RESOLUTION NO. 6074

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF SOLEDAD TO ACCEPT AND APPROVE THE FINAL MIRAMONTE STORM DRAIN IMPACT STUDY DATED JANUARY 2023

WHEREAS, infrastructure master plan updates are performed periodically to ensure that the current highest priority projects are determined, prioritized and commenced as intended with collected funds; and

WHEREAS, with the annexation of the Miramonte development, the City's infrastructure master plans needed to be updated to include the infrastructure necessary to serve the full Miramonte development; and

WHEREAS, the Water System Master Plan (WSMP) and Sanitary Sewer Master Plan (SSMP) updates are separate projects already accepted and approved by the Council at the April 3, 2024 meeting.

WHEREAS, an updated Storm Drain Impact Study (SDIS) is needed to ensure that the current storm drain system is analyzed and the highest priority storm drain projects are programmed to sustain the City's storm drain system.

NOW THEREFORE, BE IT HEREBY RESOLVED, by the City Council of the City of Soledad that the Miramonte Storm Drain Impact Study Dated January 2023, a copy of which is attached hereto as **Exhibit 1**, and by reference incorporated herein, is hereby accepted and approved to include the Miramonte Project

PASSED AND ADOPTED by the City Council of the City of Soledad at a regular meeting duly held on the 1st day of May 2024 by the following vote:

AYES, and in favor thereof Councilmembers: Fernando Ansaldo-Sánchez, Fernando Cabrera, Mayor Pro Tem Maria Corralejo, Mayor Anna M. Velazquez

NOES, Councilmembers: None

ABSENT, Councilmembers: None

ABSTAIN, Councilmembers: None

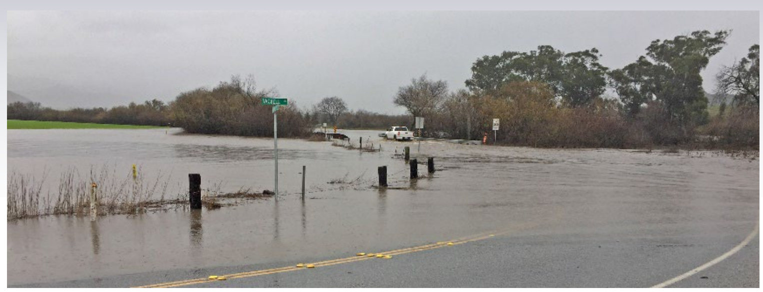
ANNA M. VELAZQUEZ, Mayor

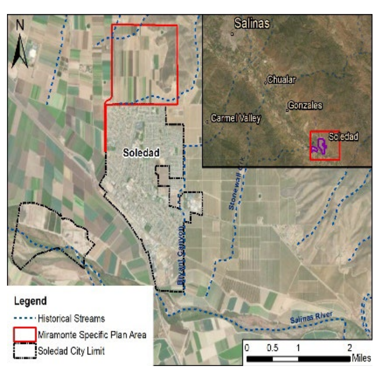
ATTEST:

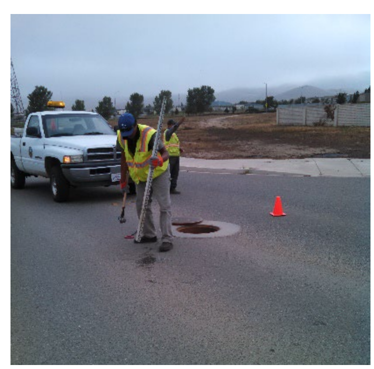
MEGAN HUNTER, City Clerk

Exhibit 1

Final
Miramonte Storm Drain Impact Study
January 2023







PREPARED FOR:

City of Soledad
248 Main Street
Soledad, CA 93960

PREPARED BY:

Schaaf & Wheeler
870 Market St.,
Ste. 1278
San Francisco, CA 94102

Schaaf & Wheeler
CONSULTING CIVIL ENGINEERS

Introduction

The City of Soledad contracted Schaaf & Wheeler to complete a hydrologic and hydraulic analysis to determine the impact the Miramonte Development will have on the City's storm drain system, and what, if any, improvements are required to support the development. Schaaf & Wheeler completed the City of Soledad Storm Drain Master Plan Update in 2015 and will utilize the same hydrologic and hydraulic model to complete this analysis. The MIKE-URBAN (MU) model works within the ArcMap GIS interface and can simulate runoff, open channel flow, and pipe flow.

The Miramonte Development is located to the north of the current City limit as shown in Figure 1. Storm runoff in the development will be collected in a series of pipes and detention basins and will connect to the City's existing drainage system at San Vicente Road. The existing storm drain master plan model will be updated with any improvements that have been constructed since 2015. The development's system will then be added to the model to analyze its impact on the City's system during the 10-year storm event.

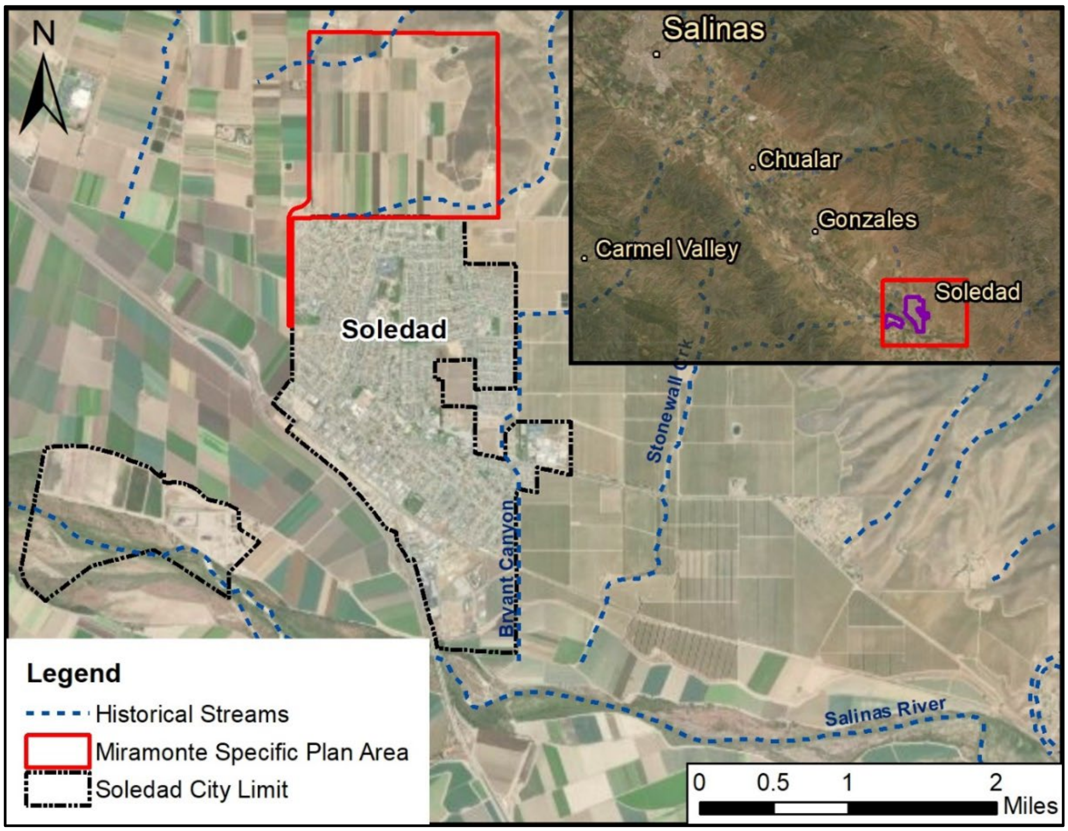


Figure 1 – Miramonte Development Vicinity Map

History of Flooding in the Development Area

The development site currently consists primarily of mildly sloped, agricultural fields draining southwest towards the northern City Limit and San Vicente Road. Off-site areas draining to this same point of concentration consist of steeper hillsides. The concentration of large storm events to San Vicente Road has historically resulted in flooding at the northwest limits of the City and accumulation of sediments from the hillsides and fields (Figure 2).

