	S. Main St. & Katherine St. On Southwest corner (as needed)
16	S. Main St. & Acacia St. (Southeast side)
17	College Dr. & Amherst Dr.
18	Laurel Detention Basins
19	Maple St. @ Front St.
20	235 Pine St
21	239 Pine St
22	90 Carmel Ave
23	Capital St. @ Clay St.
24	Lang St. @ Iverson St. North side and Southside across from each other
25	IversonSt. @ Geil St.
26	E. Laurel Dr. @ Tyler St.
27	E. Laurel Dr. @ Polk St.
28	E. Laurel Dr. @ Monroe St.
29	E. Laurel Dr. @ Adams St.
30	SW Blanco Detention Basin
31	N Main Santa Rita Creek Undercrossing
32	Santa Rita Creek west of N Main
33	SW of Carr Lake on 101
34	Carr Lake area
35	Salinas River Outfall
36	Griffin St South of E Alisal to John St
37	East Market at Towt Street
38	Elton Place at North Felice Street
39	Meyers Court (east side)
40	North Filice Street at Short Street
41	La Mancha Way at Palmera Avenue
42	La Mancha Way at Bernardo Avenue
43	Acosta Place (west side)
44	N Maderia Ave at Circle Drive

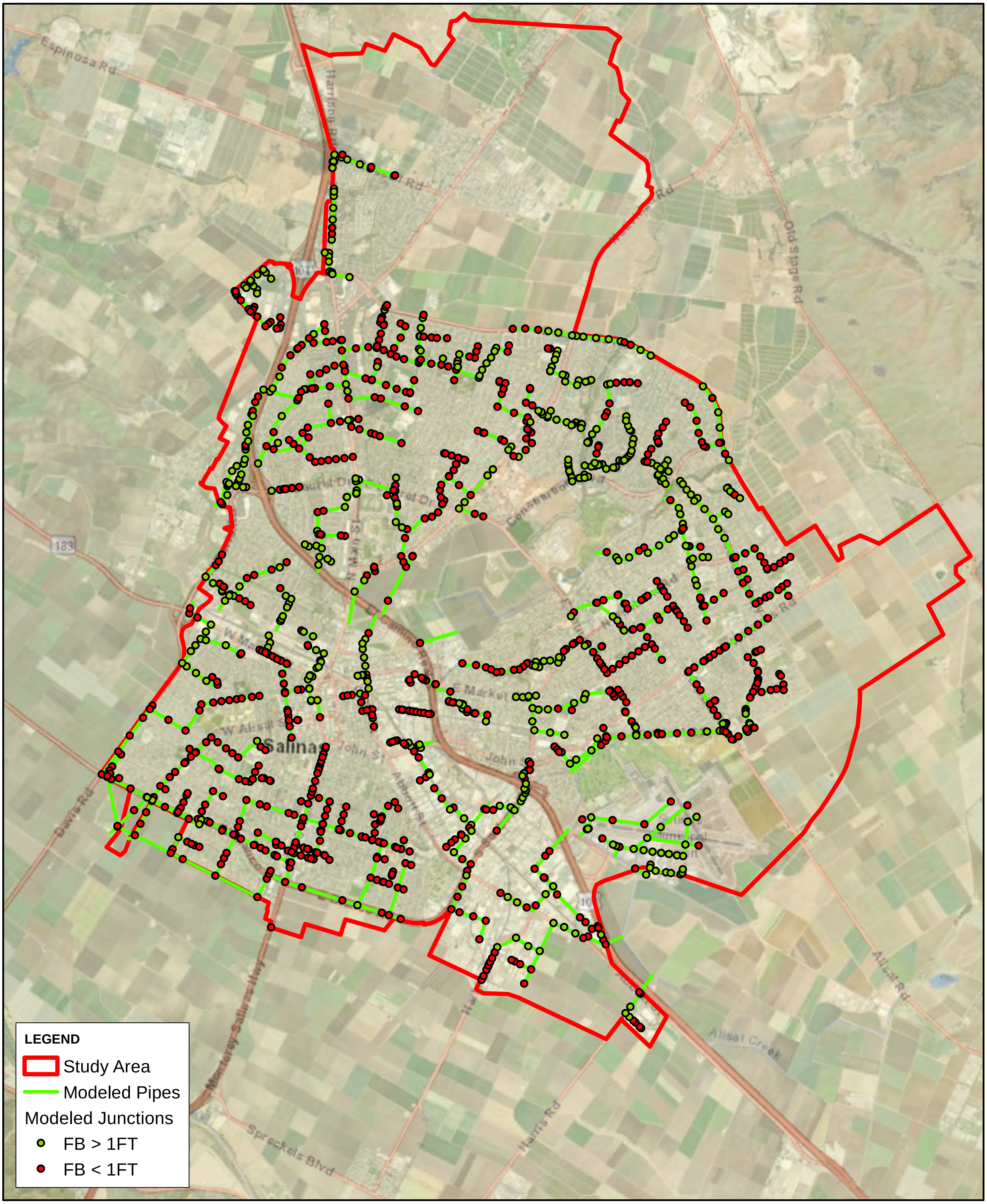
Appendix D-4
City of Salinas SWMPU
Pipes with Velocity Less than 2 fps (5-yr 6-hr storm)

Pipe ID (Model)	Upstream Junction	Pipe Length (ft)	Pipe Diameter (in)
81	SWMH-F5-033	242.3	24
225	SWMH-I3-004	169.1	30
226	SWMH-I3-003	299.4	30
227	SWMH-I3-002	223.8	30
290	SWMH-N5-015	136.8	24
339	MONTEBELLA_DITCH_OVF	80.2	54
350	SWMH-J7-015	47.5	18
374	SWMH-L6-012	162.9	36
393	SWMH-L7-017	278.8	24
404	SWMH-M8-009	56.6	27
420	MONTEBELLA_DITCH_OVF2	35.0	36
483	SWMH-O8-016	389.3	24
484	SWMH-O8-017	89.2	24
752	SWMH-G4-016	761.8	27
757	WG-PT-2726	222.6	18
761	SWMH-G3-007	614.1	60
764	SWMH-G3-009	876.0	60
793	SWCB-E3-005	45.2	24
794	SWMH-E3-034	35.0	24
860	SWMH-H8-035	47.3	15
875	WG-PT-3238	55.5	21
878	SWMH-N6-004	53.4	18
913	SWMH-J8-015	151.7	21
914	WG-PT-3468	39.8	21
916	SWMH-J8-014	257.0	21
918	SWMH-K8-021	149.8	18
1064	SWMH-H7-016	113.2	21
1100	SWMH-G6-024	34.4	18
1129	WG-PT-2330	1496.5	24
1201	SWMH-L3-019	26.8	42
1203	SWMH-L3-002	101.2	48
1205	WG-PT-2610	19.8	42
1282	SWMH-L1-003	160.6	42
1292	SWMH-N2-023	234.2	21
1338	SWMH-O2-016	168.0	36
1339	SWMH-O2-008	193.3	27

Appendix D-5
City of Salinas SWMPU
Potential CIPs due to Future Development and Climate Change Conditions

