Appendix A: Pipe Conditions Assessment

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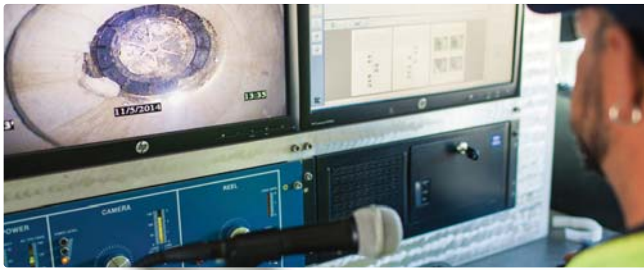

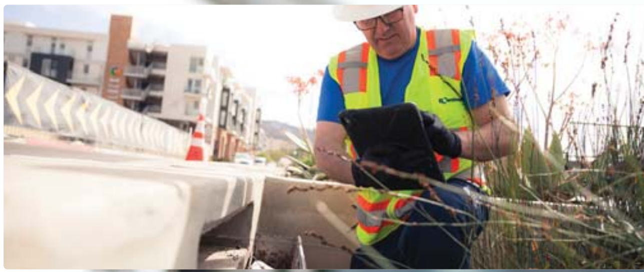

SBA Master Drainage Plan
04.04.2023 to 04.26.2024

Mead & Hunt

SBA Master Drainage Plan

DownStream Services, Inc.

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SBA Master Drainage Plan
04.04.2023 to 04.26.2024

Mead & Hunt

SBA Master Drainage Plan

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PACP CONDITION GRADING SYSTEM

From the Pipeline Assessment Certification Program Handbook, Version 7.0.2 September 2016, page C-1.
Colors added to match reporting software.

Using the PACP Code Matrix, each PACP code is assigned a condition grade ranging from 1 to 5. Grades are assigned based on the significance of the defect, extent of damage, percentage of restriction to flow capacity or the amount of wall loss due to deterioration.

Note: The PACP Condition Grading System alone is inadequate for determining if a pipe segment should be rehabilitated or replaced. Many other factors in addition to the internal condition of the segment should be considered. The fact that a segment has significant grade 4 or grade 5 defects does not necessarily mean the pipe segment should be immediately rehabilitated, thus PACP does not replace the judgment of professional engineers.

CONDITION GRADES

Condition Grades are assigned for two defects categories, structural and operation and maintenance (O&M). Grades and definitions are listed below:

- 5 – MOST SIGNIFICANT DEFECT GRADE
- 4 – SIGNIFICANT DEFECT GRADE
- 3 – MODERATE DEFECT GRADE
- 2 – MINOR TO MODERATE DEFECT GRADE
- 1 – MINOR DEFECT GRADE

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PACP QUICK RATING

From the Pipeline Assessment Certification Program Handbook, Version 7.0.2 September 2016, page C-3.

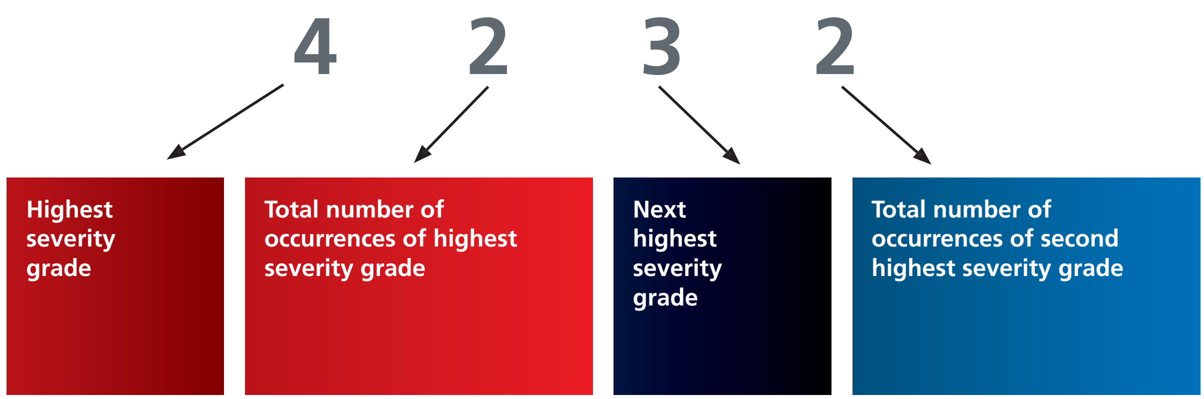
The PACP Quick Rating is a shorthand way of expressing the number of occurrences for the two highest severity grades. The quick rating is a four character score compiled as follows:

First Character: Highest severity grade occurring along the pipe length.

Second Character: Total number of occurrences of that highest severity grade. If the total number exceeds 9, then alphabetic characters are used as follows:
10 to 14=A, 15 to 19=B and 20 to 24=C, etc.

Third Character: Second highest severity grade occurring along the pipe length.

Fourth Character: Total number of the second highest severity grade occurrences. If the total number exceeds 9, then alphabetic characters are used as follows:
10 to 14=A, 15 to 19=B and 20 to 24=C, etc.



FOR EXAMPLE: 4B27

This immediately shows no grade 5 defects or grade 3 defects were observed.

However, fifteen to nineteen grade 4 defects and seven grade 2 defects were found.

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TERMS AND DESCRIPTIONS

PIPE GRAPHIC:

The image on the left side of the report is a visual representation of a top side looking down image of the pipe segment displaying information such as laterals and condition grades for codes/observations.

DISTANCE:

The distance is measured from the access point wall in feet to the nearest tenth.

CONTINUOUS- CONTINUOUS:

Continuous defects are used if a recurring observation such as roots or grease occurs over a length of pipe, allowing simplified coding and limiting the amount of codes recorded. Continuous codes use a "Start Label" and "Finish Label" to represent the opening and closing of a continuous defect. The "Start Label" is Sn, where "n" is the next consecutive start number, and the "Finish Label" is Fn, where "n" is the same number as the Sn for the defect/observation.

POSITION- POS:

The position of the defect/observation in reference to the clock position. If the defect/observation covers a range of clock positions, the second value will be the ending positions traveling clockwise from start to end.

VALUE- VAL 1/2:

The column is used for defects/observations that require a physical dimension such as a diameter of a service tap (1). Some defects may require a second physical dimension (2). Rules vary by defect type.

PERCENT- %:

This column is used to quantify the percentage of height, cross-sectional area affected or alignment for many defects/observation. Visual observations should be recorded in increments of 5%.

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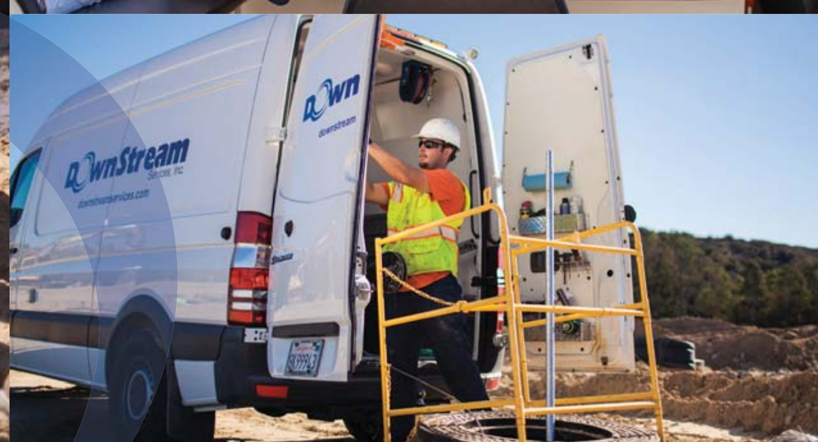
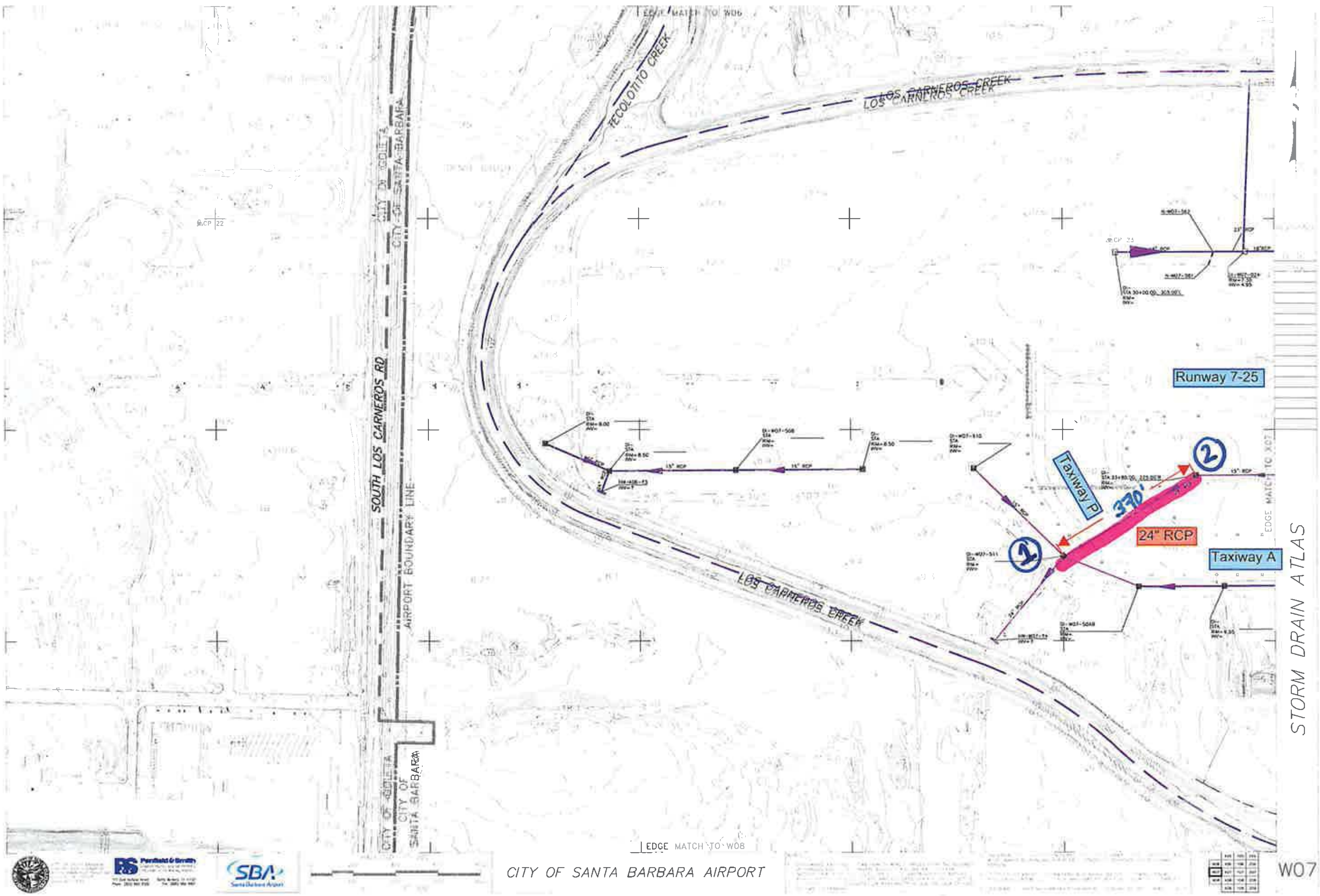
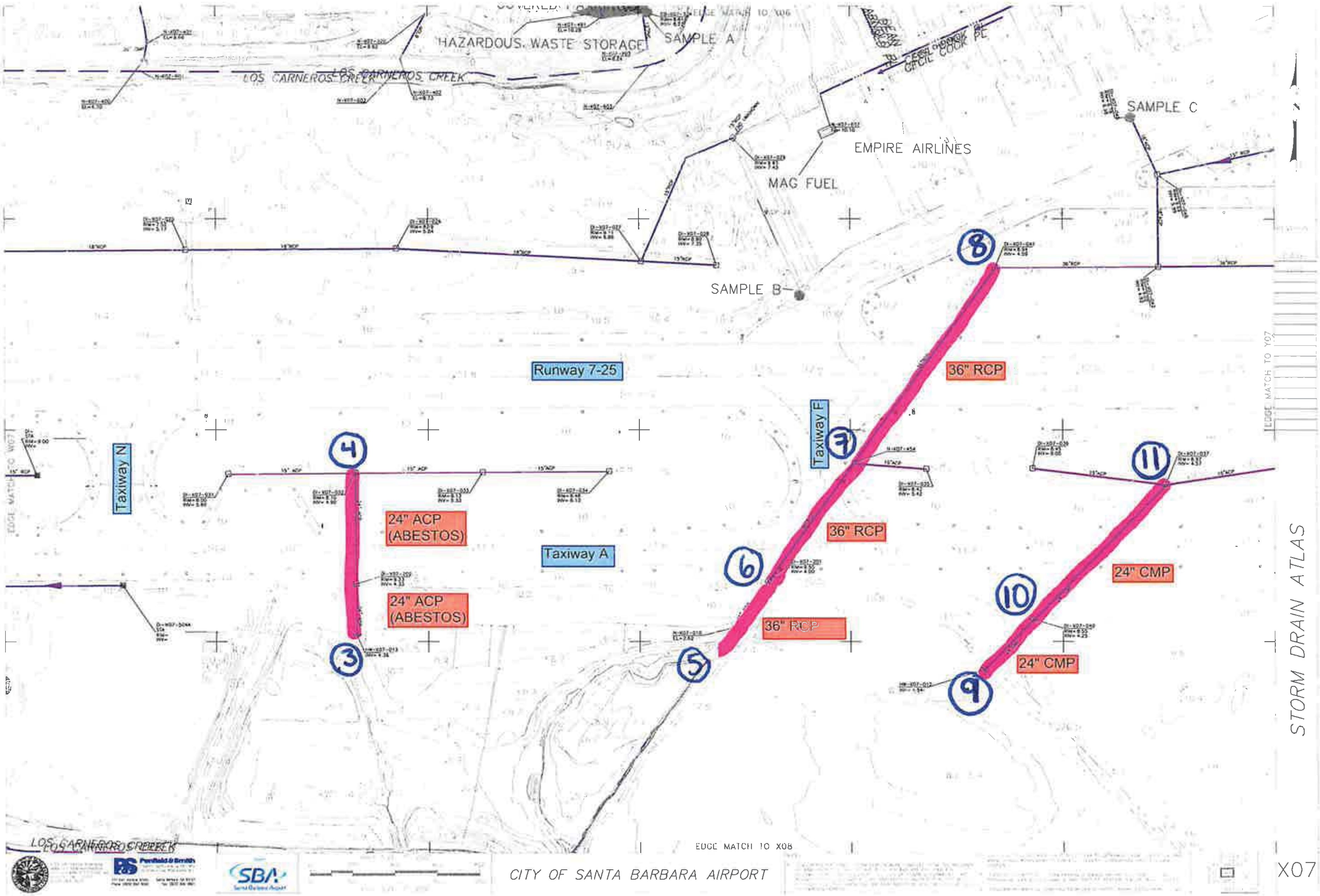
FIELD DATA

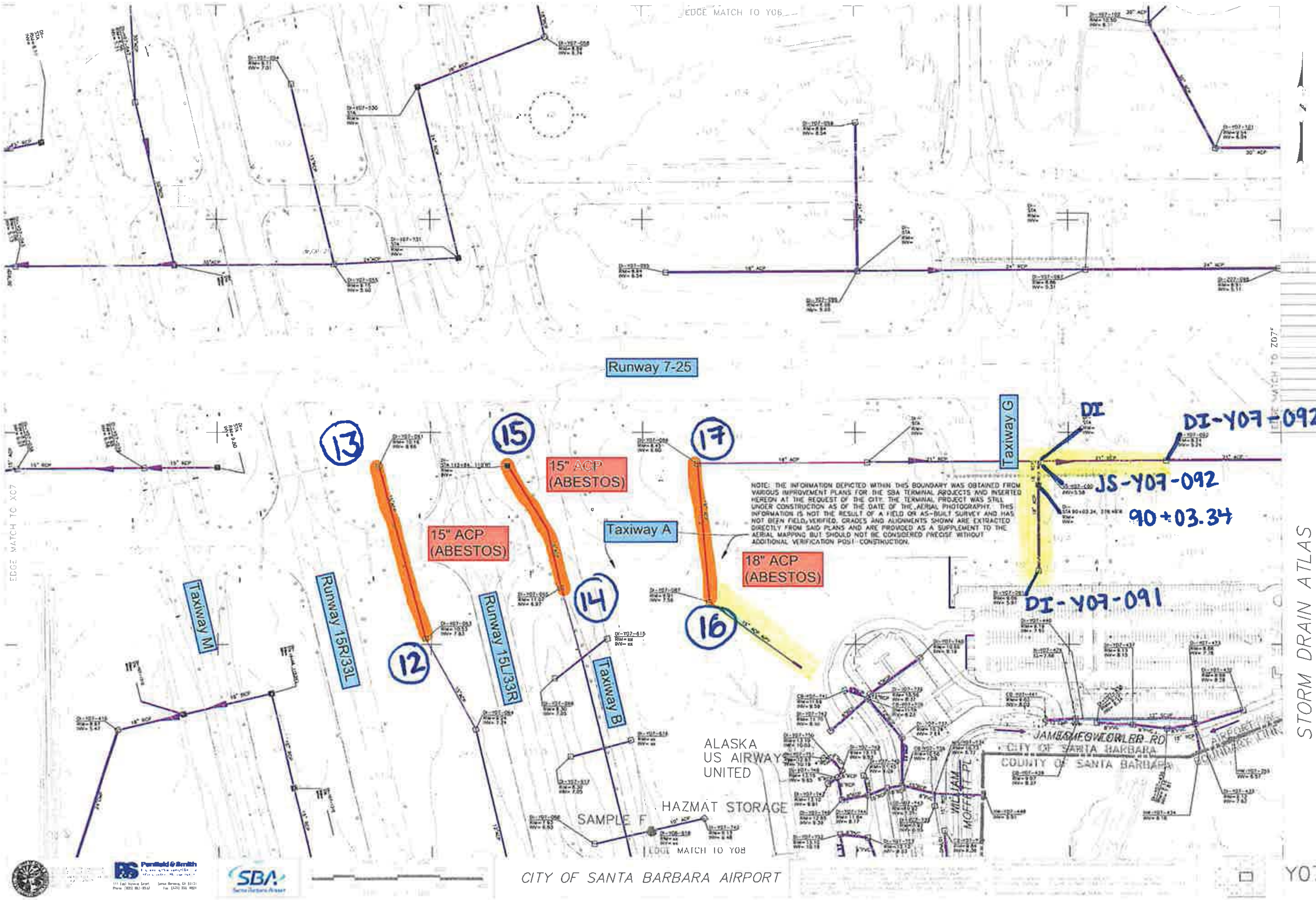
CCTV Inspections




STORM DRAIN ATLAS
W07
CITY OF SANTA BARBARA AIRPORT
Runway 7-25
Taxiway P
Taxiway A
24" RCP
370'
1
2
LOS CARNEROS CREEK
TECOLOTITO CREEK
SOUTH LOS CARNEROS RD
AIRPORT BOUNDARY LINE
CITY OF GOLETA
CITY OF SANTA BARBARA
EDGE MATCH TO W06
EDGE MATCH TO W08
EDGE MATCH TO X07
SBA



HAZARDOUS WASTE STORAGE
SAMPLE A
LOS CARNEROS CREEK
EMPIRE AIRLINES
MAG FUEL
SAMPLE B
SAMPLE C
Runway 7-25
Taxiway N
Taxiway A
Taxiway F
24" ACP (ABESTOS)
24" ACP (ABESTOS)
36" RCP
36" RCP
36" RCP
24" CMP
24" CMP
3
4
5
6
7
8
9
10
11
EDGE MATCH TO X08
EDGE MATCH TO Y07
STORM DRAIN ATLAS
CITY OF SANTA BARBARA AIRPORT
SBA
X07


STORM DRAIN ATLAS
Y07
EDGE MATCH TO Y06
EDGE MATCH TO Z07
EDGE MATCH TO X07
EDGE MATCH TO Y08
Runway 7-25
Taxiway G
Taxiway A
Taxiway B
Taxiway M
Runway 15L/33R
Runway 15R/33L
DI
DI-Y07-092
JS-Y07-092
90+03.34
DI-Y07-091
13
15
17
12
14
16
15" ACP (ABESTOS)
15" ACP (ABESTOS)
18" ACP (ABESTOS)
NOTE: THE INFORMATION DEPICTED WITHIN THIS BOUNDARY WAS OBTAINED FROM VARIOUS IMPROVEMENT PLANS FOR THE SBA TERMINAL PROJECTS AND INSERTED HEREON AT THE REQUEST OF THE CITY. THE TERMINAL PROJECT WAS STILL UNDER CONSTRUCTION AS OF THE DATE OF THE AERIAL PHOTOGRAPHY. THIS INFORMATION IS NOT THE RESULT OF A FIELD OR AS-BUILT SURVEY AND HAS NOT BEEN FIELD VERIFIED. GRADES AND ALIGNMENTS SHOWN ARE EXTRACTED DIRECTLY FROM SAID PLANS AND ARE PROVIDED AS A SUPPLEMENT TO THE AERIAL MAPPING BUT SHOULD NOT BE CONSIDERED PRECISE WITHOUT ADDITIONAL VERIFICATION POST CONSTRUCTION.
ALASKA
US AIRWAYS
UNITED
HAZMAT STORAGE
SAMPLE F
JAMES FOWLER RD
CITY OF SANTA BARBARA
COUNTY OF SANTA BARBARA
WILLIAM MOFFETT PL
SBA
CITY OF SANTA BARBARA AIRPORT

Downstream Services, Inc.
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Inspection report

Date:	Work Order:	Weather:	Surveyed By:	Certificate Number:	Pipe Segment Ref.:
4/24/2024		**Dry**	**Jason Cook**	**U-0219-07030452**	**AP6-AP5**
Year laid:	Pre-cleaning:	Direction:	Pipe Joint Length:	Total Length:	Length Surveyed:
	Light Cleaning	**Downstream**		**141.10 '**	**141.10 '**

City:	**Santa Barbara**	Drainage Area:		Upstream MH:	**AP6**
Street:	**SBA Airport**	Media Label:		Up Rim to Invert:	**0.0**
Location Code:		Flow Control:		Downstream MH:	**AP5**
Location Details:		Sheet Number:		Down Rim to Invert:	**0.0**
Pipe shape:	**Circular**	Sewer Use:	**Stormwater Pipe**	Total gallons used:	**0.0**
Pipe size:	**36 "**	Sewer Category:	**SEC**	Joints passed:	**0**
Pipe material:	**Reinforced Concrete Pipe**	Purpose:		Joints failed:	**0**
Lining Method:		Owner:			
Additional Info:					

1:1065	Distance	Code	Observation	Grade
AP6				
	0.0	ACB	Catch Basin / AP6	
	0.0	MWL	Water Level, 5% of the vertical dimension	
	141.1	ADP	Discharge Point / AP5	
AP5				

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	0000	0.0	0.0	0.0	0.0	0.0	0.0

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Section Pictures - 4/24/2024 - AP6-AP5

City	Street	Date	Lateral Segment Reference	Section No.
Santa Barbara	**SBA Airport**	**4/24/2024**	**AP6-AP5**	**1**

0.00ft
Catch Basin / AP6

0.00ft
Water Level, 5% of the vertical dimension

141.10ft
Discharge Point / AP5

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Inspection report

Date:	Work Order:	Weather:	Surveyed By:	Certificate Number:	Pipe Segment Ref.:
4/24/2024		**Dry**	**Jason Cook**	**U-0219-07030452**	**AP7-AP6**
Year laid:	Pre-cleaning:	Direction:	Pipe Joint Length:	Total Length:	Length Surveyed:
	Light Cleaning	**Upstream**		**120.90 '**	**120.90 '**

City:	**Santa Barbara**	Drainage Area:		Upstream MH:	**AP7**
Street:	**SBA Airport**	Media Label:		Up Rim to Invert:	**0.0**
Location Code:		Flow Control:		Downstream MH:	**AP6**
Location Details:		Sheet Number:		Down Rim to Invert:	**0.0**
Pipe shape:	**Circular**	Sewer Use:	**Stormwater Pipe**	Total gallons used:	**0.0**
Pipe size:	**36 "**	Sewer Category:	**SEC**	Joints passed:	**0**
Pipe material:	**Reinforced Concrete Pipe**	Purpose:		Joints failed:	**0**
Lining Method:		Owner:			
Additional Info:					

1:913	Distance	Code	Observation	Grade
AP6				
	0.0	ACB	Catch Basin / AP6	
	0.0	MWL	Water Level, 10% of the vertical dimension	
	120.9	MSA	Miscellaneous Survey Abandoned / OBR	

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	0000	0.0	0.0	0.0	0.0	0.0	0.0

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Section Pictures - 4/24/2024 - AP7-AP6

City	Street	Date	Lateral Segment Reference	Section No.
Santa Barbara	SBA Airport	4/24/2024	AP7-AP6	2

0.00ft
Catch Basin / AP6

0.00ft
Water Level, 10% of the vertical dimension

120.90ft
Miscellaneous Survey Abandoned / OBR

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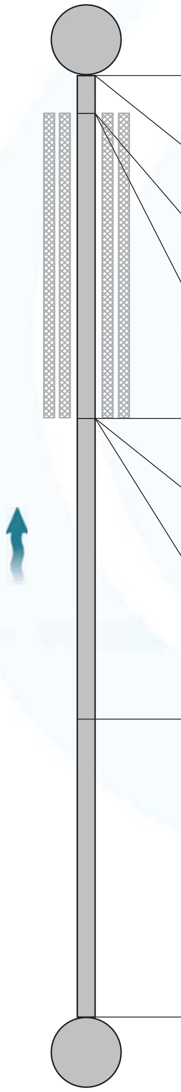
Inspection report

Date:	Work Order:	Weather:	Surveyed By:	Certificate Number:	Pipe Segment Ref.:
4/24/2024		**Dry**	**Jason Cook**	**U-0219-07030452**	**AP11-AP10**
Year laid:	Pre-cleaning:	Direction:	Pipe Joint Length:	Total Length:	Length Surveyed:
	No Pre-Cleaning	**Upstream**		**458.80 '**	**458.80 '**

City:	**Santa Barbara**	Drainage Area:		Upstream MH:	**AP11**
Street:	**SBA Airport**	Media Label:		Up Rim to Invert:	**0.0**
Location Code:		Flow Control:		Downstream MH:	**AP10**
Location Details:		Sheet Number:		Down Rim to Invert:	**0.0**
Pipe shape:	**Circular**	Sewer Use:	**Stormwater Pipe**	Total gallons used:	**0.0**
Pipe size:	**24 "**	Sewer Category:	**SEC**	Joints passed:	**0**
Pipe material:	**Corrugated Metal Pipe**	Purpose:		Joints failed:	**0**
Lining Method:		Owner:			
Additional Info:					



1:3463	Distance		Code	Observation	Grade
AP10					
	0.0		ACB	Catch Basin / AP10	
	0.0		MWL	Water Level, 20% of the vertical dimension	
	18.7	S01	SCP	Surface Damage Corrosion from 2 o'clock to 5 o'clock, Start	
	18.7	S02	SCP	Surface Damage Corrosion from 7 o'clock to 10 o'clock, Start	
	167.2	F01	SCP	Surface Damage Corrosion from 2 o'clock to 5 o'clock, Finish	S3
	167.2	F02	SCP	Surface Damage Corrosion from 7 o'clock to 10 o'clock, Finish	S3
	167.2		MMC	Miscellaneous Material Change, Reinforced concrete pipe / RCP	
	313.7		MMC	Miscellaneous Material Change, Corrugated metal pipe / CMP	
	458.8		ACB	Catch Basin / AP11	
AP11					

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
3K00	0000	180.0	0.0	180.0	3.0	0.0	3.0

Section Pictures - 4/24/2024 - AP11-AP10

City	Street	Date	Lateral Segment Reference	Section No.
Santa Barbara	**SBA Airport**	**4/24/2024**	**AP11-AP10**	**3**

0.00ft
Catch Basin / AP10

0.00ft
Water Level, 20% of the vertical dimension

18.70ft
Surface Damage Corrosion from 2 o'clock to 5 o'clock, Start

18.70ft
Surface Damage Corrosion from 7 o'clock to 10 o'clock, Start

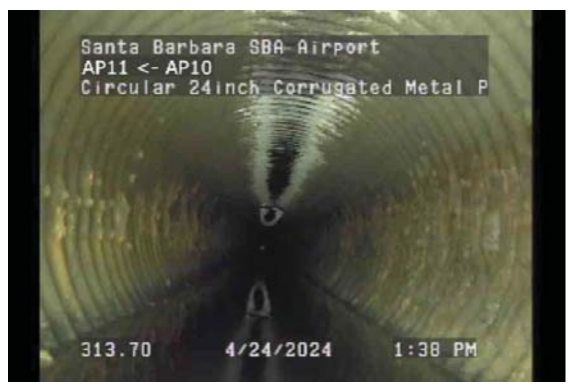
Section Pictures - 4/24/2024 - AP11-AP10

City	Street	Date	Lateral Segment Reference	Section No.
Santa Barbara	**SBA Airport**	**4/24/2024**	**AP11-AP10**	**3**

167.20ft
Surface Damage Corrosion from 2 o'clock to 5 o'clock, Finish

167.20ft
Surface Damage Corrosion from 7 o'clock to 10 o'clock, Finish

167.20ft
Miscellaneous Material Change, Reinforced concrete pipe / RCP



313.70ft
Miscellaneous Material Change, Corrugated metal pipe / CMP

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Section Pictures - 4/24/2024 - AP11-AP10

City	Street	Date	Lateral Segment Reference	Section No.
Santa Barbara	**SBA Airport**	**4/24/2024**	**AP11-AP10**	**3**

458.80ft
Catch Basin / AP11

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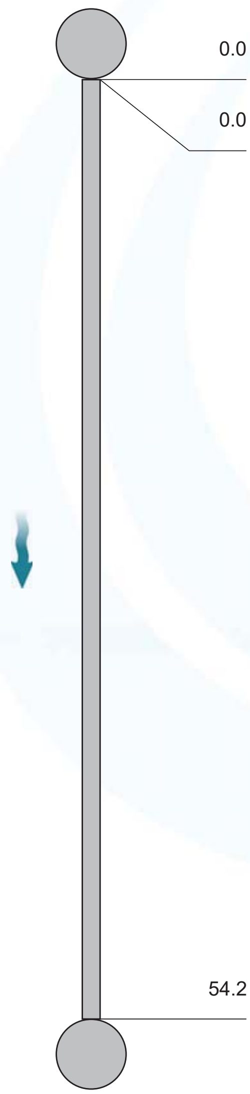
Inspection report

Date:	Work Order:	Weather:	Surveyed By:	Certificate Number:	Pipe Segment Ref.:
4/7/2023		**Dry**	**Jason Cook**	**U-0219-07030452**	**90+03.34 -JS-Y07-090**
Year laid:	Pre-cleaning:	Direction:	Pipe Joint Length:	Total Length:	Length Surveyed:
	Light Cleaning	**Downstream**		**54.20 '**	**54.20 '**

City:	**Santa Barbara**	Drainage Area:		Upstream MH:	**90+03.34**
Street:	**SBA Airport**	Media Label:	**T8704072023**	Up Rim to Invert:	**0.0**
Location Code:		Flow Control:		Downstream MH:	**JS-Y07-090**
Location Details:		Sheet Number:		Down Rim to Invert:	**0.0**
Pipe shape:	**Circular**	Sewer Use:	**Stormwater Pipe**	Total gallons used:	**0.0**
Pipe size:	**18 "**	Sewer Category:	**SEC**	Joints passed:	**0**
Pipe material:	**Reinforced Concrete Pipe**	Purpose:		Joints failed:	**0**
Lining Method:		Owner:			
Additional Info:					

90+03.34



JS-Y07-090

1:410 Distance	Code	Observation	Grade
0.0	ACB	Catch Basin / 90+03.34	
0.0	MWL	Water Level, 10% of the vertical dimension	
54.2	ATC	Tee Connection / JS-Y07-090	

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	0000	0.0	0.0	0.0	0.0	0.0	0.0

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Section Pictures - 4/7/2023 - 90+03.34 -JS-Y07-090

City	Street	Date	Lateral Segment Reference	Section No.
Santa Barbara	SBA Airport	4/7/2023	90+03.34 -JS-Y07-090	4

0.00ft
Catch Basin / 90+03.34

0.00ft
Water Level, 10% of the vertical dimension

54.20ft
Tee Connection / JS-Y07-090

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Inspection report

Date:	Work Order:	Weather:	Surveyed By:	Certificate Number:	Pipe Segment Ref.:
4/4/2023		**Dry**	**Jason Cook**	**U-0219-07030452**	**AP1 - AP2**
Year laid:	Pre-cleaning:	Direction:	Pipe Joint Length:	Total Length:	Length Surveyed:
	Light Cleaning	**Upstream**		**375.10 '**	**375.10 '**

City:	**Santa Barbara**	Drainage Area:		Upstream MH:	**AP2**
Street:	**SBA Airport**	Media Label:	**T8704042023**	Up Rim to Invert:	**0.0**
Location Code:		Flow Control:		Downstream MH:	**AP1**
Location Details:		Sheet Number:		Down Rim to Invert:	**0.0**
Pipe shape:	**Circular**	Sewer Use:	**Stormwater Pipe**	Total gallons used:	**0.0**
Pipe size:	**24 "**	Sewer Category:	**SEC**	Joints passed:	**0**
Pipe material:	**Reinforced Concrete Pipe**	Purpose:		Joints failed:	**0**
Lining Method:		Owner:			
Additional Info:					

1:2831	Distance	Code	Observation	Grade
AP1				
	0.0	ACB	Catch Basin / AP1	
	0.0	MWL	Water Level, 5% of the vertical dimension	
	352.9	CM	Crack Multiple from 11 o'clock to 1 o'clock, within 8 inch	S3
	375.1	ACB	Catch Basin / AP2	
AP2				

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
3100	0000	3.0	0.0	3.0	3.0	0.0	3.0

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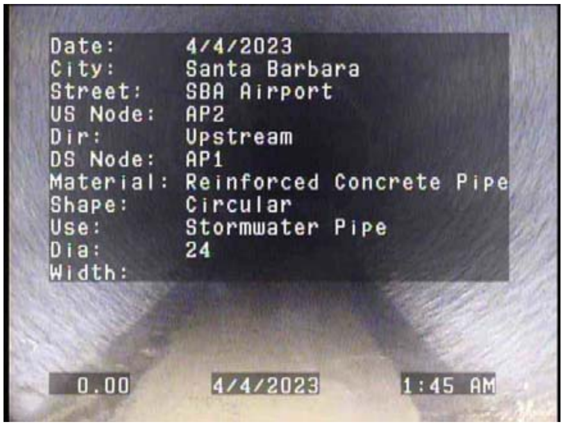
Section Pictures - 4/4/2023 - AP1 - AP2

City	Street	Date	Lateral Segment Reference	Section No.
Santa Barbara	**SBA Airport**	**4/4/2023**	**AP1 - AP2**	**5**



0.00ft
Catch Basin / AP1

0.00ft
Water Level, 5% of the vertical dimension

352.90ft
Crack Multiple from 11 o'clock to 1 o'clock, within 8 inch

375.10ft
Catch Basin / AP2

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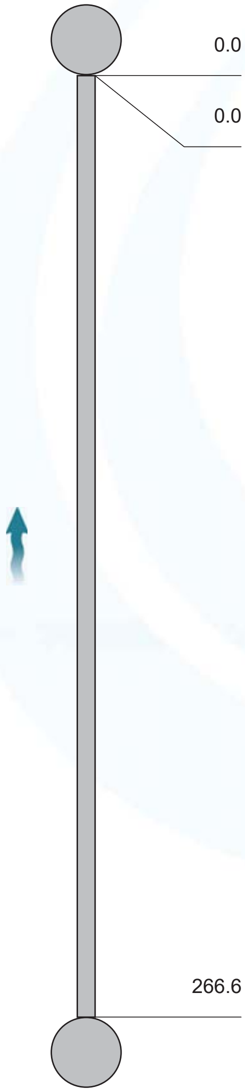
Inspection report