Figure 2 – Accumulation of Sediment at the corner of Vista De Soledad and San Vicente Road in January 2021.

The City has requested that RJA provide a detention basin design that allows for 100-year overflows to exit the basin and discharge to the west, across San Vicente, rather than allowing the full 100-year peak discharge to enter the City pipe system.

Hydrologic Analysis

The hydrologic methodology used for this study is consistent with the 2015 master plan. The NRCS Curve Number (CN) methodology is used to determine basin runoff. It relies on the use of curve numbers to characterize basin infiltration and runoff potential. Curve numbers are based on a combination of land use, soil characteristics, and antecedent moisture condition (AMC). The AMC for 10-year and 100-year storms is 1.5 based on previous calibration to regional stream gages. The soils and land use are shown in Figures 2 and 3. Percent impervious and CN are shown in Table 1.

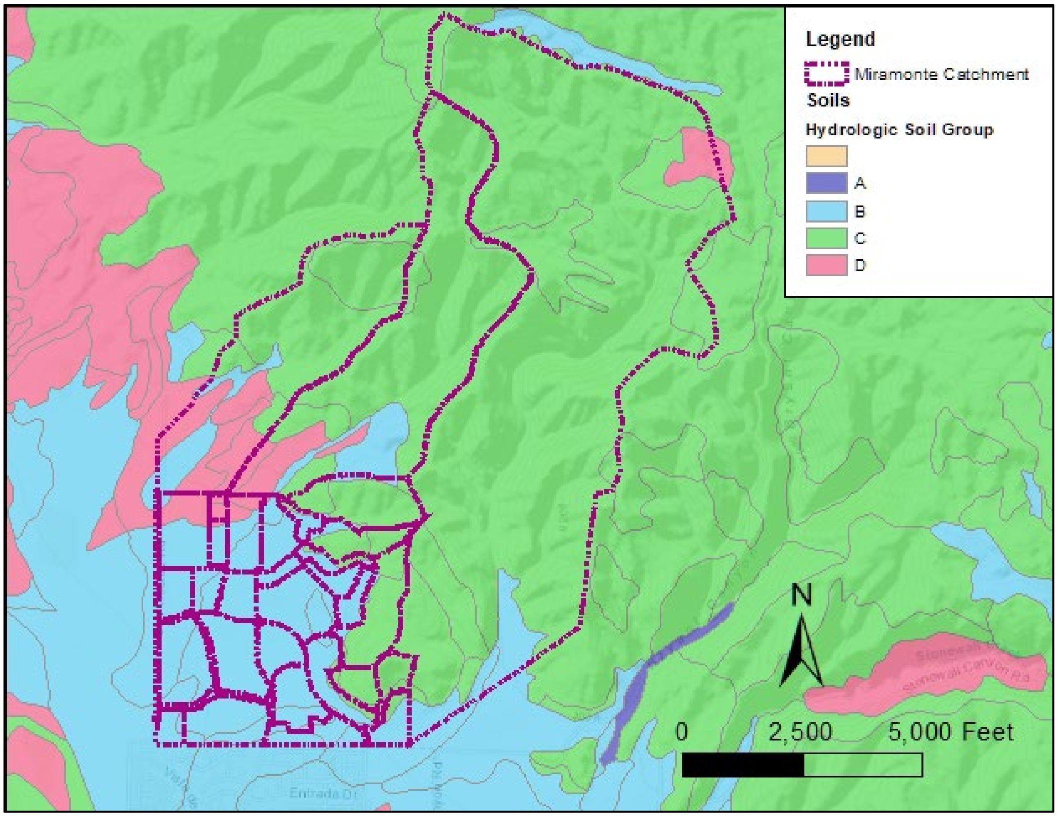


Figure 3 – Hydrologic Soil Group

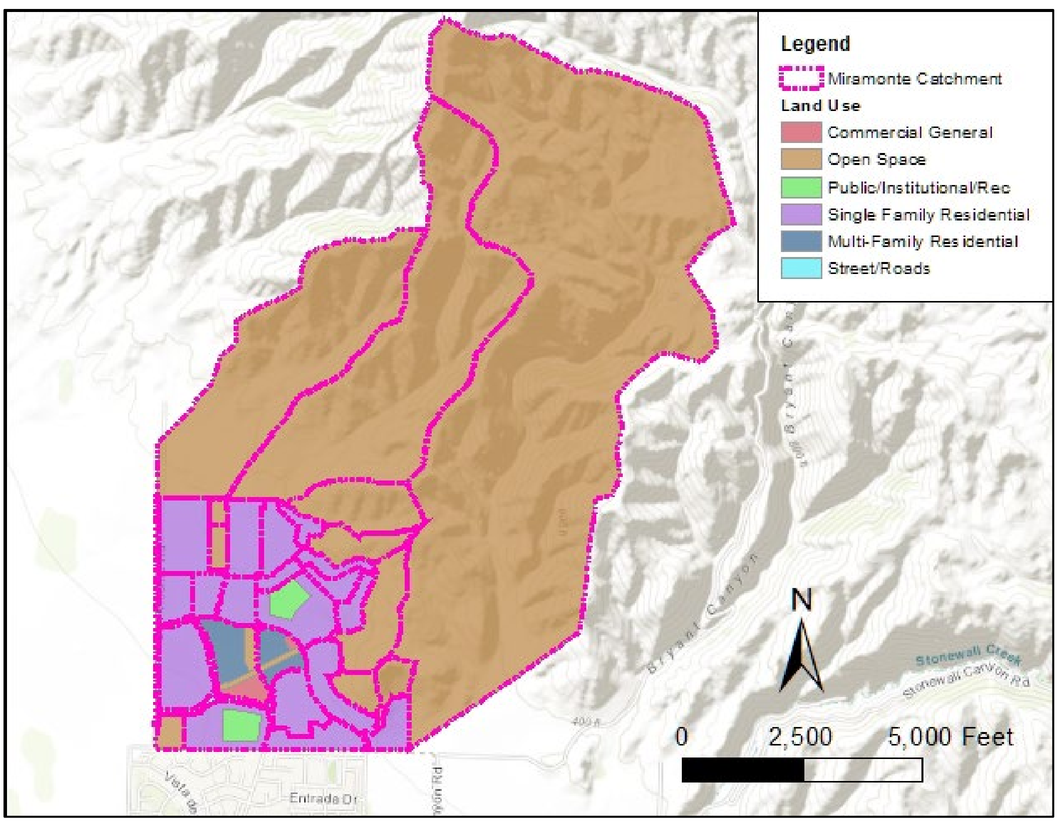


Figure 4 - Miramonte Development Area Land Use

Table 1 - Curve Number by Soil Group and Land Use

			Curve Number by Soil Group			
Land Use	**Impervious**	**Basin N**	**A**	**B**	**C**	**D**
Commercial General	0.80	0.025	44	58	71	74
Commercial Convenience	0.85	0.025	64	68	78	79
Commercial Community	0.85	0.025	64	68	78	79
Commercial-Residential	0.80	0.025	44	58	71	74
Commercial Highway	0.98	0.050	44	58	71	74
Industrial	0.90	0.050	44	58	71	74
Heavy Industrial	0.95	0.050	64	68	78	79
Industrial Buffer	0.60	0.080	44	58	71	74
Office	0.85	0.025	44	58	71	74
Open Space/Wildlife	0.05	0.080	35	51	65	72
Public/Institutional/Rec	0.20	0.025	44	58	71	74
Planned Unit Development	0.65	0.025	44	60	74	80
Single-Family Residential	0.65	0.025	44	58	71	74
Low Density Residential	0.70	0.025	44	58	71	74
Medium Density Residential	0.75	0.025	44	58	71	74
Multi-Family Residential	0.80	0.025	64	68	78	79
Streets/Roads	0.98	0.025	44	58	71	74

Catchment data includes the boundaries of each drainage catchment along with relevant physical and hydrologic parameters including surface area, land use characteristics, basin lag, and curve number. Catchment delineations completed by RJA were utilized for this study.