Pipe ID (Model)	Upstream Junction	Pipe Length (ft)	Existing Pipe Diameter (in)	Future Conditions Impact?	Future Pipe Diameter (in)	Future Conditions Impact?	Climate Change Pipe Diameter (in)
26	WG-PT-3256	6.5	18	N	N/A	Y	30
213	SWMH-I4-010	818.6	42	N	N/A	Y	48
216	SWMH-I4-008	232.2	42	N	N/A	Y	48
233	SWMH-H4-001	88.1	24	N	N/A	Y	30
235	SWMH-H4-002	107.6	24	N	N/A	Y	30
824	WG-PT-2859	57.9	54	N	N/A	Y	60
825	WG-PT-2858	26.5	54	N	N/A	Y	60
826	WG-PT-2857	222.3	54	N	N/A	Y	60
827	WG-PT-2856	27.6	48	Y	54	Y	60
828	SWMH-C4-017	27.5	48	Y	54	Y	60
829	SWMH-B4-001	265.0	48	Y	54	Y	60
830	SWMH-B4-002	296.8	48	Y	54	Y	60
879	SWMH-M6-011	247.9	18	N	N/A	Y	30
1198	SWMH-L4-032	30.7	24	N	N/A	Y	36
1383	SWMH-O3-009	290.5	24	N	N/A	Y	30
1403	WG-PT-5225	58.3	24	N	N/A	Y	30
1404	WG-PT-5226	155.8	24	N	N/A	Y	30
1427	SWMH-O3-008	53.1	24	N	N/A	Y	30
689	SWMH-E4-007	156.0	36	Y	42	N	N/A
690	WG-PT-2899	119.9	36	Y	42	N	N/A
691	SWCB-E4-010	68.8	36	Y	42	N	N/A
692	SWMH-E4-008	32.1	36	Y	42	N	N/A
700	SWMH-F5-009	315.8	60	Y	66	N	N/A
701	SWMH-E5-001	412.8	60	Y	66	N	N/A
CDT_31	SWCB-E4-009	288.7	36	Y	42	N	N/A
CDT_33	SWMH-E4-009	122.7	36	Y	42	N	N/A

APPENDIX E: Storm Drain Model Results Exhibits - Existing Conditions



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1 in = 5,000 Feet

SWMPU

FIGURE E-1. FREEBOARD LESS THAN 1FT (5-YEAR 24-HOUR STORM, EXISTING CONDITIONS)

JOB NO: 886-022
CREATED BY: AJM
DATE: 09/27/2024

NOTES:
WALLACE GROUP DID NOT PERFORM SURVEY SERVICES FOR THIS MAP. NOT A LEGAL DOCUMENT.

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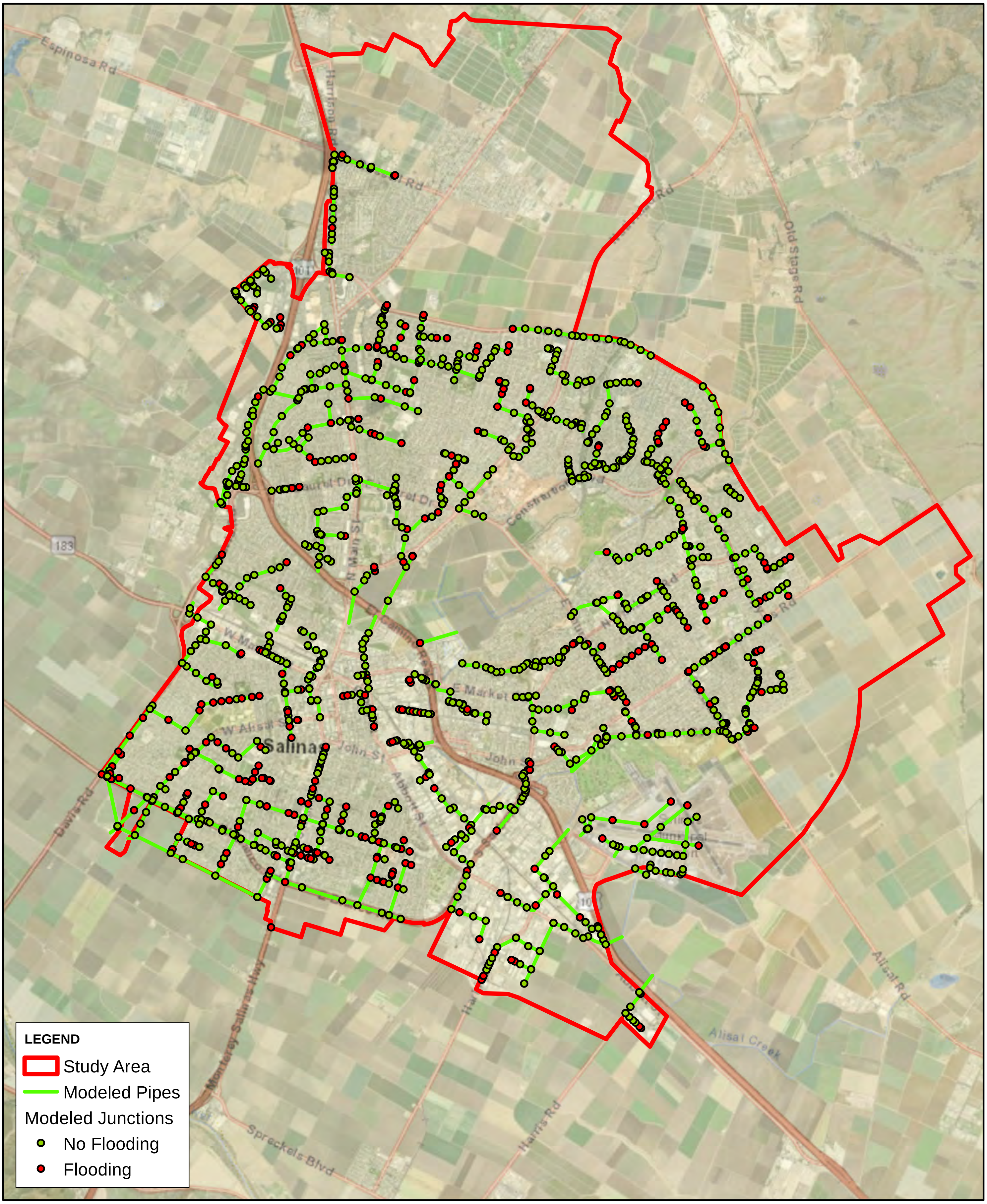

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FIGURE E-2. FLOODING (5-YEAR 24-HOUR STORM, EXISTING CONDITIONS)

JOB NO: 886-022
CREATED BY: AJM
DATE: 09/27/2024

NOTES:
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1 in = 5,000 Feet

FIGURE D-3. PIPES WITH VELOCITY LESS THAN 2 FPS (5-YEAR 6-HOUR STORM, EXISTING CONDITIONS)