Date:	Work Order:	Weather:	Surveyed By:	Certificate Number:	Pipe Segment Ref.:
4/4/2023		**Dry**	**Jason Cook**	**U-0219-07030452**	**AP4 - AP4A**
Year laid:	Pre-cleaning:	Direction:	Pipe Joint Length:	Total Length:	Length Surveyed:
	Light Cleaning	**Upstream**		**266.60 '**	**266.60 '**

City:	**Santa Barbara**	Drainage Area:		Upstream MH:	**AP4**
Street:	**SBA Airport**	Media Label:	**T8704042023**	Up Rim to Invert:	**0.0**
Location Code:		Flow Control:		Downstream MH:	**AP4A**
Location Details:		Sheet Number:		Down Rim to Invert:	**0.0**
Pipe shape:	**Circular**	Sewer Use:	**Stormwater Pipe**	Total gallons used:	**0.0**
Pipe size:	**24 "**	Sewer Category:	**SEC**	Joints passed:	**0**
Pipe material:	**Asbestos Cement**	Purpose:		Joints failed:	**0**
Lining Method:		Owner:			
Additional Info:					

1:2013	Distance	Code	Observation	Grade
AP4A				
	0.0	ACB	Catch Basin / AP4A	
	0.0	MWL	Water Level, 5% of the vertical dimension	
	266.6	ACB	Catch Basin / AP4	
AP4				



QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	0000	0.0	0.0	0.0	0.0	0.0	0.0

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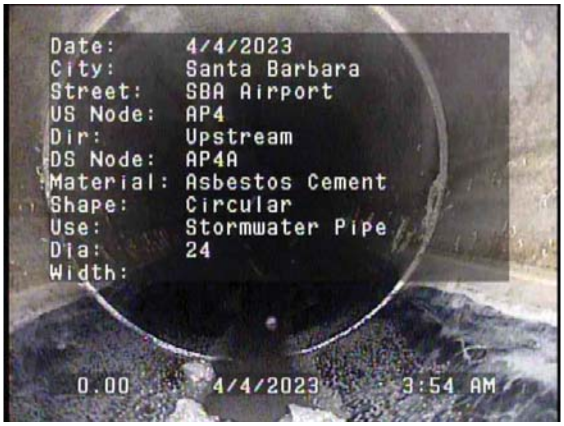
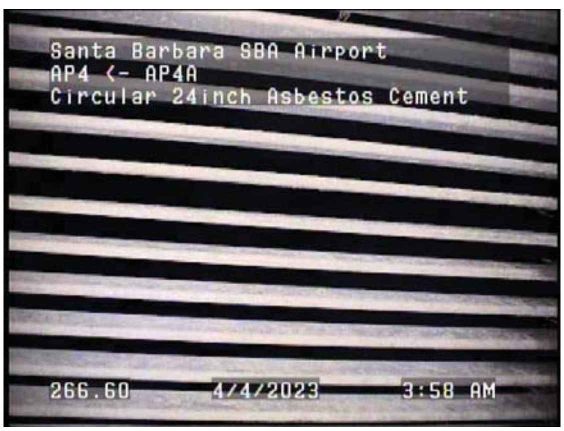
Section Pictures - 4/4/2023 - AP4 - AP4A

City	Street	Date	Lateral Segment Reference	Section No.
Santa Barbara	**SBA Airport**	**4/4/2023**	**AP4 - AP4A**	**6**



0.00ft
Catch Basin / AP4A

0.00ft
Water Level, 5% of the vertical dimension



266.60ft
Catch Basin / AP4

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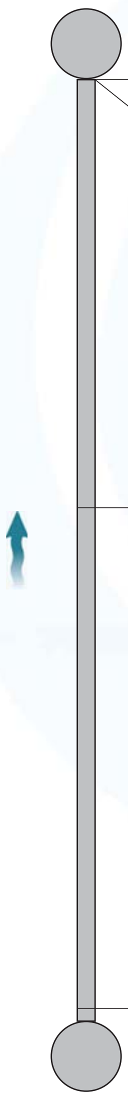
Inspection report

Date:	Work Order:	Weather:	Surveyed By:	Certificate Number:	Pipe Segment Ref.:
4/4/2023		**Dry**	**Jason Cook**	**U-0219-07030452**	**AP4 - AP4A**
Year laid:	Pre-cleaning:	Direction:	Pipe Joint Length:	Total Length:	Length Surveyed:
	Light Cleaning	**Upstream**		**266.60 '**	**262.90 '**

City:	**Santa Barbara**	Drainage Area:		Upstream MH:	**AP4**
Street:	**SBA Airport**	Media Label:	**T8704042023**	Up Rim to Invert:	**0.0**
Location Code:		Flow Control:		Downstream MH:	**AP4A**
Location Details:		Sheet Number:		Down Rim to Invert:	**0.0**
Pipe shape:	**Circular**	Sewer Use:	**Stormwater Pipe**	Total gallons used:	**0.0**
Pipe size:	**24 "**	Sewer Category:	**SEC**	Joints passed:	**0**
Pipe material:	**Asbestos Cement**	Purpose:		Joints failed:	**0**
Lining Method:		Owner:			
Additional Info:					

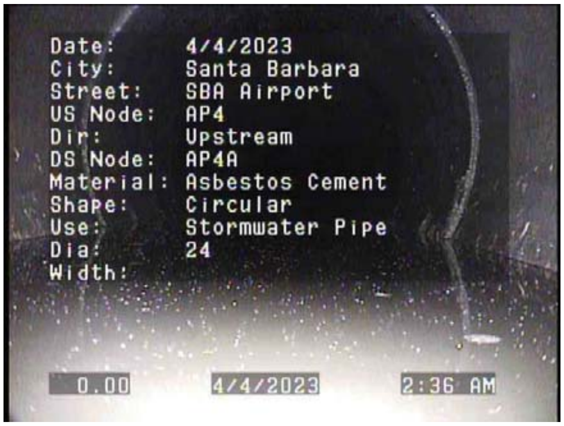
1:2013	Distance	Code	Observation	Grade
AP4A				
	0.0	ACB	Catch Basin / AP4A	
	0.0	MWL	Water Level, 20% of the vertical dimension	
	121.3	MWL	Water Level, 10% of the vertical dimension	
	262.9	ACB	Catch Basin / AP4	
AP4				



QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	0000	0.0	0.0	0.0	0.0	0.0	0.0

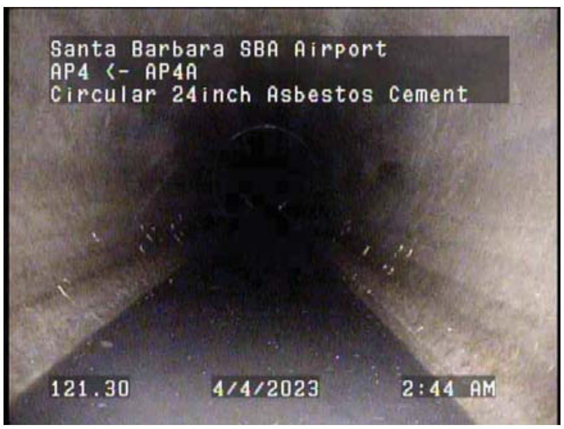
Section Pictures - 4/4/2023 - AP4 - AP4A

City	Street	Date	Lateral Segment Reference	Section No.
Santa Barbara	SBA Airport	4/4/2023	AP4 - AP4A	6



0.00ft
Catch Basin / AP4A

0.00ft
Water Level, 20% of the vertical dimension



121.30ft
Water Level, 10% of the vertical dimension

262.90ft
Catch Basin / AP4

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Inspection report

Date:	Work Order:	Weather:	Surveyed By:	Certificate Number:	Pipe Segment Ref.:
4/5/2023		**Dry**	**Jason Cook**	**U-0219-07030452**	**AP4A - AP3**
Year laid:	Pre-cleaning:	Direction:	Pipe Joint Length:	Total Length:	Length Surveyed:
	Light Cleaning	**Downstream**		**123.70 '**	**123.70 '**

City:	**Santa Barbara**	Drainage Area:		Upstream MH:	**AP4A**
Street:	**SBA Airport**	Media Label:	**T8704052023**	Up Rim to Invert:	**0.0**
Location Code:		Flow Control:		Downstream MH:	**AP3**
Location Details:		Sheet Number:		Down Rim to Invert:	**0.0**
Pipe shape:	**Circular**	Sewer Use:	**Stormwater Pipe**	Total gallons used:	**0.0**
Pipe size:	**24 "**	Sewer Category:	**SEC**	Joints passed:	**0**
Pipe material:	**Asbestos Cement**	Purpose:		Joints failed:	**0**
Lining Method:		Owner:			
Additional Info:					

1:934	Distance	Code	Observation	Grade
AP4A				
	0.0	ACB	Catch Basin / AP4A	
	0.0	MWL	Water Level, 20% of the vertical dimension	
	18.7	JOM	Joint Offset Medium	S3
	64.1	CM	Crack Multiple from 11 o'clock to 1 o'clock, within 8 inch	S3
	64.1	ID	Infiltration Dripper at 12 o'clock, within 8 inch	M3
	66.0	DSZ	Deposits Settled Other, 5% of cross sectional area from 6 o'clock to 7 o'clock / Debris	M2
	67.9	MWL	Water Level, 5% of the vertical dimension	
	89.6	DSZ	Deposits Settled Other, 10% of cross sectional area from 5 o'clock to 7 o'clock / Debris	M2
	123.7	ADP	Discharge Point / AP3	
AP3				

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
3200	3122	6.0	7.0	13.0	3.0	2.3	2.6

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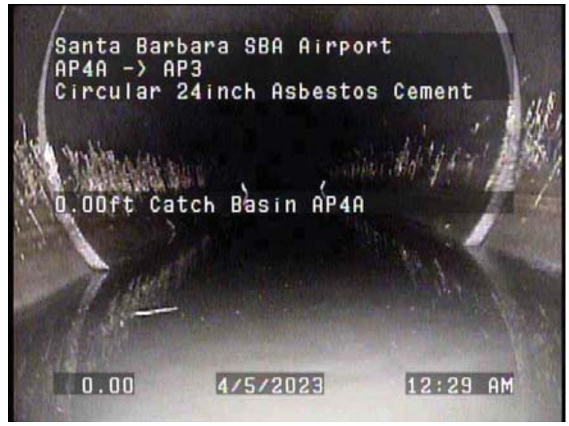
Section Pictures - 4/5/2023 - AP4A - AP3

City	Street	Date	Lateral Segment Reference	Section No.
Santa Barbara	**SBA Airport**	**4/5/2023**	**AP4A - AP3**	**7**

0.00ft
Catch Basin / AP4A



0.00ft
Water Level, 20% of the vertical dimension

18.70ft
Joint Offset Medium

64.10ft
Crack Multiple from 11 o'clock to 1 o'clock, within 8 inch

Section Pictures - 4/5/2023 - AP4A - AP3

City	Street	Date	Lateral Segment Reference	Section No.
Santa Barbara	**SBA Airport**	**4/5/2023**	**AP4A - AP3**	**7**

64.10ft
Infiltration Dripper at 12 o'clock, within 8 inch

66.00ft
Deposits Settled Other, 5% of cross sectional area from 6 o'clock to 7 o'clock / Debris

67.90ft
Water Level, 5% of the vertical dimension

89.60ft
Deposits Settled Other, 10% of cross sectional area from 5 o'clock to 7 o'clock / Debris

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Section Pictures - 4/5/2023 - AP4A - AP3

City	Street	Date	Lateral Segment Reference	Section No.
Santa Barbara	**SBA Airport**	**4/5/2023**	**AP4A - AP3**	**7**

123.70ft
Discharge Point / AP3

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Inspection report

Date:	Work Order:	Weather:	Surveyed By:	Certificate Number:	Pipe Segment Ref.:
4/5/2023		**Dry**	**Jason Cook**	**U-0219-07030452**	**AP7 - AP6**
Year laid:	Pre-cleaning:	Direction:	Pipe Joint Length:	Total Length:	Length Surveyed:
	Light Cleaning	**Downstream**		**331.90 '**	**331.90 '**

City:	**Santa Barbara**	Drainage Area:		Upstream MH:	**AP7**
Street:	**SBA Airport**	Media Label:	**T8704052023**	Up Rim to Invert:	**0.0**
Location Code:		Flow Control:		Downstream MH:	**AP6**
Location Details:		Sheet Number:		Down Rim to Invert:	**0.0**
Pipe shape:	**Circular**	Sewer Use:	**Stormwater Pipe**	Total gallons used:	**0.0**
Pipe size:	**36 "**	Sewer Category:	**SEC**	Joints passed:	**0**
Pipe material:	**Reinforced Concrete Pipe**	Purpose:		Joints failed:	**0**
Lining Method:		Owner:			
Additional Info:					

1:2505	Distance		Code	Observation	Grade
AP7	0.0		AMH	Manhole / AP7	
	0.0		MWL	Water Level, 5% of the vertical dimension	
	97.4		SRV	Surface Damage Reinforcement Visible from 11 o'clock to 1 o'clock, within 8 inch	S4
	111.4		SRV	Surface Damage Reinforcement Visible from 11 o'clock to 1 o'clock, within 8 inch	S4
	212.9	S01	MCU	Miscellaneous Camera Underwater, Start	
	331.9	F01	MCU	Miscellaneous Camera Underwater, Finish	M4
AP6	331.9		ACB	Catch Basin / AP6	

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
4200	4C00	8.0	96.0	104.0	4.0	4.0	4.0

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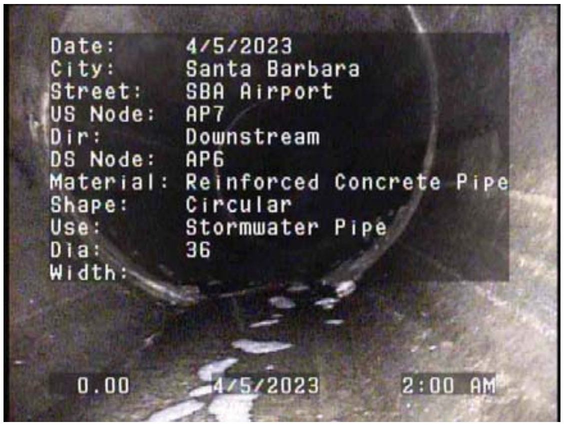
Section Pictures - 4/5/2023 - AP7 - AP6

City	Street	Date	Lateral Segment Reference	Section No.
Santa Barbara	SBA Airport	4/5/2023	AP7 - AP6	8



0.00ft
Manhole / AP7

0.00ft
Water Level, 5% of the vertical dimension

97.40ft
Surface Damage Reinforcement Visible from 11 o'clock to 1 o'clock, within 8 inch

111.40ft
Surface Damage Reinforcement Visible from 11 o'clock to 1 o'clock, within 8 inch

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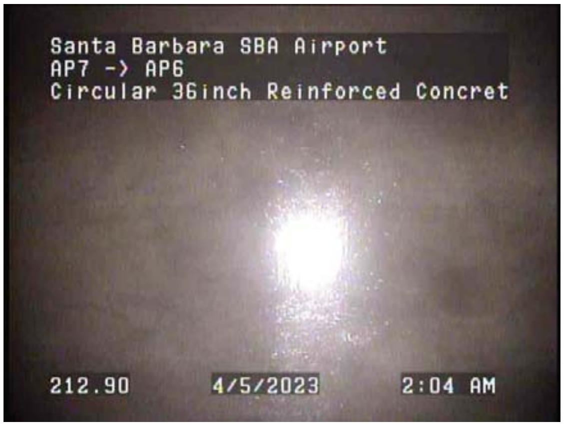
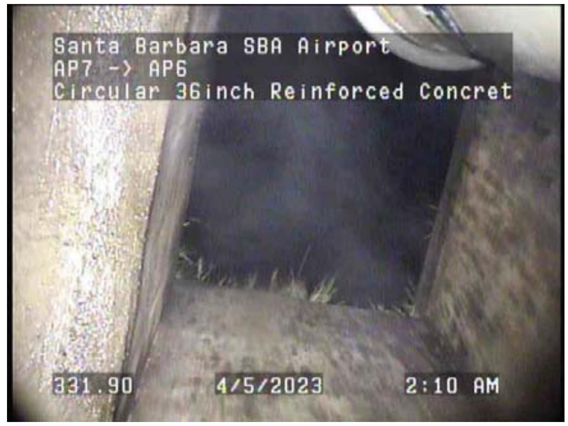
Section Pictures - 4/5/2023 - AP7 - AP6

City	Street	Date	Lateral Segment Reference	Section No.
Santa Barbara	**SBA Airport**	**4/5/2023**	**AP7 - AP6**	**8**



212.90ft
Miscellaneous Camera Underwater, Start



331.90ft
Miscellaneous Camera Underwater, Finish

331.90ft
Catch Basin / AP6

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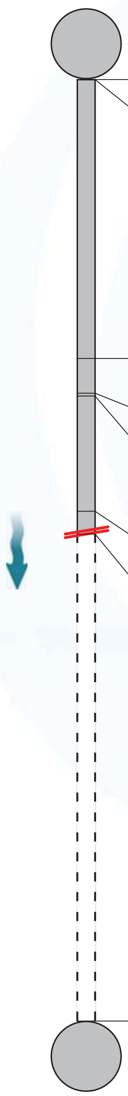
Inspection report

Date:	Work Order:	Weather:	Surveyed By:	Certificate Number:	Pipe Segment Ref.:
4/5/2023		**Dry**	**Jason Cook**	**U-0219-07030452**	**AP7 - AP6**
Year laid:	Pre-cleaning:	Direction:	Pipe Joint Length:	Total Length:	Length Surveyed:
	Light Cleaning	**Downstream**		**331.90 '**	**160.20 '**

City:	**Santa Barbara**	Drainage Area:		Upstream MH:	**AP7**
Street:	**SBA Airport**	Media Label:	**T8704052023**	Up Rim to Invert:	**0.0**
Location Code:		Flow Control:		Downstream MH:	**AP6**
Location Details:		Sheet Number:		Down Rim to Invert:	**0.0**
Pipe shape:	**Circular**	Sewer Use:	**Stormwater Pipe**	Total gallons used:	**0.0**
Pipe size:	**36 "**	Sewer Category:	**SEC**	Joints passed:	**0**
Pipe material:	**Reinforced Concrete Pipe**	Purpose:		Joints failed:	**0**
Lining Method:		Owner:			
Additional Info:					

AP7



AP6

1:2505	Distance	Code	Observation	Grade
	0.0	AMH	Manhole / AP7	
	0.0	MWL	Water Level, 20% of the vertical dimension	
	98.2	SRV	Surface Damage Reinforcement Visible from 11 o'clock to 1 o'clock	S4
	110.7	ISGT	Intruding Sealing Material Grout, 10% of cross sectional area from 11 o'clock to 1 o'clock	M2
	111.5	SRV	Surface Damage Reinforcement Visible from 11 o'clock to 1 o'clock, within 8 inch	S4
	152.2	MCU	Miscellaneous Camera Underwater	M4
	160.2	MSA	Miscellaneous Survey Abandoned / mcu	
	331.9		End of pipe	

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
4200	4121	8.0	6.0	14.0	4.0	3.0	3.5

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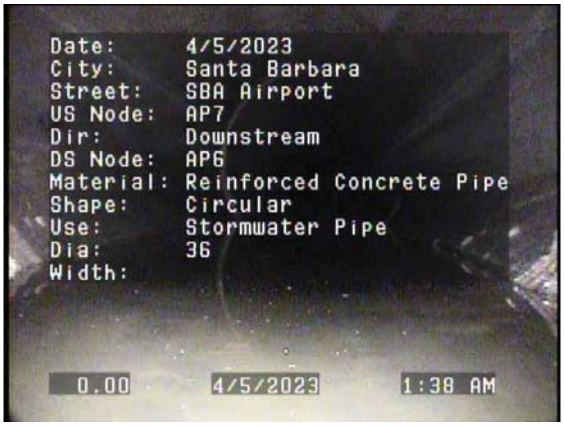
Section Pictures - 4/5/2023 - AP7 - AP6

City	Street	Date	Lateral Segment Reference	Section No.
Santa Barbara	**SBA Airport**	**4/5/2023**	**AP7 - AP6**	**8**



0.00ft
Manhole / AP7

0.00ft
Water Level, 20% of the vertical dimension

98.20ft
Surface Damage Reinforcement Visible from 11 o'clock to 1 o'clock

110.70ft
Intruding Sealing Material Grout, 10% of cross sectional area from 11 o'clock to 1 o'clock

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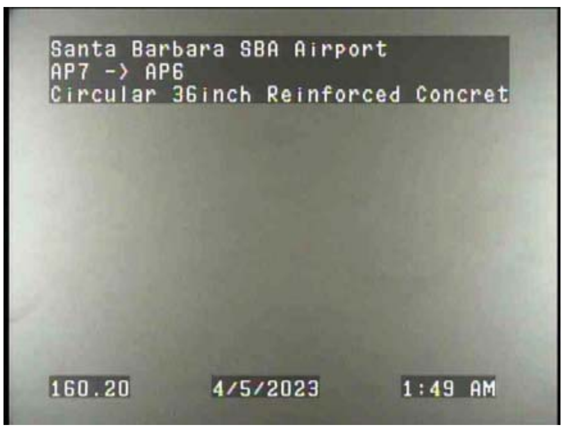
Section Pictures - 4/5/2023 - AP7 - AP6

City	Street	Date	Lateral Segment Reference	Section No.
Santa Barbara	**SBA Airport**	**4/5/2023**	**AP7 - AP6**	**8**

111.50ft
Surface Damage Reinforcement Visible from 11 o'clock to 1 o'clock, within 8 inch

152.20ft
Miscellaneous Camera Underwater



160.20ft
Miscellaneous Survey Abandoned / mcu

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Inspection report

Date:	Work Order:	Weather:	Surveyed By:	Certificate Number:	Pipe Segment Ref.:
4/26/2024		**Dry**	**Jason Cook**	**U-0219-07030452**	**AP7-AP6**
Year laid:	Pre-cleaning:	Direction:	Pipe Joint Length:	Total Length:	Length Surveyed:
	Light Cleaning	**Upstream**		**331.80 '**	**331.80 '**

City:	**Santa Barbara**	Drainage Area:		Upstream MH:	**AP7**
Street:	**SBA Airport**	Media Label:	**T8704252024**	Up Rim to Invert:	**0.0**
Location Code:		Flow Control:		Downstream MH:	**AP6**
Location Details:		Sheet Number:		Down Rim to Invert:	**0.0**
Pipe shape:	**Circular**	Sewer Use:	**Stormwater Pipe**	Total gallons used:	**0.0**
Pipe size:	**36 "**	Sewer Category:	**SEC**	Joints passed:	**0**
Pipe material:	**Reinforced Concrete Pipe**	Purpose:		Joints failed:	**0**
Lining Method:		Owner:			
Additional Info:					

1:2505	Distance	Code	Observation	Grade
AP6	0.0	ACB	Catch Basin / AP6	
	0.0	MWL	Water Level, 15% of the vertical dimension	
	206.7	MWL	Water Level, 5% of the vertical dimension	
	216.9	OBI	Obstruction Intruding Through Wall, 10% of cross sectional area from 11 o'clock to 1 o'clock, within 8 inch	M5
	216.9	SRV	Surface Damage Reinforcement Visible from 11 o'clock to 1 o'clock, within 8 inch	S4
	230.5	SRV	Surface Damage Reinforcement Visible from 11 o'clock to 1 o'clock, within 8 inch	S4
AP7	331.8	AMH	Manhole / AP7	

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
4200	5100	8.0	5.0	13.0	4.0	5.0	4.3

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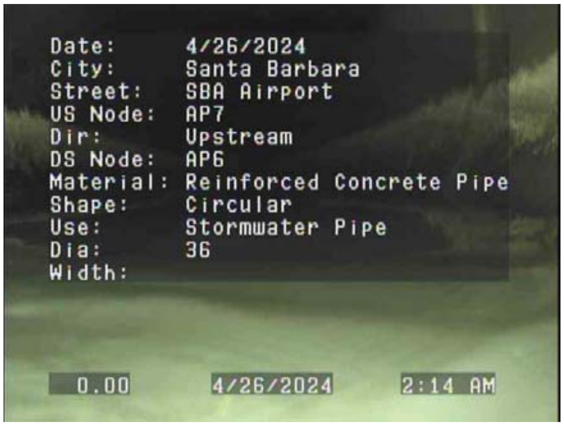
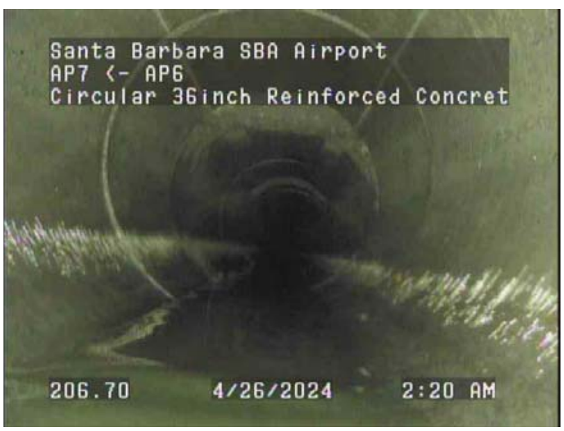
Section Pictures - 4/26/2024 - AP7-AP6

City	Street	Date	Lateral Segment Reference	Section No.
Santa Barbara	SBA Airport	4/26/2024	AP7-AP6	9



0.00ft
Catch Basin / AP6

0.00ft
Water Level, 15% of the vertical dimension



206.70ft
Water Level, 5% of the vertical dimension

216.90ft
Obstruction Intruding Through Wall, 10% of cross sectional area from 11 o'clock to 1 o'clock, within 8 inch

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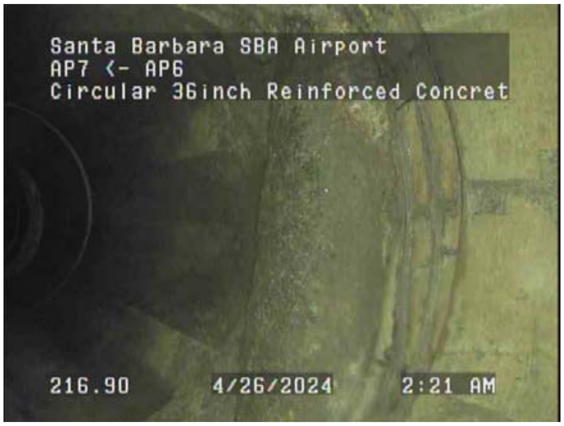
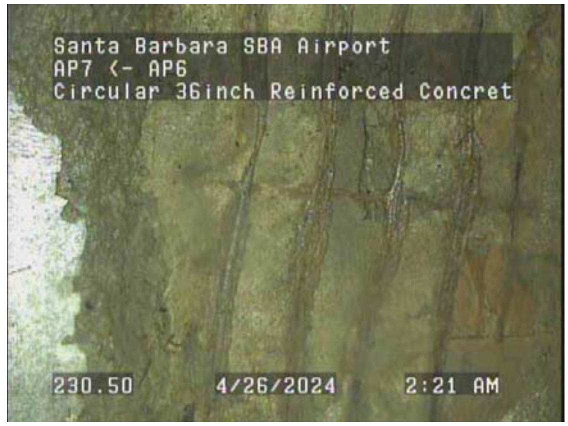
Section Pictures - 4/26/2024 - AP7-AP6

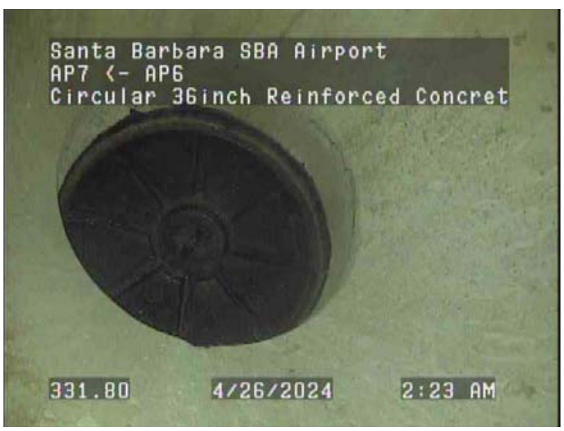
City	Street	Date	Lateral Segment Reference	Section No.
Santa Barbara	**SBA Airport**	**4/26/2024**	**AP7-AP6**	**9**



216.90ft
Surface Damage Reinforcement Visible from 11 o'clock to 1 o'clock, within 8 inch



230.50ft
Surface Damage Reinforcement Visible from 11 o'clock to 1 o'clock, within 8 inch



331.80ft
Manhole / AP7

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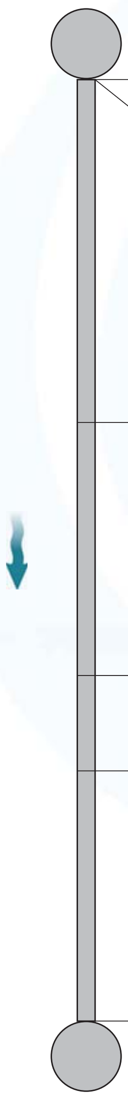
Inspection report

Date:	Work Order:	Weather:	Surveyed By:	Certificate Number:	Pipe Segment Ref.:
4/5/2023		**Dry**	**Jason Cook**	**U-0219-07030452**	**AP8 - AP7**
Year laid:	Pre-cleaning:	Direction:	Pipe Joint Length:	Total Length:	Length Surveyed:
	Light Cleaning	**Downstream**		**605.60 '**	**605.60 '**

City:	**Santa Barbara**	Drainage Area:		Upstream MH:	**AP8**
Street:	**SBA Airport**	Media Label:	**T8704052023**	Up Rim to Invert:	**0.0**
Location Code:		Flow Control:		Downstream MH:	**AP7**
Location Details:		Sheet Number:		Down Rim to Invert:	**0.0**
Pipe shape:	**Circular**	Sewer Use:	**Stormwater Pipe**	Total gallons used:	**0.0**
Pipe size:	**36 "**	Sewer Category:	**SEC**	Joints passed:	**0**
Pipe material:	**Reinforced Concrete Pipe**	Purpose:		Joints failed:	**0**
Lining Method:		Owner:			
Additional Info:					

AP8



AP7

1:4571	Distance	Code	Observation	Grade
	0.0	ACB	Catch Basin / AP8	
	0.0	MWL	Water Level, 10% of the vertical dimension	
	220.6	MWM	Miscellaneous Water Mark, 20% of the vertical dimension	
	383.1	IR	Infiltration Runner at 4 o'clock, within 8 inch	M4
	444.7	LR	Line Right, change to: 5%	M1
	605.6	AMH	Manhole / AP7	

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	4111	0.0	5.0	5.0	0.0	2.5	2.5

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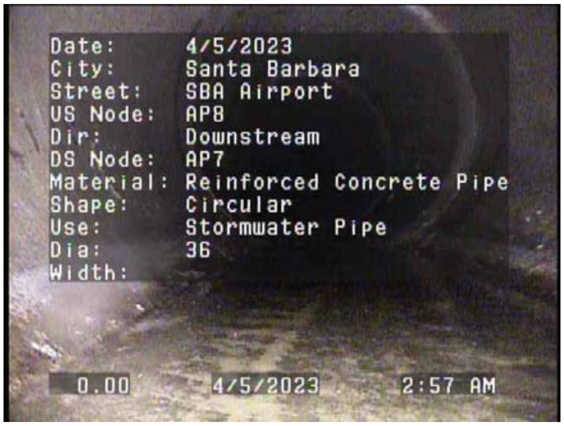
Section Pictures - 4/5/2023 - AP8 - AP7

City	Street	Date	Lateral Segment Reference	Section No.
Santa Barbara	**SBA Airport**	**4/5/2023**	**AP8 - AP7**	**10**



0.00ft
Catch Basin / AP8

0.00ft
Water Level, 10% of the vertical dimension

220.60ft
Miscellaneous Water Mark, 20% of the vertical dimension

383.10ft
Infiltration Runner at 4 o'clock, within 8 inch

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Section Pictures - 4/5/2023 - AP8 - AP7

City	Street	Date	Lateral Segment Reference	Section No.
Santa Barbara	SBA Airport	4/5/2023	AP8 - AP7	10

444.70ft
Line Right, change to: 5%

605.60ft
Manhole / AP7

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Inspection report

Date:	Work Order:	Weather:	Surveyed By:	Certificate Number:	Pipe Segment Ref.:
4/26/2024		Dry	Jason Cook	U-0219-07030452	AP8-AP7
Year laid:	Pre-cleaning:	Direction:	Pipe Joint Length:	Total Length:	Length Surveyed:
	Light Cleaning	Upstream		601.40 '	601.40 '

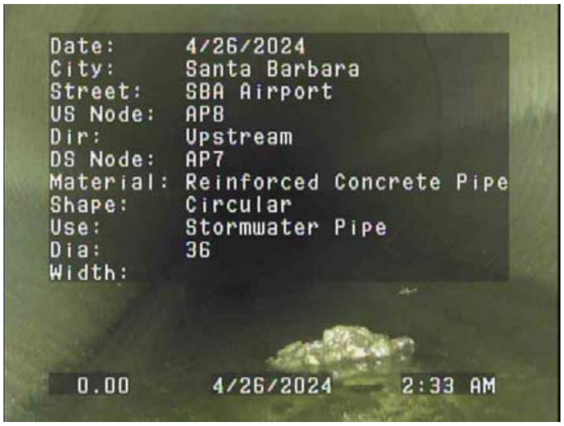
City:	Santa Barbara	Drainage Area:		Upstream MH:	AP8
Street:	SBA Airport	Media Label:	T8704252024	Up Rim to Invert:	0.0
Location Code:		Flow Control:		Downstream MH:	AP7
Location Details:		Sheet Number:		Down Rim to Invert:	0.0
Pipe shape:	Circular	Sewer Use:	Stormwater Pipe	Total gallons used:	0.0
Pipe size:	36 "	Sewer Category:	SEC	Joints passed:	0
Pipe material:	Reinforced Concrete Pipe	Purpose:		Joints failed:	0
Lining Method:		Owner:			
Additional Info:					

1:4539	Distance	Code	Observation	Grade
AP7	0.0	AMH	Manhole / AP7	
	0.0	MWL	Water Level, 10% of the vertical dimension	
AP8	601.4	ACB	Catch Basin / AP8	

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	0000	0.0	0.0	0.0	0.0	0.0	0.0

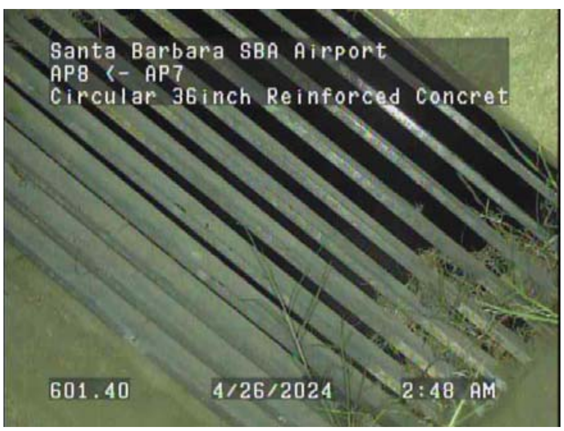
Section Pictures - 4/26/2024 - AP8-AP7

City	Street	Date	Lateral Segment Reference	Section No.
Santa Barbara	**SBA Airport**	**4/26/2024**	**AP8-AP7**	**11**



0.00ft
Manhole / AP7

0.00ft
Water Level, 10% of the vertical dimension



601.40ft
Catch Basin / AP8

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Inspection report

Date:	Work Order:	Weather:	Surveyed By:	Certificate Number:	Pipe Segment Ref.:
4/25/2024		**Dry**	**Jason Cook**	**U-0219-07030452**	**AP10-AP9**
Year laid:	Pre-cleaning:	Direction:	Pipe Joint Length:	Total Length:	Length Surveyed:
	Light Cleaning	**Downstream**		**179.90 '**	**179.90 '**