Curve numbers vary from 0 to 100, with 0 equating to no runoff and 100 indicating that all precipitation will run off. Weighted curve numbers were calculated for each catchment by applying the appropriate CN to the pervious percentage of the catchment and a CN of 100 to the impervious percentage of the catchment.

Basin lag time was calculated using the same methodology used in the storm drain mater plan. The equation uses basin length, shape, slope and land use and is shown below. Any lag times calculated below 10 minutes were raised to 10 minutes, which is a typical time used for roof to gutter flow time.

$$t_{lag} = (0.862) * 24 * N * \left(\frac{L * L_c}{\sqrt{S}}\right)^{0.38} + 0.083$$

where:

t_{lag} basin lag (hours)

N watershed roughness (calculated per catchment

L longest flow path from catchment divide to outlet (miles)

L_c length along flow path from a point perpendicular with the basin centroid to its outlet (miles)

S effective slope along main watercourse (feet/mile)

A 10-year, 24-hour design rainfall event with a total rainfall depth of 2.29-inches and a 100-year, 24-hour design event with a depth of 3.47-inches are utilized per NOAA Atlas 14. The design rainfall pattern is distributed in 5-minute time increments with a fraction of the total rainfall occurring in each interval. The 10-year and 100-year storm intensity graphs are shown in Figure 4.

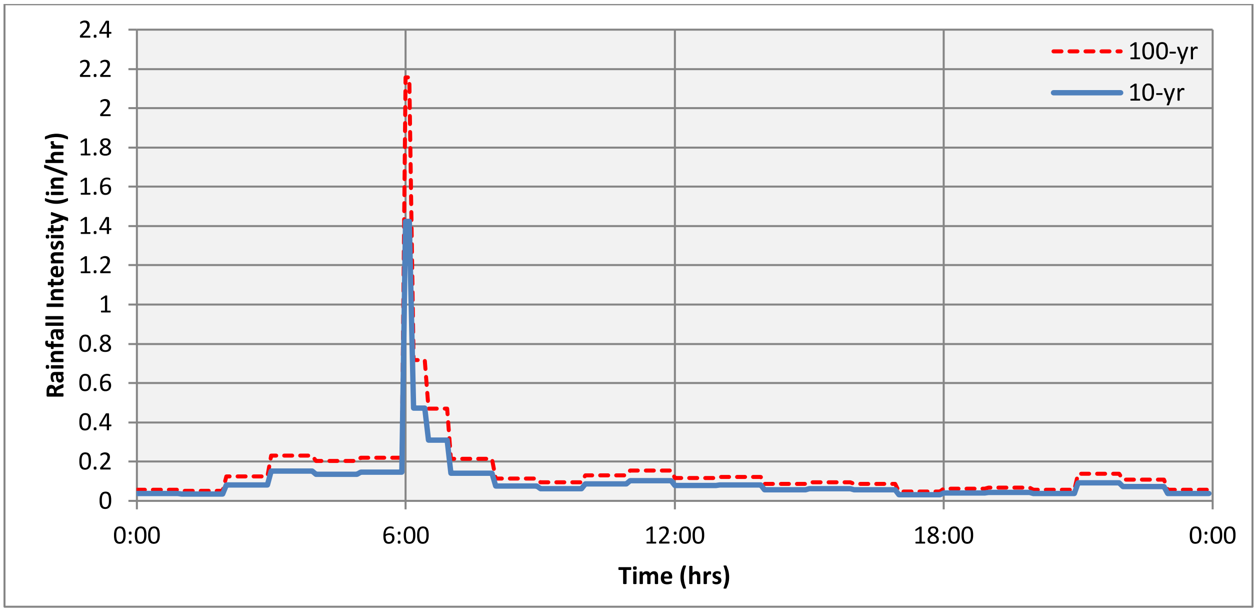


Figure 5 - Soledad 10-year and 100-year, 24-hour Storm Intensity Graph

A more detailed discussion of the hydrologic methodology used in the analysis can be found in the 2015 Soledad Storm Drain Master Plan Update.

Hydraulic Analysis

Model Development

The City's storm drain master plan MU model was updated with improvements constructed since 2015. Improvements include the "Soledad Regional Recharge Project" which consists of pipe improvements adjacent to San Vicente Road and the UPRR basin and the "Gabilan Drive Storm Drain Improvements" which include piping improvements along Gabilan Drive.

The Miramonte Development storm drain network data was added to the storm drain master plan MU model. The development's network consists of storm drain pipes, bioretention areas, detention basins, and detention basin outlet structures. All elements are added to the network except for the bioretention areas. They are considered insignificant due to their limited volume and they fill early enough in the storm to have an insignificant impact on the peak discharge. It is a conservative approach to not include them in the model. The development's network layout is included as Attachment 1.

The Miramonte Development drainage network includes five (5) detention basins of various sizes. They are added to the model as a basin node with an associated volume-elevation curve. The volume-elevation curve data is provided by RJA and is included as Attachment 2. Each basin has an associated outlet structure which restricts the flow out of the basin. The outlet invert and size for each structure is provided by RJA and is included as Attachment 3. Infiltration at the basins is ignored to be conservative.

The basin located at the southwest corner of the development (Basin 1) has a tributary drainage area that includes the entire development and most of the off-site hillside to the northeast. RJA has identified that runoff from the westernmost off-site drainage area (identified in Attachment 1 as O-3) concentrates in an existing agricultural basin to the north of the City. As such, a bypass system conveys that runoff separately and discharges on the west side of San Vicente into that existing basin.

Model Results

The MU model was run with and without the Miramonte Development. MIKE URBAN "Node flood" results were compared to determine the impact of the development on the City's system. Node flood is defined as the maximum depth of water above ground during the storm event. Soledad's level of service per the master plan is a maximum depth of 0.5-feet above ground during the 10-year event. This roughly translates to curb height which means water is contained in the street.

The City's existing storm drain system in and around San Vicente Road currently meets this level of service. The Miramonte Development as initially designed increases the flood depths in the San Vicente system to greater than 0.5-feet at 4 locations between Front Street and Market Street as shown in Attachment 4. The initial design parameters of the outlet structure are summarized in Table 2.

Table 2 - Original Basin 1 Outlet Structure Design

	Original Design	
	Height/Invert	**Size (Shape)**
Orifice #1	1 ft	12 in (Circular)
Orifice #2	1 ft	13 in (Circular)
Orifice #3	1 ft	14 in (Circular)
Orifice #4	8 ft	3 ft x 1 ft (Rectangular)
Orifice #5	8 ft	3 ft x 1 ft (Rectangular)
Riser #1	12 ft	60 in (Circular)
Riser #2	12 ft	60 in (Circular)

The project inherently addresses the existing flooding issue adjacent to San Vicente by containing the runoff from the development and a large portion of the off-site area. Currently, this runoff accumulates at the northwest corner of the City and causes significant ponding. However, the City also voiced some concern about the impact of discharge from the 100-year event through the risers, which were connected to the City's pipe system. At least some portion of the runoff that ponds at the northern City limit discharges across San Vicente to the adjacent agricultural fields.