JOB NO: 886-022
CREATED BY: AJM
DATE: 09/27/2024

NOTES:
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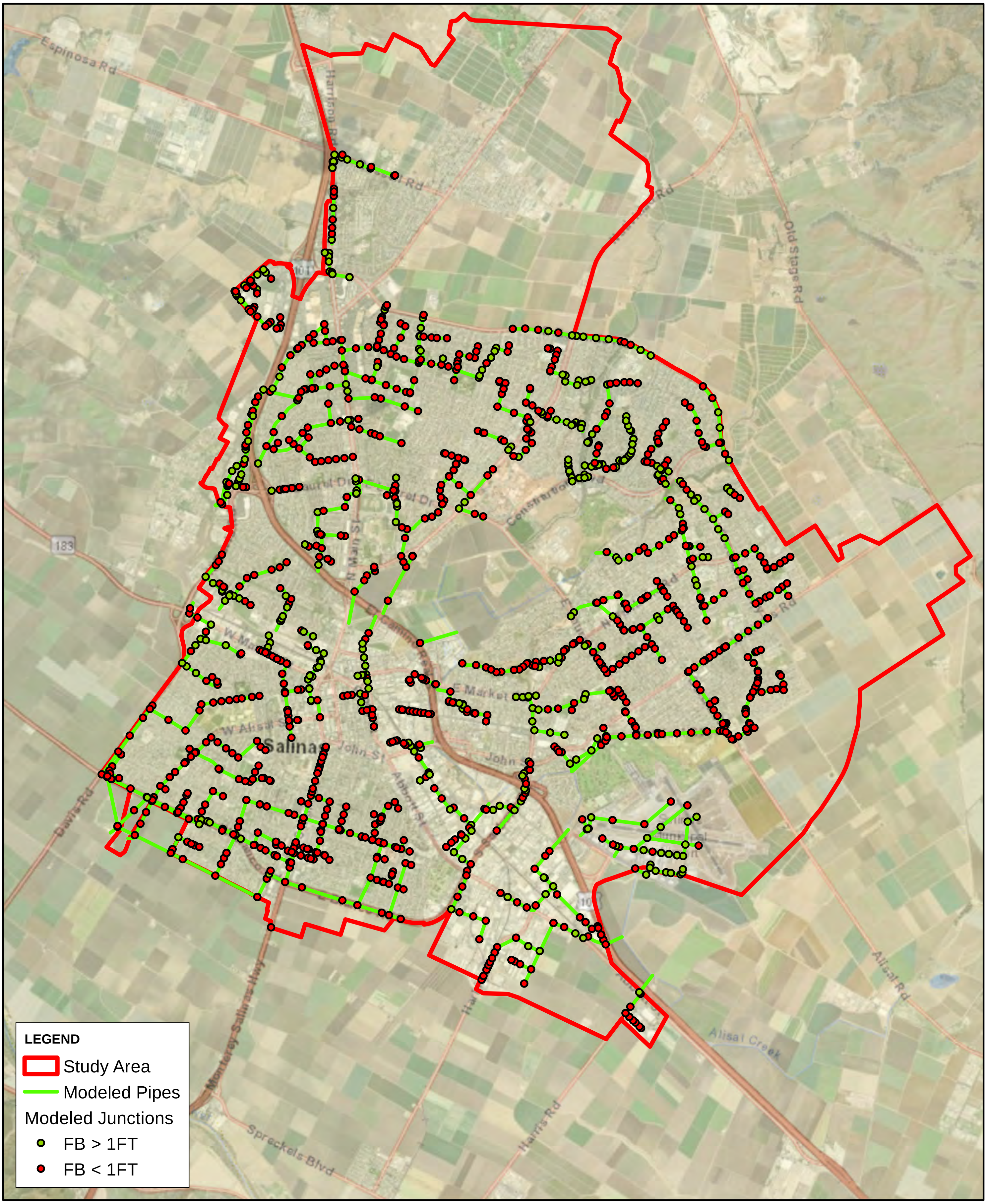

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FIGURE E-4. FREEBOARD LESS THAN 1FT (20-YEAR 24-HOUR STORM, EXISTING CONDITIONS)

JOB NO: 886-022
CREATED BY: AJM
DATE: 09/27/2024

NOTES:
WALLACE GROUP DID NOT PERFORM SURVEY SERVICES FOR THIS MAP. NOT A LEGAL DOCUMENT.

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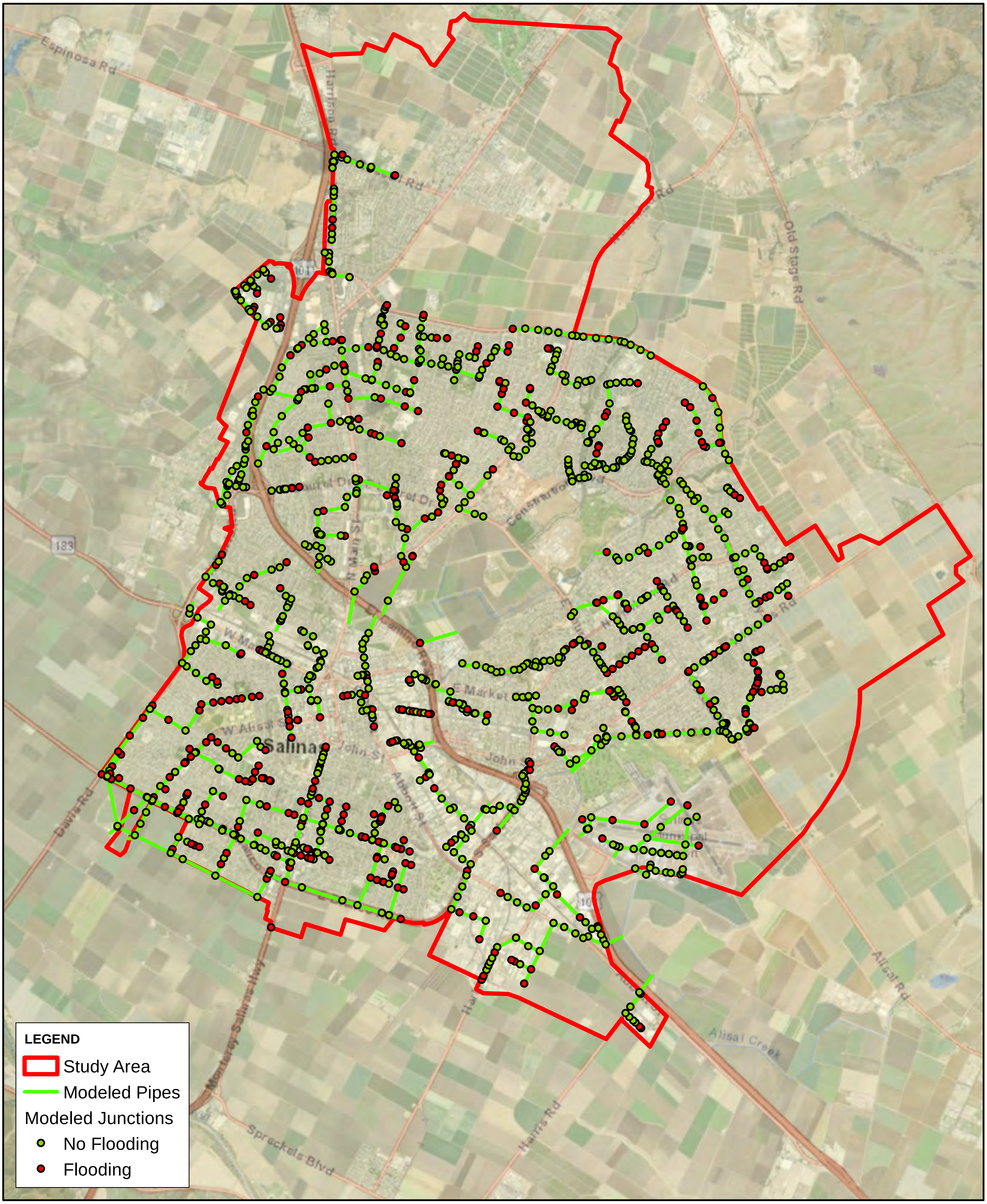