City:	**Santa Barbara**	Drainage Area:		Upstream MH:	**AP10**
Street:	**SBA Airport**	Media Label:	**T8704252024**	Up Rim to Invert:	**0.0**
Location Code:		Flow Control:		Downstream MH:	**AP9**
Location Details:		Sheet Number:		Down Rim to Invert:	**0.0**
Pipe shape:	**Circular**	Sewer Use:	**Stormwater Pipe**	Total gallons used:	**0.0**
Pipe size:	**24 "**	Sewer Category:	**SEC**	Joints passed:	**0**
Pipe material:	**Polyethylene**	Purpose:		Joints failed:	**0**
Lining Method:		Owner:			
Additional Info:					

1:1358	Distance	Code	Observation	Grade
AP10	0.0	ACB	Catch Basin / AP10	
	0.0	MWL	Water Level, 20% of the vertical dimension	
	179.9	MGP	Miscellaneous General Photograph from 1 o'clock to 5 o'clock	
	179.9	MGP	Miscellaneous General Photograph from 7 o'clock to 11 o'clock	
AP9	179.9	ADP	Discharge Point / AP9	

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
0000	0000	0.0	0.0	0.0	0.0	0.0	0.0

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Section Pictures - 4/25/2024 - AP10-AP9

City	Street	Date	Lateral Segment Reference	Section No.
Santa Barbara	**SBA Airport**	**4/25/2024**	**AP10-AP9**	**12**

0.00ft
Catch Basin / AP10

0.00ft
Water Level, 20% of the vertical dimension

179.90ft
Miscellaneous General Photograph from 1 o'clock to 5 o'clock

179.90ft
Miscellaneous General Photograph from 7 o'clock to 11 o'clock

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Section Pictures - 4/25/2024 - AP10-AP9

City	Street	Date	Lateral Segment Reference	Section No.
Santa Barbara	**SBA Airport**	**4/25/2024**	**AP10-AP9**	**12**

179.90ft
Discharge Point / AP9

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Inspection report

Date:	Work Order:	Weather:	Surveyed By:	Certificate Number:	Pipe Segment Ref.:
4/6/2023		**Dry**	**Jason Cook**	**U-0219-07030452**	**AP13 - AP12**
Year laid:	Pre-cleaning:	Direction:	Pipe Joint Length:	Total Length:	Length Surveyed:
	Light Cleaning	**Upstream**		**431.50 '**	**431.50 '**

City:	**Santa Barbara**	Drainage Area:		Upstream MH:	**AP13**
Street:	**SBA Airport**	Media Label:	**T8704062023**	Up Rim to Invert:	**0.0**
Location Code:		Flow Control:		Downstream MH:	**AP12**
Location Details:		Sheet Number:		Down Rim to Invert:	**0.0**
Pipe shape:	**Circular**	Sewer Use:	**Stormwater Pipe**	Total gallons used:	**0.0**
Pipe size:	**15 "**	Sewer Category:	**SEC**	Joints passed:	**0**
Pipe material:	**Asbestos Cement**	Purpose:		Joints failed:	**0**
Lining Method:		Owner:			
Additional Info:					

1:3257	Distance	Code	Observation	Grade
AP12				
	0.0	ACB	Catch Basin / AP12	
	0.0	MWL	Water Level, 5% of the vertical dimension	
	52.2	JOM	Joint Offset Medium	S3
	252.4	H	Hole from 11 o'clock to 1 o'clock, within 8 inch	S5
	431.5	ACB	Catch Basin / AP13	
AP13				

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
5131	0000	8.0	0.0	8.0	4.0	0.0	4.0

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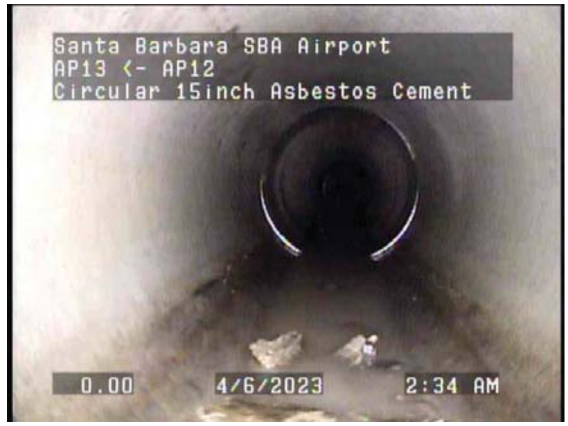
Section Pictures - 4/6/2023 - AP13 - AP12

City	Street	Date	Lateral Segment Reference	Section No.
Santa Barbara	SBA Airport	4/6/2023	AP13 - AP12	13

0.00ft
Catch Basin / AP12



0.00ft
Water Level, 5% of the vertical dimension

52.20ft
Joint Offset Medium

252.40ft
Hole from 11 o'clock to 1 o'clock, within 8 inch

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Section Pictures - 4/6/2023 - AP13 - AP12

City	Street	Date	Lateral Segment Reference	Section No.
Santa Barbara	**SBA Airport**	**4/6/2023**	**AP13 - AP12**	**13**

431.50ft
Catch Basin / AP13

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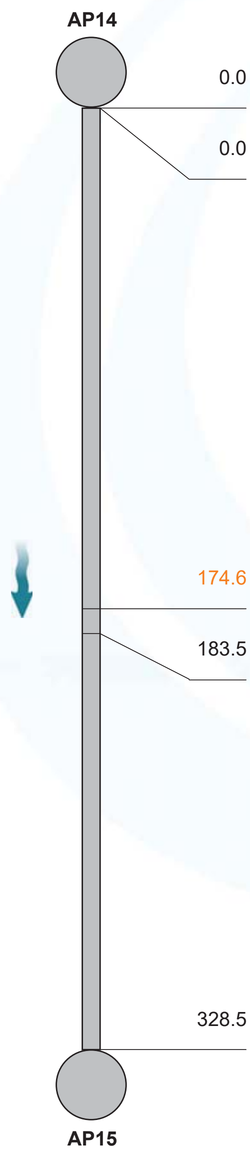
Inspection report

Date:	Work Order:	Weather:	Surveyed By:	Certificate Number:	Pipe Segment Ref.:
4/6/2023		**Dry**	**Jason Cook**	**U-0219-07030452**	**AP14 - AP15**
Year laid:	Pre-cleaning:	Direction:	Pipe Joint Length:	Total Length:	Length Surveyed:
	Light Cleaning	**Downstream**		**328.50 '**	**328.50 '**

City:	**Santa Barbara**	Drainage Area:		Upstream MH:	**AP14**
Street:	**SBA Airport**	Media Label:	**T8704062023**	Up Rim to Invert:	**0.0**
Location Code:		Flow Control:		Downstream MH:	**AP15**
Location Details:		Sheet Number:		Down Rim to Invert:	**0.0**
Pipe shape:	**Circular**	Sewer Use:	**Stormwater Pipe**	Total gallons used:	**0.0**
Pipe size:	**24 "**	Sewer Category:	**SEC**	Joints passed:	**0**
Pipe material:	**Polypropylene**	Purpose:		Joints failed:	**0**
Lining Method:		Owner:			
Additional Info:					



1:2480	Distance	Code	Observation	Grade
AP14	0.0	ACB	Catch Basin / AP14	
	0.0	MWL	Water Level, 5% of the vertical dimension	
	174.6	JAM	Joint Angular Medium	S3
	183.5	MMC	Miscellaneous Material Change, Asbestos cement / ACP	
AP15	328.5	ACB	Catch Basin / AP15	

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
3100	0000	3.0	0.0	3.0	3.0	0.0	3.0

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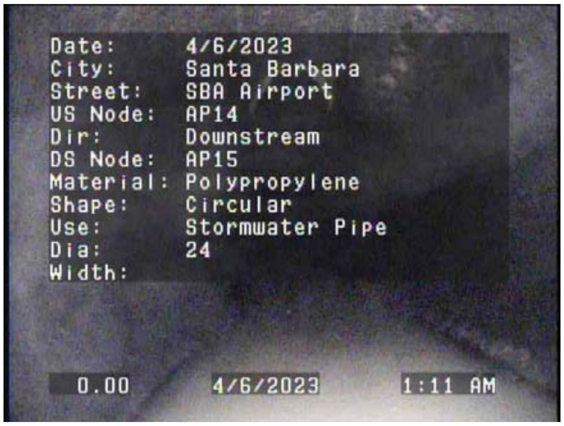
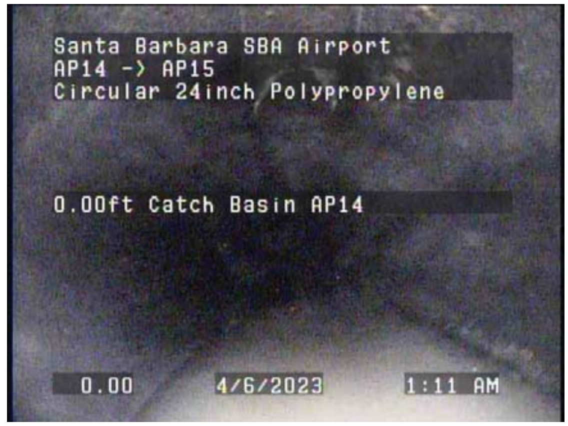
Section Pictures - 4/6/2023 - AP14 - AP15

City	Street	Date	Lateral Segment Reference	Section No.
Santa Barbara	**SBA Airport**	**4/6/2023**	**AP14 - AP15**	**14**

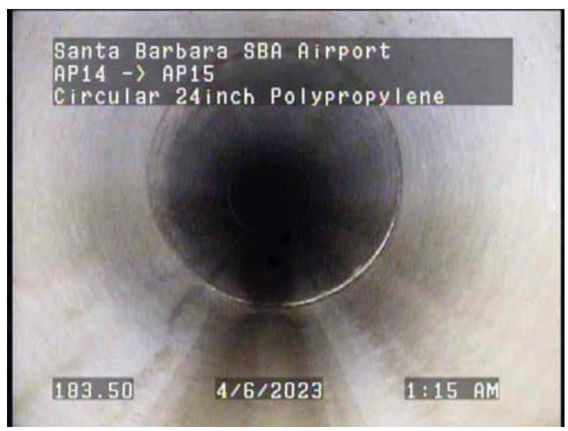


0.00ft
Catch Basin / AP14



0.00ft
Water Level, 5% of the vertical dimension

174.60ft
Joint Angular Medium



183.50ft
Miscellaneous Material Change, Asbestos cement / ACP

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Section Pictures - 4/6/2023 - AP14 - AP15

City	Street	Date	Lateral Segment Reference	Section No.
Santa Barbara	**SBA Airport**	**4/6/2023**	**AP14 - AP15**	**14**

328.50ft
Catch Basin / AP15

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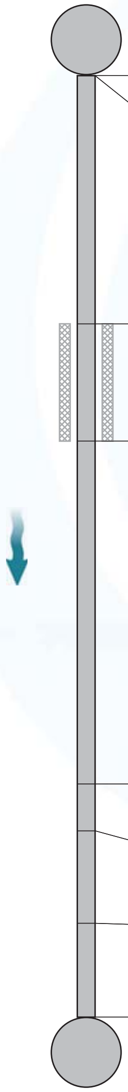
Inspection report

Date:	Work Order:	Weather:	Surveyed By:	Certificate Number:	Pipe Segment Ref.:
4/6/2023		**Dry**	**Jason Cook**	**U-0219-07030452**	**AP16 - AP17**
Year laid:	Pre-cleaning:	Direction:	Pipe Joint Length:	Total Length:	Length Surveyed:
	Light Cleaning	**Downstream**		**336.20 '**	**336.20 '**

City:	**Santa Barbara**	Drainage Area:		Upstream MH:	**AP16**
Street:	**SBA Airport**	Media Label:	**T8704062023**	Up Rim to Invert:	**0.0**
Location Code:		Flow Control:		Downstream MH:	**AP17**
Location Details:		Sheet Number:		Down Rim to Invert:	**0.0**
Pipe shape:	**Circular**	Sewer Use:	**Stormwater Pipe**	Total gallons used:	**0.0**
Pipe size:	**18 "**	Sewer Category:	**SEC**	Joints passed:	**0**
Pipe material:	**Asbestos Cement**	Purpose:		Joints failed:	**0**
Lining Method:		Owner:			

Additional Info:

AP16



1:2538	Distance		Code	Observation	Grade
	0.0		ACB	Catch Basin / AP16	
	0.0		MWL	Water Level, 5% of the vertical dimension	
	88.6	S01	DSZ	Deposits Settled Other, 5% of cross sectional area from 5 o'clock to 7 o'clock, Start / Debris	
	130.5	F01	DSZ	Deposits Settled Other, 5% of cross sectional area from 5 o'clock to 7 o'clock, Finish / Debris	M2
	253.0		CM	Crack Multiple from 7 o'clock to 9 o'clock, within 8 inch	S3
	269.6		DSZ	Deposits Settled Other, 5% of cross sectional area from 4 o'clock to 5 o'clock / metal	M2
	302.6		CM	Crack Multiple from 8 o'clock to 9 o'clock, within 8 inch	S3
	336.2		ACB	Catch Basin / AP17	

AP17

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
3200	2900	6.0	18.0	24.0	3.0	2.0	2.2

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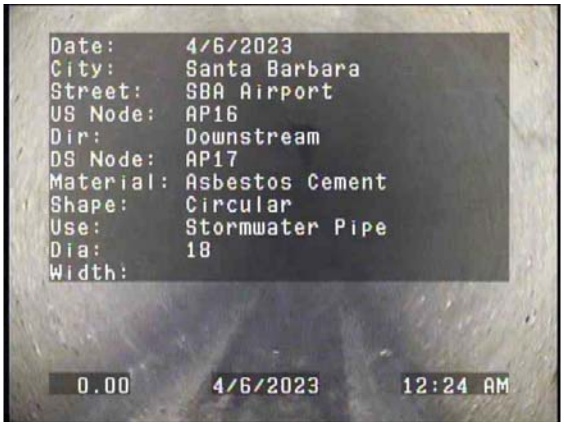
Section Pictures - 4/6/2023 - AP16 - AP17

City	Street	Date	Lateral Segment Reference	Section No.
Santa Barbara	**SBA Airport**	**4/6/2023**	**AP16 - AP17**	**15**



0.00ft
Catch Basin / AP16

0.00ft
Water Level, 5% of the vertical dimension

88.60ft
Deposits Settled Other, 5% of cross sectional area from 5 o'clock to 7 o'clock, Start / Debris

130.50ft
Deposits Settled Other, 5% of cross sectional area from 5 o'clock to 7 o'clock, Finish / Debris

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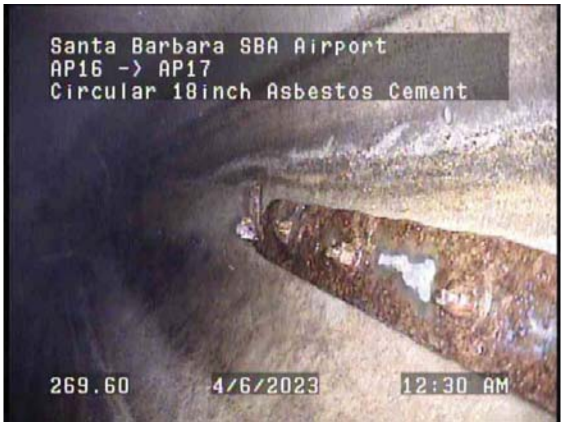
Section Pictures - 4/6/2023 - AP16 - AP17

City	Street	Date	Lateral Segment Reference	Section No.
Santa Barbara	**SBA Airport**	**4/6/2023**	**AP16 - AP17**	**15**

253.00ft
Crack Multiple from 7 o'clock to 9 o'clock, within 8 inch



269.60ft
Deposits Settled Other, 5% of cross sectional area from 4 o'clock to 5 o'clock / metal

302.60ft
Crack Multiple from 8 o'clock to 9 o'clock, within 8 inch

336.20ft
Catch Basin / AP17

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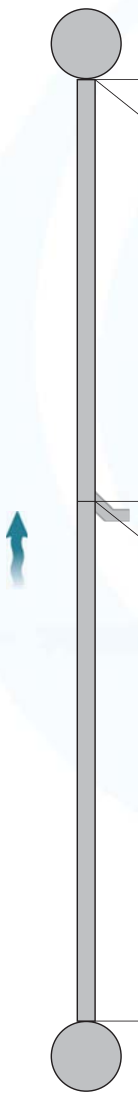
Inspection report

Date:	Work Order:	Weather:	Surveyed By:	Certificate Number:	Pipe Segment Ref.:
4/7/2023		**Dry**	**Jason Cook**	**U-0219-07030452**	**D I- DI-Y07-092**
Year laid:	Pre-cleaning:	Direction:	Pipe Joint Length:	Total Length:	Length Surveyed:
	Light Cleaning	**Upstream**		**666.20 '**	**666.20 '**

City:	**Santa Barbara**	Drainage Area:		Upstream MH:	**DI**
Street:	**SBA Airport**	Media Label:	**T8704072023**	Up Rim to Invert:	**0.0**
Location Code:		Flow Control:		Downstream MH:	**DI-Y07-092**
Location Details:		Sheet Number:		Down Rim to Invert:	**0.0**
Pipe shape:	**Circular**	Sewer Use:	**Stormwater Pipe**	Total gallons used:	**0.0**
Pipe size:	**21 "**	Sewer Category:	**SEC**	Joints passed:	**0**
Pipe material:	**Reinforced Concrete Pipe**	Purpose:		Joints failed:	**0**
Lining Method:		Owner:			

Additional Info:

DI-Y07-092



DI

1:5028	Distance	Code	Observation	Grade
	0.0	ACB	Catch Basin / DI-Y07-092	
	0.0	MWL	Water Level, 10% of the vertical dimension	
	298.5	TB	Tap Break-in/Hammer at 9 o'clock, dia/height: 18inch	
	298.5	SRV	Surface Damage Reinforcement Visible from 9 o'clock to 10 o'clock	S4
	666.2	ACB	Catch Basin / DI	

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
4100	0000	4.0	0.0	4.0	4.0	0.0	4.0

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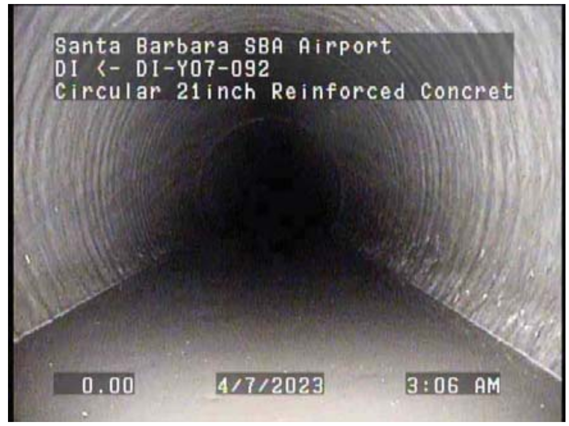
Section Pictures - 4/7/2023 - D I- DI-Y07-092

City	Street	Date	Lateral Segment Reference	Section No.
Santa Barbara	**SBA Airport**	**4/7/2023**	**D I- DI-Y07-092**	**16**

0.00ft
Catch Basin / DI-Y07-092



0.00ft
Water Level, 10% of the vertical dimension

298.50ft
Tap Break-in/Hammer at 9 o'clock, dia/height: 18inch

298.50ft
Surface Damage Reinforcement Visible from 9 o'clock to 10 o'clock

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Section Pictures - 4/7/2023 - D I- DI-Y07-092

City	Street	Date	Lateral Segment Reference	Section No.
Santa Barbara	**SBA Airport**	**4/7/2023**	**D I- DI-Y07-092**	**16**

666.20ft
Catch Basin / DI

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Inspection report

Date:	Work Order:	Weather:	Surveyed By:	Certificate Number:	Pipe Segment Ref.:
4/7/2023		**Dry**	**Jason Cook**	**U-0219-07030452**	**DI-Y07-091 - 90+03.34**
Year laid:	Pre-cleaning:	Direction:	Pipe Joint Length:	Total Length:	Length Surveyed:
	Light Cleaning	**Upstream**		**208.00 '**	**208.00 '**

City:	**Santa Barbara**	Drainage Area:		Upstream MH:	**DI-Y07-091**
Street:	**SBA Airport**	Media Label:	**T8704072023**	Up Rim to Invert:	**0.0**
Location Code:		Flow Control:		Downstream MH:	**90+03.34**
Location Details:		Sheet Number:		Down Rim to Invert:	**0.0**
Pipe shape:	**Circular**	Sewer Use:	**Stormwater Pipe**	Total gallons used:	**0.0**
Pipe size:	**18 "**	Sewer Category:	**SEC**	Joints passed:	**0**
Pipe material:	**Asbestos Cement**	Purpose:		Joints failed:	**0**
Lining Method:		Owner:			
Additional Info:					

1:1570

90+03.34

Distance		Code	Observation	Grade
0.0		ACB	Catch Basin / 90+03.34	
0.0		MWL	Water Level, 5% of the vertical dimension	
4.6		CL	Crack Longitudinal at 10 o'clock	S2
74.2		ISGT	Intruding Sealing Material Grout, 10% of cross sectional area from 4 o'clock to 8 o'clock	M2
98.8		CM	Crack Multiple from 3 o'clock to 4 o'clock	S3
115.2	S01	DSZ	Deposits Settled Other, 5% of cross sectional area from 5 o'clock to 7 o'clock, Start / Debris	
144.5	F01	DSZ	Deposits Settled Other, 5% of cross sectional area from 5 o'clock to 7 o'clock, Finish / Debris	M2
202.2		DSZ	Deposits Settled Other, 10% of cross sectional area from 5 o'clock to 7 o'clock / Debris	M2
208.0		ACB	Catch Basin / DI-Y07-091	

DI-Y07-091

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
3121	2800	5.0	16.0	21.0	2.5	2.0	2.1

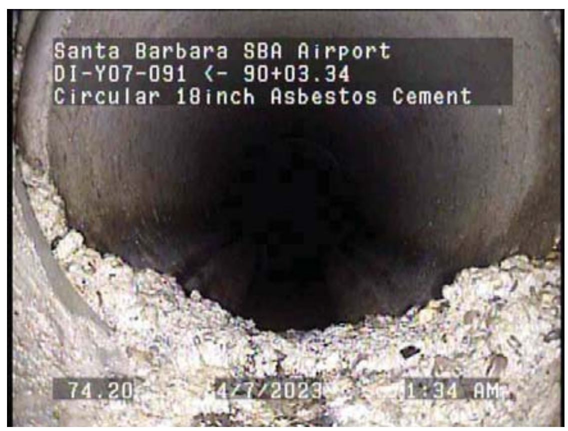
Section Pictures - 4/7/2023 - DI-Y07-091 - 90+03.34

City	Street	Date	Lateral Segment Reference	Section No.
Santa Barbara	**SBA Airport**	**4/7/2023**	**DI-Y07-091 - 90+03.34**	**17**

0.00ft
Catch Basin / 90+03.34

0.00ft
Water Level, 5% of the vertical dimension

4.60ft
Crack Longitudinal at 10 o'clock



74.20ft
Intruding Sealing Material Grout, 10% of cross sectional area from 4 o'clock to 8 o'clock

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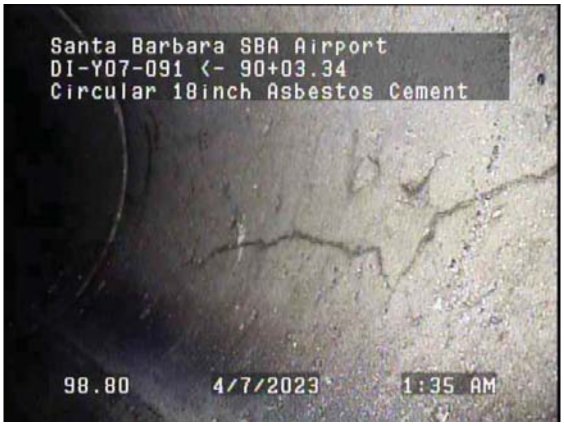
Section Pictures - 4/7/2023 - DI-Y07-091 - 90+03.34

City	Street	Date	Lateral Segment Reference	Section No.
Santa Barbara	**SBA Airport**	**4/7/2023**	**DI-Y07-091 - 90+03.34**	**17**



98.80ft
Crack Multiple from 3 o'clock to 4 o'clock

115.20ft
Deposits Settled Other, 5% of cross sectional area from 5 o'clock to 7 o'clock, Start / Debris

144.50ft
Deposits Settled Other, 5% of cross sectional area from 5 o'clock to 7 o'clock, Finish / Debris

202.20ft
Deposits Settled Other, 10% of cross sectional area from 5 o'clock to 7 o'clock / Debris

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Section Pictures - 4/7/2023 - DI-Y07-091 - 90+03.34

City	Street	Date	Lateral Segment Reference	Section No.
Santa Barbara	**SBA Airport**	**4/7/2023**	**DI-Y07-091 - 90+03.34**	**17**

208.00ft
Catch Basin / DI-Y07-091

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Inspection report

Date:	Work Order:	Weather:	Surveyed By:	Certificate Number:	Pipe Segment Ref.:
4/7/2023		**Dry**	**Jason Cook**	**U-0219-07030452**	**UNK - DI-Y07-087**
Year laid:	Pre-cleaning:	Direction:	Pipe Joint Length:	Total Length:	Length Surveyed:
	Light Cleaning	**Upstream**		**249.60 '**	**249.60 '**

City:	**Santa Barbara**	Drainage Area:		Upstream MH:	**UNK**
Street:	**SBA Airport**	Media Label:	**T8704072023**	Up Rim to Invert:	**0.0**
Location Code:		Flow Control:		Downstream MH:	**DI-Y07-087**
Location Details:		Sheet Number:		Down Rim to Invert:	**0.0**
Pipe shape:	**Circular**	Sewer Use:	**Stormwater Pipe**	Total gallons used:	**0.0**
Pipe size:	**15 "**	Sewer Category:	**SEC**	Joints passed:	**0**
Pipe material:	**Asbestos Cement**	Purpose:		Joints failed:	**0**
Lining Method:		Owner:			
Additional Info:					

1:1884

DI-Y07-087

Distance	Code	Observation	Grade
0.0	ACB	Catch Basin / DI-Y07-087	
0.0	MWL	Water Level, 5% of the vertical dimension	
11.3	CC	Crack Circumferential from 7 o'clock to 5 o'clock	S1
29.5	CC	Crack Circumferential from 7 o'clock to 5 o'clock	S1
64.3	DSZ	Deposits Settled Other, 5% of cross sectional area from 5 o'clock to 7 o'clock / Debris	M2
187.7	DSZ	Deposits Settled Other, 10% of cross sectional area from 5 o'clock to 7 o'clock / Debris	M2
231.3	DSZ	Deposits Settled Other, 5% of cross sectional area from 5 o'clock to 7 o'clock / Debris	M2
246.7	DSC	Deposits Settled Compacted, 50% of cross sectional area from 3 o'clock to 9 o'clock / Concrete	M5
249.6	DSC	Deposits Settled Compacted, 100% of cross sectional area from 12 o'clock to 12 o'clock / Concrete	M5
249.6	MSA	Miscellaneous Survey Abandoned / DSC	

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
1200	5223	2.0	16.0	18.0	1.0	3.2	2.6

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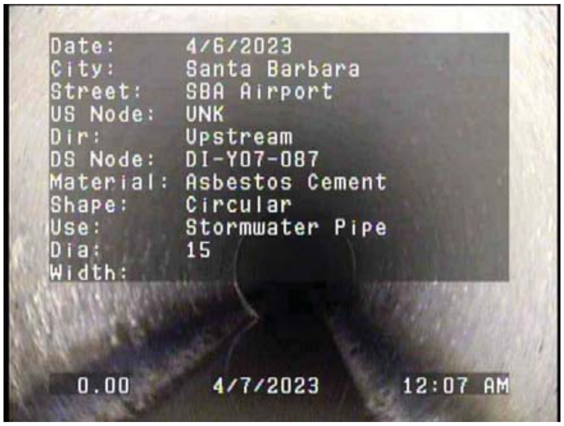
Section Pictures - 4/7/2023 - UNK - DI-Y07-087

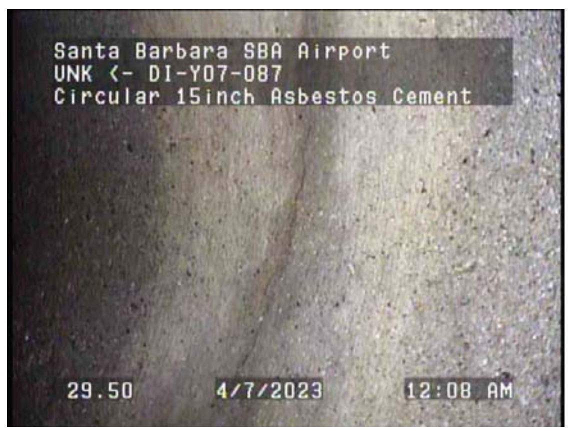
City	Street	Date	Lateral Segment Reference	Section No.
Santa Barbara	**SBA Airport**	**4/7/2023**	**UNK - DI-Y07-087**	**18**



0.00ft
Catch Basin / DI-Y07-087

0.00ft
Water Level, 5% of the vertical dimension

11.30ft
Crack Circumferential from 7 o'clock to 5 o'clock



29.50ft
Crack Circumferential from 7 o'clock to 5 o'clock

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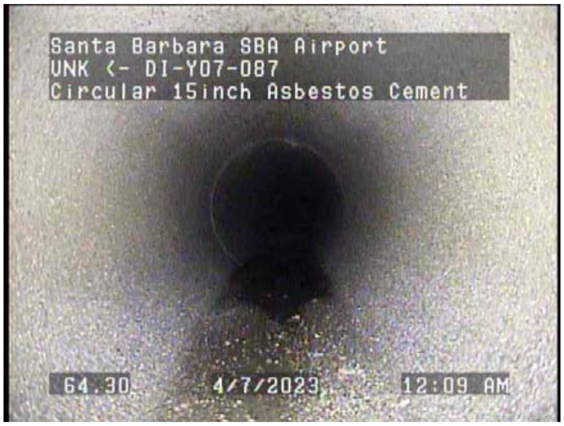
Section Pictures - 4/7/2023 - UNK - DI-Y07-087

City	Street	Date	Lateral Segment Reference	Section No.
Santa Barbara	**SBA Airport**	**4/7/2023**	**UNK - DI-Y07-087**	**18**



64.30ft
Deposits Settled Other, 5% of cross sectional area from 5 o'clock to 7 o'clock / Debris

187.70ft
Deposits Settled Other, 10% of cross sectional area from 5 o'clock to 7 o'clock / Debris

231.30ft
Deposits Settled Other, 5% of cross sectional area from 5 o'clock to 7 o'clock / Debris

246.70ft
Deposits Settled Compacted, 50% of cross sectional area from 3 o'clock to 9 o'clock / Concrete

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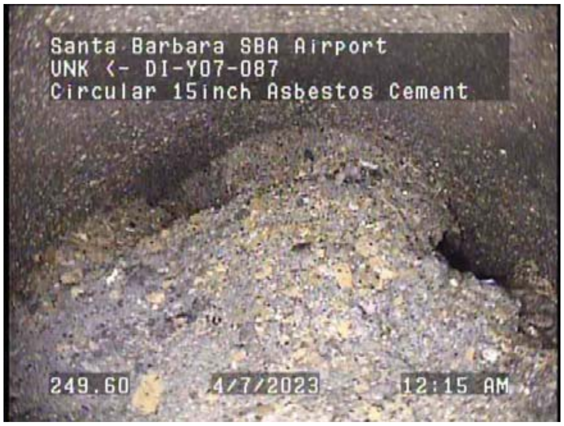
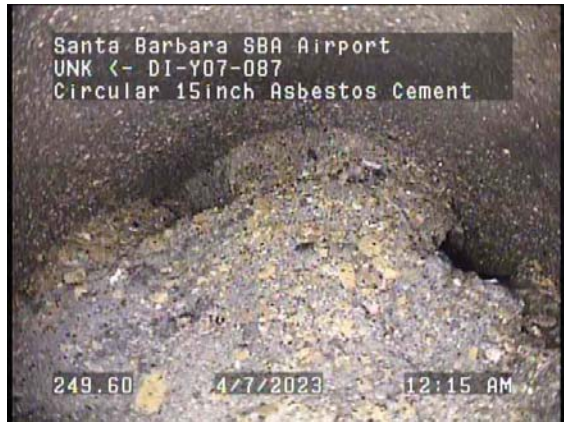
Section Pictures - 4/7/2023 - UNK - DI-Y07-087

City	Street	Date	Lateral Segment Reference	Section No.
Santa Barbara	**SBA Airport**	**4/7/2023**	**UNK - DI-Y07-087**	**18**



249.60ft
Deposits Settled Compacted, 100% of cross sectional area from 12 o'clock to 12 o'clock / Concrete



249.60ft
Miscellaneous Survey Abandoned / DSC

DOWNSTREAMSERVICES.COM

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Fax 760.746.2667

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DownStream
Services, Inc.

Technical Memorandum

To:	Jessica Metzger, SBA
From:	Bob Thayne, PE
Reviewed by:	Kari Nichols, PE (Mead & Hunt)
Date:	June 10, 2024
Subject:	SBA Existing Pipe Condition Assessments Report Data

Explanation of PACP Condition Grading System

Using the PACP Code Matrix, each PACP code is assigned a condition grade ranging from 1 to 5. Grades are assigned based on the significance of the defect, extent of damage, percentage of restriction to flow capacity of the amount of wall loss due to deterioration. Condition grades are assigned for two defect categories: structural ("S") and operation and maintenance ("M"), with 5 being the most significant defect grade and 1 being a minor defect grade. The higher the number (1-5) the more severe it is.

The letters to the right of the distance column refer to the start and finish of each defect. Using AP10-AP11 as an example, "S01" means the start of defect 01, which references Surface Damage Corrosion from 2 o'clock to 5'oclock. "F01" means the finish of defect 01. This essentially means on the report there is Surface Damage Corrosion from 2 o'clock to 5 o'clock between 18.7' to 167.2'. The "S3" grade means this defect is a grade 3 structural defect. Likewise, for the segment from AP4A to AP3 there is a grade labeled "M2". This means a grade 2 maintenance defect.

Appendix B: Environmental Conditions Assessment

SANTA BARBARA AIRPORT

MASTER PLAN

SBA
Santa Barbara Airport

DRAFT 1/13/2023

Mead&Hunt

- 2 -

ENVIRONMENTAL CONDITIONS

INTRODUCTION

The purpose of this Environmental Inventory chapter is to establish a baseline of existing environmental conditions on the Santa Barbara Airport. Airfield development projects, improvements or other projects will be analyzed in subsequent chapters of this Master Plan and the environmental conditions described here will be used to weigh the development options.

BIOLOGICAL RESOURCES

Section prepared by Rincon Consultants, Inc.

Primary Author	Secondary Authors	Technical Reviewers
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Graphics	**Publishing**	
Kat Castanon, GIS Analyst	Debra Jane Seltzer, Formatting Lead Dario Campos, Technical Editor	

Summary

This Environmental Inventory provides an assessment of biological resources located in the main Airport Property (Study Area) of the Santa Barbara Airport, including the areas identified as airfield and airspace, air cargo, support, non-aero support, and environmental inventory. The Study Area includes Goleta Slough, open areas, and portions of San Pedro Creek, Tecolotito Creek, and Carneros Creek that overlap with the Study Area. The Study Area is roughly bounded by Hollister Avenue to the north, Los Carneros Road to the west, Mesa Road and State Route 217 to the south, and Moffett Place, James Fowler Road, and South Fairview Avenue to the east. Portions of the property identified as General Aviation and Terminal Area are not included within the Study Area assessed in this report.