Without considerably greater detention volume, directing 100-year discharge from the basin into the City's pipe system downstream would cause significant increases in flooding, both in magnitude and duration. In order to mitigate those issues, RJA revised the initial design to include a spillway discharging to the west, across San Vicente to the adjacent fields, in lieu of the proposed risers discharging to the City pipe system. This design still caused a significant increase in flooding in the San Vicente system during the 10-year event.

Schaaf & Wheeler worked with the City and RJA to best determine how to meet the following performance criteria:

1. Decrease the impact of the development on the City's system
2. Ensure that the spillway does not activate in the 10-year event
3. Ensure that 100-year discharge to the west is adequately controlled.

Alterations to the Basin 1 geometry and outlet structure have been recommended. Changes to the outlet structure orifices, which control discharges to the City's system, were made in the model to control 10-

year flooding. The orifice inverts and sizes were adjusted until impacts to the City's system were decreased to meet City's level of service. The basin was also deepened by two feet (from 12 feet to 14 feet) and the spillway crest was raised by two feet. This was required to prevent spillway activation during the 10-year event that started to occur when the orifice sizes were reduced.

The recommended changes to the outlet structure are shown in Table 3. The basin geometry is summarized in Table 4. Provided these changes are made to the design no further storm drain improvements are required. The resulting rise in water surface elevation and flood depth are shown in Attachment 5.

Table 3 – Recommended Changes to Basin 1 Outlet Structure

	Updated Spillway Design		Recommended Design	
	Height/Invert	**Size (Shape)**	**Height/Invert**	**Size (Shape)**
Orifice #1	1 ft	12 in (Circular)	1 ft	6 in (Circular)
Orifice #2	4 ft	12 in (Circular)	4 ft	7 in (Circular)
Orifice #3	6 ft	12 in (Circular)	6 ft	12 in (Circular)
Orifice #4	9 ft	12 in (Circular)	8 ft	12 in (Circular)
Overflow Weir	10 ft	50 ft wide (Spillway)	12 ft	60 ft wide (Spillway)

Table 4 – Recommended Basin Geometry

Height (ft)	Surface Area (sq ft)
0	186,900
2	197,400
4	208,100
6	219,000
8	230,200
10	241,500
12	253,100
14	265,000

The spillway sends high flows beyond the capacity of the four orifices and basin storage into an open channel that discharges through culverts beneath San Vicente Road into the fields to the west. These facilities are to be sufficiently sized to convey flow to the west during a 100-year event without surcharge or flooding.

In general, this system should discharge at or below existing flow rates to adjacent properties. With the recommended orifice design to control flooding in the City's pipe system, the spillway conveys a 100-year peak flow of approximately 96 cfs with a maximum water surface elevation in the basin of 211.9 feet NAVD.

Table 5 – Pre- and Post-Development Result Summary

Model Scenario	10-year	100-year
Predevelopment Peak Discharge*	40.8 cfs	106.4 cfs
Post-Development Spillway Peak Discharge	0 cfs	94.5 cfs
Post-Development Orifice Discharge to System	18.8 cfs	21.0 cfs
Peak Basin Water Surface Elevation	211.5 ft NAVD	212.6 ft NAVD
Pre-Development Node Flood at Market St Basin	0.26 ft	1.98 ft
Post-Development Node Flood at Market St Basin	0.35 ft	2.03 ft

**This does not include the basin that bypasses the development system (O-3) or the development area*

Conclusion

The Miramonte Development was added to the City of Soledad's storm drain master plan hydrologic and hydraulic model to determine the impact the development will have on the City's system. As initially designed the development would have had a significant impact on the City's system by raising flood elevations to greater than 0.5-feet at 4 locations between Front Street and Market Street. Alternatives were explored to reduce the impact of the development. Changing the configuration of the Basin 1 outlet structure and geometry is the best way to reduce the impact of the development to an acceptable level. Designing the outlet structure and basin as shown in Table 3 and Table 4 reduces the 10-year flooding depths to below 0.5-feet, which is the City's level-of-service standard.

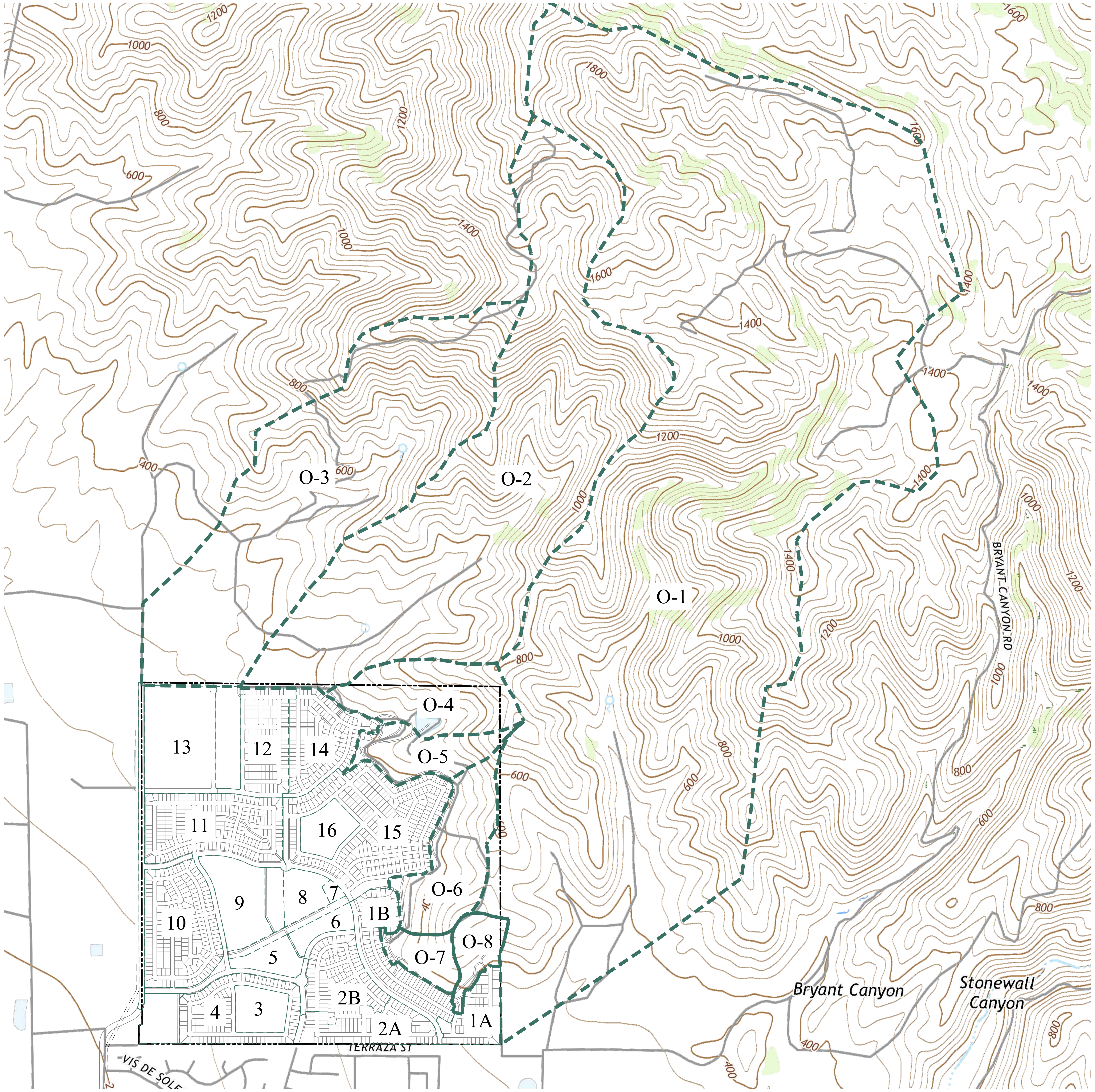
The model has also been used to evaluate the 100-year event and performance of the proposed basin spillway. Importantly, model results indicate that the spillway passes flows that don't exceed the pre-development 100-year peak. Discharge through the orifices during a 100-year event also do not appear to significantly worsen flooding depths in the City's system downstream. Further, the basin's proposed depth of 14 feet provides adequate freeboard during a 100-year event