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FIGURE E-5. FLOODING (20-YEAR 24-HOUR STORM, EXISTING CONDITIONS)

JOB NO: 886-022
CREATED BY: AJM
DATE: 09/27/2024

NOTES:
WALLACE GROUP DID NOT PERFORM SURVEY SERVICES FOR THIS MAP. NOT A LEGAL DOCUMENT.

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APPENDIX F: Storm Drain Model Results Exhibits - Future Conditions

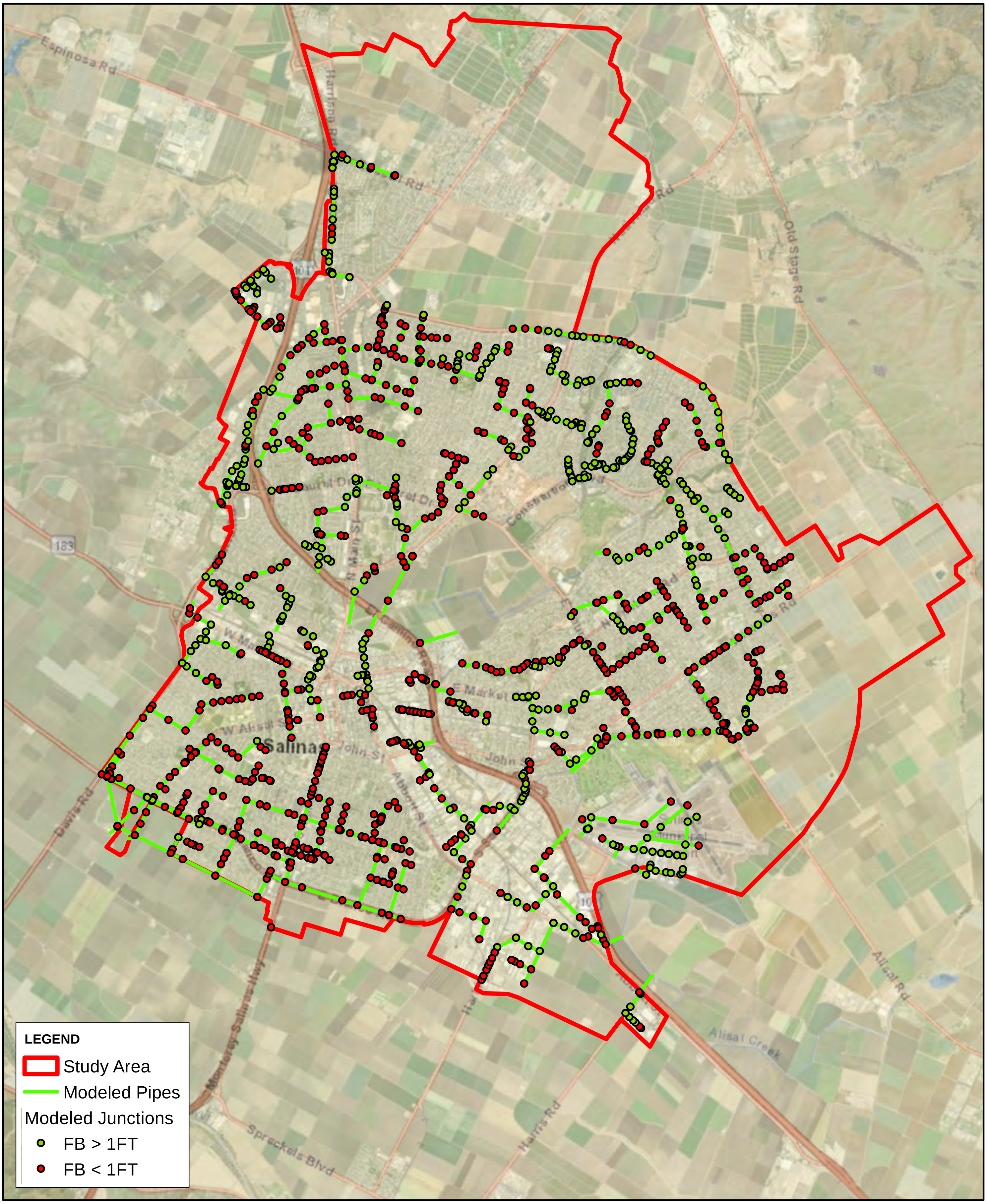

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FIGURE F-1. FREEBOARD LESS THAN 1FT (5-YEAR 24-HOUR STORM, FUTURE CONDITIONS)

JOB NO: 886-022
CREATED BY: AJM
DATE: 09/27/2024

NOTES:
WALLACE GROUP DID NOT PERFORM SURVEY SERVICES FOR THIS MAP. NOT A LEGAL DOCUMENT.