The entirety of the 752-acre Study Area is operated by the City of Santa Barbara and is largely comprised of development associated with Santa Barbara Airport facilities. The remainder of the Study Area is a large portion of the Goleta Slough State Ecological Reserve, creek segments, and various other habitats that have been modified by adjacent land use and development. The Study Area is located within the Coastal Zone, as designated by the California Coastal Commission.

The primary California Department of Fish and Wildlife (CDFW) sensitive natural community occurring in the Study Area is southern coastal salt marsh, which is present in Goleta Slough. In addition, creeks onsite have riparian corridors vegetated in part by arroyo willow thickets, which is a CDFW sensitive natural community. Furthermore, San Pedro Creek is federally designated critical habitat for southern California steelhead (National Marine Fisheries Service [NMFS] 2022).

There are 14 special-status plant species and 20 special-status wildlife species that have moderate or high probability of occurring in the Study Area or are considered present as they have been documented in the Study Area. Species reasonably anticipated to occur were determined based on the published ranges of the species, and the type, extent, and condition of habitat available at the site. Sensitive bird species that have been observed foraging or soaring in the Study Area but lack suitable nesting habitat are not presumed to be present.

Special-Status Plant Species

- Present
  - California seablite (*Suaeda californica*; Federally Endangered [FE], California Rare Plant Rank [CRPR] 1B.1)
  - Coulter's goldfields (*Lasthenia glabrata* ssp. *coulteri*; CRPR 1B.1, Locally Rare [LR])
  - Leopold rush (*Juncus acutus* ssp. *leopoldii*; LR)
  - Parish's glasswort (*Arthrocnemum subterminale*; LR)
  - Santa Barbara honeysuckle (*Lonicera subspicata* var. *subspicata*; CRPR 1B.2)
  - Shore grass (*Distichlis littoralis*; LR)
  - Short-seeded waterwort (*Elatine brachysperma*; LR)
  - Southern tarplant (*Centromadia parryi* ssp. *australis*; CRPR 1B.1, LR)
- High Potential
  - Estuary seablite (*Suaeda esteroa*; CRPR 1B.2, LR)
- Moderate Potential:
  - Black-flowered figwort (*Scrophularia atrata*; CRPR 1B.2)

- Coulter's saltbush (*Atriplex coulteri*; CRPR 1B.2, LR)
- Davidson's saltscale (*Atriplex serenana* var. *davidsonii*; CRPR 1B.2, LR)
- Nuttall's scrub oak (*Quercus dumosa*; CRPR 1B.1)
- Saltwort (*Batis maritima*; LR)

Special-Status Wildlife Species

- Present
  - Tidewater goby (*Eucyclogobius newberryi*; FE, State Candidate [SC])
  - Steelhead, Southern California Distinct Population Segment (DPS) (*Oncorhynchus mykiss irideus*; FE, SC)
  - Western snowy plover (*Charadrius nivosus*; Federally Threatened, CDFW Species of Special Concern [SSC])
  - Great egret (*Ardea alba*; CDFW Special Animal [SA])
  - Great blue heron (*Ardea herodias*; CDFW SA)
  - Snowy egret (*Egretta thula*; CDFW SA)
  - Double-crested cormorant *(Nannopterum auritum*; CDFW Watch List [WL])
  - Belding's savannah sparrow (*Passerculus sandwichensis beldingi*; State Endangered)
  - Black-crowned night heron (*Nycticorax nycticorax*; CDFW SA)
  - White-tailed kite (*Elanus leucurus*; CDFW Fully Protected)
- High Potential to Occur
  - Cooper's hawk (*Accipiter cooperii*; CDFW WL)
- Moderate Potential to Occur
  - Burrowing owl (*Athene cunicularia*; CDFW SSC)
  - California horned lark (*Eremophila alpestris actia*; CDFW WL)
  - Northern California legless lizard (*Anniella pulchra*; CDFW SSC)
  - Tricolored blackbird (*Agelaius tricolor*; State Threatened, CDFW SSC)
  - Western pond turtle (*Emys marmorata*; CDFW SSC)
  - Coast horned lizard (*Phrynosoma blainvillii*; CDFW SSC)
  - Coast patch-nosed snake (*Salvadora hexalepis virgultea*; CDFW SSC)
  - Two-striped garter snake (*Thamnophis hammondi*; CDFW SSC)
  - Crotch bumble bee (*Bombus crotchii*; SC)
  - Mimic tryonia (*Tryonia imitator*; CDFW SA)

Study Area Location

This Environmental Overview provides an inventory of biological resources present in the main Santa Barbara Airport Property (Study Area) and those with the potential to occur. The Study Area is roughly bounded by Hollister Avenue to the north, Los Carneros Road to the west, Mesa Road and State Route 217 to the south, and Moffett Place, James Fowler Road, and South Fairview Avenue to the east. Portions of the property identified as General Aviation and Terminal Area are not included within the Study Area assessed in this report. (**Figure 2-1**). The center of the Study Area is located at approximately 34.425901°N, -119.843672°W, Township 4N, Range 28W (no section) in the *Goleta, California* U. S. Geological Survey (USGS) quadrangle (**Figure 2-2**). The 752-acre Study Area is primarily occupied by Santa Barbara Airport facilities (structures and runways) and the Goleta Slough. The Study Area also includes segments of San Pedro Creek, Carneros Creek, and Tecolotito Creek. The Study Area is located within the Coastal Zone as designated by the California Coastal Commission (CCC). Although the Study Area is located in Goleta, the Santa Barbara Airport is under the jurisdiction of the City of Santa Barbara.

Regulatory Summary

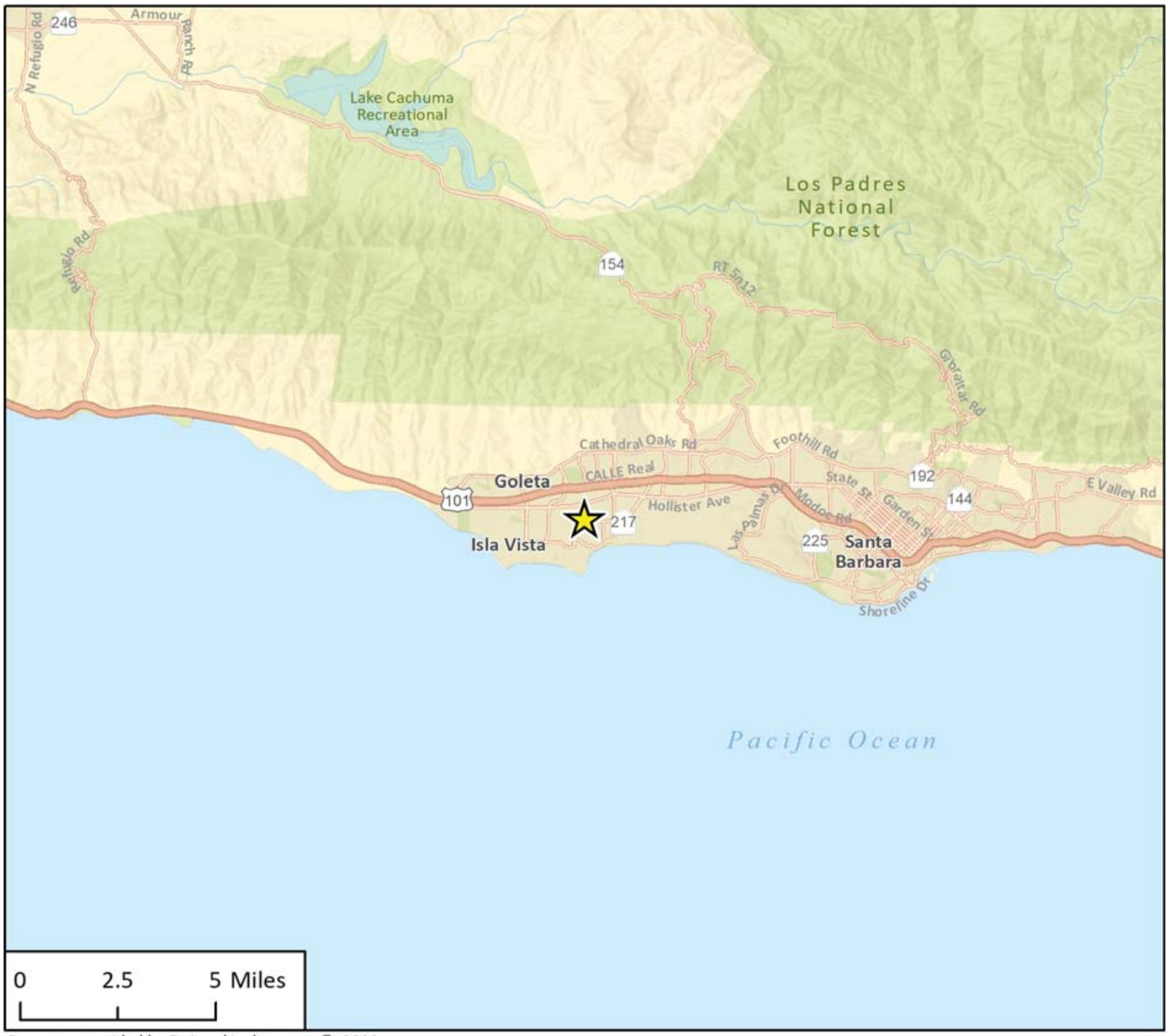
Regulated or sensitive biological resources studied and analyzed herein include special-status plant and wildlife species, nesting birds and raptors, sensitive plant communities, jurisdictional waters, including wetlands, wildlife movement, and regionally protected resources, such as protected trees. Regulatory authority over biological resources is shared by federal, State, and local authorities. Primary authority for regulation of general biological resources lies within the land use control and planning authority of local jurisdictions (in this instance, the City of Santa Barbara).

Environmental Statutes

For the purpose of this report, sensitive biological resources were assessed based on the following statutes:

- National Environmental Policy Act (NEPA)
- California Environmental Quality Act (CEQA)
- Federal Endangered Species Act (ESA)
- California Endangered Species Act (CESA)
- Federal Clean Water Act (CWA)
- California Fish and Game Code (CFGC)
- Migratory Bird Treaty Act (MBTA)
- The Bald and Golden Eagle Protection Act
- Porter-Cologne Water Quality Control Act
- City of Santa Barbara Coastal Land Use Plan (2019)
- City of Santa Barbara General Plan (2011)
- Santa Barbara Municipal Code (2022)

Figure 2-1: **Regional Location Map**



Basemap provided by Esri and its licensors © 2022.

Project Location

N

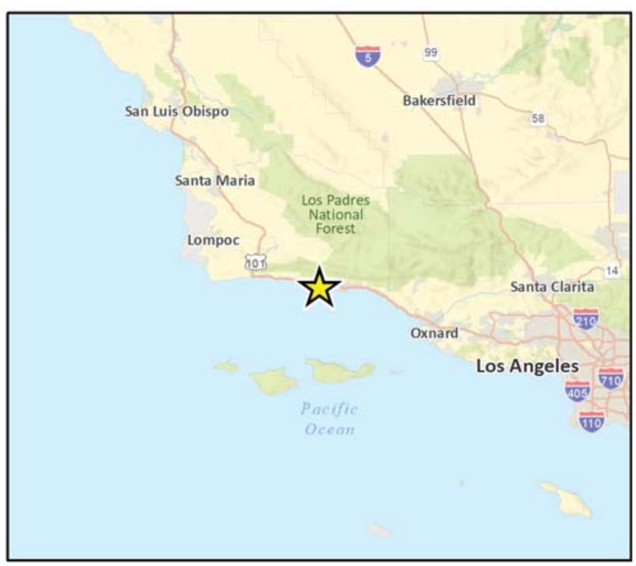
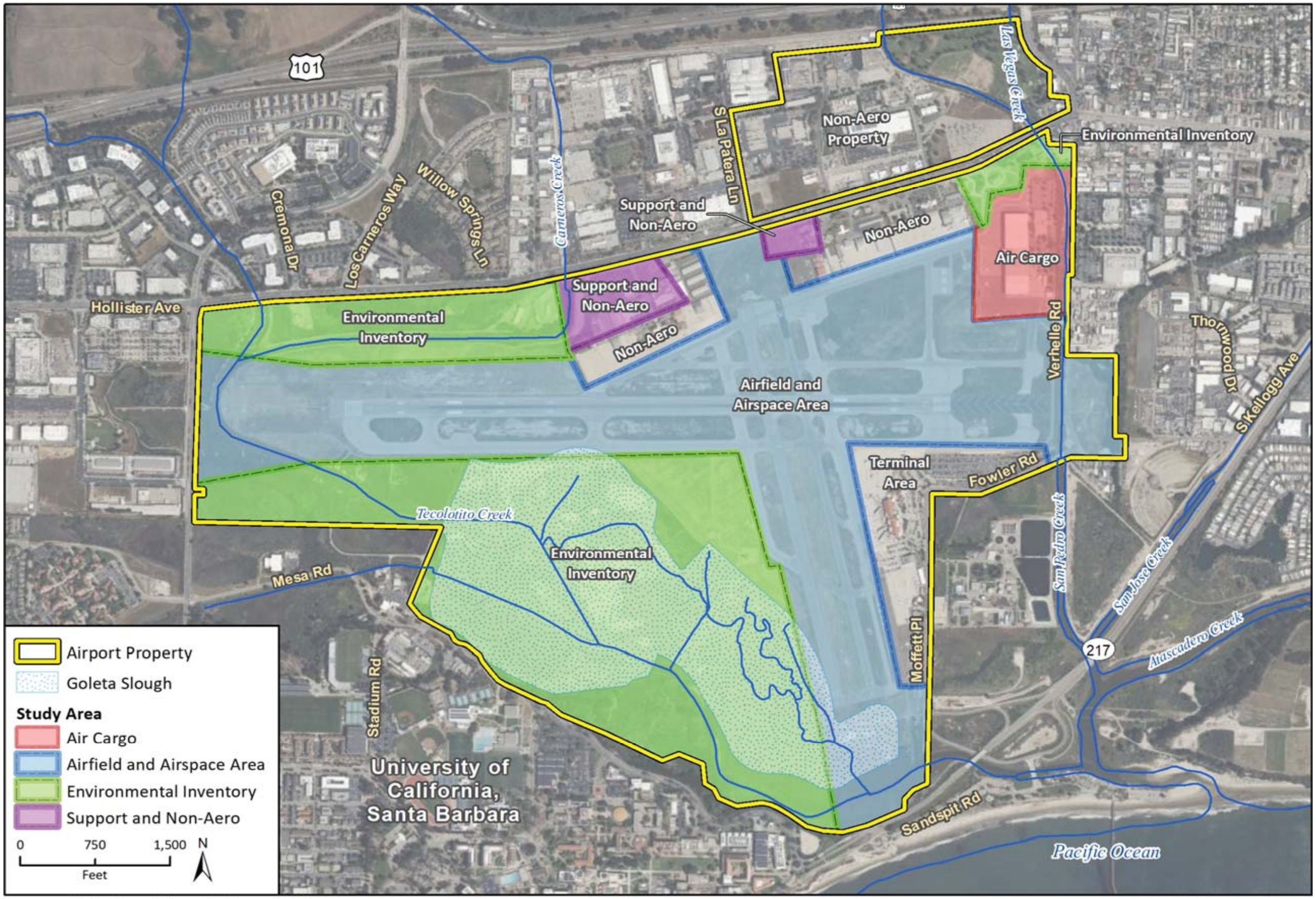


Figure 2-2: **Study Area Location Map**



Imagery provided by Microsoft Bing and its licensors © 2022
Additional data provided by City of Santa Barbara; National Hydrology Dataset, 2022.

Fig X Project Location_Environmental Inventory

Methodology

Regulated or sensitive biological resources studied and analyzed herein include special-status plant and animal species, nesting birds and raptors, sensitive plant communities, jurisdictional waters, including wetlands, wildlife movement, and locally protected resources, such as protected trees. Regulatory authority over biological resources is shared by federal, State, and local authorities. Primary authority for regulation of general biological resources typically lies within the land use control and planning authority of local jurisdictions (in this instance, the City of Santa Barbara).

Due to the extensive existing documentation of biological resources within the Study Area, no site visit was conducted in preparation of this assessment. The databases, reports, and online resources referenced when evaluating biological resources in the Study Area are detailed below.

Literature Review

Rincon Consultants, Inc. (Rincon) conducted a literature review to characterize the nature and extent of biological resources within and adjacent to the Study Area. The Goleta Slough Mouth Management Biological Technical Report (Rincon 2015), Goleta Slough Mouth Management Biological Assessment (Rincon 2016), Santa Barbara Airport Master Plan (Coffman and Associates, Inc. 2017a), and Program Environmental Impact Report on the Proposed Santa Barbara Airport Master Plan (Coffman and Associates, Inc. 2017b) were reviewed for biological information and potential updates with the use of the following resources.

The literature review included an evaluation of current and historical aerial photographs of the site (Google Earth Pro 2022), published datasets, regional and site-specific topographic maps, and climatic data as further described below. The California Native Plant Society (CNPS) Online Inventory of Rare and Endangered Plants (CNPS 2022) was reviewed for records of California Rare Plant Rank (CRPR) 1 and 2 plant species within the *Goleta, California* USGS 7.5-minute quadrangle, and the five surrounding landward quadrangles (*Lake Cachuma, Little Pine Mountain, San Marcos Pass, Dos Pueblos Canyon, and Santa Barbara, California*), as the three southernmost quadrangles of a standard nine-quad search would be in the ocean. Within the same quadrangles, the California Natural Diversity Database (CNDDB) (California Department of Fish and Wildlife [CDFW] 2022a) was queried for records of special-status species and sensitive natural communities. The U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) (USFWS 2022a) was searched for a list of federally threatened and endangered species known to occur within or near the Study Area. The USFWS and NMFS Critical Habitat Portals (USFWS 2022b, NMFS 2022) were reviewed for information on designated critical habitat areas. The results of the literature review were further evaluated and are presented in **Appendix EC2: Special-Status Species Evaluation Table**.

To aid in characterizing the nature and extent of jurisdictional waters potentially occurring within the Study Area, resources including the most recent *Goleta, California* USGS 7.5-minute topographic quadrangle map, and the U.S. Department of Agriculture, Natural Resources Conservation Service (USDA, NRCS) Web Soil Survey (USDA, NRCS 2022a) were reviewed. Additionally, the National Hydrography Dataset (NHD) (USGS 2022) and National Wetlands Inventory (NWI) (USFWS 2022c) were reviewed to determine if any potential wetlands and/or other waters have been previously mapped within the Study Area. Lastly, the State Soils Data Access (SDA) Hydric Soils List (USDA, NRCS 2022b) was queried to determine if any of the soil map units within the Study Area are classified as hydric.

Several existing reports were referenced when assessing potential for sensitive species to occur and when mapping and describing vegetation communities present in the Study Area. These reports include Goleta Slough Mouth Management Biological Technical Report (Rincon 2015), Goleta Slough Mouth Management Biological Assessment (Rincon 2016), Santa Barbara Airport Master Plan (Coffman and Associates, Inc. 2017a), and Draft Special-Status Species Inventory for the Santa Barbara Airport Master Plan Update (Dudek 2012).

Definition of Special-Status Species

For the purposes of this report, special-status species include:

- Species listed as threatened or endangered under the FESA; including proposed and candidate species
- Species listed as candidate, threatened, or endangered under the CESA
- Wildlife species designated as Fully Protected by the CFGC, and Species of Special Concern, Special Animals, or Watch List by the CDFW
- Plant species listed as State Rare (SR) under the Native Plant Protection Act (NPPA)
- Plant species with CRPR of 1A, 1B, 2A and 2B per CNPS and CDFW
- Species designated as sensitive by the U.S. Forest Service or Bureau of Land Management, if the project would affect lands administered by these agencies
- Species designated as locally important by the Local Agency and/or otherwise protected through ordinance, local policy, or Habitat Conservation Plans (HCP)/NCCPs

Existing Conditions

Physical Characteristics

Topography and Geography

The weather in Santa Barbara County is typical of a Mediterranean climate. Summers are warm and dry while winters are cool and wet with most of the precipitation falling between November and March. The Study Area mainly includes Santa Barbara Airport facilities and runways as well as the Goleta Slough and its surrounding wetland, riparian, and tidal habitats. The Study Area is roughly bounded by Hollister Avenue to the north, Los Carneros Road to the west, Mesa Road and State Route 217 to the south, and Moffett Place, James Fowler Road, and South Fairview Avenue to the east. The Pacific Ocean is immediately south of State Route 217, adjacent to the Study Area. The Santa Ynez mountains are to the north, with the crest approximately 5 miles away. The Study Area is relatively flat, with slightly more elevational variability in the riparian area north of Mesa Road in the southern portion of the Study Area, and ranges between approximately 2 and 40 feet above mean sea level (amsl).

Water Quality, Aquatic Habitat, and Vectors

Goleta Slough is divided into multiple basins separated by artificial berms. As noted above, previous projects have partially restored tidal flow into the basins when the mouth of the slough is open (URS Corporation 2009). These projects were implemented when slough mouth management was still regularly occurring, and cessation of management has altered hydrology in the basins. When the slough mouth is closed for extended periods, tidal mixing does not occur. Lower dissolved oxygen and stagnation are reported when the slough is closed for extended periods (Padre and Associates 2010). Under the previous management strategy, until 2012, the mouth of the slough was opened any time sand buildup caused a closure lasting more than 2 weeks. Creation of a channel through the sandbar allowed tidal water to flow in and out of the slough. Without management, when sand closes the slough mouth, the slough can be cut off from tidal influence for extended periods. Changes in frequency of tidal mixing and reduced water movement can alter salinity, temperature, and dissolved oxygen. Water depth is also affected. While inundation can increase total area of aquatic habitat, prolonged inundation can have negative implications for wetlands and terrestrial vegetation as discussed further in Section 2.4. Aquatic habitat suitability values for tidewater goby in Goleta Slough and steelhead in the Slough and upstream have been based on extensive literature review of habitat criteria, USFWS designation of critical habitat, and observations of tidewater goby and steelhead in Goleta Slough, as discussed further in Sections 4 and 5.

Previous assessments of general water quality in Goleta Slough identified high levels of pathogens, priority organic pollutants, specifically organic chlorine pesticides, and excessive sediment loads (Padre and Associates 2010). The Slough was listed on the 2010 CWA Section 303(d) list of Water Quality Limited Segments requiring Total Maximum Daily Loads (TMDL) for pathogens and organic pollutants (State Water Resources Control Board 2010). Carneros and Tecolotito creeks are tributaries to Goleta Slough and are also listed for various water quality problems that include chloride, pathogens, *Enterococcus, Escherichia coli* (*E. coli*), fecal coliform, low dissolved oxygen, sodium, water temperature, pH, priority organics, electrical conductivity, and nitrate. Note, the listed reaches of tributary streams include the project area but also extend several miles upstream of the project site.

Watershed and Drainages

Goleta Slough, which comprises a large portion in the southern Study Area, receives water from five major streams. Atascadero, San Pedro, and San Jose creeks meet near the mouth of the slough on the east side. Carneros and Tecolotito creeks meet upstream to the west. The San Pedro Creek watershed (Hydrologic Unit Code [HUC] 180600130202) includes San Pedro, San Jose, Carneros, and Tecolotito creeks and their tributaries, and drains approximately 27.6 square miles, while the Atascadero Creek watershed (HUC 180600130201) includes Atascadero Creek and its tributaries and drains approximately 19.8 square miles. Combined watersheds of these creeks drain over 47.4 square miles according to the NHD (USGS 2022). The lower reaches of all these creeks have had regular previous management actions, including silt removal projects, and structures such as check dams, concrete lining, and sediment basins are present. Tecolotito and Carneros creeks had channel realignment projects implemented in 2006 (URS Corporation 2008, Padre and Associates 2010).

Soils

The Web Soil Survey (USDA, NRCS 2022a) depicts the following soil map units within the Study Area[1], as shown in **Figure 2-3**

- **Aquents, fill areas (AC)** is a poorly drained soil formed in disturbed landscapes on floodplains, often found in excavated areas and/or where fill has been imported. This soil typically has a uniform horizon between 0 to 60 inches. This soil is not prone to ponding or flooding and is not considered hydric. This soil is mapped in the developed airport facility portion of the Study Area and covers approximately 55 percent of the total Study Area.
- **Aquepts, flooded (AD)** is a very poorly drained soil formed from alluvium on the toeslopes of sloughs. This soil typically has one variable horizon between 0 to 60 inches, is frequently flooded, and is considered hydric. Within the Study Area this soil is mapped in the Goleta Slough, covering approximately 31 percent of the total Study Area.
- **Baywood loamy sand, 2 to 9 percent slopes (BcC)** is a somewhat excessively drained soil formed on the toeslope of dunes. This soil typically has a uniform horizon of loamy sand between 0 to 62 inches. This soil is not prone to ponding or flooding and is not considered hydric. This soil is mapped in a small portion of the Study Area north of Mesa Road between development and Goleta Slough, covering less than 1 percent of the total Study Area.
- **Camarillo fine sandy loam (Ca)** is a poorly drained soil found on the toeslopes of floodplains. It is formed from alluvium derived from calcareous sedimentary rock. A typical profile contains two horizons. The first occurs between 0 and 19 inches and contains fine sandy loam, and the second occurs between 19 and 57 inches and contains loam. This soil is not prone to flooding or ponding and is not considered hydric. This soil is mapped in small, disturbed portions of the northwestern and southern Study Area, covering approximately 11 percent of the total Study Area.
- **Xerorthents, cut and fill areas (XA)** is a well-drained soil formed on the backslopes and shoulders of terraces. This soil typically has one variable horizon between 0 to 6 inches and is composed of rock, concrete, asphalt, or other debris and fill. This soil is not prone to ponding or flooding and is not considered hydric. Within the Study Area, this soil is mapped in small portions of the airport runway and Goleta Slough, covering approximately 3 percent of the total Study Area.

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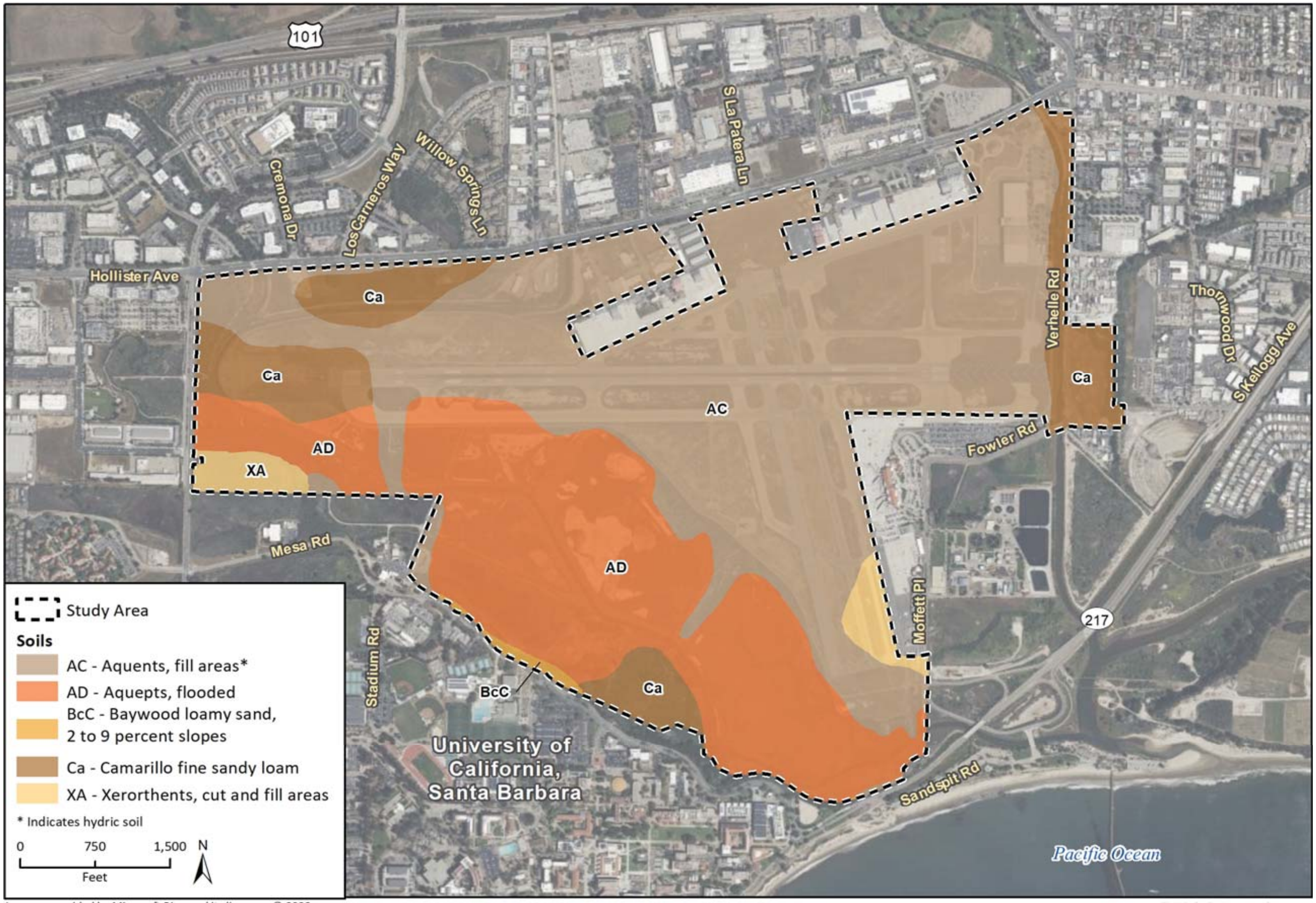
[1] Published soil surveys are documented at a broad scale and they may not match the level of detail or refinement captured during formal jurisdictional delineation surveys.

Figure 2-3: **Soils Map**



Imagery provided by Microsoft Bing and its licensors © 2022
Additional data provided by Natural Resource Conservation Service Soil Survey Geographic, 2022.

Fig X Soils_Environmental Inventory

Vegetation Communities and Other Land Cover

A total of four general physiognomic vegetation communities have been documented in the Study Area as identified by the *Manual of California Vegetation, Second Edition* (Sawyer et al. 2009) and Natural Communities List (NCL) (CDFW 2010): 1) grass and forb, 2) coastal scrub, 3) riparian scrub, and 4) woodland dominated communities. These vegetation communities and wildlife habitats are summarized in **Table 2-1** and described further below as described in the Special-Status Species Inventory for the Santa Barbara Airport Master Plan Update (Dudek 2012). In this inventory, the group non-vegetated habitats is equivalent to a general physiognomic and physical location type and associated wildlife habitat and is described at the end of the following section. Mapping of vegetation communities and land cover types within the Study Area is shown in **Figure 2-4**.

Table 2-1: Summary of Vegetation Communities and Land Cover Types within the Study Area

Physiognomic Category	General Habitat	Vegetation Community	Approximate Acreage	Approximate Percent Area
Herbaceous Alliances and Stands (Upland)	Grassland	Annual Brome Grassland (ABG)	91.8	12.2%
		Italian Rye Grass (IRG)	9.6	1.3%
	Forb Dominated	Ice Plant Mats (IPM)	0.1	<0.1%
		Black Mustard (UM)	3.3	0.4%
		Western Ragweed Meadows (WRM)	1.0	0.1%
Herbaceous Alliances and Stands (Wetland)	Grassland	Creeping Rye Grass Turfs (CRGT)	4.7	0.6%
		Harding Grass Swards (HGS)	0.7	0.1%
		Meadow Barley Patches (MBP)	4.7	0.6%
		Salt Grass Flats (SGF)[1]	8.1	1.1%
	Forb Dominated	Alkali Heath Marsh (ASH)[1]	1.6	0.2%
		Alkali Weed[1]	0.1	<0.1%
		California Bulrush Marsh (CBM)[1]	5.4	0.7%
		Broadleaf Cattail Marshes (BLC)	3.9	0.5%
		Curly Dock (CD)	2.1	0.3%
		Fennel Patches (FP)	0.1	<0.1%
		Giant Reed Breaks (GRB)	<0.1	<0.1%
		Pale Spike Rush Marshes (PSRM)	0.2	<0.1%
		Pickleweed Mats (PW)[1]	144.9	19.3%
		Poison Hemlock Patches (PH)	0.6	0.1%
		Salt Marsh Bulrush Marshes (MBR)[1]	1.5	0.2%
		Smartweed – Cocklebur Patches (CBR)	0.4	0.1%
		Western Rush Marshes (WRM)	1.0	0.1%
		Bristly Ox-Tongue (BOT)	0.7	0.1%

Physiognomic Category	General Habitat	Vegetation Community	Approximate Acreage	Approximate Percent Area
Shrubland Alliances and Stands (Upland)	Coastal Scrub	Blue Elderberry Stands (BES)	<0.1	<0.1%
		California Sagebrush Scrub (CSS)	0.3	<0.1%
		Coyote Brush Scrub (CYS)	27.5	3.7%
		Menzies's Golden Bush Scrub (MGBS)[1]	2.2	0.3%
		Poison Oak Scrub (POS)	1.8	0.2%
		Quailbush Scrub (QS)	19.8	2.6%
Shrubland Alliances and Stands (Wetland)	Riparian Scrub	Arroyo Willow Thickets (ARWT)[1]	12.8	1.7%
		Mulefat Thickets (MFT)	0.1	<0.1%
Woodlands and Tree Clusters	Woodland and Tree Clusters (planted or naturally occurring)	Coast Live Oak Woodland (CLOW)	3.0	0.4%
		Cypress stands (CYP)	3.6	0.5%
		Eucalyptus Groves (EG)	2.6	0.4%
		Myoporum Groves (MP)	0.3	<0.1%
Non-Vegetated Habitats		Mudflats (MDFT)	1.2	0.2%
		Saltflats (STFT)	13.3	1.8%
		Open Water (non-vegetated) (OW)	15.9	2.1%
		Dredge Spoil or Work Area (DRDG)	139.6	18.6%
		Developed (DVLP)	217.7	29.0%
		Bare Ground (BG)	4.8	0.6%

[1]CDFW Sensitive Natural Community (CDFW 2022b)

Source: Dudek 2012.

Grassland and Forb-Dominated Habitats (Upland)

The Study Area includes two grassland-dominated (annual brome grassland and Italian rye grass) and three forb-dominated (ice plant mats, upland mustard, and western ragweed meadows) upland vegetation communities.

Grassland Habitats (Upland)

Non-native Annual brome grasslands contain ripgut brome (*Bromus diandrus*) and soft brome (*Bromus hordeaceus*) as dominant or co-dominant species in the herbaceous layer. Annual brome grasslands are typically found on seasonally dry hillsides and valleys in the Central Valley, interior valleys of the Coast Ranges, and along the coast of central and Southern California, as well as some of the offshore islands. This mix of grasses and forbs is often found on gravelly to deep, fine-grained soils well suited for annual growth. Annual brome grasslands have open to continuous cover less than 2.5 feet in height; low cover of emergent trees and shrubs may be present. This community occurs from sea level to 7,218 feet amsl. Vegetation in this habitat type is composed primarily of non-native short to tall annual grasses and native and non-native broad-leafed forbs. Noxious weeds are also present in disturbed areas adjacent to this habitat type. Dominant grasses include soft brome, ripgut grass, foxtail chess (*Bromus madritensis*), wild oats (*Avena fatua*), Italian ryegrass (*Festuca perennis*), and rat-tail fescue (*Festuca myuros*). Flowering herbs include western verbena (*Verbena lasiostachys*), scarlet pimpernel (*Lysimachia arvensis*), common catchfly (*Silene gallica*), coast morning glory (*Calystegia macrostegia* ssp. *cyclostegia*), and doveweed (*Croton setiger*) (Sawyer et al. 2009).

Annual brome grassland occurs widely throughout the site, especially in areas along roadsides and areas within the airfield that received regular maintenance, such as mowing. At least one special-status plant species, southern tarplant (*Centromadia parryi* ssp. *australis*; CRPR 1B.1, Locally Rare [LR]) has the potential to occur in this community and has been documented at the airport.