Provided the design recommendations are followed, the Miramonte Development will have an insignificant impact on the City of Soledad's storm drain system.

Attachment 1

Miramonte Development Storm Drain System Layout

(by RJA)



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MASTER PLAN NOTES:

1. THIS MASTER PLAN IS INTENDED TO REFLECT BACKBONE INFRASTRUCTURE REQUIRED TO SUPPORT THE FUTURE MIRAMONTE DEVELOPMENT. THE PRELIMINARY UTILITY DESIGNS OF THE INDIVIDUAL NEIGHBORHOODS WILL BE SHOWN ON FUTURE APPLICATIONS.

2. STORM DRAIN PIPE SIZES AND LOCATIONS SHOWN ON THIS MASTER PLAN ARE CONCEPTUAL AND SUBJECT TO CHANGE DURING FINAL DESIGN.

3. STORM DRAINS AND STORMWATER BASINS WILL BE PHASED AND MAY BE FURTHER DIVIDED INTO SUBPHASES.

4. ALL BACKBONE CONVEYANCE SYSTEMS AND RETENTION BASINS SHALL BE SIZED AND DESIGNED IN ACCORDANCE WITH THE APPLICABLE CITY DESIGN STANDARDS AND SHALL BE APPROPRIATELY SIZED TO ACCOMMODATE STORMWATER RUNOFF FROM A 100-YEAR STORM EVENT. THE FULL STREET SECTION MAY BE USED TO CONVEY THE 100-YEAR 24-HOUR STORM EVENT.

STORMWATER CONTROL NOTES:

1. THE PROJECT IS LOCATED IN THE CENTRAL COAST REGIONAL WATER QUALITY CONTROL BOARD (CCRWQCB) JURISDICTION. STORM WATER RUNOFF MANAGEMENT SHALL ADHERE TO CCRWQCB RESOLUTION NO. R3-2013-0032 "POST-CONSTRUCTION STORMWATER MANAGEMENT REQUIREMENTS FOR DEVELOPMENT PROJECTS IN THE CENTRAL COAST REGION."

2. LOW IMPACT DEVELOPMENT STRATEGIES (LID) SHALL BE IMPLEMENTED TO THE MAXIMUM EXTENT FEASIBLE WITHIN INDIVIDUAL NEIGHBORHOODS. CONCEPTUAL LOCATIONS OF LID FACILITIES ARE IDENTIFIED ON SHEET 2. THESE LOCATIONS ARE PRELIMINARY AND SUBJECT TO CHANGE DURING FINAL DESIGN. FUTURE APPLICANTS ARE ENCOURAGED TO ADD ADDITIONAL LID FACILITIES WHERE FEASIBLE WITHIN INDIVIDUAL NEIGHBORHOODS.

3. EACH LAND USE AREA WITHIN THE MIRAMONTE DEVELOPMENT IS RESPONSIBLE FOR PROVIDING STORMWATER RETENTION AND TREATMENT PER CCRWQCB RESOLUTION R3-2013-0032 PERFORMANCE REQUIREMENT NO. 2 AND NO. 3. APPROXIMATE RUNOFF RETENTION VOLUMES ARE PROVIDED IN THE CONCEPTUAL STORMWATER TABLE ON SHEET 2.

4. TREATMENT FOR SAN VICENTE IS ANTICIPATED TO OCCUR IN ROADSIDE BIORETENTION SWALES OR MODULAR BIORETENTION BASINS THAT ACCEPTS RUNOFF VIA CURB CUTS. TREATED STORMWATER WILL THEN FLOW TO THE SAN VICENTE STORM DRAIN SYSTEM AND ULTIMATELY TO BASIN 1 WHICH WILL PROVIDE RUNOFF RETENTION FOR SAN VICENTE.

5. COMPLIANCE WITH RESOLUTION R3-2013-0032 PERFORMANCE REQUIREMENT NO. 2 AND NO. 3 IS ASSUMED TO BE ACHIEVED VIA INFILTRATION. HOWEVER, THIS IS SUBJECT TO CHANGE BASED ON SITE SPECIFIC INFILTRATION TESTING AND GEOTECHNICAL INVESTIGATIONS WHICH MAY REQUIRE MODIFICATIONS IN THE SITE PLAN, ASSUMED STOMWATER BASIN LOCATIONS, AND SIZES.

6. STORMWATER FROM ONSITE AREAS 1 THROUGH 16 AND OFFSITE DRAINAGE AREAS O-1 THROUGH O-8 ARE TRIBUTARY TO BASIN 1. IN ORDER TO NOT EXCEED CAPACITY OF THE EXISTING SAN VICENTE STORM DRAIN SYSTEM, BASIN 1 SHALL BE DESIGNED TO LIMIT ULTIMATE BUILDOUT CONDITION PEAK OUTFLOWS TO 100-CFS OR LESS FOR THE 25-YEAR STORM EVENT. IN ADDITION, PEAK FLOWS FOR THE FULLY DEVELOPED CONDITION SHALL NOT EXCEED THE PREDEVELOPMENT PEAK FLOWS FOR THE 2-YEAR THROUGH 100-YEAR STORM EVENTS.

7. CONCEPTUAL BACKBONE STORMWATER BASIN SIZES WERE DETERMINED USING CIVILSTORM HYDRAULIC ROUTING SOFTWARE BY BENTELY SYSTEMS INC. IN CONJUNCTION WITH THE NRCS CURVE NUMBER METHOD. TOTAL RAINFALL DEPTHS WERE DETERMINED USING NOAA ATLAS 14 PRECIPITATION FREQUENCY ESTIMATES SPECIFIC TO EACH DRAINAGE BASIN LOCATION AND ELEVATION. COMPOSITE OUTLET STRUCTURES WERE EMPLOYED FOR EACH BASIN CONSISTING OF A LOW FLOW ORIFICE, WEIR NOTCH OPENINGS, AND AN OVERFLOW INLET RISER.

8. ALL THE INFORMATION AND CALCULATIONS SHOWN ON THIS MASTER PLAN ARE CONCEPTUAL AND SUBJECT TO CHANGE DURING FINAL DESIGN.