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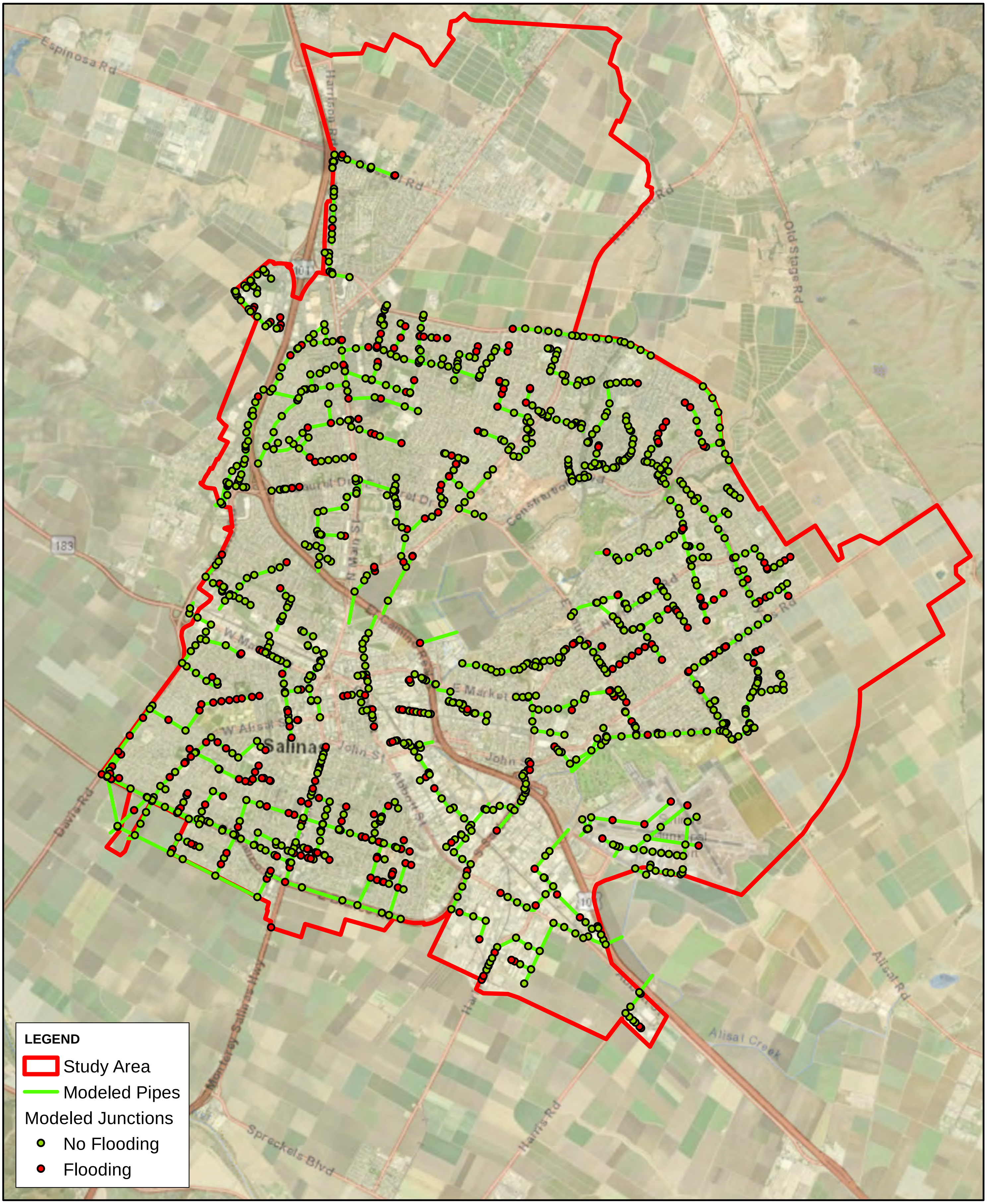

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FIGURE F-2. FLOODING (5-YEAR 24-HOUR STORM, FUTURE CONDITIONS)

JOB NO: 886-022
CREATED BY: AJM
DATE: 09/27/2024

NOTES:
WALLACE GROUP DID NOT PERFORM SURVEY SERVICES FOR THIS MAP. NOT A LEGAL DOCUMENT.

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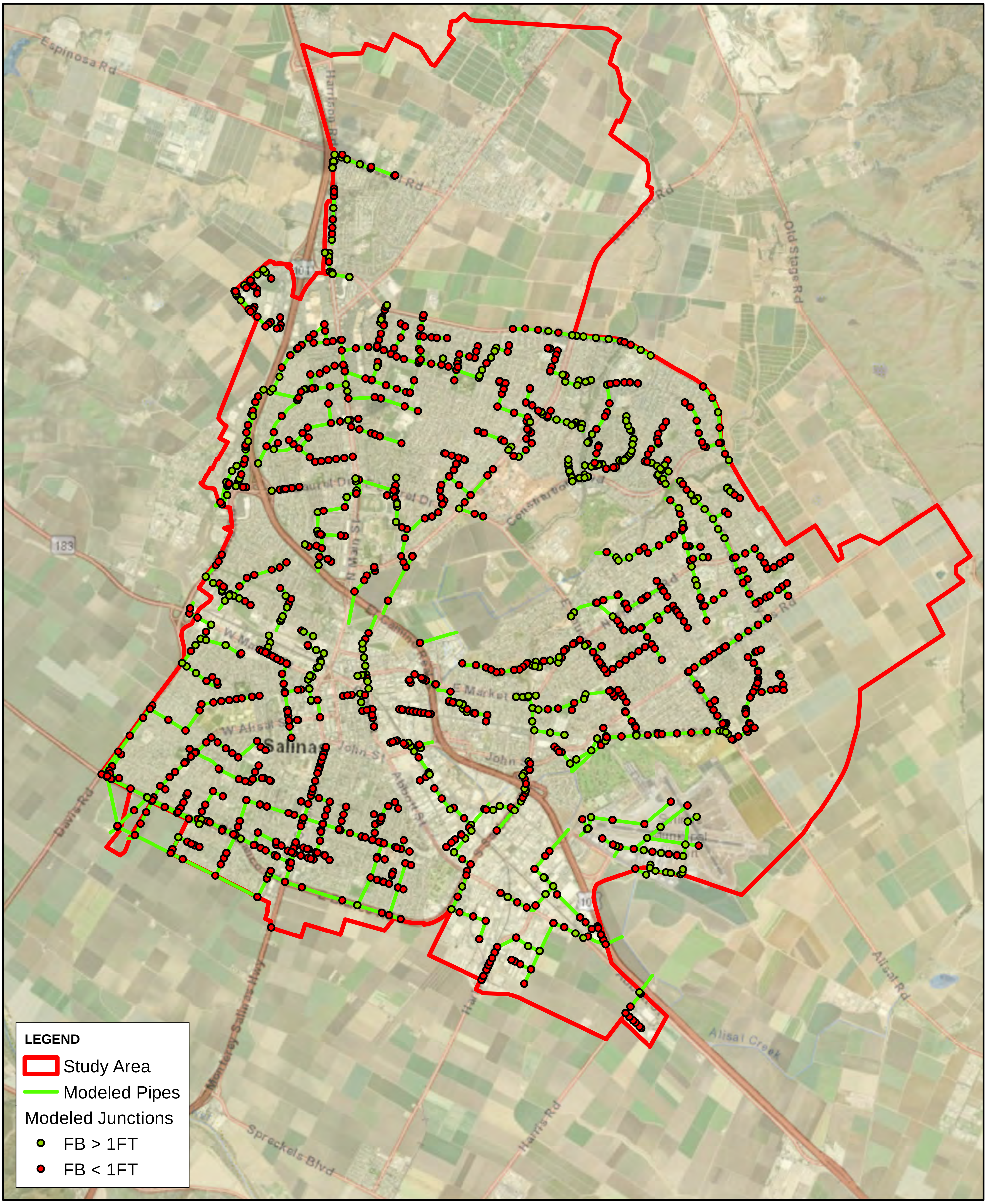

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FIGURE F-3. FREEBOARD LESS THAN 1FT (20-YEAR 24-HOUR STORM, FUTURE CONDITIONS)

JOB NO: 886-022
CREATED BY: AJM
DATE: 09/27/2024

NOTES:
WALLACE GROUP DID NOT PERFORM SURVEY SERVICES FOR THIS MAP. NOT A LEGAL DOCUMENT.