Many of the annual brome grasslands within the Study Area are located where the value as wildlife habitat is suppressed under the draft Wildlife Hazard Management Plan (Santa Barbara Airport 2008). Many of these areas are mowed in fall and spring. Rodent control measures are implemented here, and animal carcasses are promptly removed to deter the presence of scavengers. Some of the larger mammals present on the site, such as the coyote (*Canus latrans*) and common raccoon (*Procyon lotor*), have the potential to use grassland habitats as movement corridors. Some small mammals, such as the California vole (*Microtus californicus*) and Botta's pocket gopher (*Thomomys bottae*), may occur here, but rodent control measures likely suppress their presence as well. This community is likely not attractive to large numbers of reptiles and amphibians. Some birds are found here, although wildlife hazard-management practices likely suppress their presence as well. Nesting waterfowl, especially mallards (*Anas platyrhynchos*) and gadwalls (*Anas strepera*), occasionally nest in grassland habitats when they are near water and grasses are relatively high. Birds of prey, especially the red-tailed hawk (*Buteo jamaicensis*), are encountered occasionally over these areas.

In this current condition, special-status species such as the white-tailed kite forage over these grasslands, although some areas adjacent to the airfield subject to rodent control measures are likely less often used. The state endangered Belding's savannah sparrow (*Passerculus sandwichensis beldingi*) forages here, especially where this community occurs near tidal areas. California horned larks (*Eremophila alpestris actia*) may nest in brome grasslands in the airfield.

Italian rye grass grasslands are dominated by non-native Italian ryegrass. These grasslands are found throughout California except in deserts and the Great Basin. Italian rye grass grasslands often occur in pastures, roadsides, fields, agronomic crops, vineyards, and orchards. They are found in fertile, well-drained soils, but also in saturated soils, from sea level to 3.280 feet amsl (DiTomaso and Healy 2007).
In the Study Area, Italian rye grass grasslands occur in isolated patches in the north-central and northeastern portions of the Airport continuous with annual brome grasslands, but in more mesic areas.
The larger mammals occurring on the site are able to travel through this habitat, and small mammals, such as the California vole and Botta's pocket gopher, occur here. Common Coast Range fence lizards (*Sceloporus occidentalis bocourtii*) and San Diego gopher snakes (*Pituophis catenifer annectens*) likely occur here. Bird species occurring in this community, including the white-tailed kite and foraging Belding's savannah sparrows, are the same as those occurring in annual brome grasslands.

Forb-Dominated Habitats (Upland)

Ice plant mats (*Carpobrotus* spp. Herbaceous Semi-Natural Alliance) contain non-native iceplant (*Carpobrotus edulis*), sea fig (*Carpobrotus chilensis*), or other ice plant taxa as the dominant or co-dominant species in the herbaceous layer. These species invade coastal bluff scrub, dune mat, dune scrub, and coastal prairies and compete with native plants. Ice plant semi-natural herbaceous stands have an intermittent to continuous canopy within the herbaceous layer less than 1.6 feet in height. Shrubs and emergent trees may be present at low cover. Ice plant mats occur on disturbed land, bluffs, coastal sand dunes, and coastal and alkaline terraces from sea level to 330 feet amsl (Sawyer et al. 2009).

In the Study Area, ice plant mats occur in stands of variable sizes in disturbed areas near access roads and dredge spoils work areas. This community forms stands along the upland edges of pickleweed mats in tidal basins, Tecolotito Creek, and Carneros Creek.

Very few wildlife species occur in ice plant mats. California ground squirrels (*Spermophilus beecheyi*) often inhabit this community, but rodent control measures may limit their numbers in the Study Area. This community provides poor nesting habitat for birds. Common reptiles such as the Coast Range fence lizard likely occur here. This community is not generally valuable to special-status wildlife species.

Upland mustards (*Brassica nigra* Herbaceous Semi-Natural Alliance) contain black mustard, common mustard (*Brassica rapa*), Saharan mustard (*Brassica tournefortii*), short-podded mustard (*Hirschfeldia incana*), or wild radish (*Raphanus sativus*) as the dominant species in the herbaceous layer. Upland mustard has an open to continuous canopy less than 10 feet in height in the herbaceous layer. Throughout California, upland mustard occurs in fallow fields, roadsides, grasslands, levee slopes, riparian areas, disturbed scrublands, and waste places from sea level to 4,920 feet amsl (Sawyer et al. 2009).

In the Study Area, upland mustard occurs along disturbed basin berms, roadside areas, and other disturbed habitats. The black mustard in this community here grows in very dense stands from which other herbaceous species are excluded. Dense, extensive mustard stands provide poor habitat for most wildlife, although the habitat value of upland mustard stands increases where it is patchy and adjacent to other communities that provide habitat value. California voles are common mammals that likely occur in this vegetation community. Larger mammals likely avoid this community, as passage through mustard stands is difficult. The Coast Range fence lizard is a common reptile species found in this community. Birds that sometimes nest in mustard fields include red-winged blackbirds (*Agelaius phoeniceus*), common yellowthroats (*Geothlypis trichas*), and song sparrows (*Melospiza melodia*). Where this community occurs in a mosaic of communities, white-tailed kites (FP) hunt the edges of mustard stands.

Western ragweed meadows contain native western ragweed (*Ambrosia psilostachya*) as the dominant or co-dominant species in the herbaceous layer. Western ragweed meadows occur in areas with moderate to heavy disturbance regimes, including overgrazed rangeland, roadsides, railroads, waste places, throughout North America. Western ragweed meadows occur from sea level to 4,265 feet amsl. Western ragweed meadows have an intermittent to continuous canopy within the herbaceous layer less than 3 feet in height. Throughout California, the western ragweed meadow provisional alliance occurs in intermittently wet and disturbed meadows, at the edges of salt and brackish marshes, and temporarily flooded depressions and lowlands from the coast inland to cismontane California. Soils are sandy to clay loams. Some species associated with the western ragweed provisional alliance include ripgut brome, soft brome, Bermuda grass (*Cynodon dactylon*), fillaree (*Erodium* spp.), gumweed (*Grindelia* spp.), foxtail barley (*Hordeum murinum*), arctic rush (*Juncus balticus*), wild hollyhock (*Sidalcea malviflora*), and blue-eyed grass (*Sisyrinchium bellum*) (Sawyer et al. 2009).

Western ragweed meadows occur in stands of variable sizes in transitional areas in various parts of the Study Area. Although western ragweed is widespread in the Study Area, locations where it is dominant are generally limited in extent. These areas provide limited cover for many animals and are most likely used as foraging habitat for animals inhabiting adjacent areas. Small mammals, such as California voles, may inhabit these areas. Coast Range fence lizards are likely common here, and California alligator lizards (*Elgaria multicarinata multicarinata*) may occur here as well. As the growth period for western ragweed is generally late, areas dominated by this annual generally do not provide good nesting habitat for songbirds.

However, many songbirds have the potential to forage here during the non-nesting season or where western ragweed meadows occur near suitable nesting habitat. Therefore, species common in the ecological reserve, such as resident song sparrows, California towhees (*Melozone crissalis*), and northern mockingbirds (*Mimus polyglottos*), as well as wintering white-crowned sparrows (*Zonotrichia leucophrys*), likely forage here.

Grassland and Forb-Dominated Habitats (Wetland)

The Study Area includes wetland grassland and forb-dominated habitats, including 15 vegetation communities. These include four grasslands (creeping rye grass turfs, Harding grass swards, meadow barley patches, and salt grass flats) and 11 forb-dominated communities (alkali heath marsh, California bulrush marsh, cattail marsh, curly dock, giant reed breaks, pickleweed mats, poison hemlock patches, salt marsh bulrush marsh, smartweed – cocklebur patches, western rush marsh, and bristly ox-tongue).

Grassland Dominated Habitats (Wetland)

Creeping rye grass turfs include native creeping rye grass (*Elymus triticoides*) as the dominant or codominant species in the herbaceous layer. The creeping rye grass alliance includes creeping rye grass with greater than 50 percent cover in the herbaceous layer (Sawyer et al. 2009). Creeping rye grass turfs occur in stands with approximately 75 percent creeping rye grass cover within the grassland species. Open to continuous creeping rye grass berm areas contain low percentages of salt grass, pickleweed, and Italian rye grass. Creeping rye grass turfs have an open to continuous canopy less than 3 feet in height in the herbaceous layer. In California, creeping rye grass turfs occur on poorly drained floodplains, mesic areas with flat to sloping topography, drainage and valley bottoms, and marsh margins. This species has adapted to become extremely saline tolerant. Soils are loams and clays (Sawyer et al. 2009). Creeping rye grass is a CDFW sensitive natural community. Species associated with the creeping rye grass turfs alliance include western ragweed, yerba mansa (*Anemopsis californica*), purple threeawn (*Aristida purpurea*), wild oat, bromes, onespike oatgrass (*Danthonia unispicata*), salt grass (*Distichlis spicata*), squirreltail (*Elymus elymoides*), barley (*Hordeum* spp.), Italian rye grass, arctic rush, Sandberg bluegrass (*Poa secunda*), and seaside arrowgrass (*Triglochin maritima*) (Sawyer et al. 2009).

In the Study Area, creeping rye grass turfs occur on restored creek berms and on the sloped banks of the tidal areas. The larger mammals commonly found in the Study Area, such as the common raccoon, striped skunk (*Mephitis mephitis*), and coyote, have the potential to travel through creeping rye grass turfs and even forage on small vertebrates and insects here. Dense growth of creeping rye grass may deter some smaller vertebrate species, but it likely provides cover for others. Small mammals such as the California vole may inhabit these areas. Some bird species, such as the common yellowthroat and song sparrow, especially where some shrubs occur within this community, have the potential to nest here. Among special-status wildlife species, Belding's savannah sparrows (SE) likely forage within this community, particularly where it occurs near pickleweed mats.

Harding grass swards include the non-native invasive Harding grass (*Phalaris aquatica*) as the dominant species. There are three membership rules for the Harding grass swards alliance: 1) Harding grass swards include Harding grass with greater than 20 percent absolute cover as the dominant grass in grasslands; 2) Harding grass swards include Harding grass with greater than 50 percent relative cover in the herbaceous layer; 3) Harding grass swards include Harding grass at greater than 15 percent absolute cover and greater than 75 relative cover when compared to native species in the herbaceous layer. Harding grass swards have an intermittent to continuous canopy less than 5 feet within the herbaceous layer. Some emergent shrubs, such as coyote brush (*Baccharis pilularis*) and wedgeleaf ceanothus (*Ceanothus cuneatus*), may be present. They occur in and along arroyo and lake margins, ditches, washes, rivers, watercourses, and seasonally wet and alkaline sites (Sawyer et al. 2009).

Harding grass swards occur north of the Santa Barbara Airport fence line along Hollister Avenue near the intersection with Los Carneros Road. In addition, one isolated patch is located in the southeastern portion of the site, just east of a large coyote brush scrub area. Species occurring in association with Harding grass swards include black mustard, bromes, and Italian ryegrass.

Where this community occurs near Hollister Avenue, it is part of an emergent wetland complex that includes several other wetland communities. Also, some Harding grass swards within or near the Hollister Avenue right of way are routinely mowed. Mammals such as the common raccoon and striped skunk may occur here, but inundation of the area in some years may limit populations of smaller terrestrial vertebrates, including rodents and reptiles. Baja California treefrogs (*Pseudacris hypochondriaca hypochondriaca*) are found in the wetland complex and may occur in other parts of the Study Area where this community occurs. Some predatory bird species, such as the great egret (*Ardea alba)* and snowy egret (*Egretta thula*), have the potential to hunt for treefrogs in these areas. Wilson's snipes (*Gallinago delicata*) are common here in winter and early spring, under wet conditions. This community is not suitable nesting habitat for most bird species. One special-status predatory bird species, the white-tailed kite (FP), is well suited to hunting in Harding grass swards.

Meadow barley patches contain native meadow barley (*Hordeum brachyantherum*) as the dominant or co-dominant species in the herbaceous layer. There are two membership rules for the meadow barley patch alliance: 1) meadow barley patches are meadow barley with greater than 30 percent relative cover in the herbaceous layer; 2) meadow barley patches are areas where meadow barley is characteristically present, usually with other wetland plants that may be at high cover. The meadow barley patches alliance inhabits coastal California and the Sierra Nevada Mountains. This alliance is found along stream terraces, in moist to wet meadows and sites adjacent to springs and seeps. Meadow barley patches have a continuous canopy within the herbaceous layer less than 3.5 feet in height. Meadow barley patches occur from sea level to 4,264 feet amsl. Some species associated with the meadow barley patches alliance include sedge (*Carex* spp.), California oatgrass (*Danthonia californica*), tufted hairgrass (*Deschampsia caespitosa*), annual hairgrass (*Deschampsia danthonioides*), needle spikerush (*Eleocharis acicularis*), fringed willowherb (*Epilobium ciliatum*), Hall's willowherb (*Epilobium hallianum*), velvet grass (*Holcus lanatus*), arctic rush, brownhead rush (*Juncus phaeocephalus*), Italian rye grass, lotus (*Lotus* spp.), California burclover (*Medicago polymorpha*), pullup muhly (*Muhlenbergia filiformis*), fowl blue grass (*Poa palustris*), Kentucky blue grass (*Poa pratensis*), California buttercup (*Ranunculus californicus*), dock (*Rumex* spp.), arrowleaf ragwort (*Senecio triangularis*), and clover (*Trifolium* spp.) (Sawyer et al. 2009). Meadow barley patches are a CDFW Sensitive Natural Community.

In the Study Area, meadow barley patches occur in low-lying grassland areas that tend to remain moist for extended periods of time. Patches of meadow barley grassland occur south of Runway 7-25 near the ASR and south of Tecolotito Creek near Los Carneros Road. Surrounding communities are annual brome grassland, pickleweed mats, and alkali heath marshes. One special-status species occurring in the Study Area that may occur in this community is southern tarplant.

Wildlife species found in this community are similar to those occurring in annual brome grassland. Belding's savannah sparrows were found in this community near the southern boundary of the Study Area in March 2012; this species likely forages here in the non-nesting season, and possibly the nesting season. Another special-status bird species, the white-tailed kite likely forages in meadow barley patches. Other birds of prey that may forage here include the red-tailed hawk and American kestrel (*Falco sparverius*).

Salt grass flats contain native salt grass as the dominant or co-dominant species in the herbaceous layer. There are two membership rules for the salt grass flats alliance: 1) salt grass flats are areas where salt grass provides greater than 50 percent relative cover in the herbaceous layer and has a higher cover than any other single grass species; 2) salt grass flats are areas where salt grass provides greater than 30 percent relative cover in the herbaceous layer and *Sarcocornia* or *Salicornia* spp. if present, occurs in less than 30 percent relative cover. This is a CDFW Sensitive Natural Community. Salt grass flats have an open to continuous canopy less than 3 feet in height within the herbaceous layer. Throughout California, the salt grass flats alliance occurs in coastal marshes and in inland habitats including swales, playas, and terraces along washes that are typically intermittently flooded. Soils are alkaline, often deep, and have an impermeable layer making them poorly drained. Ground surfaces often have salt accumulations when the soil is dry. The salt grass flats alliance occurs throughout most of temperate North America. In California, salt grass flats are found in alkaline or saline environments from the coast to mountains and deserts. Salt grass flats occur from sea level to 4,920 feet amsl. Some species associated with the salt grass flats alliance include water beard grass (*Polypogon viridis*), beach bur (*Ambrosia chamissonis*), yerba mansa, fat-hen (*Atriplex prostrata*), saltwort (*Batis maritima*; LR), ripgut brome, brass buttons (*Cotula coronopifolia*), common spikerush (*Eleocharis palustris*), alkali heath, meadow barley, foxtail barley, marsh jaumea (*Jaumea carnosa*), arctic rush, Cooper's rush (*Juncus cooperi*), broadleaved pepperweed (*Lepidium latifolium*), creeping rye grass, California sea lavender (*Limonium californicum*), scratchgrass (*Muhlenbergia asperifolia*), strigose sicklegrass (*Parapholis strigosa*), western wheat grass (*Elymus smithii*), Sandberg bluegrass, Nuttall's alkaligrass (*Puccinellia nuttalliana*), pickleweed, alkali sacaton (*Sporobolus airoides*), and seaside arrowgrass (Sawyer et al. 2009).

In the Study Area, salt grass flats occur in stands of variable sizes in areas of slightly higher elevation than pickleweed. This community forms large stands along the upper edges of tidal pickleweed basins, Tecolotito Creek, and Carneros Creek. Alkali heath and creeping rye grass grow in patchy areas within the salt grass. In more upland areas, salt grass forms flats in depressed areas and among shrubs such as quailbush and coyote brush. Special-status plant species that have the potential to occur here include Coulter's goldfields (CRPR 1B.1, LR) and woolly seablite (*Suaeda taxifolia*).

This series hosts many of the same wildlife species found in other grassland habitats on the site: mammals such as the California vole and reptiles such as the Coast Range fence lizard. Brush rabbits (*Sylvilagus bachmani*) occur in this community when it is adjacent to scrub communities. Salt grass flats also occur adjacent to pickleweed mats, the favored nesting habitat of the state endangered Belding's savannah sparrow. This species often forages in salt grass flats and may even nest in this community when it is adjacent to tidal areas. Other songbird species common in the ecological reserve, including song sparrows and wintering white-crowned sparrows, often occur within this community. The State fully protected white-tailed kite likely forages over this community as well.

Forb Dominated Habitats (Wetlands)

Alkali heath marsh contains native alkali heath (*Frankenia salina*) as the dominant or co-dominant species in the herbaceous and subshrub layers. Alkali heath marshes occur where alkali heath is greater than 30 percent relative cover in the herbaceous layer, and sometimes where it is codominant with salt grass or other herbs or subshrubs. Alkali heath marshes occur in western California in coastal salt marshes, brackish marshes, alkali playas, and alkali meadows. These marshes have an open to continuous canopy with the herbaceous and subshrub layers less than 2 feet in height. Alkali heath marshes occur at elevations less than 985 feet amsl (Sawyer et al. 2009). Some species associated with the alkali heath marsh alliance include Parish's glasswort (*Arthrocnemum subterminale*), saltbush (*Atriplex* spp.), Pacific bentgrass (*Agrostis avenacea*), saltwort, alkali weed (*Cressa truxillensis*), salt grass, foxtail barley, goldfields (*Lasthenia* spp.), pepper grass (*Lepidium* spp.), California sea lavender, shore grass (*Distichlis littoralis*), and pickleweed (Sawyer et al. 2009). Alkali weed is a CDFW Sensitive Natural Community.

In the Study Area, alkali heath marshes occur in stands of variable sizes in areas of slightly higher elevation than pickleweed. This community forms large stands along the upper edges of tidal pickleweed basins, Tecolotito Creek, and Carneros Creek. Salt grass and creeping rye grass grow in patchy areas within the alkali heath. Special-status plant species occurring in this community include woolly seablite and estuary seablite (*Suaeda esteroa*; CRPR 1B.2, LR).

The density of the ground cover provided by the dominant species in alkali heath marsh and its tendency to occur in isolated patches and narrows strips at the edges of salt marsh dictate the usefulness of this community for wildlife. Many of the wildlife species found in both upland and wetland habitats likely occur. Skunks and common raccoons likely forage at the edges and in openings within this community. California voles are probably relatively common at the upland edges. Coast Range fence lizards, while largely limited to the more upland communities within the ecological reserve, venture into alkali heath marsh where it is adjacent to upland areas, and San Diego gopher snakes likely do as well. Baja California treefrogs can be plentiful here. One listed bird species, Belding's savannah sparrow (SE) may nest here where this community occurs at the edges of pickleweed mats. Common songbird species potentially occurring here include nesting common yellowthroats and song sparrows and wintering marsh wrens (*Cistothorus hiemalis*). Waterfowl species, including mallards, gadwalls, and cinnamon teal (*Anas cyanoptera*), may nest in alkali heath marsh where it occurs near open water.

California bulrush marsh contains California bulrush (*Schoenoplectus californicus*) as the dominant or co-dominant species in the herbaceous layer. It has a continuous or intermittent herb canopy of less than 13 feet in height. The California bulrush marsh alliance is California bulrush marsh greater than or equal to 10 percent absolute cover in the herbaceous layer. If present, hardstem bulrush (*Schoenoplectus acutus*) occurs in less than 50 percent relative cover, although it can be co-dominant with California bulrush. The California bulrush marsh alliance often occurs in brackish to freshwater marshes, bars, shores, and channels of river mouth estuaries. California bulrush marsh is widespread throughout California in emergent marshes. Soils have a high organic presence and are poorly aerated. This alliance occurs between sea level and 660 feet amsl. Species associated with the California bulrush marsh alliance include Indian hemp dogbane (*Apocynum cannabinum*), salt marsh bulrush (*Bolboschoenus maritimus*), common water hyacinth (*Eichhornia crassipes*), western goldentop (*Euthamia occidentalis*), floating primrose willow (*Ludwigia peploides*), dotted smartweed (*Persicaria punctata*), common reed (*Phragmites australis*), hardstem bulrush, narrowleaf cattail (*Typha angustifolia*), southern cattail (*Typha domingensis*), and broadleaf cattail (*Typha latifolia*). Emergent species may include common buttonbush (*Cephalanthus* *occidentalis*), California wild rose (*Rosa californica*), or arroyo willow (*Salix lasiolepis*) (Sawyer et al. 2009). California bulrush marsh is a CDFW sensitive natural community.

In the Study Area, California bulrush marshes are found in low-lying marsh areas and within Tecolotito and Carneros Creeks. The marshes are dominated by California bulrush with some cattails and salt marsh bulrush.

The density of ground cover within this community and its frequent inundation deter many mammals and other terrestrial vertebrates from occurring here. The principal vertebrate species occurring in this community are songbirds and aquatic vertebrates. Song sparrows, common yellowthroats, and red-winged blackbirds nest here. Marsh wrens forage and seek cover here from fall to spring, and a variety of other songbirds has the potential to forage here. American coots (*Fulica americana*) and pied-billed grebes (*Podilymbus podiceps*) likely nest within this community when it is inundated in spring. Virginia rails (*Rallus limicola*), soras (*Porzana carolina*), and, on rare occasions, least bitterns (*Ixobrychus exilis*; SSC) are found in this community. Snowy and great egrets hunt the edges of this habitat, particularly when Baja California treefrogs are common. Where this species occurs in the brackish waters of Carneros Creek, it may harbor the tidewater goby (FE), which likely seeks shelter and burrows among the bases of inundated cattails. A variety of aquatic invertebrates occur here as well.

Cattail marshes contain narrowleaf cattail, southern cattail, or broadleaf cattail as the dominant or co-dominant in the herbaceous layer. There are four membership rules for the cattail marsh alliance: 1) cattail marsh occurs where one or more of narrowleaf cattail, southern cattail, and broadleaf cattail is present in greater than 50 percent relative cover in the herbaceous layer; 2) cattail marsh occurs where broadleaf cattail is present in greater than 50 percent relative cover in the herbaceous layer; 3) cattail marsh occurs where narrowleaf cattail is present in greater than 50 percent relative cover at greater than 2 feet height in the herbaceous layer; 4) cattail marsh occurs where broadleaf cattail is present in greater than 50 percent relative cover in the herbaceous layer and common reed is not present. Throughout California, the cattail marsh alliance occurs in brackish or semi-permanently flooded freshwater marshes. Cattail marshes have a continuous or intermittent herbaceous canopy of less than 5 feet in height. This alliance occurs from sea level to 1,150 feet amsl (Sawyer et al. 2009).

In the Study Area, cattail marshes occur in the same areas as California bulrush marshes. Cattails, California bulrush, and salt marsh bulrush dominate these marshes. Some species associated with the cattail marsh alliance include creeping bentgrass (*Agrostis stolonifera*), Pacific potentilla (*Argentina egedii*), flatsedge (*Cyperus* spp.), salt grass, watergrass (*Echinochloa crus-galli*), pale spike rush (*Eleocharis macrostachya*), giant horsetail (*Equisetum telmateia*), rush (*Juncus* spp.), least duckweed (*Lemna minuta*), broadleaved pepperweed, water parsley (*Oenanthe sarmentosa*), gray willow weed, dotted smartweed, common reed, chairmaker's bulrush (*Schoenoplectus americanus*), California bulrush, and cocklebur (Dudek 2012).

Wildlife species occurring in cattail marshes marsh are similar to those occurring in the California bulrush marshes.

Curly dock patches are dominated by nonnative curly dock (*Rumex crispus*). Curly dock occurs throughout California from sea level to 8,203 feet amsl. Curly dock patches often occur in wetlands, ditches, roadsides, pastures, agronomic crops (especially perennial crops such as alfalfa), orchards, waste places, and other disturbed moist areas. It is seldom found on acidic soils. Established curly dock individuals can tolerate periods of drought (DiTomaso and Healy 2007).

In the Study Area, curly dock patches occur in slightly depressed non-tidal areas along Hollister Avenue and Los Carneros Road, and south of Tecolotito Creek adjacent to CDFW property.

As this alliance largely occurs in wetlands within the Study Area, some common terrestrial vertebrates may be largely absent here. Some small mammals, such as California voles, may sometimes occur here. In addition, reptiles such as the Coast Range fence lizard may also occur. Baja California treefrogs likely are found here. Some common songbird species, such as the common yellowthroat and song sparrow, have some potential to nest here, and these species and wintering Lincoln's sparrows (*Melospiza lincolnii*) forage here. Wilson's snipes, a ground dwelling wetland bird species, occur here from fall through early spring.

Giant reed breaks include nonnative giant reed (*Arundo donax*) as the dominant species in the herbaceous layer. In addition, giant reed breaks include giant reed as greater than 60 percent relative cover in the herbaceous and shrub layers. Throughout California, the giant reed break alliance occurs along low-gradient streams, riparian areas, ditches, and coastal marshes. This species is an introduced aggressive perennial grass that forms massive thickets of vegetation that can cover several hectares. Giant reed out-competes native plants, forms dense stands, and chokes riverbanks and stream channels. Giant reed breaks have a continuous canopy less than 25 feet in height. They grow to a height of approximately 20 feet and occur from sea level to 1,641 feet amsl (Sawyer et al. 2009).

In the Study Area, giant reed breaks occur in monoculture stands outside the Santa Barbara Airport fence line along Hollister Avenue near the intersection with Los Carneros Road.

Since giant reed breaks are relatively small within the Study Area wildlife using this community may reflect the species attracted to adjacent areas. The dense structure of giant reed breaks may restrict movements by some terrestrial vertebrates, but openings between clusters likely permit even some medium-sized mammals, such as common raccoons and striped skunks, to move through this community. Smaller vertebrates using adjacent communities, such as California voles and Coast Range fence lizards, likely occur here. Although giant reed is often considered poor nesting habitat for birds, some species that occur in the Study Area have been documented using this plant for nesting at other locations (Greaves 2009). These species include Anna's hummingbird (*Calypte anna*) and lesser goldfinch (*Spinus psaltria*).

Pickleweed mats contain native pickleweed (*Sarcocornia pacifica*) as the dominant or co-dominant species in the subshrub and herbaceous layers. There are three membership rules for the pickleweed mat alliance: 1) pickleweed mats are areas where pickleweed occurs in greater than 10 percent absolute cover and sometimes where a higher cover of short annual or perennial grasses is present (if salt grass is greater than or equal to 50 percent relative cover, stands are in the salt grass flats alliance); 2) pickleweed mats are areas where pickleweed occurs in greater than 50 percent relative cover in the herbaceous layer; 3) pickleweed mats are areas where pickleweed occurs in greater than 50 percent relative cover and salt grass occurs in less than 30 percent relative cover in the herbaceous layer. Pickleweed pats are a CDFW Sensitive Natural Community. Pickleweed mats have an intermittent to continuous canopy less than 5 feet in height. Throughout California, the pickleweed mats alliance occurs from coastal marshes to inland alkaline seeps. The pickleweed mat alliance inhabits coastal California from the Mexico border, to depressions of the San Francisco Bay region, to the Oregon border. Pickleweed mats occur from 0.5 to 8 feet amsl. Species associated with the pickleweed mats alliance include spear orache (*Atriplex patula*), fathen, saltwort, salt marsh bulrush, brass buttons, swamp pricklegrass, saltmarsh dodder (*Cuscuta salina*), salt grass, watergrass, alkali heath, Oregon gumweed (*Grindelia stricta*), marsh jaumea, rush, broadleaved pepperweed, California sea lavender, shore grass, gray willow weed, verrucose seapurslane (*Sesuvium verrucosum*), cordgrass (*Spartina foliosa*), seaside arrowgrass, cocklebur, and algae (Sawyer et al. 2009).

In the Study Area, pickleweed mats occur in low-lying tidal areas, previously tidal areas, and occasionally on the sloped banks of tidal areas. Pickleweed mats occur in large stands with approximately 95 to 100 percent cover of pickleweed. Intermittent, low-lying, tidal pickleweed areas contain low percentages of alkali heath, saltmarsh dodder, and bare ground. Pickleweed on sloped banks contain herbaceous cover of salt grass, alkali heath, and creeping rye grass. Coulter's goldfields (CRPR 1B.1, LR), woolly seablite (CRPR 4.2, LR), and estuary seablite (CRPR 1B.2, LR) are special-status species occurring within this community.

The large expanses of pickleweed found along water bodies in the Study Area likely inhibit movement of small mammals such as common raccoons and striped skunks. However, in locations such where pickleweed is less dense, these species are able to move about, as shown by scat and tracks found in these areas in February and March 2012. Smaller terrestrial vertebrates, such as California voles and Coast Range fence lizards, may be found at the edges of the larger expanses of pickleweed or within more patchy growth of this species. However, tidal areas supporting pickleweed are unsuitable for these species. Relatively few bird species inhabit pickleweed salt marsh, but this community is the preferred habitat for State endangered Belding's savannah sparrow, which is found here year-round and nests within this habitat. The light-footed clapper rail (*Rallus longirostric levipes*; FE, SE), a species heavily dependent on this community, formerly was resident within pickleweed mats in the Study Area, which was the northern limit of its range (Dudek 2012). In winter, marsh wrens are often found in pickleweed mats. Some birds of prey forage over pickleweed from time to time, including northern harriers (*Circus cyaneus*) and the State fully protected white-tailed kite.

Poison hemlock patches include nonnative poison hemlock (*Conium maculatum*) or other non-native invasive plants of the Umbelliferae are dominant or co-dominant with other non-native plants in the herbaceous layer. Poison hemlock patches include poison hemlock with greater than 50 percent relative cover in the herbaceous layer. Poison hemlock patches have an open to continuous canopy less than 7 feet tall in the herbaceous layer. Throughout California, the poison hemlock alliance occurs in moist locations of various topography and is tolerant of semi-shaded areas. Poison hemlock patches occurs from sea level to 3,280 feet amsl (Sawyer et al. 2009).

In the Study Area, poison hemlock patches occur in small stands near moist disturbed locations.

Bottae's pocket gophers and California voles are common mammals that may occur in this vegetation community. Larger mammals likely avoid this community, as the density of the vegetation makes passage is difficult. The Coast Range fence lizard is a common reptile likely found in this community. Birds that may nest in poison hemlock patches include common yellowthroats and song sparrows.

Salt marsh bulrush marsh includes native salt marsh bulrush as the dominant or co-dominant species (greater than 50 percent relative cover) in the herbaceous layer. Throughout California, the salt marsh bulrush marsh alliance occurs at low elevations in tidal brackish marshes with seasonal flooding, seasonally flooded mudflats, and sub-saline marshes and ditches. Salt marsh bulrush marshes have an intermittent to continuous herbaceous canopy less than 5 feet in height and occur from sea level to 8,200 feet amsl. Some species associated with the salt marsh bulrush marsh alliance include creeping bentgrass, Pacific potentilla, fat-hen, seacoast bulrush (*Bolboschoenus robustus*), leafy goosefoot (*Chenopodium foliosum*), brass buttons, salt grass, pale spike rush, least duckweed, pickleweed, verrucose seapurslane, salt marsh sand spurry (*Spergularia salina*), and broadleaf cattail (Sawyer et al. 2009). Salt marsh bulrush marsh is a CDFW Sensitive Natural Community.

In the Study Area, salt marsh bulrush marsh occurs in stands along the edges of cattail marshes and California bulrush marshes. The emergent hydrophytic salt marsh bulrush occurs in wet areas throughout the property and within upper portions of Tecolotito Creek and Carneros Creek.

Vertebrate species occurring within this community are similar to those occurring in California bulrush marshes. However, marine and brackish water species that are relatively unlikely to occur in cattails may be more likely to occur within salt marsh bulrush marsh. Where this species occurs along Carneros Creek, the FE tidewater goby (*Eucyclogobius newberryi*) may seek cover or burrow within this community.

Smartweed-cocklebur patches include native smartweed (*Persicaria lapathifolia*), cocklebur (*Xanthium strumarium*), or other knotweed species as dominant or co-dominant in the herbaceous layer. The smartweed-cocklebur patches alliance has an open to continuous canopy less than 5 feet tall in the herbaceous layer. Throughout California, cocklebur patches occur in particularly disturbed areas such as seasonally flooded streamsides and alluvial flats. Smartweed-cocklebur patches occur from sea level to 4,900 feet amsl. Some species associated with the smartweed-cocklebur patches alliance include devil's beggartick (*Bidens frondosa*), western filed dodder (*Cuscuta pentagona*), *Echinochloa* spp., pale spike rush, western goldentop, *Fallopia* spp., *Persicaria* spp., and common lippie (*Phyla nodiflora*) (Sawyer et al. 2009).

Within the Study Area, smartweedcocklebur patches occur only as areas dominated by cocklebur, in disturbed wetland and marsh areas. Wildlife species using cocklebur patches are similar to those using curly dock. However, cocklebur patches provide poor structure for nesting songbirds such as the common yellowthroat and song sparrow, which nest within curly dock patches.

Western rush marshes include native, common (sometimes "western") rush (*Juncus patens*) as dominant species in the herbaceous layer. The western rush marsh alliance has an intermittent to continuous canopy less than 2.5 feet tall in the herbaceous layer. Throughout California, western rush marshes occur on seasonally saturated soils on flats, gentle slopes, or depressions. Western rush marshes occur from sea level to 5,250 feet amsl. Some species associated with the western rush marsh alliance include Pacific potentilla, coast carex (*Carex obnupta*), coastal burnweed (*Senecio minimus*), velvet grass, toad rush (*Juncus bufonius*), dune rush (*Juncus lescurii*), brownhead rush, Italian rye grass, Pacific woodrush (*Luzula comosa*), white clover (*Trifolium repens*), and cow clover (*Trifolium wormskioldii*) (Sawyer et al. 2009).

Within the Study Area, western rush marshes occur in disturbed wetland and marsh areas. Seasonal saturation of this community may limit its use by many terrestrial vertebrates. Common yellowthroats and song sparrows likely nest here. Other songbirds, such as California towhees and white-crowned sparrows likely forage here in dry conditions. Baja California treefrogs occur here.

Bristly ox-tongue patches are dominated by nonnative bristly ox-tongue (*Helminthotheca echioides*). These patches occur throughout California except in deserts and the Great Basin. Most commonly, bristly ox-tongue occurs in seasonally wet places near the coast of southern California. Bristly ox-tongue often occurs in waste places, roadsides, pastures, fields, crop fields, vineyards, orchards, gardens, landscaped areas, and other disturbed open places. Bristly ox-tongue thrives on clay soils, especially those high in calcium. This species occurs from sea level to 1,4800 feet amsl (DiTomaso and Healy 2007).

In the Study Area, bristly ox-tongue patches occur in slightly depressed non-tidal areas along Hollister Avenue and Los Carneros Road, and south of Tecolotito Creek adjacent to CDFW property. Wildlife species using bristly ox-tongue are similar to those using cocklebur patches and curly dock. Wet conditions probably limit the use of these areas for some terrestrial vertebrates, including reptiles and small mammals that occur in more upland areas. Baja California treefrogs occur within the wetland habitats where this community occurs. Nesting songbirds include common yellowthroats and song sparrows. Birds present during the non-nesting season include Wilson's snipe, marsh wren, and Lincoln's sparrow.