STORM DRAIN NOTES:

1. THE STORM DRAIN PIPE NETWORK AND BASIN LOCATIONS ARE CONCEPTUAL AND SUBJECT TO REVISION DURING FINAL DESIGN.

2. STORM DRAIN BACKBONE INFRASTRUCTURE PIPE SIZES REPRESENT THE APPROXIMATE SIZE NECESSARY TO CONVEY FLOW DURING THE 25-YEAR STORM EVENT , AND ARE PRELIMINARY. BACKBONE STORM DRAINS ARE SIZED FOR THE 25 YEAR STORM EVENT PER CITY OF SOLEDAD REQUIREMENTS FOR TRUNK STORM DRAIN LINES. RAINFALL INTENSITY AND RUNOFF COEFFICIENTS WERE SELECTED FROM THE CITY OF SOLEDAD DESIGN STANDARDS AND SPECIFICATIONS.

3. THE CONCEPTUAL SIZE OF STORM DRAIN LINE "G" SHOWN ON THIS MASTER PLAN INCORPORATES DETENTION PROVIDED IN BASINS 2, 3 & 4. BASIN OUTFLOWS WERE CALCULATED USING CIVILSTORM HYDROGRAPH ROUTING.

4. INDIVIDUAL NEIGHBORHOOD STORM DRAIN PIPE SYSTEMS TO BE DESIGNED TO MEET CITY OF SOLEDAD DESIGN STANDARDS TO CONVEY THE 10-YEAR 24-HOUR PEAK FLOW RATE. THE 100-YEAR 24-HOUR PEAK FLOW WILL BE CONVEYED BY THE FULL STREET SECTION TO THE DOWNSTREAM STORMWATER BASIN.

STORM DRAIN MASTER PLAN

MIRAMONTE

SOLEDAD, CALIFORNIA

AUGUST 2020

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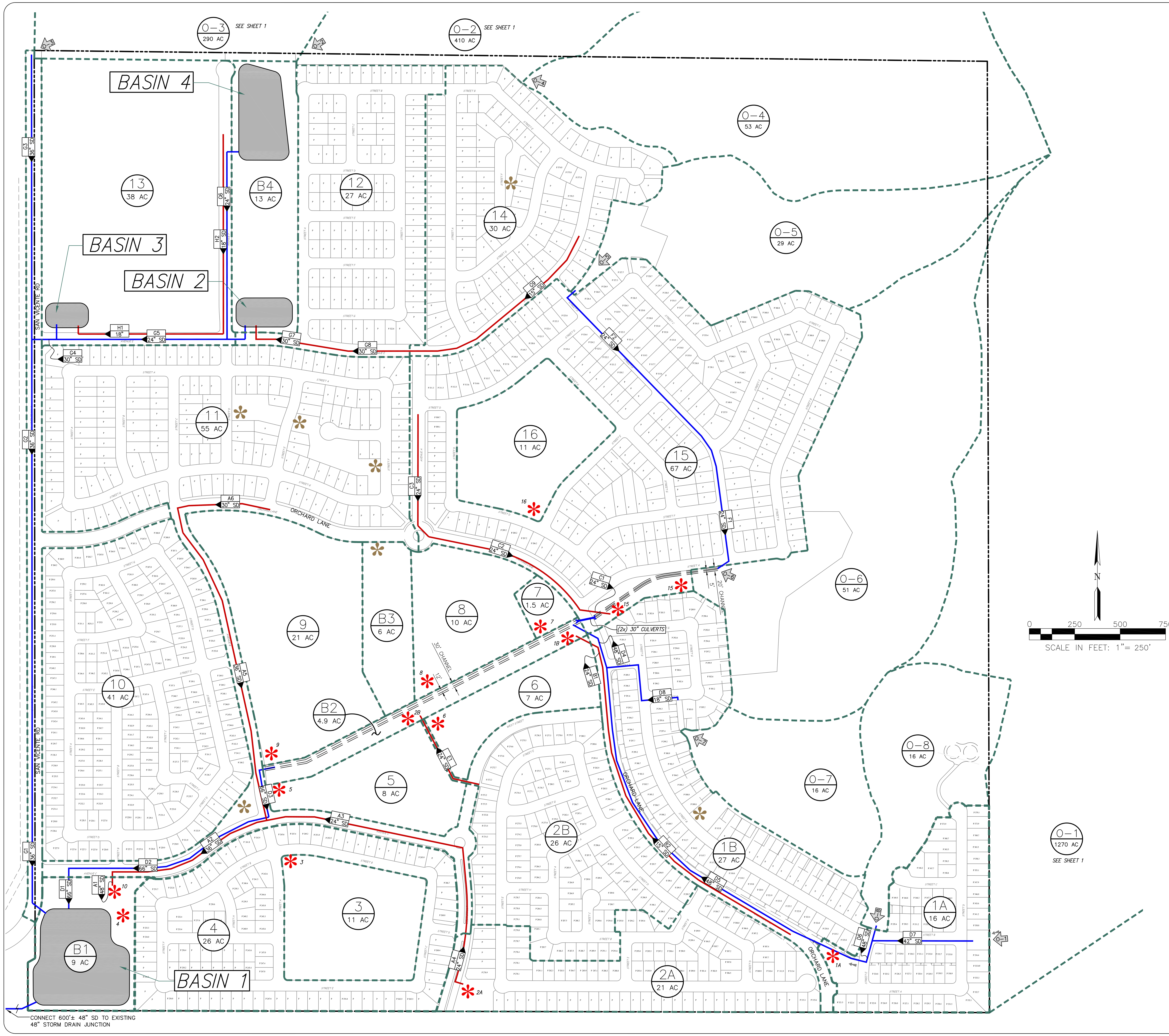

LEGEND

- DRAINAGE AREA BOUNDARY
- 15 / 67 AC — DRAINAGE AREA I.D.
- STORM DRAIN PIPE (TREATED STORMWATER AND OFFSITE STORMWATER BYPASS)
- STORM DRAIN PIPE (NON-TREATED STORMWATER)
- A1 / XX" SD — STORM DRAIN PIPE I.D.
- BACKBONE STORMWATER DETENTION BASIN
- ASSUMED NEIGHBORHOOD STORMWATER BIORETENTION BASIN LOCATION
- POTENTIAL LOCATION OF ADDITIONAL STORMWATER BMP/LID FACILITY
- STORM DRAIN CULVERT
- OFFSITE FLOW DIRECTION

NOTE:
ASSUMED BIORETENTION BASIN LOCATIONS ARE CONCEPTUAL AND DO NOT REPRESENT A FINAL DESIGN. THEY ARE INTENDED TO REPRESENT A MINIMUM DISTRIBUTION OF LID STORMWATER MANAGEMENT FACILITIES THROUGHOUT THE MIRAMONTE DEVELOPMENT. ADDITIONAL BMP/LID FACILITIES MAY BE INCORPORATED INTO THE SITE PLAN, WHERE FEASIBLE, UPON FUTURE APPLICATIONS OF INDIVIDUAL NEIGHBORHOODS.