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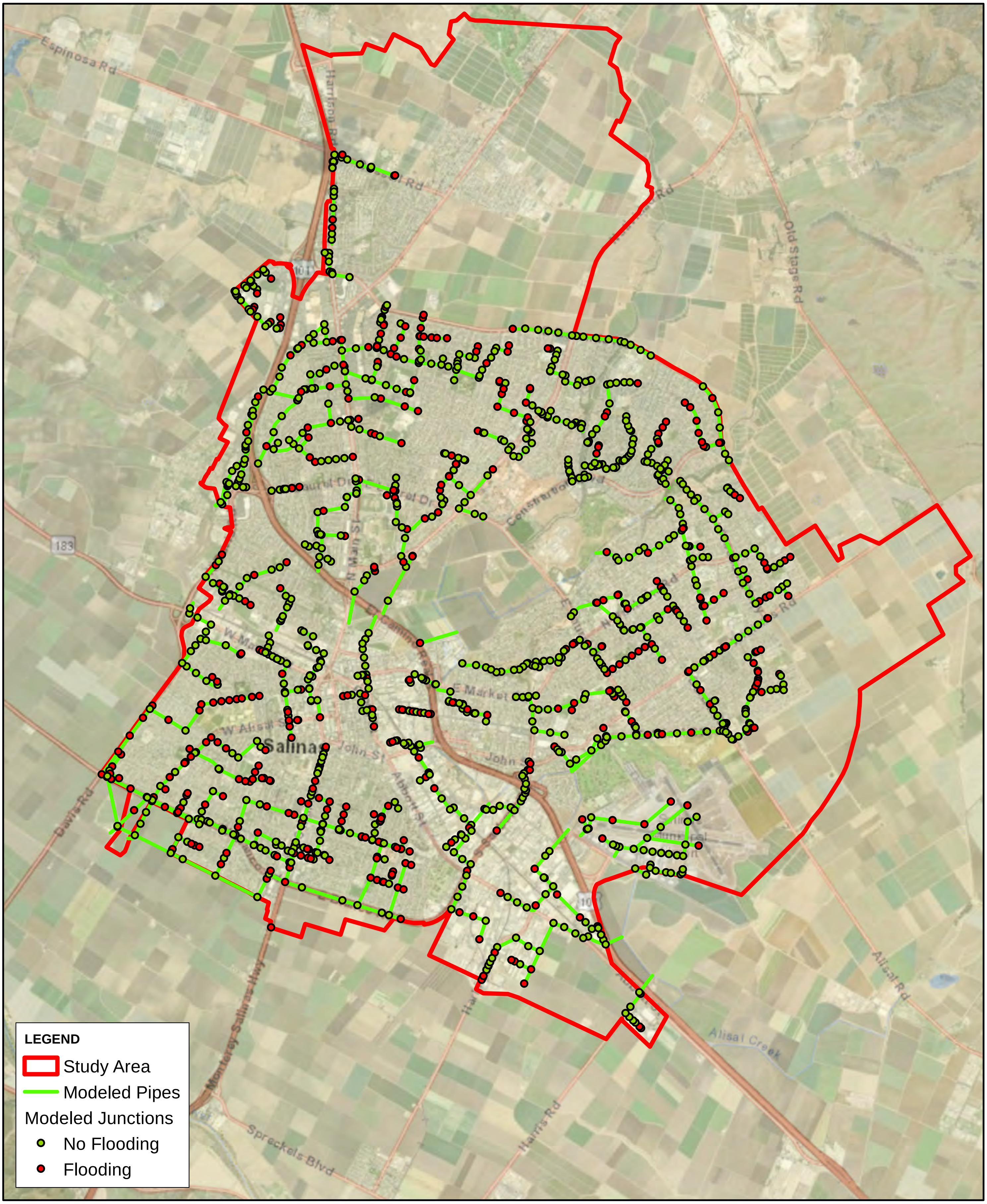

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FIGURE F-4. FLOODING (20-YEAR 24-HOUR STORM, FUTURE CONDITIONS)

JOB NO: 886-022
CREATED BY: AJM
DATE: 09/27/2024

NOTES:
WALLACE GROUP DID NOT PERFORM SURVEY SERVICES FOR THIS MAP. NOT A LEGAL DOCUMENT.

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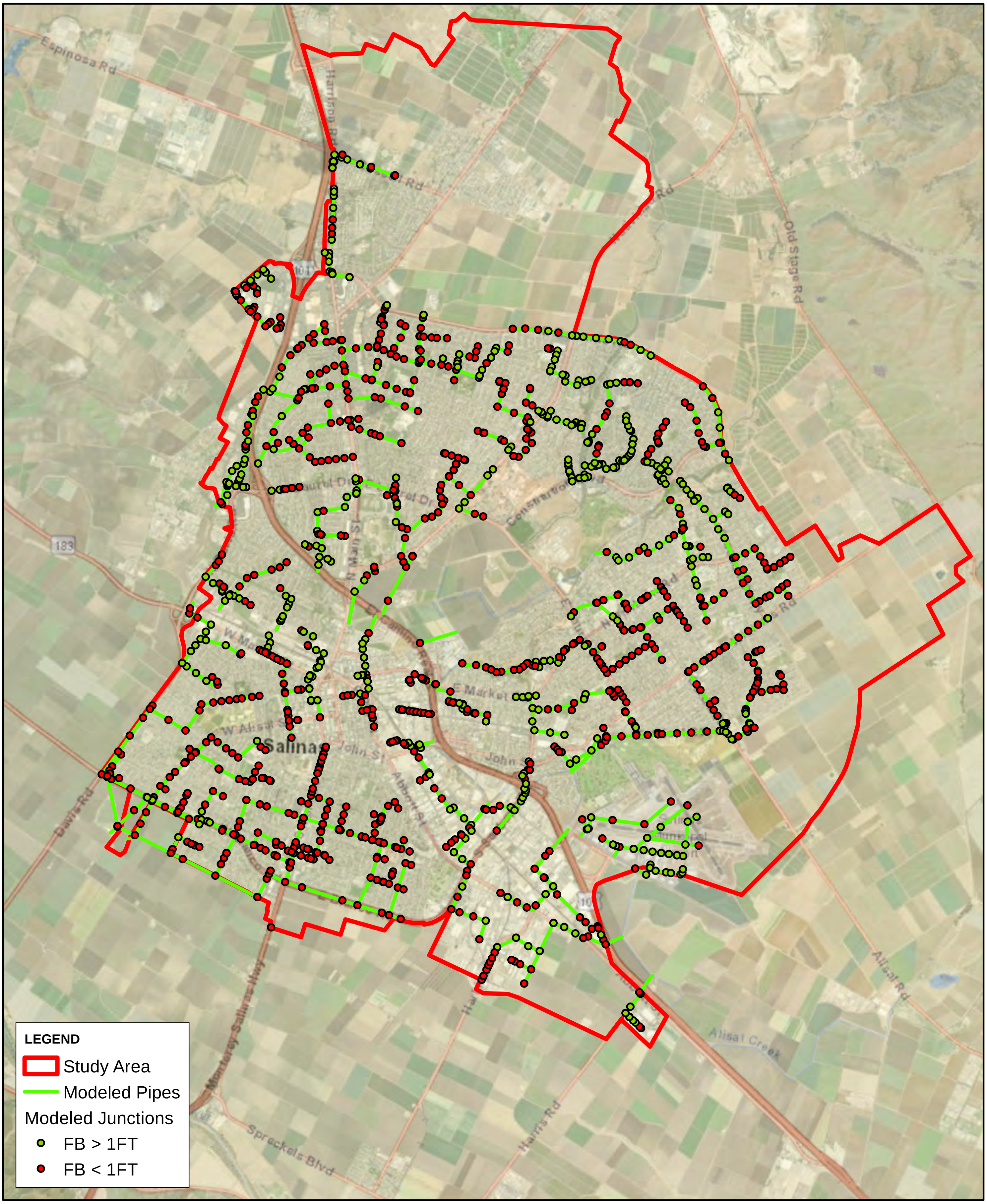