Scrub Communities

There are two general habitat types: upland coastal scrub and riparian scrub. The following section describes the scrub communities that were observed in the Study Area.

Upland Coastal Scrub Communities

Upland scrub communities, or coastal scrub, are a general habitat type in the more general scrub community physiognomic group. The Study Area includes seven individual vegetation communities: blue elderberry stands, California sagebrush scrub, coyote brush scrub, Menzies's golden bush scrub, poison oak scrub, and quailbush scrub. Each vegetation community is described below.

Blue elderberry stands include native blue elderberry (*Sambucus nigra* ssp. *caerulea*) as the dominant species (greater than 50 percent cover) in the shrub canopy. Throughout California, the blue elderberry stand alliance occurs on stream terraces and in bottomlands; localized areas occur in upland settings. Soils are usually gravelly alluvium and intermittently flooded. Blue elderberry stands have an open to continuous shrub canopy less than 26 feet in height that may be two tiered. The herbaceous ground layer is variable and usually grassy. Blue elderberry stands occur from sea level to 985 feet amsl. Some species associated with the blue elderberry stand alliance include California sagebrush (*Artemisia californica*), coyote brush, mulefat, bigpod ceanothus (*Ceanothus megacarpus*), bush monkey flower (*Diplacus aurantiacus*), Oregon ash (*Fraxinus latifolia*), sawtooth goldenbush (*Hazardia squarrosa*), toyon (*Heteromeles arbutifolia*), laurel sumac (*Malosma laurina*), tree tobacco (*Nicotiana glauca*), fuchsia flowered gooseberry (*Ribes speciosum*), lemonade berry (*Rhus integrifolia*), blackberry (*Rubus* spp.), narrowleaf willow (*Salix exigua*), arroyo willow, poison oak, and California wild grape (*Vitis californica*). In addition, emergent tree species such as black walnut (*Juglans californica*), Fremont cottonwood (*Populus fremontii*), coast live oak (*Quercus agrifolia*), and valley oak (*Quercus lobata*) may be present (Sawyer et al. 2009).

In the Study Area, blue elderberry stands occur in limited upland areas of variable size across the entire project site.

As blue elderberry occurs in limited patches within the Study Area, wildlife using this community is partly dictated by adjacent communities, which are generally other scrub communities. Brush rabbits may occur within these areas, and some species of small mammals may occur here as well. Coast Range fence lizards likely occur within this community and within adjacent communities. Songbirds with the potential to nest within this community include the mourning dove, bushtit (*Psaltriparus minimus*), northern mockingbird, and song sparrow.

California sagebrush scrub contains native California sagebrush as the sole or dominant shrub species. It has a continuous or intermittent shrub canopy of less than 7 feet in height with a variable ground layer. There are three membership rules for the California sagebrush scrub alliance: 1) California sagebrush scrub is present where California sagebrush occurs in greater than 60 percent relative cover in the shrub canopy; 2) California sagebrush scrub is present where California sagebrush is three times the cover of coyote brush and other shrub species; 3) California sagebrush scrub occurs where California sagebrush provides greater than 60 percent cover in the shrub canopy, although laurel sumac or bush monkey flower sometimes occurs in greater than 30 percent relative cover. The California sagebrush scrub alliance often occurs on steep, north-facing slopes and rarely in flooded low-gradient deposits along streams in shallow alluvial or colluvial-derived soils. Soils are alluvial or colluvial derived and shallow (Sawyer et al. 2009). California sagebrush scrub generally grows in areas with a long summer dry season with approximately 14 inches of annual precipitation that generally falls between November and April. California sagebrush scrub occurs along the central and south coast of California, as well as on the Channel Islands. Inland, this alliance occurs along the base of the Transverse and Peninsular ranges. In San Benito County, California, sagebrush scrub occurs in the central coastal interior mountains (NatureServe 2009). This alliance occurs between sea level and 3,940 feet amsl. Species associated with the California sagebrush scrub include chamise (*Adenostoma fasciculatum*), bush monkey flower, California encelia, goldenhills (*Encelia farinosa*), California buckwheat (*Eriogonum fasciculatum*), chaparral yucca (*Hesperoyucca whipplei*), Menzies's goldenbush (*Isocoma menziesii*), heartleaf keckiella (*Keckiella cordifolia*), coyote brush, deerweed (*Acmispon glaber*), western prickly pear (*Opuntia littoralis*), white sage (*Salvia apiana*), black sage (*Salvia mellifera*), purple sage (*Salvia leucophylla*), and poison oak (*Toxicodendron diversilobum*) (Sawyer et al. 2009).

In the Study Area, California sagebrush scrub occurs in the upland restoration berms of Tecolotito Creek and Carneros Creek. The herbaceous understory includes a sparse cover of various brome species as well as scarlet pimpernel and red-stemmed filaree.

Wildlife occupying California sagebrush scrub includes many species common to other scrub communities within the Study Area. Brush rabbits seek cover in these areas, and small mammals such as California voles likely occur here. Coast Range fence lizards and San Diego gopher snakes are reptiles that occur in scrub habitats. Songbirds nesting here include the mourning dove, northern mockingbird, California towhee, and song sparrow. White-crowned sparrows occur here in winter.

Coyote brush scrub includes native coyote brush as the dominant species (greater than 50 percent absolute cover) in the shrub layer. In addition, coyote brush scrub includes coyote brush as greater than 15 percent shrub cover over a grassy understory with coyote brush relative cover greater than 50 percent among shrub species. Coyote brush scrub also includes both quailbush and coyote brush with relative cover of both species between 30 percent and 60 percent in the shrub canopy. Coyote brush scrub has a variable shrub canopy less than 10 feet in height with a variable herbaceous ground layer. Throughout California, the coyote brush scrub alliance occurs on streamsides, stabilized dunes of coastal bars, river mouths, spits along the coastline, coastal bluffs, open slopes, ridges, and terraces. Soils are variable, from relatively heavy clay to sandy. The coyote brush scrub alliance inhabits the entire coast of California and extends into southern Oregon. Inland, this alliance occurs in the interior of the Coast Ranges and in the Transverse Ranges of the Los Padres National Forest in Southern California. Coyote brush scrub occurs from sea level to 4,920 feet amsl. Some species associated with the coyote brush scrub alliance include California sagebrush, blueblossom (*Ceanothus thyrsiflorus*), beaked hazelnut (*Corylus cornuta*), bush monkey flower, California buckwheat, seaside woolly sunflower (*Eriophyllum staechadifolium*), California coffeeberry (*Frangula californica*), coast silktassel (*Garrya elliptica*), salal (*Gaultheria shallon*), oceanspray (*Holodiscus discolor*), deerweed, yellow bush lupine (*Lupinus arboreus*), California wax myrtle (*Morella californica*), California blackberry (*Rubus ursinus*), white sage, purple sage, and poison oak (Sawyer et al. 2009).

In the Study Area, coyote brush scrub occurs in stands of variable sizes in upland areas spread across the entire project site. Some of the larger stands are dense and include partial coverage of quailbush. Herbaceous cover among coyote brush individuals includes salt grass and ripgut brome.

Coyote brush scrub provides shelter for brush rabbits and probably for other medium-sized mammal species such as the common raccoon and striped skunk. California voles may occur in this vegetation community. Common reptile species that occur here include the Coast Range fence lizard and San Diego gopher snake. Nesting songbirds occurring here include the mourning dove, bushtit, northern mockingbird, and song sparrow. Songbirds that may perch on shrubs within this community include the loggerhead shrike (*Lanius ludovicianus*) and black phoebe (*Sayornis nigricans*). Some birds of prey, such the white-tailed kite, may also perch in this community where it is adjacent to foraging habitat.

Menzies's golden bush scrub includes native Menzies's golden bush as the dominant or co-dominant species (greater than 50 percent relative cover) in the shrub layer. Menzies's golden bush scrub occurs in Southern California along the coast and in the Southern California mountains and valleys. It often occurs in sandy areas, including alluvial fans, arroyos, and stream terraces, with frequent disturbance. Menzies's golden bush scrub has an open to intermittent shrub canopy less than 3 feet in height with an open to continuous, diverse, and grassy herbaceous layer. It occurs from sea level to 3,937 feet amsl. Some species asciated with the Menzies's golden bush scrub alliance include California sagebrush, broom baccharis (*Baccharis sarothroides*), California matchweed (*Gutierrezia californica*), Virginia glasswort (*Salicornia europaea*), and (*Salicornia depressa*) (Sawyer et al. 2009). Menzies's golden bush scrub is a CDFW Sensitive Natural Community.

In the Study Area, this community occurs within restoration areas along the edges of tidal basins and along the banks of Tecolotito Creek and Carneros Creek. This community forms long, linear stands immediately upland of pickleweed and alkali heath in restoration areas. Wildlife using Menzies's golden bush scrub is, to some extent, dictated by adjacent habitats, including other scrub communities and salt marsh communities. Most mammals common to the ecological reserve likely occur here, including common raccoons, striped skunks, brush rabbits, and California voles. Common reptiles such as the Coast Range fence lizard and San Diego gopher snake also occur here. Songbirds foraging or nesting in adjacent habitats all likely occur here. Belding's savannah sparrows nesting in pickleweed or foraging in other parts of the reserve forage within this community, as do bushtits, common yellowthroats, California towhees, song sparrows, and wintering Lincoln's, white-crowned, and golden-crowned sparrows.

Poison oak scrub includes poison oak as the dominant shrub in the canopy. Poison oak scrub has a two-tiered, intermittent to continuous shrub canopy less than 13 feet in height with a variable ground layer (Sawyer et al. 2009). According to Holland (1986), this is a disturbance-related type maintained by frequent fires. The poison oak scrub alliance occurs along the majority of the California coast, in the Sierra Nevada Foothills, and the Mojave Desert. Poison oak scrub occurs in mesic hollows where salt-laden fog is present and on sheltered mesic and disturbed dry slopes farther inland. Elevations range from sea level to 2,360 feet amsl. Some species associated with the poison oak scrub alliance include California sagebrush, coyote bush, bush monkey flower, toyon, heartleaf keckiella, Lewis' mock orange (*Philadelphus lewisii*), laurel sumac, holly-leaf redberry (*Prunus ilicifolia*), thimbleberry (*Rubus parviflorus*), purple sage, black sage, and blue elderberry. Sparse emergent trees, such as black walnut and coast live oak, also may occur (Sawyer et al. 2009).

In the Study Area, this community occurs in stands along the southeastern boundary of the site, where it forms an intermittent shrub layer with an open herbaceous layer. Trees, including blue elderberry, are occasionally emergent. A continuous cover of poison oak with inclusions of coyote brush dominates the alliance in the Study Area. It also is adjacent to arroyo willow thickets and coast live oak woodland. As this community is most predominant adjacent to coast live oak woodland, arroyo willow thickets, and coyote brush scrub and the bluff bordering University of California at Santa Barbara (UCSB), wildlife found in this community is partly dictated by the mixing of poison oak scrub with these adjacent communities.

The density of this community, however, may dictate the ability of some medium-sized mammals, such as common raccoons and striped skunks, to pass through these areas. Some small mammals may occur here, including California vole, and some species of reptiles, such as the Coast Range fence lizard, inhabit these areas. Poison oak stands provide nesting habitat or cover for bird species including wrentit (*Chamaea fasciata*), common yellowthroat, spotted towhee (*Pipilo maculatus*), and California towhee. Wintering species such as the white-crowned sparrow and fox sparrow occur here, and poison oak is an important element in habitat for “Myrtle” yellow-rumped warblers (*Setophaga coronata*, coronata group).

Quailbush scrub includes native quailbush as greater than 50 percent of the relative cover in the shrub canopy. Quailbush scrub has an open to intermittent shrub canopy less than 16 feet in height with a variable herbaceous ground layer. Throughout Southern California, the quailbush scrub alliance occurs on gentle to steep slopes from coastal shrublands, alkali sinks, alkali meadows, flats, washes, and wetlands, and inland at desert washes and oases. It is often found in disturbed areas where soils are alkaline or saline clays. Some species associated with the quailbush scrub alliance include California sagebrush, coyote bush, mulefat, California sunflower, green molly (*Kochia americana*), laurel sumac, myoporum (*Myoporum laetum*), arrowweed (*Pluchea sericea*), honey mesquite (*Prosopis glandulosa*), lemonade berry, and tamarisk (*Tamarix* spp.) (Sawyer et al. 2009).

In the Study Area, this community occurs within restoration areas along the edges of tidal basins and along the banks of Tecolotito Creek and Carneros Creek. This community forms large stands in upland areas near gravel and paved access roads. Quailbush scrub forms an intermittent shrub layer with an open herbaceous layer where it grows in the Study Area. A continuous cover of quailbush with inclusions of coyote bush and salt grass herbaceous ground cover dominates the alliance in the Study Area. Woolly seablite (CRPR 4.2 species, LR) also may occur here.

Wildlife occurring in quailbush scrub is very similar to that occurring in coyote brush scrub. Because of the wetland affinities of quailbush and its overall greater proximity to other wetland vegetation, some wildlife species occurring in wetlands are more likely to occur in this community than in coyote brush scrub. Baja California treefrogs are more likely to be found in quailbush scrub than coyote brush scrub. One listed species, Belding’s savannah sparrow (SE) overall are more likely to forage and seek cover in quailbush scrub compared to coyote brush scrub.

Riparian Scrub Communities

Riparian scrub is a general habitat type in the more general physiognomic group scrub community, arroyo willow thickets and mulefat thickets. The vegetation communities are described below.

Arroyo willow thickets include native arroyo willow as the dominant or co-dominant shrub or tree in the canopy. Arroyo willow thickets have an open to continuous canopy less than 33 feet in height with a variable herbaceous ground layer. Arroyo willow thickets occur along stream banks and benches, on slope seeps, and on stringers along drainages. Some species associated with the arroyo willow thickets alliance include big leaf maple (*Acer macrophyllum*), coyote brush, mulefat (*Baccharis salicifolia*), common buttonbush (*Cephalanthus occidentalis*), American dogwood (*Cornus sericea*), wax myrtle, California sycamore (*Platanus racemosa*), black cottonwood (*Populus trichocarpa*), Fremont cottonwood, willows (*Salix* spp.), and blue elderberry (Sawyer et al. 2009). Arroyo willow thickets is a CDFW Sensitive Natural Community.

Arroyo willow thickets occur along the banks within the upper reaches of Carneros Creek and Tecolotito Creek as well as the upland areas near these creeks. In the Study Area, this community is dominated by arroyo willow and sometimes includes a low cover of coyote brush. There is a sparse herbaceous layer composed of black mustard, scarlet pimpernel, western verbena, California figwort (*Scrophularia californica*), and California pearly everlasting.

Wildlife use riparian habitats for a variety of purposes. Although arroyo willow thickets themselves are sometimes difficult for some animals to penetrate, some medium-sized mammals, such as the common raccoon, striped skunk, and coyote, may follow the riparian edges along creek beds near Hollister Avenue to move within or enter the site. Baja California treefrogs inhabit this community, and reptiles such as the Coast Range garter snake, California alligator lizard, and San Diego gopher snake may occur here. Arroyo willow thickets provide nesting, foraging, and wintering habitat for a variety of birds, including the Anna's hummingbird, Nuttall's woodpecker (*Picoides nuttallii*), bushtit, wrentit, ruby-crowned kinglet (*Regulus calendula*) yellow-rumped warbler, common yellowthroat, spotted towhee, song sparrow, house finch (*Carpodacus mexicanus*), and lesser goldfinch. Wilson's warblers (*Cardellina pusilla*) and warbling vireos (*Vireo gilvus*) are among species that use this habitat during migration. Some special-status bird species have been observed foraging in the Study Area within this community, including the yellow warbler (*Setophaga petechia*; SSC), yellow-breasted chat (*Icteria virens*; SSC), and least Bell's vireo (*Vireo bellii pusillus*; FE, SE).

Mulefat thickets include native mulefat as the dominant or co-dominant species in the shrub canopy. There are two membership rules for the mulefat thicket alliance: 1) mulefat thickets occurs where mulefat comprises greater than 50 percent relative cover in the shrub canopy; 2) mulefat thicket occurs where mulefat comprises greater than 30 percent relative cover in the shrub canopy with blue elderberry. Throughout California, the mulefat thickets alliance occur in canyon bottoms, irrigation ditches, floodplains, lake margins, and stream channels. It has a continuous two-tiered shrub canopy at less than 7 feet in height, or less than 16 feet with a sparse herbaceous layer. This alliance occurs on mixed alluvium soils between sea level and 4,100 feet amsl. Species associated with mulefat thickets include California sagebrush, willow baccharis (*Baccharis salicina*), coyote brush, tree tobacco, laurel sumac, arrowweed, blackberry, narrowleaf willow, arroyo willow, blue elderberry, and tamarisk. Sparse emergent trees, such as California foothill pine (*Pinus sabiniana*), California sycamore, Fremont cottonwood, oaks (*Quercus* spp.), and willows, may occur (Sawyer et al. 2009).

In the Study Area, mulefat thickets occur in stands of variable sizes spread across the entire project site. Some of the larger stands are fairly dense and include a sparse cover of herbaceous species. Mulefat thickets comprise approximately 9.22 acres, or 14.1 percent, of the vegetation cover in the Study Area.

As mulefat thickets occur in the Study Area in small patches adjacent to other scrub habitats, such as arroyo willow thickets, quailbush scrub, and coyote brush scrub, wildlife occurring in this community is similar to that occurring in these other scrub habitats. Mulefat thickets likely provide cover for brush rabbits and for small mammals such as California voles. Coast Range fence lizards and San Diego gopher snakes are common reptile species that occur in scrub habitats. Northern mockingbirds and song sparrows are common songbirds that nest in this community. One listed species, least Bell's vireo (FE, SE) often occurs in this community, although it has not been documented in mulefat scrub in the Study Area.

Woodlands and Tree Clusters

The tree-dominated physiognomic group in the Study Area includes two general habitat types: woodlands and tree clusters. Within these two general habitat types in the Study Area are three communities: coast live oak woodland, eucalyptus groves, and myoporum groves. The vegetation communities are described below.

Coast live oak woodland contains native coast live oak as the dominant or codominant species in the tree canopy. There are two membership rules for the coast live oak woodland alliance: 1) coast live oak woodland occurs where coast live oaks comprise greater than 50 percent relative cover in the tree canopy, or less than 3 percent where California bay (*Umbellularia californica*) trees are present; 2) coast live oak woodland occurs where coast live oaks comprise greater than 60 percent relative cover in the tree canopy. Coast live oak woodlands occur all along the California coast. Throughout California, the coast live oak woodland alliance occurs in alluvial terraces, canyon bottoms, stream banks, slopes, and flats. Coast live oak woodlands have an open to continuous tree canopy less than 98 feet in height, a sparse to intermittent shrub layer, and sparse or grassy herbaceous layer. Soils are deep, sandy or loamy, and include a high level of organic matter. Coast live oak woodlands occur from sea level to 3,940 feet amsl. In the Study Area, coast live oak woodlands occur in small, isolated stands in upland areas. This community occurs along the UCSB boundary and within the northern portion of the Study Area near Carneros Creek. Some species associated with the coast live oak woodland alliance include big leaf maple, boxelder (*Acer negundo*), Pacific madrone (*Arbutus menziesii*), California black walnut, California sycamore, Fremont cottonwood, blue oak (*Quercus douglasii*), valley oak, Engelmann oak (*Quercus engelmannii*), California black oak (*Quercus kelloggii*), arroyo willow, and California bay (Sawyer et al. 2009).

Coast live oak woodland provides a wide array of habitat values for wildlife. The shaded woodland north of Mesa Road has a sparse ground cover that is suitable for medium-sized mammals such as common raccoons, striped skunks, and coyotes to move around the Study Area. Small mammals such as Botta's pocket gophers likely live under the oak canopy. Amphibians and reptiles such as Baja California treefrogs and California alligator lizards likely live here. Nesting songbirds found here include Nuttall's woodpecker, Hutton's vireo (*Vireo huttoni*), western scrub-jay (*Aphelocoma californica*), oak titmouse (*Baeolophus inornatus*), bushtit, and house wren (*Troglodytes aedon*). The State fully protected white-tailed kite nest in this community within the Study Area. Other raptor species, including Cooper's hawks (*Accipiter cooperi*), red-shouldered hawks (*Buteo lineatus*), and red-tailed hawks, have the potential to nest here as well. Common wintering bird species found here include the ruby-crowned kinglet and yellow-rumped warbler.

Eucalyptus groves contain nonnative blue gum (*Eucalyptus globulus*), red gum (*Eucalyptus camaldulensis*), or other gum species as the dominant species in the tree canopy. Eucalyptus groves include Eucalyptus species with greater than 80 percent relative cover in the tree layer. The groves have an intermittent to continuous tree canopy less than 165 feet in height. Understory shrub and herbaceous layers are sparse to intermittent. Throughout California, the eucalyptus grove semi-natural woodland stands occur on naturalized upland and stream courses as planted trees, groves, and windbreaks. Eucalyptus groves occur from sea level to 985 feet amsl (Sawyer et al. 2009).

Eucalyptus groves occur along the southwestern portion of the Study Area, adjacent to UCSB. Stands occur along the slopes and upland areas near Mesa Road. This community comprises approximately 2.33 acres, or 3.6 percent, of the vegetation cover in the Study Area. Plant species occurring in the understory of this community include non-native grasses such as bromes and black mustard, and coyote brush.

Because of shade, and possibly the allelopatric (toxic) properties of eucalyptus leaf litter, little other vegetation is present in this community, and relatively little wildlife is found here. However, the relatively open ground under the canopy permits medium-sized mammals such as common raccoons and striped skunks to move easily through this community to access adjacent areas. Some bird species are adapted to this community. Yellow-rumped warblers feed on insects attracted to eucalyptus blossoms in the winter. Some birds of prey favor eucalyptus trees for nesting. Red-tailed hawks nest in eucalyptus north of Mesa Road. Cooper's hawks and great horned owls (*Bubo virginianus*) also have the potential to nest in this community. Monarch butterflies (*Danaus plexippus*; special animal [SA]) use this community for roosting in the region, but they are not known to use eucalyptus within the Study Area.

Myoporum groves contain nonnative myoporum as the dominant species in the tree canopy. Myoporum groves occur where Myoporum comprises greater than 60 percent relative cover in the tree layer. The groves have an open to continuous tree canopy less than 60 feet in height. Understory shrubs are infrequent or common and the herbaceous layer is simple to diverse. Throughout central and southern California, myoporum grove semi-natural woodland stands occur in coastal canyons, washes, slopes, riparian areas, and roadsides. Myoporum trees form dense single-species stands in coastal areas (Sawyer et al. 2009).

Myoporum groves occur in scattered small stands along the boundary of the Study Area. Myoporum groves provide shelter for medium-sized mammal species such as the brush rabbit, common raccoon, and striped skunk. California voles may occur in this vegetation community. Common reptile species such as the Coast Range fence lizard likely occur. Nesting songbirds occurring here likely include the mourning dove, bushtit, and northern mockingbird. Wintering loggerhead shrikes (SSC) and black phoebes are among birds that likely on myoporum. Some birds of prey, such the white-tailed kite, may also perch in this community where it is adjacent to foraging habitat.

Non-Vegetated Habitats

Remaining areas in the Study Area do not contain vegetation but still may provide habitat for wildlife. This section discusses four naturally occurring non-vegetated habitats and one habitat that does not occur naturally.

Naturally Occurring Habitats

Three naturally occurring non-vegetated habitats were identified in the Study Area.

Mudflats are not recognized in MCV2 or NCL. They are characterized as un-vegetated areas containing fine-grained sediment (mud) that are sometimes flooded. Mudflats occur in tidal areas and in freshwater lake and river systems. Mudflats are considered "special aquatic sites" and are protected under the Clean Water Act. Although mudflats are characterized in part by their absence of vegetation, some plant species do occur there, including around the margins.

Mudlfats are present within the Study Area in the low-lying areas of Goleta Slough. Special-status plant species that may occur around mudflats include Coulter's goldfields and woolly seablite.

Mudflats attract a variety of shorebirds. Species occurring here year-round include killdeer (*Charadrius vociferus*), greater yellowlegs (*Tringa melanoleuca*), long-billed curlew (*Numenius americanus*), least sandpiper (*Calidris minutilla*), and long-billed dowitcher (*Limnodromus scolopaceus*). Species occurring here seasonally include migrants such as the western sandpiper (*Calidris mauri*), Baird's sandpiper (*Calidris bairdii*), pectoral sandpiper (*Calidris malanotos*), dunlin (*Calidris alpina*), and short-billed dowitcher (*Limnodromus griseus*). Some duck species, particularly green-winged teal (A*nas crecca*), occasionally forage on mudflats. Herons and egrets, although more closely associated with shallow water, sometimes may be found in this habitat. Common raccoon tracks frequently are found on mudflats within the Study Area, and other mammals, such as coyotes, likely use these open areas for passage.

Saltflats are not recognized in MCV2 and NCL. These areas are characterized as un-vegetated areas containing fine-grained sediment (mud) that are frequently flooded, leaving a thin salt crust on the ground surface. Although this community is characterized in part by an absence of vegetation, some plant species may occur within this habitat or around its perimeter.

Saltflats are present within the study area in low-lying areas of Goleta Slough that experience occasional inundation. Species occurring here are essentially the same as those occurring in mudflats. Wildlife using saltflats within the Study Area are also essentially the same as those using mudflats.

The category "**open water**" encompasses a variety of aquatic habitats within the Study Area, including highly saline tidal areas, brackish waters, freshwater marshes, creeks with sandy or muddy bottoms, and combinations of the above.

Open water occurs in the Study Area along the Tecolotito Creek, Carneros Creek, and other connected side channels.

A wide variety of invertebrates, fish, and birds are found in these habitats. Dominant macroinvertebrates in tidal areas include crustaceans such as those of the genus *Corophium* and the class Ostrocoda, ringworms of the class Oligochaeta, mollusks of the family Physidae, and gastropods such as the California horned snail (*Certhidea californica*). Common fish occurring in brackish and saline waters include the yellow fin goby (*Acanthogobius flavimanus*), arrow goby (*Clevelandia ios*), longjaw mudsucker (*Gillichthys mirabilis*), fathead minnow (*Pimephales promelas*), topsmelt (*Atherinops offinis*), and California killifish (*Fundulus parvipinnis*). One listed fish species, the tidewater goby (FE), is also common in the Study Area in open water. Another listed fish species, the steelhead of the southern California DPS, may occasionally pass through the creeks at the airport. Baja California treefrogs are common around freshwater habitats of the ecological reserve.

Open water habitats attract bird species not found elsewhere in the ecological reserve, although some of these species will use vegetated areas when the latter areas are inundated. Waterfowl forage in a variety of open water habitats. Shallow waters, including fresh, brackish, and salt water, attract dabbling ducks such as gadwalls, mallards, and cinnamon teal, which are present for most of the year. These species may forage year-round in shallow water and bring their young here during the breeding season. Common wintering species using these areas include the American wigeon (*Anas penelope*), northern pintail (Anas acuta), northern shoveler (*Anas clypeata*), and green-winged teal. Shallower waters also attract great blue herons (*Ardea herodias*), great egrets, snowy egrets, and black-crowned night-herons (*Nycticorax nycticorax*). Black-necked stilts (*Himantopus mexicanus*), greater yellowlegs, lesser yellowlegs (*Tringa flavipes*), short-billed dowitchers, and long-billed dowitchers are among shorebirds that feed in very shallow water.

In slightly deeper waters are several species of diving ducks. Ruddy ducks (*Oxyura jamaicensis*) are present year-round when suitable habitat is available. Lesser scaup (*Aythya affinis*), ringnecked ducks (*Aythya collaris*), redheads (*Aythya americana*), and buffleheads (*Bucephala albeola*) are present from fall to spring. These species are often found in inundated areas north of Mesa Road. They also appear in tidal channels, including Tecolotito Creek. Sharing many of the same habitats are the pied-billed grebe and American coot. Some bird of prey species, such as the peregrine falcon (*Falco peregrinus*) sometimes hunt ducks, shorebirds, and other birds using open water goby

Bare ground areas within the Study Area are disturbed areas absent of vegetation. Within the Study Area, anthropogenic disturbances for access roads, non-native plant removal, and restoration projects dominate disturbed areas. Some areas characterized as bare ground within the Study Area include a small amount of vegetation.

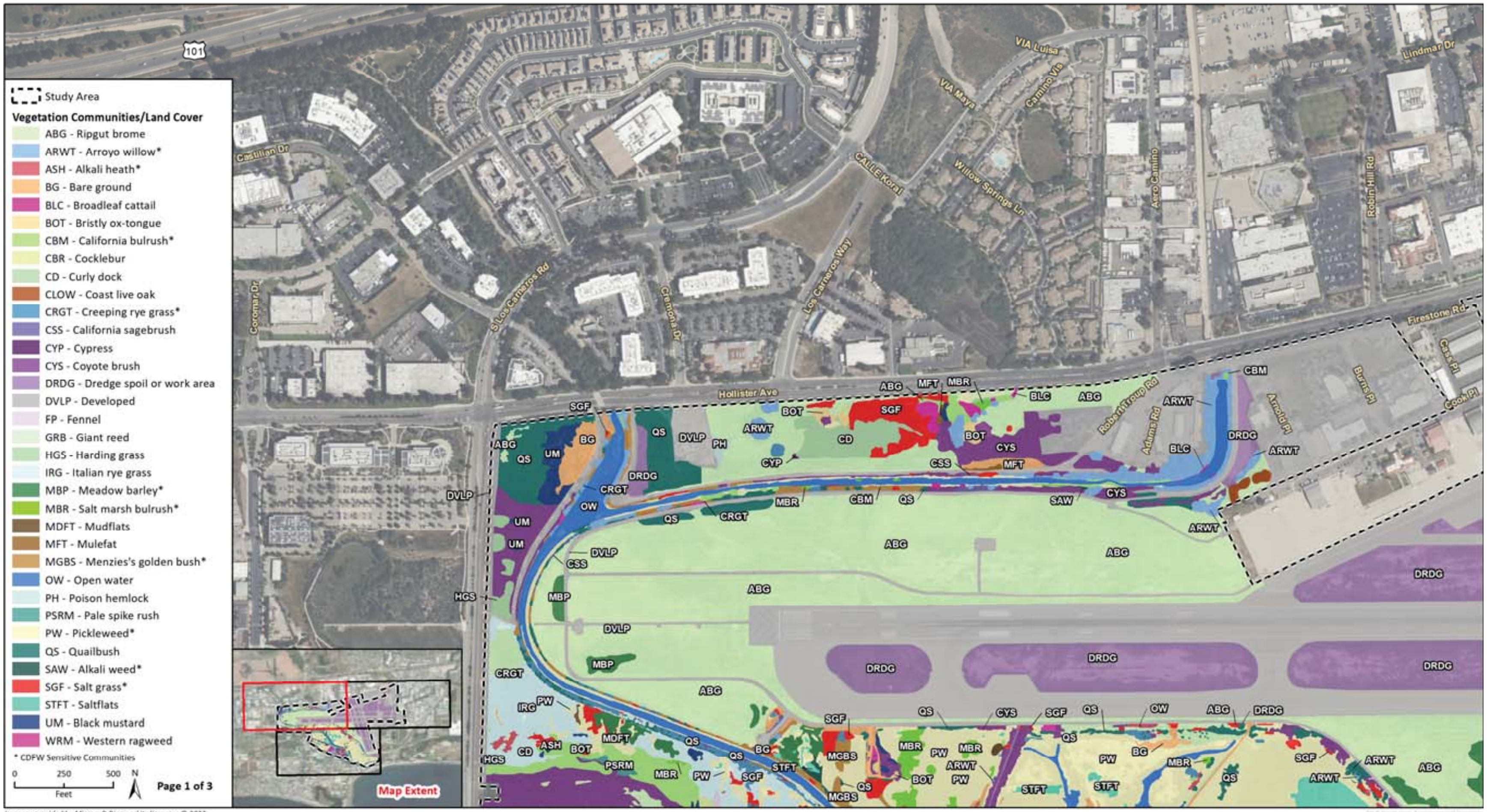
Bare Ground is sporadically present within the Study Area in disturbed, unvegetated uplands adjacent to waterways. One relatively disturbance tolerant special-status plant species, southern tarplant occurs in these areas and has been documented in the Study Area.

Bare ground within the Study Area is attractive to small mammals, such as the California ground squirrel, but this species is likely limited in these areas because of rodent control measures. Bird species found in these areas include the killdeer, which may nest as well as forage here. American pipits and western meadowlarks forage here from fall to spring. Birds of prey that forage over these areas include the northern harrier (from fall to spring) and red-tailed hawk.

Maintained/Frequently Disturbed Habitat

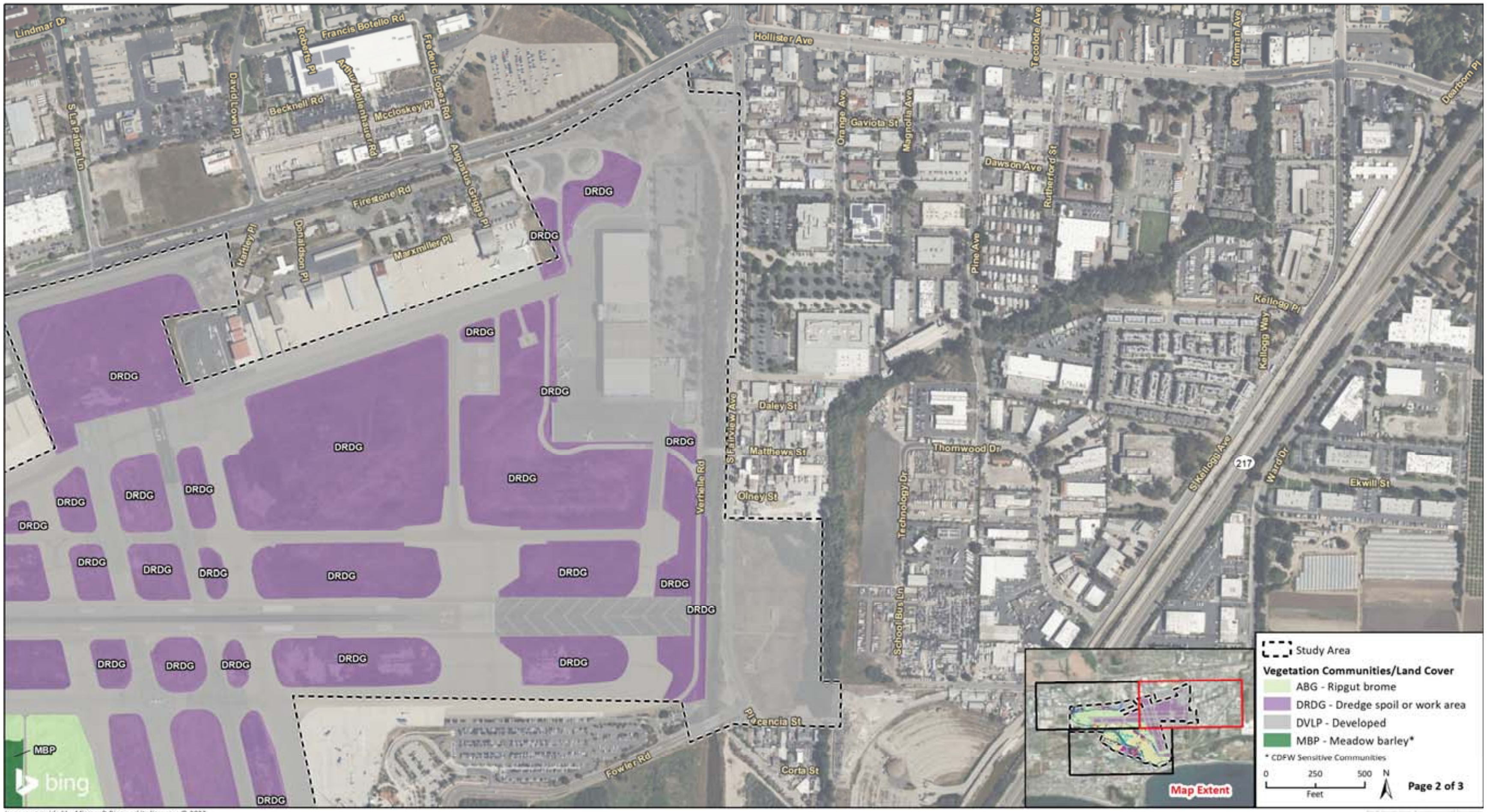
Dredge spoils and work areas are areas that are periodically modified by dredging or are subject to modifications such as grading. Dredge spoils are piled by County Flood Control around the airport in several locations, including near Tecolotito Creek and Carneros Creek. Other infield areas are subject to modification through grading for drainage purposes and to limit their use as wildlife habitat. Both areas are characterized by the presence of disturbance tolerant vegetation. One special-status plant species, southern tarplant occurs in dredge spoils areas. Dredge spoils piles are removed soon after dredging, and the ground that occupies these piles generally remains relatively free of vegetation, a condition favored by southern tarplant.