CONCEPTUAL ONSITE STORMWATER CALCULATION TABLES:

Area ID	Total Area (ac)	Impervious Area (ac)	Pervious Area (ac)	Total % Imperv	Runoff Coefficient	Peak Flow Q_{25} (cfs)	CCRWQCB 95th% Runoff Retention Volume V_{95} (ft^3)
1A	15.7	9.4	6.3	60%	0.60	13.2	23,246
1B	27.3	16.4	10.9	60%	0.60	23.0	40,450
2A	21.0	13.7	7.4	65%	0.64	18.8	34,241
2B	26.4	17.1	9.2	65%	0.64	23.6	42,980
3	10.5	4.2	6.3	40%	0.45	6.7	10,671
4	26.0	16.9	9.1	65%	0.64	23.3	42,361
B1	9.4	0.2	9.2	2%	0.17	2.2	1,883
5	8.4	7.1	1.3	85%	0.79	9.3	20,163
6	6.7	5.3	1.3	80%	0.75	7.0	14,488
B2	4.9	1.0	3.9	20%	0.30	2.1	3,032
7	1.5	1.3	0.2	85%	0.79	1.7	3,601
8	9.5	7.6	1.9	80%	0.75	10.0	20,593
B3	5.6	1.1	4.4	20%	0.30	2.3	3,434
9	21.1	16.9	4.2	80%	0.75	22.3	45,945
10	40.8	26.5	14.3	65%	0.64	36.6	66,509
11	54.8	35.6	19.2	65%	0.64	49.1	89,271
12	26.5	17.2	9.3	65%	0.64	23.8	43,192
B4	12.5	2.5	10.0	20%	0.30	5.3	7,735
13	37.8	24.6	13.2	65%	0.64	33.9	61,609
14	29.9	19.4	10.5	65%	0.64	26.8	48,769
15	67.0	43.5	23.4	65%	0.64	60.0	109,179
16	11.0	4.4	6.6	40%	0.45	7.0	11,169
San Vicente	10.4	7.8	2.6	75%	0.71	11.7	20,467
TOTAL							**764,989**

Notes:

1. Land use density is per the approved VTM for Miramonte Subdivision with associated percent impervious taken from Table 2-2 of the City of Soledad Storm Drain Master Plan, May 2015.
2. Runoff Coefficients are based off Part V, Section 2 of the City of Soledad Design Standards and Specifications.

Governing Equations:

$$V_{95} = \frac{C*P_{95}*A}{12}$$

V_{95} = *95% Rainfall Depth Runoff Retention Volume (ft^3)*

$C = 0.858i^3 - 0.78i^2 + 0.774i + 0.04$

P_{95} = 1.00 *24-hr 95th percentile rainfall depth (in)*

A = *drainage area (ft^2)*

i = *% impervious*

OFFSITE STORMWATER DRAINAGE AREA SUMMARY						
Area ID	Total Area (ac)	Impervious Area (ac)	Pervious Area (ac)	Total % Imperv	Curve Number CN	Peak Flow Q_{25} (cfs)
O-1	1270.0	0.0	1270.0	0%	65	108.5
O-2	410.0	0.0	410.0	0%	65	43.6
O-3	290.0	0.0	290.0	0%	65	35.4
O-4	53.0	0.0	53.0	0%	65	9.3
O-5	29.0	0.0	29.0	0%	65	5.6
O-6	52.0	0.0	52.0	0%	65	10.8
O-7	15.5	0.0	15.5	0%	65	3.4
O-8	15.5	0.0	15.5	0%	65	3.3

Notes:

1. Curve numbers (CNs) were selected from Table 2-2 of the City of Soledad Storm Drain Master Plan, dated May 2005, based on the Open Space/Wildlife land use for Class C soil.

BACKBONE STORMWATER BASINS					
BASIN ID	BASIN LOCATION	TRIBUTARY AREA ID	INFLOW (CFS)	OUTFLOW (CFS)	REQUIRED VOLUME (AC FT)
BASIN 1	SOUTHWEST CORNER OF PROJECT	All	294	91	66.1±
BASIN 2	SOUTHWEST CORNER OF AREA 13	13	51	9	4.7±
BASIN 3	SOUTHERN PORTION OF PUBLIC PARK (12B)	12, 14	32	7	2.9±
BASIN 4	NORTHERN PORTION OF PUBLIC PARK (12B)	O-2, O-4	50	13	10.6±

STORM DRAIN MASTER PLAN
MIRAMONTE
SOLEDAD, CALIFORNIA

AUGUST 2020

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JOB NUMBER: 202015

PLOT DATE: August 24, 2020
FILE PATH: W:\Jobs 20\202015 - Miramonte\Drawings\Prelim\Exhibits\Master Plans\Storm Drain\MP-Miramonte Storm Drain-Sheet 2.dwg

Attachment 2

Basin Volume-Elevation Data (from RJA)

Project Name: Miramonte
Project Location: Soledad, CA
Date: November 2022

Basin 1

Basin Volume Calculations					Infiltration Rate = 0 in/hr		
Elev (ft)	Stage (ft)	Basin Area (ft²)	Total Area (ac)	Void Ratio	Increment Volume (ft³)	Cumm Volume (ft³)	Cumm Volume (ac-ft)
200.00	0	186,900	4.2906		0	0	0.000
201.00	1.0	192,100	4.4100	100%	189,500	189,500	4.350
202.00	2.0	197,400	4.5317	100%	194,750	384,250	8.821
203.00	3.0	202,700	4.6534	100%	200,050	584,300	13.414
204.00	4.0	208,100	4.7773	100%	205,400	789,700	18.129
205.00	5.0	213,500	4.9013	100%	210,800	1,000,500	22.968
206.00	6.0	219,000	5.0275	100%	216,250	1,216,750	27.933
207.00	7.0	224,600	5.1561	100%	221,800	1,438,550	33.025
208.00	8.0	230,200	5.2847	100%	227,400	1,665,950	38.245
209.00	9.0	235,800	5.4132	100%	233,000	1,898,950	43.594
210.00	10.0	241,500	5.5441	100%	238,650	2,137,600	49.073
211.00	11.0	247,300	5.6772	100%	244,400	2,382,000	54.683
212.00	12.0	253,100	5.8104	100%	500,400	2,882,400	66.171
213.00	13.0	259,000	5.9458	100%	506,267	2,888,267	66.305
214.00	14.0	265,000	6.0836	100%	262,000	3,150,267	72.320

Basin 2

Basin Volume Calculations			Infiltration Rate =		1 in/hr		
Stage (ft)	Basin Area (ft²)	Total Area (ac)	Void Ratio	Increment Volume (ft³)	Cumm Volume (ft³)	Cumm Volume (ac-ft)	Infiltration Flow (cfs)	
0.00	40,000	0.9183		0	0	0.000	0.9259	
0.50	40,000	0.9183	40%	8,000	8,000	0.184		*Gravel Layer Volume*
1.00	40,000	0.9183	40%	8,000	16,000	0.367		
1.50	40,000	0.9183	25%	5,000	21,000	0.482		*BSM Layer Volume*
2.00	40,000	0.9183	25%	5,000	26,000	0.597		
2.50	40,000	0.9183	25%	5,000	31,000	0.712		
3.00	40,000	0.9183	25%	5,000	36,000	0.826		
4.00	40,020	0.9187	100%	40,010	76,010	1.745		*Ponding Depth*
5.00	42,440	0.9743	100%	41,230	117,240	2.691		*Freeboard*
6.00	44,920	1.0312	100%	43,680	160,920	3.694		
7.00	47,450	1.0893	100%	89,873	207,113	4.755		

Basin 3

Basin Volume Calculations			Infiltration Rate =		1	in/hr		
Stage (ft)	Basin Area (ft^2)	Total Area (ac)	Void Ratio	Increment Volume (ft^3)	Cumm Volume (ft^3)	Cumm Volume (ac-ft)	Infiltration Flow (cfs)	
0.00	22,630	0.5195		0	0	0.000	0.5238	
0.50	22,630	0.5195	40%	4,526	4,526	0.104		*Gravel Layer Volume*
1.00	22,630	0.5195	40%	4,526	9,052	0.208		
1.50	22,630	0.5195	25%	2,829	11,881	0.273		*BSM Layer Volume*
2.00	22,630	0.5195	25%	2,829	14,710	0.338		
2.50	22,630	0.5195	25%	2,829	17,538	0.403		
3.00	22,630	0.5195	25%	2,829	20,367	0.468		
4.00	24,420	0.5606	100%	23,525	43,892	1.008		*Ponding Depth*
5.00	26,260	0.6028	100%	25,340	69,232	1.589		*Freeboard*
6.00	28,160	0.6465	100%	27,210	96,442	2.214		
7.00	30,120	0.6915	100%	56,360	125,592	2.883		