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FIGURE F-5. FREEBOARD LESS THAN 1FT (CLIMATE CHANGE 5-YEAR 24-HOUR STORM, FUTURE CONDITIONS)

JOB NO: 886-022
CREATED BY: AJM
DATE: 09/27/2024

NOTES:
WALLACE GROUP DID NOT PERFORM SURVEY SERVICES FOR THIS MAP. NOT A LEGAL DOCUMENT.

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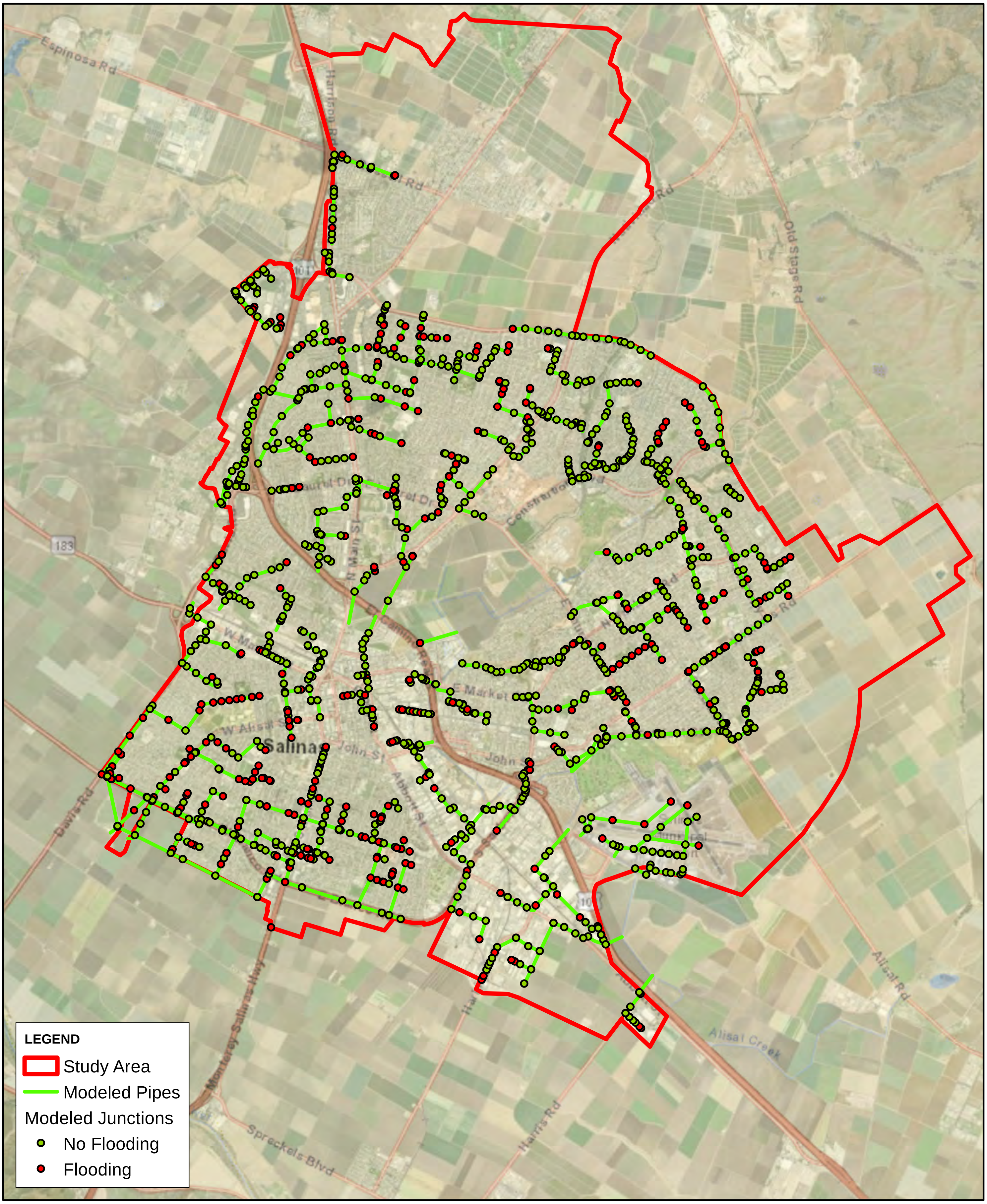

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FIGURE F-6. FLOODING (CLIMATE CHANGE 5-YEAR 24-HOUR STORM, FUTURE CONDITIONS)

JOB NO: 886-022
CREATED BY: AJM
DATE: 09/27/2024

NOTES:
WALLACE GROUP DID NOT PERFORM SURVEY SERVICES FOR THIS MAP. NOT A LEGAL DOCUMENT.