Figure 2-4: Vegetation Communities and Land Cover Map



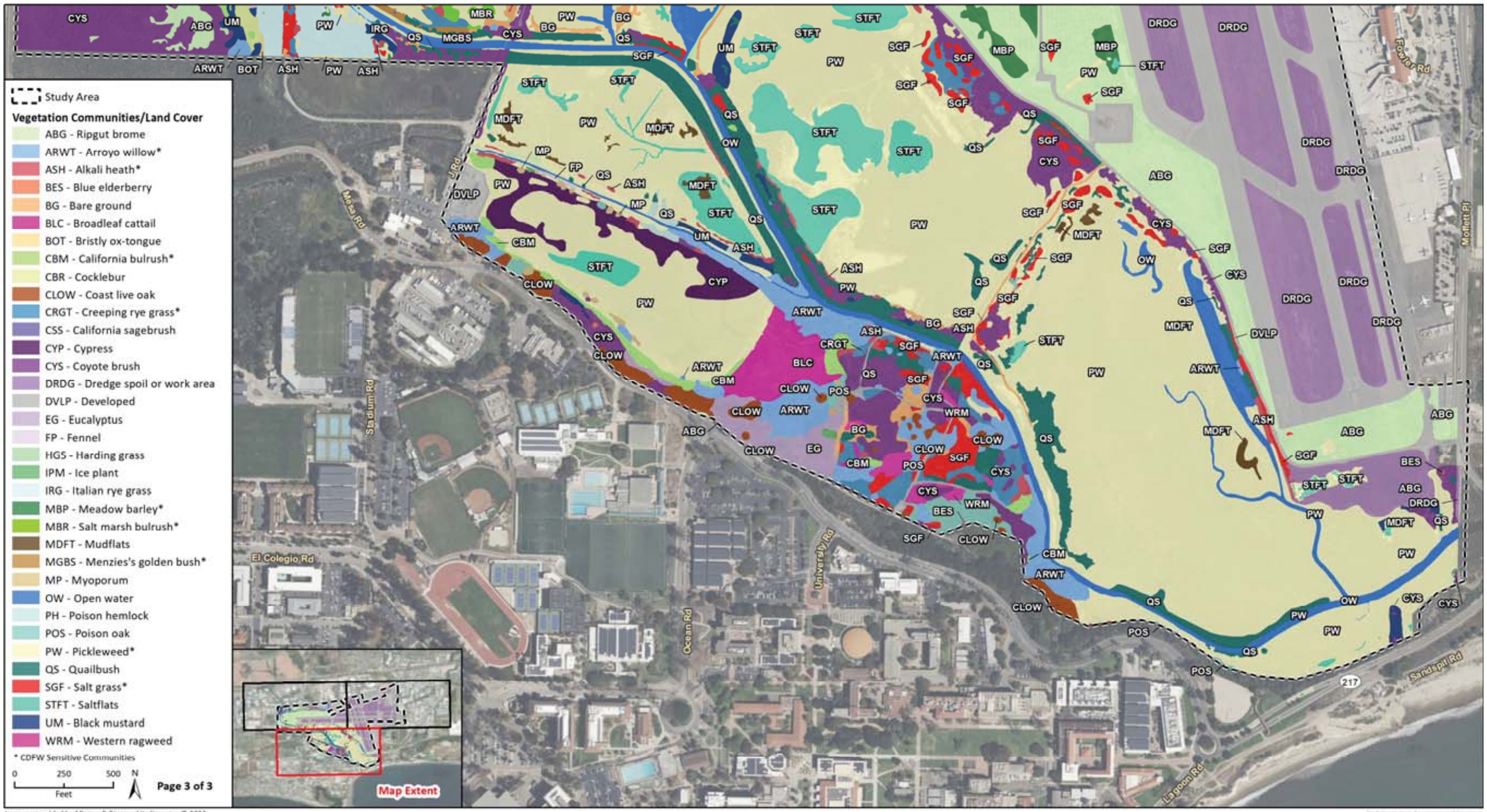
Imagery provided by Microsoft Bing and its licensors © 2022

Figure 2-5: **Vegetation Communities and Land Cover Map**



Imagery provided by Microsoft Bing and its licensors © 2022

Figure 2-6: Vegetation Communities and Land Cover Map



General Wildlife

Goleta Slough, creeks within the Study Area, and the Airport contain habitat for numerous special-status and common species. Common wildlife species that are accustomed to urban environments may be found in the Study Area, including migratory birds, amphibians, aquatic species, and small mammals. Nesting birds and raptors have the potential to utilize riparian trees along creeks in the Study Area and the wooded areas north of Mesa Road for nesting and perching, while the slough and low vegetation in undeveloped areas provide foraging habitat (Dudek 2012).

Several species of raptors, such as the state fully protected white-tailed kite (*Elanus leucurus*) and the northern harrier often hunt within portions of wetland habitat. Sandpipers and plovers feeding in mudflats and other sparsely vegetated areas feed on invertebrates. During particularly wet periods, these species also may feed in seasonal pools that form in grassy areas near the airfield. The pickleweed marsh in Goleta Slough provides nesting habitat for the State endangered Belding's savannah sparrow and formerly hosted the federally endangered light-footed clapper rail (*Rallus longirostris levipes*), both species occurring at the extreme northern limit of their ranges. The brackish waters of Tecolotito and Carneros creeks, as well as other tidal channels within the slough, are occupied by the tidewater goby, a federally endangered species and a California Species of Concern. Steelhead of the southern California DPS, also a federally endangered species and a California Species of Concern, may occasionally pass through Goleta Slough in transit to upstream spawning areas. Scrub habitats and the small amount of woodland support a more upland assemblage of primarily common plant and wildlife species (Dudek 2012). Wildlife species that may use the vegetation habitats present in the Study Area are discussed in the Vegetation Communities and Other Land Cover section above.

Sensitive Biological Resources

Regulated or sensitive biological resources studied and analyzed herein include special-status plant and wildlife species, nesting birds and raptors, sensitive plant communities, and jurisdictional waters, including wetlands.[2]

For the purposes of this report, special-status species include:

- Species listed as threatened or endangered under the FESA; including proposed and candidate species
- Species listed as candidate, threatened, or endangered under the CESA
- Wildlife species designated as Fully Protected by the CFGC, and SSC, Special Animals, or Watch List by the CDFW
- Native Plant Protection Act (NPPA) – State Rare (SR)

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[2] Note that this study did not include field surveys, and the findings in this report are based on literature review as defined in the Methodology section. Standard data sources relied upon during the completion of this report, such as the CNDDB, may vary with regard to accuracy and completeness. In particular, the CNDDB is compiled from research and observations reported to CDFW that may or may not have been the result of comprehensive or site-specific field surveys. Although Rincon believes the data sources are reasonably reliable, Rincon cannot and does not guarantee the authenticity or reliability of the data sources it has used. Additionally, pursuant to our contract, the data sources reviewed included only those that are practically reviewable without the need for extraordinary research and analysis.

- CNPS CRPR 1A, 1B, 2A and 2B
- Species designated as sensitive by the U.S. Forest Service or Bureau of Land Management, if the project would affect lands administered by these agencies
- Species designated as locally important by the Local Agency and/or otherwise protected through ordinance, local policy, or HCPs/NCCPs

This section discusses special-status species and sensitive biological resources documented in the vicinity of the Study Area and evaluates the potential for the Study Area to support sensitive biological resources. The potential for each special-status species to occur in the Study Area was evaluated according to the following criteria:

- **No Potential.** Habitat on and adjacent to the site is clearly unsuitable for the species requirements (foraging, breeding, cover, substrate, elevation, hydrology, plant community, site history, disturbance regime), and species would have been identifiable on the site if present (e.g., oak trees). Protocol surveys (if conducted) did not detect species.
- **Low Potential.** Few of the habitat components (foraging, breeding, cover, substrate, elevation, hydrology, plant community, site history, disturbance regime) meeting the species requirements are present, and/or the majority of habitat on and adjacent to the site is unsuitable or of very poor quality. The species is not likely to be found on the site. Protocol surveys (if conducted) did not detect species.
- **Moderate Potential**. Some of the habitat components (foraging, breeding, cover, substrate, elevation, hydrology, plant community, site history, disturbance regime) meeting the species requirements are present, and/or only some of the habitat on or adjacent to the site is unsuitable. The species has a moderate probability of being found on the site.
- **High Potential.** All the habitat components (foraging, breeding, cover, substrate, elevation, hydrology, plant community, site history, disturbance regime) meeting the species requirements are present and/or most of the habitat on or adjacent to the site is highly suitable. The species has a high probability of being found on the site.
- **Present.** Species is observed on the site or has been recorded (e.g., CNDDB, other reports) on the site recently (within the last 25 years).

Special-Status Species

Based on the database and literature review, 28 special-status plant species and 53 special-status wildlife species may occur at or near the Study Area. Assessments for the potential occurrence of special-status species are based upon known ranges, habitat preferences for the species, species occurrence records from the CNDDB and other sources, species occurrence records from other sites in the vicinity of the Study Area, and previous reports for the Study Area. Species with moderate or high potential to occur in the Study Area are detailed below. A comprehensive list of sensitive species documented in the Study Area vicinity and their potential to occur within the Study Area is provided in **Appendix EC2**.

Special-Status Plant Species

Special-status plant species typically have specialized habitat requirements, including plant community types, soils, and elevational ranges. The literature review identified 30 special-status plant species that have been previously recorded within the vicinity of the Study Area. Of the 30 special-status plant species identified in the CNDDB review, 14 are not expected to occur because habitat on and adjacent to the Study Area is clearly unsuitable for the species' based on a variety of factors, including the disturbance history of the site, lack of suitable soils or habitat, elevation of the site, or inappropriate hydrologic conditions. Two of these species have a low potential to occur based on site conditions in the Study Area. Of these 30 special-status plant species, 14 are either assumed present or have a moderate or high potential to occur. The species with low or no potential to occur are not expected to occur and are therefore omitted from further discussion. These species are not anticipated to occur based on a variety of factors, including the lack of suitable habitat, soils, and/or other required microhabitat conditions, and/or the Study Area location in relation to the species known geographic and/or elevational range. **Appendix EC2** contains additional justification on every species' potential to occur, their listing statuses, their habitat requirements, their potential to occur designations, and their habitat suitability/observation notes.

Sensitive plant species with moderate or high potential to occur or which have been documented in the Study Area are discussed below.

- Present
  - California seablite (*Suaeda californica*; Federally Endangered [FE], CRPR 1B.1)
  - Coulter's goldfields (*Lasthenia glabrata* ssp. *coulteri*; CRPR 1B.1, Locally Rare [LR])
  - Leopold rush (*Juncus acutus* ssp. *leopoldii*; LR)
  - Parish's glasswort (*Arthrocnemum subterminale*; LR)
  - Santa Barbara honeysuckle (*Lonicera subspicata* var. *subspicata*; CRPR 1B.2)
  - Shore grass (*Distichlis littoralis*; LR)
  - Short-seeded waterwort (*Elatine brachysperma*; LR)
  - Southern tarplant (*Centromadia parryi* ssp. *australis*; CRPR 1B.1, LR)
- High Potential
  - Estuary seablite (*Suaeda esteroa*; CRPR 1B.2, LR)
- Moderate Potential:
  - Black-flowered figwort (*Scrophularia atrata*; CRPR 1B.2)
  - Coulter's saltbush (*Atriplex coulteri*; CRPR 1B.2, LR)
  - Davidson's saltscale (*Atriplex serenana* var. *davidsonii*; CRPR 1B.2, LR)
  - Nuttall's scrub oak (*Quercus dumosa*; CRPR 1B.1)
  - Saltwort (*Batis maritima*; LR)

California Seablite

California seablite, a FE and CRPR 1B.1 species is a creeping perennial herb and belongs to the pea family (Fabaceae). This species is found in the coastal dune communities of California and thrives in areas of moderate disturbance and shifting dune dynamics. It occurs in the mild maritime climate of the central California coast on partially stabilized dune communities. It is found in three disjunct areas: throughout the northern portion of the Monterey Peninsula in Monterey County, near Half Moon Bay, and from the northwest portion of Marin County at Point Reyes National Seashore to the Russian River, Sonoma County (Jepson Flora Project 2022).

Although this species has not been documented in the vicinity of the Study Area, it was planted for restoration in the marsh area of Goleta Slough in 2010 and is considered to be present in the salt marsh vegetation within the Study Area (AECOM 2018).

Coulter's Goldfields

Coulter's goldfields, a CRPR 1B.1 and LR species, is an annual herb that is found along the California coast from Marin to San Diego counties, the central valley, and the Mojave Desert within coastal salt marshes, playas, and vernal pools in alkaline soils. It is found at elevations up to approximately 3,300 feet amsl and blooms between April and May.

The Study Area is within this species known geographic and elevational range and this species was documented within the Goleta Slough in 1982 (CDFW 2022a). Additionally, suitable coastal salt marsh and alkaline playa habitat is located within this portion of the Study Area. Therefore, this species is considered present within the coastal salt marsh and mudflats within the Study Area.

Leopold Rush

Leopold's rush, a LR species, is a rhizomatous, perennial herb. This species is found in coastal dunes, meadows, seeps, and coastal salt marshes and swamps, usually in more mesic and alkaline conditions. This species can be found from 1 to 900 feet amsl and is known to bloom May through June.

This species has been documented within the Study Area in 1916 and more recently in University of California at Santa Barbara Lagoon in 1991. Additionally, it was planted for restoration in the marsh area of Goleta Slough in 2010 and is considered to be present within the Study Area (AECOM 2018).

Parish's Glasswort

Parish's glasswort is considered a LR plant species in Santa Barbara County (SBBG 2018). This bushy perennial herb is found in coastal salt marsh, alkali sink, coastal sage scrub, and wetland-riparian communities at sea level to 2,624 feet amsl and is known to bloom from May to September.

In Santa Barbara County, it is found in high salt marsh at Vandenberg Space Force Base, Goleta, and Carpinteria (Smith 1998), and a specimen was collected in the Study Area near Ward Memorial Boulevard in 1980 (Calflora 2012). This species was also planted in the Study Area for restoration in marsh areas near Goleta Slough in 2010 (AECOM 2018). Coastal sage scrub communities present in the Study Area are mostly quailbush scrub, coyote brush scrub, and Menzies's goldenbush scrub, which are not generally high quality coastal sage scrub. Riparian habitat occurs in relatively disturbed situations. This species is likely present in the Study Area in the vicinity of pickleweed mats, alkali heath marsh, salt grass flats, and saltflats.

Santa Barbara Honeysuckle

Santa Barbara honeysuckle, a CRPR 1B.2 species, is a perennial shrub that is found along the central coast between Santa Barbara to Ventura and along the Santa Ynez Mountains within coastal scrub, chaparral, and cismontane woodlands. It is found at elevations up to approximately 3,300 feet amsl and blooms between April and May.

The Study Area is within this species known geographic and elevational range and this species has been documented 18 separate times within the six-quadrangle search area; the closest observation was documented in 2013 and is located approximately 0.25 mile south of the Study Area (CDFW 2022a). Additionally, suitable coastal scrub and cismontane woodland habitat is located within the undeveloped upland portions of the Study Area. Therefore, this species has a high potential to occur within these portions of the Study Area.

Shore Grass

Shore grass is considered a LR plant species in Santa Barbara County (SBBG 2018). It occurs in coastal salt marsh and wetland-riparian from sea level to 16 feet amsl. This perennial herb is known to bloom from May to June.

Shore grass was collected in the Study Area in 1980 south of Runway 15-33, and in the vicinity of the Study Area in 1948 and 1964 (Calflora 2012, FAA and City 2001) and was planted in the Study Area for restoration in marsh areas near Goleta Slough in 2010 (AECOM 2018). Riparian habitats in the Study Area occur in disturbed situations where shore grass is probably unlikely to be found. However, coastal salt marsh communities in the Study Area, such as pickleweed mats, salt grass flats, and alkali heath, marsh may still provide good habitat for this species.

Short-Seeded Waterwort

Short-seeded waterwort is a LR species in Santa Barbara County (SBBG 2018). It occurs in many habitats, including wetland-riparian communities, saltflats, and vernal pools, from 165 to 1,640 feet amsl. It is an annual or perennial herb that is known to bloom from April to July.

Smith (1998) notes that it is found in vernal flats and pools at the Santa Barbara Airport. Although it may be unlikely to occur in riparian communities, which occur in degraded situations in the Study Area, it likely still occurs in other communities, including saltflats, meadow barley patches, and more open pickleweed mats, as occur adjacent to meadow barley patches and saltflats in the Study Area, and is considered present.

Southern Tarplant

Southern tarplant, a CRPR 1B.1 and LR species, is an annual herb that typically grows along the margins of wetland areas, marshes, grasslands, and vernal pools, and is most often found along the disturbed margins of marshes. This species geographic range includes coastal Southern California and occurs up to approximately 1,300 feet above sea level. Southern tarplant typically blooms between June and October.

The Study Area is within this species known geographic and elevational range and this species has been documented 14 separate times within the six-quadrangle search area; the closest observation was documented along the boundary of the Goleta Slough in 1989 (CDFW 2022a). Additionally, suitable wetland and upland edge habitat is present within the Study Area along with alkaline soils and anthropogenically induced disturbance. Therefore, this species this species considered present along the coastal salt marsh and wetland ecotonal areas within the Study Area.

Estuary Seablite

Estuary seablite, a CRPR 1B.2 and LR species, is a perennial herb that is found in coastal Southern California within coastal salt marshes at elevations up to approximately 15 feet amsl. This species grows in clay, silt, and sand and it blooms between May and October.

The Study Area is within this species known geographic and elevational range and this species was documented within the Goleta Slough in 1979 (CDFW 2022a). Additionally, suitable coastal salt marsh with loamy sand soil is located within this portion of the Study Area. Therefore, this species has a high potential to occur within the coastal salt marsh found within the Study Area.

Black-Flowered Figwort

Black-flowered figwort, a CRPR 1B.2 species, is a perennial herb that is found in the central coast and central coast ranges within chaparral, closed-cone coniferous forest, coastal dunes, coastal scrub, and riparian scrub at elevations between 35 to 1,640 feet amsl. This species grows on sand, and is most commonly found on diatomaceous shales, and soils derived from other calcium- and diatom-rich soils. Its preferred microhabitat includes the outer edges of swales and sand dunes, and it blooms between March and July.

The Study Area is within this species known geographic and elevational range and this species has been documented 5 separate times within the six-quadrangle search area; the closest observation was documented in 1958 and is located approximately 0.7 mile southwest of the Study Area (CDFW 2022a). Additionally, suitable coastal scrub and riparian scrub habitat is located within the undeveloped portions of the Study Area along with sandy soils. However, sand dunes are not present within the Study Area and diatom and calcium rich soils are likely not present. Therefore, this species has a moderate potential to occur within the coastal and riparian scrub vegetation communities found within the Study Area.

Coulter's Saltbush

Coulter's saltbush, a CRPR 1B.2 and LR species, is a perennial herb that is found in coastal Southern California and grows in coastal scrub, and valley and foothill grassland, and most commonly in coastal bluff scrub and coastal dunes, at elevations between 10 to 1,510 feet amsl. This species is typically, but not always, found in alkaline or clay soils and generally blooms between March and October (Jepson Flora Project 2022).

The Study Area is within this species known geographic and elevational range and this species has been documented three separate times within the six-quadrangle search area; the closest observation was documented near the UCSB Lagoon approximately 0.50 mile south of the Study Area in 2003 (CDFW 2022a). Additionally, suitable coastal scrub and grassland habitat is present within the Study Area along with alkaline soils; however, this species preferred habitat of coastal bluff scrub and coastal dunes are absent from the Study Area. Therefore, this species has a moderate potential to occur within the coastal scrub and grassland habitat found within the Study Area.

Davidson's Saltscale

Davidson's saltscale, a CRPR 1B.2 and LR species, is an annual herb that is found in coastal Southern California in alkaline soils within coastal scrub and most commonly on coastal bluffs. It is found up to approximately 650 feet amsl and typically blooms between April and October.

The Study Area is within this species known geographic and elevational range and this species has been documented two separate times within the six-quadrangle search area; the closest observation was documented along the coastal bluff south of UCSB, adjacent to the southern boundary of the Study Area, in 1948 (CDFW 2022a). Additionally, suitable coastal scrub habitat and alkaline soils are found within the Study Area. However, coastal bluffs are absent from the Study Area. Therefore, this species has a moderate potential to occur within the coastal scrub habitat found throughout the Study Area.

Nuttall's Scrub Oak

Nuttall's scrub oak, a CRPR 1B.1 species, is a perennial shrub that is found in coastal Southern California and the California peninsular ranges within chaparral and coastal scrub up to approximately 650 feet amsl. This species generally occurs on sandy soils, sandstone, and sometimes on clay loam. It blooms between March and May.

The Study Area is within this species known geographic and elevational range and this species has been documented eight separate times between 1944 to 2006 within the six-quadrangle search area; the closest observation is located approximately 5.5 miles east of the Study Area (CDFW 2022a). Additionally, suitable coastal scrub habitat with sandy soils is present within the undeveloped upland portions of the Study Area. However, the sandy soils within the Study Area are more specifically a fine sandy loam and a loamy sand (USDA, NRCS 2022a) and this species prefers sandy soils, sandstone, and clay loam. Therefore, this species has a moderate potential to occur within the undeveloped coastal scrub portions of the Study Area that contain sandy soil.

Saltwort

Saltwort is considered a LR plant species in Santa Barbara County (SBBG 2018). It is found in coastal salt marshes, coastal strands, and wetland-riparian, almost always in natural conditions. This shrub occurs from sea level to 35 feet amsl and is known to bloom from July to November.

Smith (1998) notes that it is found in large clumps in salt marshes and in broken ground in Santa Barbara County and cites an occurrence of a specimen collected in Goleta Slough in 1995; FAA and City (2001) indicate the species has occurred in the northern portion of Area A. Given the relatively recent occurrence of saltwort, it may still be found in the Study Area. Communities where it may still occur include pickleweed mats, alkali heath marsh, and salt grass flats

Special-Status Wildlife Species

Based on the literature review, 53 special-status wildlife species are known or have the potential to occur in the vicinity of the Study Area. Of these 53 species, 10 are present, one has a high potential to occur, 10 have a moderate potential to occur, 26 have a low potential, and the remaining six special-status species are not expected to occur. A comprehensive list of sensitive species documented in the Study Area vicinity and their potential to occur within the Study Area is provided in **Appendix EC2**.

Special-status species with a low potential to occur are omitted from further discussion, because these species are not expected to be present. Special-status species with moderate and high potential to occur within the Study Area, or which have been documented in the Study Area, are discussed below. Sensitive bird species that have been observed foraging in the Study Area but lack suitable nesting habitat are not considered to be present.

- Present
  - Tidewater goby (*Eucyclogobius newberryi*; FE, State Candidate [SC])
  - Steelhead, Southern California DPS (*Oncorhynchus mykiss irideus*; FE, SC)
  - Western snowy plover (*Charadrius nivosus*; Federally Threatened [FT], CDFW SSC)
  - Great egret (*Ardea alba*; CDFW Special Animal [SA])
  - Great blue heron (*Ardea herodias*; CDFW SA)
  - Snowy egret (*Egretta thula*; CDFW SA)
  - Double-crested cormorant *(Nannopterum auritum*; CDFW Watch List [WL])
  - Belding's savannah sparrow (*Passerculus sandwichensis beldingi*; State Endangered [SE])
  - Black-crowned night heron (*Nycticorax nycticorax*; CDFW SA)
  - White-tailed kite (*Elanus leucurus*; CDFW Fully Protected [FP])
- High Potential to Occur
  - Cooper's hawk (*Accipiter cooperii*; CDFW WL)
- Moderate Potential to Occur
  - Burrowing owl (*Athene cunicularia*; CDFW SSC)
  - California horned lark (*Eremophila alpestris actia*; CDFW WL)
  - Northern California legless lizard (*Anniella pulchra*; CDFW SSC)
  - Tricolored blackbird (*Agelaius tricolor*; State Threatened [ST], CDFW SSC)
  - Western pond turtle (*Emys marmorata*; CDFW SSC)
  - Coast horned lizard (*Phrynosoma blainvillii*; CDFW SSC)
  - Coast patch-nosed snake (*Salvadora hexalepis virgultea*; CDFW SSC)
  - Two-striped garter snake (*Thamnophis hammondi*; CDFW SSC)
  - Crotch bumble bee (*Bombus crotchii*; SC)
  - Mimic tryonia (*Tryonia imitator*; CDFW SA)

Special-Status Bird Species

Burrowing Owl

The burrowing owl is a CDFW SSC that is both migratory and a non-migratory resident in California. The species inhabits open, dry annual or perennial grasslands, deserts, and scrublands with low-growing, sparse vegetation and few shrubs. They prefer level to gentle topography and well-drained soils. The species may also occur in agricultural areas, ruderal grassy fields, vacant lots and pastures if the vegetation structure is suitable (short or sparse) and useable burrows and foraging habitat are present. The species is a subterranean nester and dependent on burrowing mammals such as the California ground squirrel. Natural rock cavities, debris piles, culverts, and pipes are also used for nesting and year-round roosting (CDFW 2012).

This species may utilize the margins of disturbed, vegetated spaces within the Study Area. Four CNDDB occurrences have been recorded within the six-quadrangle search area with the most recent occurring in 2001 on Ellwood Mesa, approximately 1.1 miles southwest of the Study Area. However, a more recent occurrence was documented in March 2021 approximately 1.3 miles southwest of project area on the Ellwood Mesa (iNaturalist 2022) The species has a moderate potential to occur in the Study Area.

California Horned Lark

The California horned lark is a CDFW WL species that inhabits grasslands, shores, and tundra. This species prefers open ground, typically avoiding areas with trees and bushes for both nesting and foraging. California horned lark can be found in a variety of locations that are relatively open, including short-grass prairies, extensive lawns (as on airports or golf courses), plowed fields, stubble fields, beaches, lake flats, and dry tundra of far north or high mountains, which provide suitable foraging habitat (Zeiner et al. 1990).

This species may utilize disturbed grassy locations within the Study Area for feeding and nesting. One CNDDB occurrence of California horned lark was recorded approximately 1 mile southwest of the Study Area in 2003 and the species has a moderate potential to occur in the Study Area.

Cooper's Hawk

The Cooper's hawk is a CDFW WL species that typically inhabits woodlands and forest edges but can also be found in urban parks and neighborhoods where trees are present. Nests are constructed 25 to 50 feet high in a variety of tree species, including pines, oaks, beeches, and spruces. Nests are made of sticks and are often lined with bark flakes and green twigs. Cooper's hawks are aerial predators that feed primarily on medium-sized birds, such as mourning dove (*Zenaida macroura*), American robin (*Turdus migratorius*), California quail (*Callipepla californica*), and European starling (*Sturnus vulgaris*). In addition to preying on adult birds, Cooper's hawks will also occasionally rob nests and hunt rabbits, rodents, and bats (Cornell Lab of Ornithology 2022).

This species may utilize the larger landscape/ornamental and landscape trees along roadways in the northeast corner of the Study Area and has been successful at nesting in residential areas. The nearest occurrence records for this species are 1.5 miles southeast and 1.3 miles southwest of the Study Area, recorded in 2009 and 2003, respectively. These occurrences were recorded in areas with large trees, adjacent to riparian areas and open grasslands with foraging habitat. This species has a high potential to occur in the Study Area.

Great Blue Heron

The great blue heron is a CDFW SA species and listed as a species of least concern under the International Union for Conservation of Nature (IUCN) (IUCN 2022). This species has a widespread range in North America, occurring near marshes, swamps, shores, and tideflats. The species nests in trees or shrubs near water, although they may nest on the ground if the location is free of predators. Great blue herons have an adaptable diet and are known to eat fish primarily, but also will feed on salamanders, turtles, snakes, insects, rodents, and birds. The species is known to forage in shallow water and grasslands (National Audubon Society 2022).

This species may utilize the creeks, tide flats, and marshland in the Study Area for foraging and suitable nesting habitat is present in the Study Area. The nearest occurrence records for this species is 0.2 mile southeast of the Study Area, recorded in 2012 however anecdotal observations suggest great blue herons are commonly observed in the Goleta Slough and are relatively abundant on the Southern California coast. The species is present in the Study Area.

Great Egret

The great egret is a CDFW SA species and listed as a species of least concern under the IUCN (IUCN 2022). This species is a shorebird that inhabits marshes, ponds, shores, and mudflats. This species typically nests in trees or shrubs near water but can also nest in thickets further from water sources, or in low marshes. Great egrets forage in shallow shores of lakes, lakes marshes, lagoons, and estuaries. Their diet consists primarily of fish, but they will also hunt crustaceans, amphibians, snakes, and insects. They will also eat rodents and other small birds if foraging away from water (National Audubon Society 2022).

This species may utilize the creeks, tide flats, and marshland in the Study Area for foraging and suitable nesting habitat is present in the Study Area. The nearest occurrence records for this species is 0.2 mile southeast of the Study Area, recorded in 2012; however, anecdotal observations suggest great egrets are commonly observed in the Goleta Slough and are relatively abundant on the Southern California coast. The species is present in the Study Area.

Tricolored Blackbird

The tricolored blackbird is a ST species and CDFW SSC. The tricolored blackbird is found near freshwater habitats where it nests in emergent freshwater or riparian vegetation. This species prefers nesting in dense thickets of cattails and tules. Tricolored blackbirds require open water, protected nesting substrate, and foraging areas with insect prey within a few kilometers of the colony. The sites generally need to support flooded nesting vegetation and suitable foraging sites within a few kilometers (Shuford and Gardali 2008). Due to their highly colonial nature, nesting areas must be large enough to support a colony of about 50 pairs. This species feeds in grasslands and croplands near nesting areas. The tricolored blackbird commonly occurs throughout the eastern Santa Maria Valley, Central Valley and in the Southern Coast Ranges, Transverse, and Peninsular Ranges.

Three CNDDB occurrences have been recorded within the six-quadrangle search area. One occurrence which overlaps the Study Area documents tricolored blackbirds in the late 1970s. The species was last observed there in 1983 and the species has a moderate potential to occur in the Study Area. A more recent occurrence of an individual was documented in May 2021 near Coal Oil Point, approximately 1.6 miles from the Study Area (iNaturalist 2022). This species may occur as a transient in the Study Area, however since no suitable nesting substrate or areas of open water are present the species has a moderate potential to occur in the Study Area.

White-tailed Kite

The white-tailed kite is a CDFW FP species. A yearlong resident in coastal and valley lowlands, the species inhabits a wide range of habitats, mostly in cismontane California. The species prefers trees with dense canopies for cover. Their diet consists mostly of voles and other small, diurnal mammals, but the species occasionally feeds on birds, insects, reptiles, and amphibians. Typical foraging habitat is undisturbed, open grasslands, meadows, farmlands and emergent wetlands. Nesting is typically near top of dense oak, willow, or other tree stands, located near foraging areas. This species preferentially selects herbaceous lowlands with a range of woodland structure, and high density of voles, and substantial groves of dense, broad-leafed deciduous trees for nesting and roosting (Cornell Lab of Ornithology 2022).

The dense tree canopies that this species prefers are limited to closely grouped ornamental and riparian trees the Study Area. The landscaped areas within the Study Area provide foraging habitat for the species. Three CNDDB occurrences of white-tailed kite have been recorded within the six-quadrangle search area. In 2012 this species was observed foraging in the Study Area and is considered present.

Western Snowy Plover

The western snowy plover is a FT species and CDFW SSC. The Pacific coast population of the western snowy plover breeds primarily on coastal beaches from southern Washington to southern Baja California, Mexico. The population breeds above the high tide line on coastal beaches, sand spits, dune-backed beaches, sparsely vegetated dunes, beaches at creek and river mouths, and salt pans at lagoons and estuaries. Some inland birds regularly winter at agricultural waste-water ponds in San Joaquin Valley and at saline lakes in Southern California (Page et al. 1986). The plover forages on beaches, tide flats, river mouths, and lagoons, typically in shallow (1-2 cm deep) waters (Cornell Lab of Ornithology 2021). A CNDDB occurrence in January 2017 documented 82 individuals at a winter roosting site at the west end of Goleta Beach County Park, just south of the Study Area. Suitable foraging habitat is found within the Study Area while suitable nesting habitat is found adjacent to the southern boundary of the Study Area. The species is considered present in the Study Area.

Snowy Egret

The snowy egret is a CDFW SA species and listed as a species of least concern under the IUCN (IUCN 2022). This species is a shorebird that inhabits marshes, ponds, shores, and mudflats. This species typically nests in trees or shrubs near water but can also nest in thickets further from water sources, or in low marshes. Snowy egrets forage in shallow shores of lakes, lakes marshes, lagoons, and estuaries. Their diet consists primarily of fish, but they will also hunt crustaceans, amphibians, snakes, and insects. They will also eat rodents and other small birds if foraging away from water (National Audubon Society 2022).

This species may utilize the creeks, tide flats, and marshland in the Study Area for foraging and suitable nesting habitat is present in the Study Area. Snowy egrets are frequently observed near the southern boundary of the Study Area near Goleta Beach County Park with documented occurrences as recently as November 5, 2022 (iNaturalist 2022). The species is present in the Study Area.

Double Crested Cormorant

Double-crested cormorant is a CDFW WL species that frequents coasts, bays, lakes, and rivers. This species is the most generally distributed of the six North American cormorants and may be found in almost any aquatic habitat. Their diet consists of fish and other aquatic life, foraged mostly by diving from the surface and swimming underwater, propelled by feet (may sometimes use wings as well). Nesting occurs on the ground, coastal cliff edges, and in trees, shrubs, and in artificial structures along water body margins.

Suitable nesting and foraging habitat is present onsite, and a CNDDB occurrence from May 2012 documented an estimated 37 nests and 74 breeding birds 0.2 mile east of the southern boundary of the Study Area near Goleta Beach County Park. This species is present in the Study Area.

Belding's Savannah Sparrow

Belding's savannah sparrow is a SE species that inhabits coastal marshes, from Santa Barbara south through San Diego County. It is one of only two wetland dependent avian species that reside year-round in the coastal salt marshes of Southern California. This species forages for seeds insects, snails, and spiders throughout the marsh, within the vegetation, and along intertidal mudflats. Belding's savannah sparrows nest in the salt marsh vegetation (*Salicornia* genus) on and about the margins of tidal flats. Suitable nesting and foraging habitat are present within the Study Area and a CNDDB search indicated the species was recorded on site in 2016. This species is presumed extant in the Study Area.