Basin 4

Basin Volume Calculations			Infiltration Rate =		1	in/hr	
Stage (ft)	Basin Area (ft^2)	Total Area (ac)	Void Ratio	Increment Volume (ft^3)	Cumm Volume (ft^3)	Cumm Volume (ac-ft)	Infiltration Flow (cfs)
0	104,900	2.4082		0	0	0.000	2.4282
1.0	110,400	2.5344	100%	107,650	107,650	2.471	
2.0	115,900	2.6607	100%	113,150	220,800	5.069	
3.0	121,600	2.7916	100%	118,750	339,550	7.795	
4.0	127,400	2.9247	100%	124,500	464,050	10.653	

Basin 5 (Not modeled)

Assumed bioretention basins for individual neighborhoods
Sized to retain 95th% runoff volume shown on Miramonte Storm Drain Master Plan Sheet 2

Basin Volume Calculations			Infiltration Rate =		1	in/hr		
Stage (ft)	Basin Area (ft^2)	Total Area (ac)	Void Ratio	Increment Volume (ft^3)	Cumm Volume (ft^3)	Cumm Volume (ac-ft)	Infiltration Flow (cfs)	
0.00	195,300	4.4835		0	0	0.000	4.5208	
0.50	195,300	4.4835	40%	39,060	39,060	0.897		*Gravel Layer Volume*
1.00	195,300	4.4835	40%	39,060	78,120	1.793		
1.50	195,300	4.4835	25%	24,413	102,533	2.354		*BSM Layer Volume*
2.00	195,300	4.4835	25%	24,413	126,945	2.914		
2.50	195,300	4.4835	25%	24,413	151,358	3.475		
3.00	195,300	4.4835	25%	24,413	175,770	4.035		
4.00	200,300	4.5983	100%	197,800	373,570	8.576		*Ponding Depth*
5.00	205,400	4.7153	100%	202,850	576,420	13.233		*Freeboard*

Attachment 3

Basin Outlet Structure Data (from RJA)

Basin 1

Composite Outlet Structure:

	Spillway	**Orifice #1**	**Orifice #2**	**Orifice #3**	**Orifice #4**
Invert Height	12 ft	1 ft	4 ft	6 ft	9 ft
Size (Shape)	60 ft (Spillway)	12 in (Circular)	12 in (Circular)	12 in (Circular)	12 in (Circular)

Basin 2

Composite Outlet Structure:

	Riser #1	**Orifice #1**
Invert Height	6 ft	4 ft
Size (Shape)	3 ft x 4 ft (Rectangular)	12 in (Circular)

Basin 3

Composite Outlet Structure:

	Riser #1	**Orifice #1**
Invert Height	6 ft	4 ft
Size (Shape)	3 ft x 4 ft (Rectangular)	12 in (Circular)

Basin 4

Composite Outlet Structure:

	Riser #1	**Orifice #1**
Invert Height	3 ft	0 ft
Size (Shape)	3 ft x 4 ft (Rectangular)	1 ft x 0.8 ft (Rectangular)

Basin 5

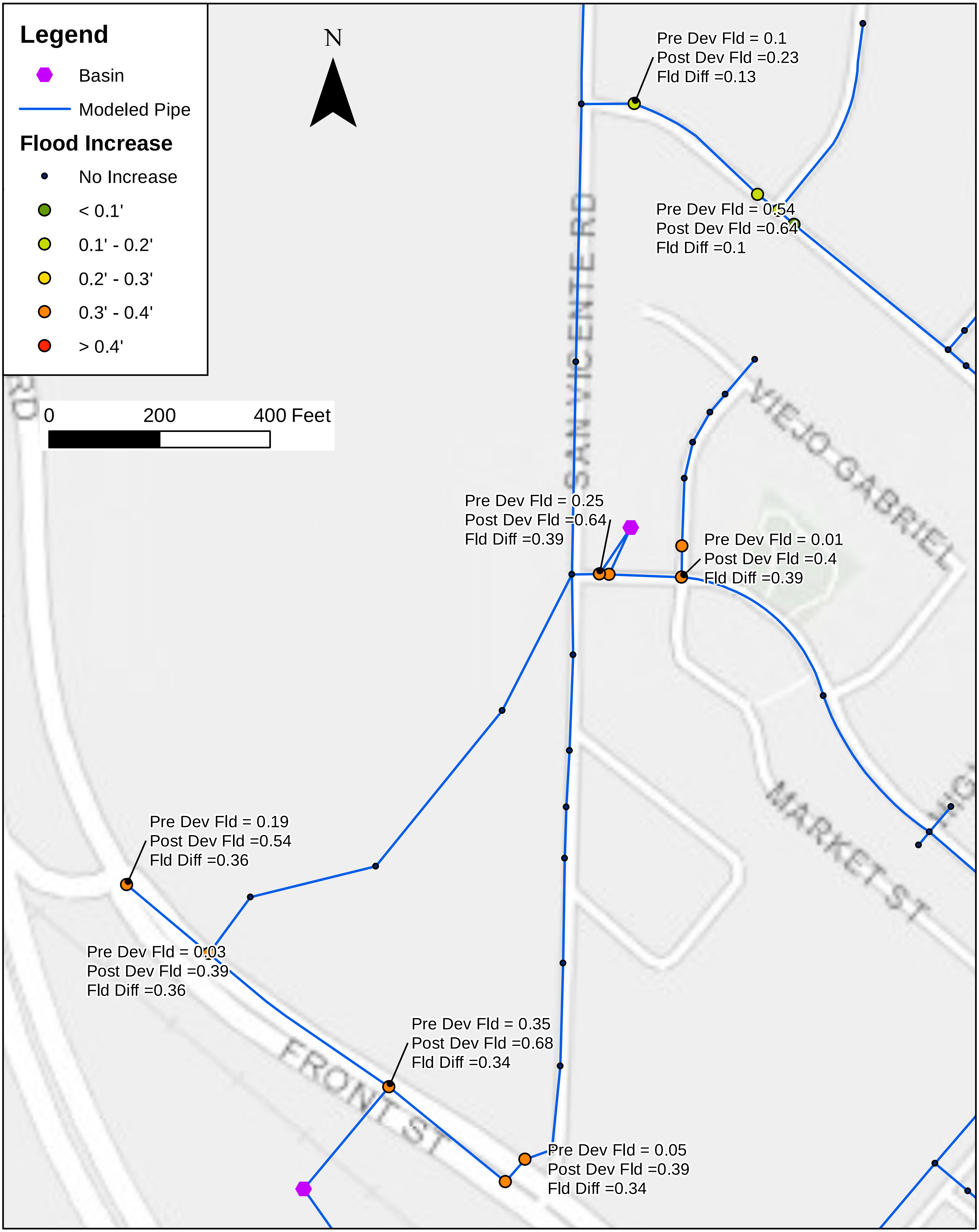
Composite Outlet Structure:

	Assumed Six (6x) Risers
Invert Height	4 ft
Size (Shape)	3 ft x 4 ft (Rectangular)

Attachment 4

10yr Water Surface Elevation Increase due to Miramonte Development as Originally Designed

Increase in 10yr WSEL due to Miramonte Development



Attachment 5

10yr Water Surface Elevation Increase due to Miramonte Development with Final (Recommended) Design

Increase in 10yr WSEL due to Miramonte Development