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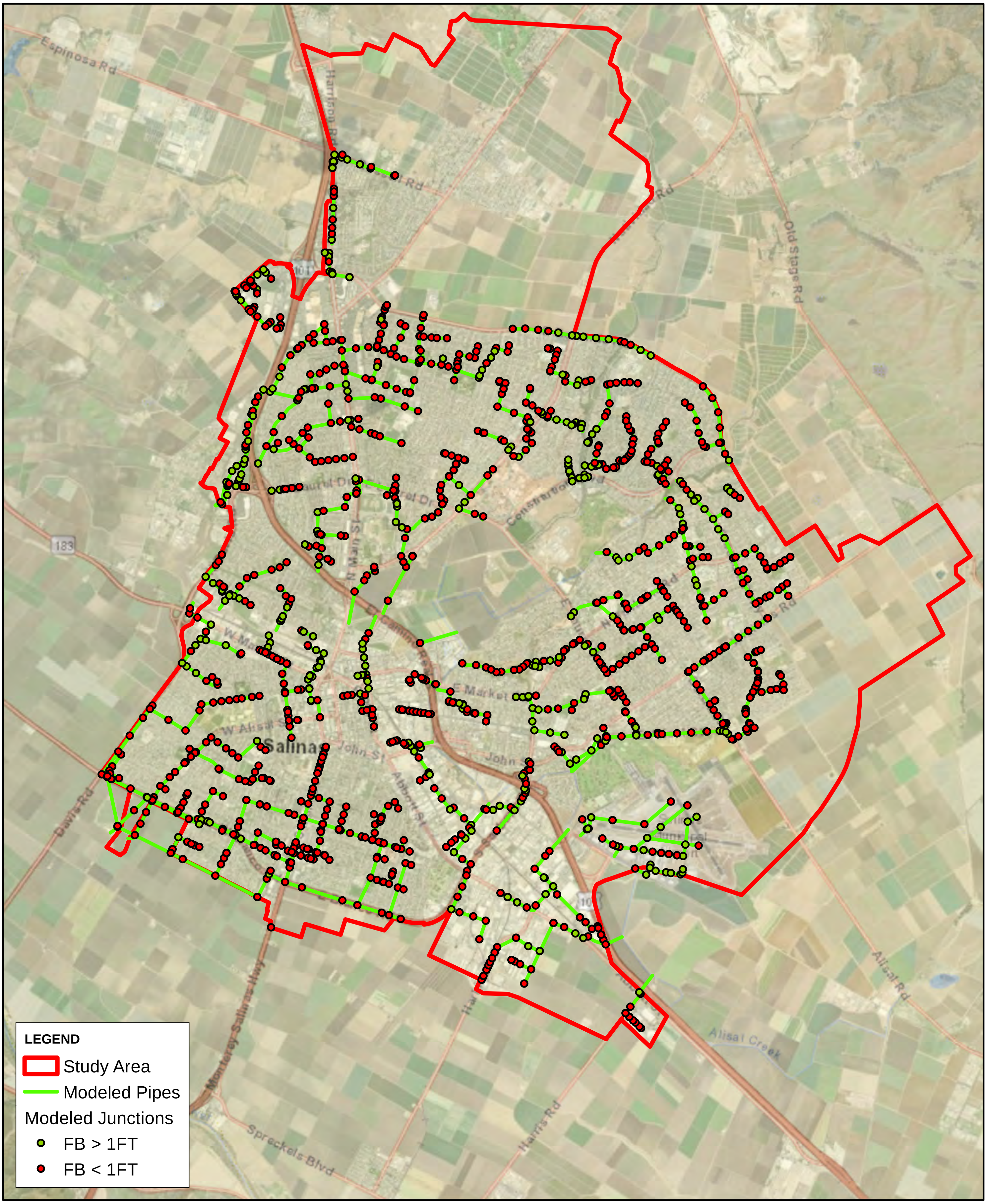

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FIGURE F-7. FREEBOARD LESS THAN 1FT (CLIMATE CHANGE 20-YEAR 24-HOUR STORM, FUTURE CONDITIONS)

JOB NO: 886-022
CREATED BY: AJM
DATE: 09/27/2024

NOTES:
WALLACE GROUP DID NOT PERFORM SURVEY SERVICES FOR THIS MAP. NOT A LEGAL DOCUMENT.

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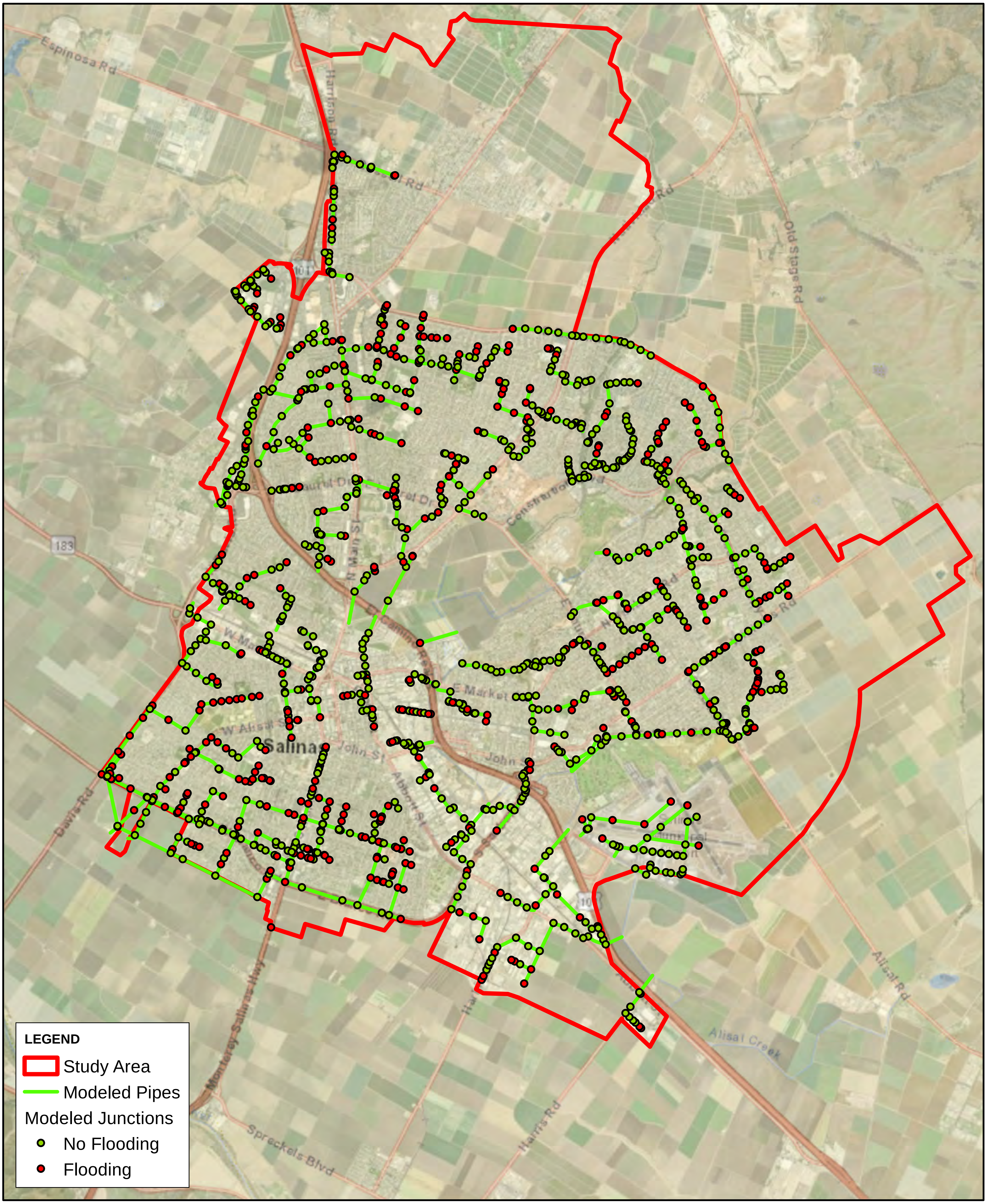

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1 in = 5,000 Feet

FIGURE F-8. FLOODING (CLIMATE CHANGE 20-YEAR 24-HOUR STORM, FUTURE CONDITIONS)

JOB NO: 886-022
CREATED BY: AJM
DATE: 09/27/2024

NOTES:
WALLACE GROUP DID NOT PERFORM SURVEY SERVICES FOR THIS MAP. NOT A LEGAL DOCUMENT.

SALINAS

APPENDIX G: Detailed Storm Drain Model Results – Existing Conditions (Under Separate Cover)

APPENDIX H: Detailed Storm Drain Model Results – Future Conditions (Under Separate Cover)