Prairie Falcon

Prairie falcon is a CDFW WL species that frequent wide, open spaces from deserts to tundra for foraging. Prairie falcons typically nest on cliffs adjacent to grasslands and appear to be declining due to loss of foraging habitat. Due to their diet on non-aquatic birds, they have not been as affected by DDT as other raptors. Individuals breed in open country throughout the western United States wherever they can find bluffs and cliffs to build nests. A CNDDB query withing the six-quadrangle search area shows the species is presumed extant in the areas surrounding the Santa Ynez Mountains, approximately 4.4 miles from the Study Area. In 2011, an observation was recorded west of Lake Cachuma reservoir, approximately 16 miles northwest of the project area. While no closer documented occurrences have been recorded, the CNDDB search noted the species is known to forage far afield, even to marshlands and ocean shores. The species has a moderate potential to occur in the Study Area.

Black-Crowned Night Heron

The black-crowned night heron is a CDFW SA species and an IUCN Species of Least Concern that typically occurs in fresh and saltwater wetlands throughout the California coast. The species primarily eats small fish, earthworms, mussels, squid, crustaceans, frogs, other amphibians, aquatic insects, lizards, snakes, small rodents, small birds and eggs. The species nests colonially, usually in trees, occasionally in tule patches. Rookery sites are located adjacent to foraging areas including lake margins, mud-bordered bays, marshy spots. Suitable nesting and foraging habitat present onsite. Black-crowned night herons are commonly observed near the southern boundary of the Study Area near Goleta Beach County Park with documented occurrences as recently as October 24, 2022 (iNaturalist 2022). The species is present in the Study Area.

Special-Status Fish Species

Tidewater Goby

The tidewater goby is a FE and SC species. Tidewater goby populations are found in brackish water habitats along the California coast from Agua Hedionda Lagoon, San Diego County to the mouth of the Smith River and typically sequestered into shallow lagoons and lower stream reaches. Although tidewater gobies have rarely been captured in the marine environment (Swift et al. 1989), individuals can disperse between lagoons and estuaries in close proximity. The tidewater goby is benthic in nature, and lives in habitats including brackish, shallow lagoons and lower stream reaches where the water is fairly still but not stagnant (Love and Passarelli 2020, Wang 1982, Irwin and Soltz 1984, Swift et al. 1989, Swenson 1999). They feed mainly on small invertebrates, including mysid shrimp (*Mysidopsis bahia*), gammarid amphipods (*Gammarus roeseli*), and aquatic insects, particularly the chironomid midge (family Chironomidae) larvae (Swenson 1995, Moyle 2002). Breeding occurs in slack, shallow waters of seasonally disconnected or tidally muted lagoons, estuaries, and sloughs. but can also occur on rocky, mud, and silt substrates (USFWS 2005). The project site is within federally designated critical habitat for this species. A CNDDB record search indicated one adult and four juveniles of this species were documented in 2011 within the Study Area, in Tecolotito Creek, during USFWS presence/absence surveys. This species is present in the Study Area.

Southern California Steelhead

Southern California steelhead is a FE and SC species. This species is one of six Pacific salmon species that are native to the west coast of North America and are currently the only species of this group that naturally reproduces within the coastal watersheds of Southern California. Juvenile steelhead born in freshwater migrate to saltwater to develop into adulthood before returning back to freshwater to breed. Steelhead employ several different life-history strategies that exploit all portions of a river system and therefore serve as an indicator of the health of Southern California watersheds. The steelhead population found in Goleta Slough is part of the southern California steelhead DPS which extends from the Santa Maria River in San Luis Obispo County to the U.S-Mexico border (NMFS 2006).

The Study Area includes a segment of San Pedro Creek, which is federally-designated critical habitat for southern California steelhead. Anecdotal data indicates that adult steelhead occurrence in Goleta Slough is necessarily limited to periods when the estuary is open, at which point adults are expected to use it as a migration corridor to the upper watershed as soon as water depth in the river allows. Timing of smolt outmigration also depends on when adequate flow conditions are present to connect the estuary to the ocean (Rincon 2016). Although steelhead must use the Goleta Slough as a migratory corridor, little information regarding steelhead use of the Slough as rearing habitat has been available. However, detailed information on rearing in other similar coastal lagoons suggests that the Slough currently provides potential rearing habitat for steelhead.

Recent observations of adult steelhead are limited to Atascadero and San Pedro creeks (Stoecker 2002 NMFS 2013 as cited in U.S. Army Corps of Engineers [USACE] 2014), however, fish sampling efforts conducted in the slough have failed to capture any steelhead. Due to occurrence reports and suitable habitat conditions, this species is presumed present within the Study Area.

Special-Status Reptile Species

Coast Horned Lizard

The coast horned lizard, commonly referred to as Blainville's horned lizard, is a CDFW SSC. Coast horned lizard occurs in grasslands, coniferous forests, woodlands, and chaparral, containing open areas and patches of loose soil. Coast horned lizard diets are specialized and almost exclusively consist of native ants (>94 percent by prey item [Suarez et al. 2000]). The species is commonly associated with open areas of sandy soil and low vegetation, often found near ant hills for feeding. The species ranges from the Baja California border west of the deserts and the Sierra Nevada, north to the Bay Area, and inland as far north as Shasta Reservoir (Nafis 2020).

The arroyo willow thickets in the Study Area may provide suitable habitat for this species. Multiple CNDDB occurrences have been recorded within the six-quadrangle search area, the most recent of which is from 2010 and is located in the Santa Ynez Mountains, approximately 4.5 miles northeast of the Study Area, and the species has a moderate potential to occur in the Study Area.

Northern California Legless Lizard

The northern California legless lizard is a CDFW SSC that is typically found in coastal dune, valley-foothill chaparral, and coastal scrub vegetation communities, and areas with sandy or loose organic soils or high amounts of leaf litter. Moisture is an essential component of their habitat requirements and individuals are often encountered buried in leaf litter where they lie barely covered in loose soil. The species ranges from northern Contra Costa County south to Ventura County, and in scattered locations in the San Joaquin Valley and on the desert side of the Tehachapi Mountains and part of the San Gabriel Mountain (Nafis 2021). This lizard usually forages for insect larvae, small adult insects, and spiders at the base of shrubs or other vegetation either on the surface or just below it in leaf litter and sandy soil. The nearest occurrence records for this species are 1.6 miles east of the Study Area near More Mesa and suitable habitat is present onsite. The species has a moderate potential to occur in the Study Area.

Western Pond Turtle

Western pond turtle is a CDFW SSC that is found in ponds, lakes, rivers, creeks, marshes, and irrigation ditches, with abundant vegetation. This species is omnivorous and feeds primarily on insects, crayfish, and other aquatic invertebrates. Plant foods include filamentous algae, lily pads, tule, and cattail roots. It requires basking sites of logs, rocks, cattail mats, or exposed banks and will estivate during summer droughts by burying itself in soft bottom mud. When creeks and ponds dry up in summer, some turtles will travel along the creek until they find an isolated deep pool, others stay within moist mats of algae in shallow pools, and many turtles move to woodlands above the creek or pond and bury themselves in loose soil. Western pond turtle is active from approximately February to November and will overwinter underground until temperatures warm up and the heavy winter flows of the creek subside before returning to the creek in the spring. Egg laying occurs in the sandy banks of creeks and this species can nest up to one-half mile in adjacent uplands if suitable habitat exists.

A CNDDB search returned three documented occurrences of western pond turtle within 1.1 miles of the Study Area since 2007. The most recent occurrence was documented in 2015 in Atascadero Creek, approximately 1 mile east of the Study Area. The site contains suitable habitat for both foraging and nesting and this species has a moderate potential to occur in the Study Area.

Coast Patch-Nosed Snake

The coast patch-nosed snake is a CDFW SSC. The coast patch-nosed snake range occurs from the northern Carrizo Plains in San Luis Obispo County, south through the coastal zone, south and west of the deserts, into coastal northern Baja California (Nafis 2020). The species is most common in semi-arid brushy areas and chaparral in canyons, rocky hillsides, and plains and require loose soils for burrowing. The species lays eggs between May and August (Stebbins 2003) and they are presumed to overwinter in small mammal burrows and/or woodrat middens during October through March. Their diet consists of mostly lizards, especially whiptails (*Aspidocelis* spp.), along with small mammals, and possibly small snakes, nestling birds, reptile eggs, and amphibians.

Seven CNDDB occurrences have been recorded within the six-quadrangle search area; however, no occurrence overlapped the Study Area. The last documented observation of the species within 5 miles of the Study Area occurred in 1979; however, suitable foraging habitat is present on site. This species has a moderate potential to occur in the Study Area.

Two-Striped Garter Snake

The two-striped garter snake is a CDFW SSC that occurs from Monterey County south along the coast, mostly west of the South Coast Ranges, into San Diego County west of the Peninsular Ranges. It is found from sea level to approximately 7,000 feet elevation. It is primarily an aquatic species that occurs near ponds, pools, creeks, cattle tanks, and other sources of water within oak woodland, chaparral, scrub communities, and coniferous forest habitats. The species occurs in rocky areas, as well. Depending upon weather conditions, two-striped garter snake can be active during January through November and typically breeds March through April.

A CNDDB record search showed five occurrences withing the six-quadrangle search area, with one occurrence in 2013 approximately 7.5 miles from the Study Area. In May 2020, a two-striped garter snake was observed in Hope Ranch approximately 2.5 miles from the Study Area (iNaturalist 2022). Both Tecolotito Creek and San Pedro Creek pass through the Study Area and offer potentially suitable foraging habitat when freshwater is present. This species has a moderate potential to occur in the Study Area.

Special-Status Invertebrate Species

Crotch Bumble Bee

Crotch bumble bee is a SC species (CDFW 2022). This species inhabits grassland and scrub areas, requiring a hotter and drier habitat than many other bumble bee species. Like other bumblebees, Crotch's bumblebees are social insects that live in annual colonies. Nests are often underground in abandoned rodent dens or above ground in tufts of grass, old bird nests, rock piles, or cavities in dead trees. This species visits a wide range of host plants and is therefore considered a dietary generalist. CNDDB search results returned three occurrences that overlap with the Study Area with numerous other occurrences documented approximately 1 mile or less from the Study Area from 2017-2022. Suitable habitat is present onsite, and this species has moderate potential to occur within the Study Area.

Mimic Tryonia

Mimic tryonia, a CDFW SA species, inhabits coastal lagoons, estuaries, and salt marshes, from Sonoma County south to San Diego County. It is found only in permanently submerged areas in a variety of sediment types and able to withstand a wide range of salinities. One CNDDB record documented in 1966 shows this species as present within the Study Area in Goleta Slough. There is moderate potential for this species to occur onsite.

Other Protected Species

Nesting Birds

The Study Area contains habitat that can support nesting birds, including raptors, protected under CFGC Section (§) 3503 and the MBTA (16 United States Code §§ 703–712). Potential nesting sites for raptors and other species of birds within the Study Area are located within the larger landscape/ornamental trees in the Twin Lake Golf Course, landscape trees along roadways, and in trees along the San Pedro Creek riparian corridor.

Sensitive Natural Communities and Critical Habitat

Plant communities are considered sensitive biological resources if they have limited distributions, have high wildlife value, include special-status species, or are particularly susceptible to disturbance. The CDFW ranks natural and sensitive communities using NatureServe's Heritage Methodology, the same system used to assign global and state rarity ranks for plant and wildlife species in the CNDDB (CDFW 2022b).

According to the literature review, three sensitive natural communities are present in the vicinity of the Study Area, of which one occurs within the Study Area. Southern Coastal Salt Marsh, a CDFW-sensitive natural community, occurs in Goleta Slough. Southern California steelhead stream CDFW-sensitive natural community is located 13 miles northwest of the Study Area along a tributary to the Santa Ynez River, and the southern vernal pool CDFW-sensitive natural community is located 16 miles northwest of the Study Area in ranchland northwest of Lake Cachuma.

The primary sensitive natural community occurring in the Study Area is Southern Coastal Salt Marsh. According to Dudek (2012), this sensitive natural community occurs in Goleta Slough in the form of four vegetation communities: alkali heath marsh, pickleweed mats, salt grass flats, and salt marsh bulrush. These communities, particularly pickleweed mats, provide the primary nesting habitat for the Belding's savannah sparrow, listed as endangered under the CESA.

Although the literature review did not indicate that CDFW-sensitive natural communities are present within the Study Area, aerial interpretation and vegetation mapping data indicates that arroyo willow thickets are present, and that they are the only CDFW-sensitive natural community present within the Study Area.

Extensive areas potentially under the jurisdictions of the USACE, Regional Water Quality Control Board (RWQCB), CDFW, and/or CCC occur in the Study Area. Prior to expiration of Santa Barbara County Flood

Control District permits for managing the slough mouth in late 2012, Dudek (2012) conducted a wetlands inventory within Santa Barbara Airport property.

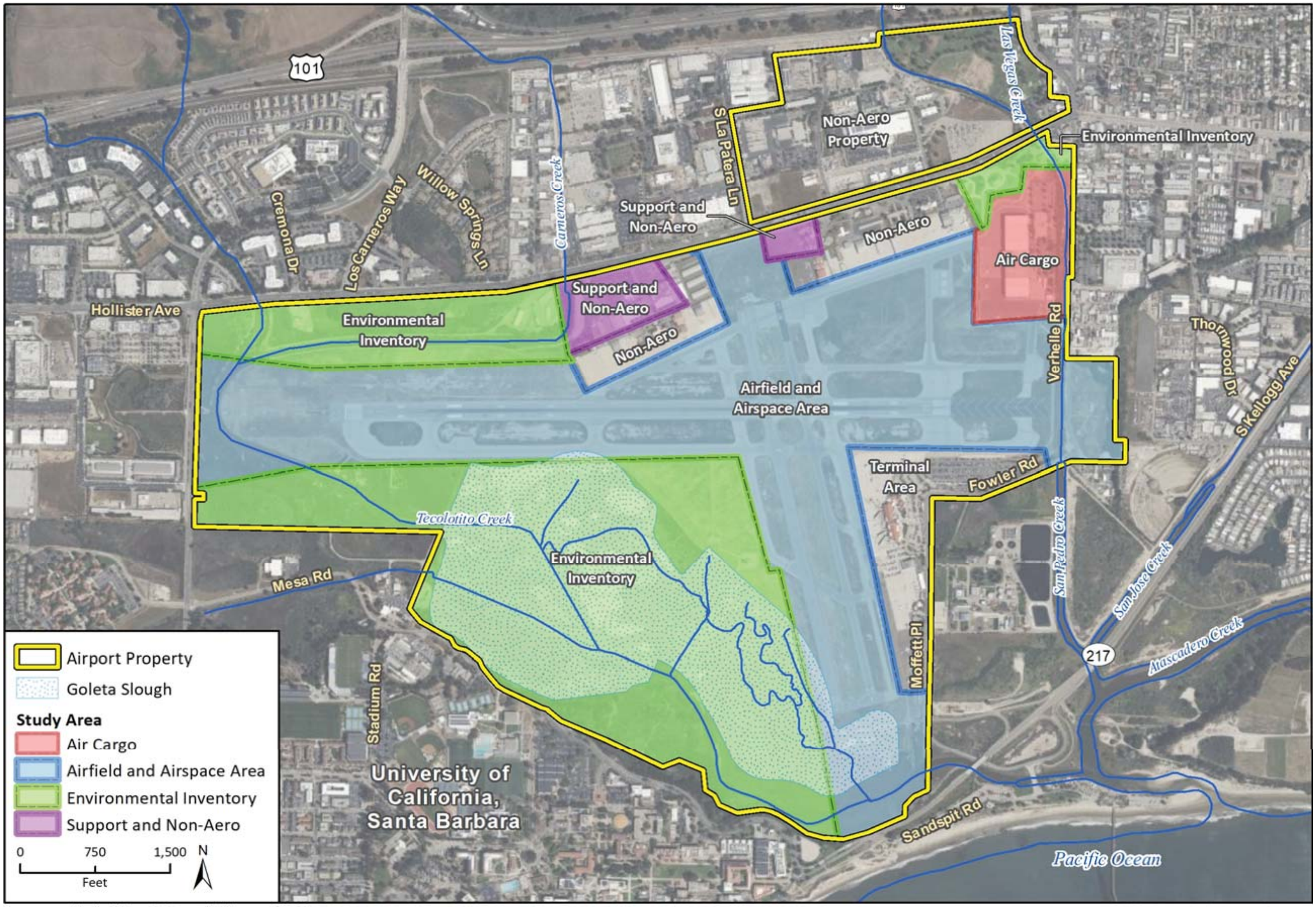
San Pedro Creek is federally designated critical habitat for southern California steelhead (NMFS 2022). Although the species has low potential to occur in the Study Area due to the highly disturbed nature of the surrounding habitat, this species may use the channel for migration during high flow events. According to the USFWS Critical Habitat Portal (USFWS 2022a), no other critical habitat exists within the Study Area or within the six-quadrangle search of the Study Area.

Jurisdictional Waters, Including Wetlands

Extensive areas potentially under the jurisdictions of the USACE, RWQCB, CDFW, and/or CCC occur in the Study Area as they are associated with Goleta Slough or other regulated waterways. The primary sensitive natural community occurring in the Study Area is Southern Coastal Salt Marsh. This sensitive natural community occurs in Goleta Slough in the form of four vegetation communities: alkali heath marsh, pickleweed mats, salt grass flats, and salt marsh bulrush (Dudek 2012). These communities, particularly pickleweed mats, provide the primary nesting habitat for the Belding's savannah sparrow, listed as endangered under the CESA.

Prior to expiration of Santa Barbara County Flood Control District permits for managing the slough mouth in late 2012, Dudek (2012) conducted a wetlands inventory within Santa Barbara Airport property. This inventory did not cover areas outside airport property. In addition, it was not intended as a formal jurisdictional delineation and was not submitted to the agencies as such. Additional Waters of the U.S. and State, as well as CDFW streambed/riparian habitat, occur within the Study Area along segments of San Pedro Creek, Carneros Creek, and Tecolotito Creek which have been modified by development within and upstream of the Study Area. Additional wetlands under the jurisdiction of the USACE and RWQCB also occur here. All of these areas would likely fall under the jurisdiction of the CCC. San Pedro Creek parallels South Fairview Avenue to the west within the Study Area. Carneros Creek flows through the northwest portion of the Study Area between the airport runways and Hollister Avenue before its confluence with Tecolotito Creek, which then flows south of the airport runways before meeting Goleta Slough in the southern Study Area. Potential jurisdictional waters mapped in the Study Area are shown in **Figure 2-7**.

Figure 2-7: **Potential Jurisdictional Waters Map**



Imagery provided by Microsoft Bing and its licensors © 2022
Additional data provided by City of Santa Barbara; National Hydrology Dataset, 2022.

Wildlife Movement

The Study Area is highly disturbed by development associated with the Santa Barbara Airport, which poses a challenge to wildlife movement, but Goleta Slough, vegetated areas, creeks, and riparian corridors provide usable corridors for a variety of wildlife species. Goleta Slough provides the primary wildlife movement corridor for avian, aquatic, and amphibian species. Trees and shrubs in the Study Area could provide habitat for migrating or nesting wildlife, including special-status bird species as described below. Carneros, Tecolotito, and San Pedro creeks could support local and regional terrestrial, aquatic, and amphibian wildlife movement. The riparian vegetation occurring along these creeks could also provide migration habitat for upland species and nesting birds; however, due to the constructed channelization of these creeks, intermittent flows, and disturbed creek habitat up and downstream of the work area, it is expected that the Study Area contains low quality, largely transitory corridor habitat for aquatic species and amphibians.

Resources Protected by Local Policies and Ordinances

The Study Area occurs within the jurisdiction of the City of Santa Barbara. The General Plans and Municipal Codes of the City of Santa Barbara include goals, policies, and ordinances intended to protect, preserve and enhance natural habitats and biological resources to varying degrees, including trees, riparian areas, and water resources (City of Santa Barbara 2011 and 2022).

Protected native trees within the Study Area are located primarily within the riparian corridor San Pedro Creek and in the uplands of Goleta Slough, north of Mesa Road. The City of Santa Barbara also requires permitting for trimming or removal of planted landscape trees, which are present in the Study Area. San Pedro Creek, Tecolotito Creek, and Carneros Creek are also waterbodies that area protected by the City of Santa Barbara. Additional regulatory details are provided in **Appendix EC1**.

In the event of proposed construction in the Study Area, a focused review of applicable local regulations will be conducted with consideration of the project components.

Limitations, Assumptions, and Use Reliance

This Biological Resources Assessment has been performed in accordance with professionally accepted biological investigation practices conducted at this time and in this geographic area. The biological investigation is limited by the scope of work performed. The findings and opinions conveyed in this report are based on findings derived from published potential jurisdictional resources, review of CNDDB RareFind5, and specified historical and literature sources. Standard data sources relied upon during the completion of this report, such as the CNDDB, may vary with regard to accuracy and completeness. In particular, the CNDDB is compiled from research and observations reported to CDFW that may or may not have been the result of comprehensive or site-specific field surveys. Although Rincon believes the data sources are reasonably reliable, Rincon cannot and does not guarantee the authenticity or reliability of the data sources it has used. Additionally, pursuant to our contract, the data sources reviewed included only those that are practically reviewable without the need for extraordinary research and analysis.

CULTURAL RESOURCES

Section prepared by Rincon Consultants, Inc.

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Summary

This Cultural Resources Inventory provides an inventory of cultural resources located in the Santa Barbara Airport Property (Study Area), which is generally located south of Hollister Avenue and Highway 101, west of Fairview Avenue and east of South La Patera Lane. The Study Area encompasses the Environmental Inventory, Air Cargo, Support and Non-aero, and Airfield and Airspace areas.

The majority of the approximately 830-acre Study Area is developed with the Santa Barbara Airport, consisting of buildings, structures, and runways. The southern portion of the Study Area is undeveloped wetlands and the Tecolotito Creek runs through the area south to the Pacific Ocean.

Twelve archaeological sites are located within the Study Area; one is listed on the National Register of Historic Places, one has been recommended as not eligible for inclusion on the National Register of Historic Places, and 10 have not been evaluated. Twenty-three built environment resources, including a segment of the Firestone Ditch, are located within the Study Area; two have been recommended eligible for National Register of Historic Places as an individual property through survey evaluation, four have been recommended as locally significant, 16 of the resources have been recommended ineligible for listing to the National Register of Historic Places, and one has not been evaluated. One other built environment resource that is of historical age (45 years) but has not been formally recorded or evaluated was identified within the Study Area during review of aerial imagery.

Study Area Location

This Cultural Resources Inventory provides an inventory of cultural resources present in the Santa Barbara Airport Property (Study Area), which is generally located south of Hollister Avenue and Highway 101, west of Fairview Avenue and east of South La Patera Lane. The Study Area encompasses the Environmental Inventory, Air Cargo, Support and Non-aero, and Airfield and Airspace areas. The majority of the approximately 830-acre Study Area is developed with the Santa Barbara Airport, consisting of buildings, structures, and runways. The southern portion of the Study Area is undeveloped wetlands and the Tecolotito Creek runs through the area south to the Pacific Ocean. Although the Study Area is located in Goleta, the Santa Barbara Airport, is under the jurisdiction of the City of Santa Barbara.

Regulatory Framework

This section discusses applicable state and local laws, ordinances, regulations, and standards governing cultural resources.

California Environmental Quality Act

Public Resources Code (PRC) Section 21084.1 were used as the basic guidelines for this cultural resources study. CEQA (§21084.1) requires lead agencies determine if a project could have a significant effect on historical or unique archaeological resources. As defined in PRC Section 21084.1, a historical resource is one listed in, or determined eligible for listing in, the California Register of Historical Resources (CRHR), a resource included in a local register of historical resources or identified in a historical resources

survey pursuant to PRC Section 5024.1(g), or any object, building, structure, site, area, place, record, or manuscript that a lead agency determines to be historically significant. PRC Section 21084.1 also states resources meeting the above criteria are presumed to be historically or culturally significant unless the preponderance of evidence demonstrates otherwise. Resources listed in the National Register of Historic Places (NRHP) are automatically listed in the CRHR and are, therefore, historical resources under CEQA. Historical resources may include eligible built environment resources and archaeological resources of the precontact or historic periods.

CEQA Guidelines Section 15064.5(c) provides further guidance on the consideration of archaeological resources. If an archaeological resource does not qualify as a historical resource, it may meet the definition of a “unique archaeological resource” as identified in PRC Section 21083.2. PRC Section 21083.2(g) defines a unique archaeological resource as an artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria: 1) it contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information, 2) has a special and particular quality such as being the oldest of its type or the best available example of its type, or 3) is directly associated with a scientifically recognized important prehistoric or historic event or person.

If an archaeological resource does not qualify as a historical or unique archaeological resource, the impacts of a project on those resources will be less than significant and need not be considered further (CEQA Guidelines Section 15064.5[c][4]). CEQA Guidelines Section 15064.5 also provides guidance for addressing the potential presence of human remains, including those discovered during the implementation of a project.

California Register of Historical Resources

The CRHR was established in 1992 and codified by PRC §§5024.1 and 4852. The CRHR is an authoritative listing and guide to be used by State and local agencies, private groups, and citizens in identifying the existing historical resources of the State and to indicate which resources deserve to be protected, to the extent prudent and feasible, from substantial adverse change (Public Resources Code, 5024.1(a)). The criteria for eligibility for the CRHR are consistent with the NRHP criteria but have been modified for state use in order to include a range of historical resources that better reflect the history of California (Public Resources Code, 5024.1(b)). Unlike the NRHP however, the CRHR does not have a defined age threshold for eligibility; rather, a resource may be eligible for the CRHR if it can be demonstrated sufficient time has passed to understand its historical or architectural significance (California Office of Historic Preservation 2006). Further, resources may still be eligible for listing in the CRHR even if they do not retain sufficient integrity for NRHP eligibility (California Office of Historic Preservation 2006). Generally, the California Office of Historic Preservation recommends resources over 45 years of age be recorded and evaluated for historical resources eligibility (California Office of Historic Preservation 1995:2)

A property is eligible for listing in the CRHR if it meets one or more of the following criteria:

Criterion 1: Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage

Criterion 2: Is associated with the lives of persons important to our past

Criterion 3: Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values

Criterion 4: Has yielded, or may be likely to yield, information important in prehistory or history

Local Regulations

City of Santa Barbara Master Environmental Assessment Guidelines for Archaeological Resources and Historic Structures and Sites

The City's Master Environmental Assessment Guidelines (City of Santa Barbara 2002) defines significant archaeological resources to include, but not be limited to, the following:

1. Any "unique archaeological resource" as defined by CEQA §21083.2.g. Such "unique archaeological resources" are defined as:

   > ... *an archaeological artifact, object, or site about which it can be clearly demonstrated that without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria*:
   >
   > (*1) Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information.*
   >
   > *(2) Has a special and particular quality such as being the oldest of its type or the best available example of its type.*
   >
   > *(3) Is directly associated with a scientifically recognized important prehistoric or historic event or person.*

2. Any known significant archaeological site depicted on the City's Archaeological Resources Reports Location Map.

3. Any archaeological artifact, object, or site designated on the most current version of the following lists:
   a. National Historic Landmarks
   b. National Register of Historic Places
   c. California Registered Historical Landmarks
   d. California Register of Historical Resources
   e. City of Santa Barbara Landmarks
   f. City of Santa Barbara Structures of Merit

4. Any archaeological artifact, object or site meeting any or all the criteria established for a City Landmark and a City Structure of Merit (SBMC §22.22.040; Ord. 3900 ¶1, 1977), as follows:
   a. Its character, interest or value as a significant part of the heritage of the City, the State or the Nation;
   b. Its location as a site of a significant historic event;

c. Its identification with a person or persons who significantly contributed to the culture and development of the City, the State or the Nation;
d. Its exemplification of a particular architectural style or way of life important to the City, the State or the Nation;
e. Its exemplification of the best remaining architectural type in a neighborhood;
f. Its identification as the creation, design or work of a person or persons whose effort has significantly influenced the heritage of the City, the State or the Nation;
g. Its embodiment of elements demonstrating outstanding attention to architectural design, detail, materials or craftsmanship;
h. Its relationship to any other landmark if its preservation is essential to the integrity of that landmark;
i. Its unique location or singular physical characteristic representing an established and familiar visual feature of a neighborhood;
j. Its potential of yielding significant information of archaeological interest;
k. Its integrity as a natural environment that strongly contributes to the wellbeing of the people of the City, the State or the Nation.

5. Any archaeological artifact, object or site meeting any or all the criteria provided for the National Register of Historic Places and the California Historical Landmark lists:

National Register Criteria for Evaluation. The quality of significance in American history, architecture, archeology. engineering. and culture is present in districts, sites, buildings, structures, and objects of State and local importance that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and

a. That are associated with events that have made a significant contribution to the broad patterns of our history; or
b. That are associated with the lives of persons significant in our past; or
c. That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
d. That have yielded, or may be likely to yield, information important in prehistory or history.

National Register Criteria Considerations. Ordinarily cemeteries, birthplaces, or graves of historical figures, properties owned by religious institutions or used for religious purposes, structures that have been moved from their original locations, reconstructed historic buildings, properties primarily commemorative in nature, and properties that have achieved significance within the past 50 years shall not be considered eligible for the National Register. However, such properties will qualify if they are integral parts of districts that do meet the criteria or if they fall within the following categories:

a. A religious property deriving primary significance from architectural or artistic distinction or historic importance.
b. A building or structure removed from its original location, but which is significant primarily for architectural value, or which is the surviving structure most importantly associated with a historic person or event.
c. A birthplace or grave of a historical figure of outstanding importance if there is no appropriate site or building directly associated with his productive life.
d. A cemetery which derives its primary significance from graves of persons of transcendent importance, from age, from distinctive design features, or from association with historic events.
e. A reconstructed building when accurately executed in a suitable environment and presented in a dignified manner as part of a mitigation master plan, and when no other building or structure with the same association has survived.

f. A property primarily commemorative in intent if design, age, tradition, or symbolic value has invested it with its own historical significance.

g. A property achieving significance within the past 50 years if it is of exceptional importance.

6. Any archaeological artifact, object, or site associated with a traditional way of life important to an ethnic, national, racial, or social group, or to the community at large; or illustrates the broad patterns of cultural, social, political, economic, or industrial history.

7. Any archaeological artifact, object, or site that conveys an important sense of time and place or contributes to the overall visual character of a neighborhood or district.

8. Any archaeological artifact, object, or site able to yield information important to the community or is relevant to historical, historic archaeological, ethnographic, folkloric, or geographical research.

9. Any archaeological artifact, object, or site determined by the City to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California, provided the City's determination is based on substantial evidence in light of the whole record [Ref. State CEQA Guidelines §15064.5(a)(3)].

Cultural Setting

Prehistoric Setting

The Study Area is located in what is generally described as the Northern Bight archaeological region, one of eight organizational divisions of the state (Jones and Klar 2007, Moratto 1984). The Northern Bight encompasses the northern portion of the California Bight, which is marked by the curve of the coastline along central California. The Northern Bight archaeological region primarily includes the counties of Santa Barbara, Ventura, and portions of Los Angeles, extending from the coastline at Vandenberg Air Force Base inland to the Cuyama River Valley and south to the Santa Monica Mountains and the Los Angeles Basin. Following Glassow et al. (2007), the prehistoric cultural chronology for the Northern Bight is generally divided into six periods: Paleo-Indian Period (ca. 10,000 - 7000 BCE), Millingstone Period (7000 - 5000 BCE), Early Period (5000 - 2000 BCE), Middle Period (2000 BCE - 1 CE), Middle-Late Transition Period (1 - 1000 CE), and Late Period (1000 CE - Historic Contact). These periods are discussed in further detail below.

Paleo-Indian Period (ca. 10,000 - 7000 BCE)

The Paleo-Indian Period defines the earliest human occupation of the Northern Bight and describes the cultural trends and subsistence strategies of prehistoric populations from approximately 10,000 to 7000 BCE (Glassow et al. 2007). The Paleo-Indian Period in North America is largely recognized by projectile points associated with extinct large mammal remains, such as mammoth, bison, and dire wolves in the Southwest and Plains regions (Erlandson et al. 2007; Huckell 1996; Reed 1992; Slaughter et al. 1992). These projectile points have been classified as the Clovis style, which exhibit a lanceolate shape with a flute initiated from the base that extends as far as the midline (Hollenshead 2007; Justice 2002).

The earliest accepted dates for human occupation in California were recovered from archaeological sites on two of the Northern Channel Islands, located off the southern coast of Santa Barbara County. The earliest radiocarbon dates known for the region, calibrated to approximately 11,000 years before present (B.P.), were derived from human remains and rodent bones recovered from within the same deposits on Santa Rosa Island (Erlandson et al. 2007; Glassow et al. 2007; Johnson et al. 2002). Archaeological deposits from the Daisy Cave site on San Miguel Island establish the presence of people in this area approximately 10,000 years ago (Erlandson 1991; Erlandson et al. 2007). In nearby San Luis Obispo County, archaeological sites CA-SLO-1764 (Lebow et al. 2001), Cross Creek (CA-SLO-1979; Fitzgerald 2000), and CA-SLO-832 (Jones et al. 2001) yielded radiocarbon dates from approximately 9,000 years ago (Jones and Ferneau 2002).

Recent data from Paleo-Indian sites in southern California indicate that the economy was a diverse mixture of hunting and gathering, with a major emphasis on aquatic resources in many coastal areas (e.g., Jones and Ferneau 2002; Erlandson et al. 2007). Archaeological deposits at the Daisy Cave site yielded an assemblage of "the oldest known fishhooks in the Americas" (Erlandson et al. 2007: 57). Shell middens discovered on the mainland of California have yielded dates from 8000 to 7000 BCE (Erlandson et al. 2007).

A fluted projectile point fragment was recovered from site CA-SBA-1951 on the Santa Barbara Channel coastal plain (Erlandson 1994:44; Erlandson et al. 1987). Another fluted projectile point was reportedly found on the surface in Nipomo, San Luis Obispo County (Mills et al. 2005; Jones and Klar 2007). Large side-notched projectile points of the Central Coast Stemmed series in this area date to as early as 8,000 years ago (Justice 2002). Points of this type have been recovered along the Central Coast from sites such as Diablo Canyon (CA-SLO-2; Greenwood 1972), Cross Creek (CA-SLO-1797; Fitzgerald 2000), Little Pico Creek (CA-SLO-175; Jones and Waugh 1995), and the Honda Beach site (CA-SBA-530; Glassow 1996), among others. The Metcalf site (CA-SCL-178; Hildebrandt 1983), in southern Santa Clara Valley, yielded two large side-notched projectile points associated with charcoal dates ranging from 9,960 – 8,500 years ago.

Millingstone Period (7000 - 5000 BCE)

It is generally accepted that human occupation of California during the Paleo-Indian Period originated from small, dispersed occupations. Archaeological sites dating to the Millingstone Period, however, indicate a population increase (Glassow et al. 2007). The Millingstone Period, as described by Wallace (1955, 1978), is characterized by an ecological adaptation to collecting plant resources, such as seeds and nuts, suggested by the appearance and abundance of well-made milling (ground stone) implements, particularly in archaeological sites along the coast of California. The dominance of milling implements is generally associated with the horizontal motion of grinding small seeds and nuts and lends to the name Millingstone Period (Glassow et al. 2007).

Rogers (1929) originally identified the Millingstone Period along the Santa Barbara Channel in 1929. Excavations at the Tank Site (CA-LAN-1) in Topanga Canyon from 1947 to 1948 (Treganza and Bierman 1958) confirmed the presence of a significant number of milling implements that correspond with the Millingstone Period identified by Rogers in 1929. Wallace (1955, 1978) further defined the period, which was recognized on the Central Coast by Greenwood (1972). The Cross Creek site (CA-SLO-1797) is a Millingstone occupation site in San Luis Obispo County that returned radiocarbon dates ranging between 9,500 – 4,700 years ago. This site represents one of the oldest expressions of the pattern (Jones et al. 2007; Fitzgerald 2000:58).

Wallace (1955, 1978) and Warren (1968) identify ground stone implements including Millingstones (e.g., metates, milling slabs) and hand stones (e.g., manos, mullers). Millingstones occur in high frequencies for the first time in the archaeological record of the Central Coast region and become even more prevalent near the end of the Millingstone Period. Flaked stone assemblages, which include crude core and cobble-core tools, flake tools, large side-notched projectile points, and pitted stones (Glassow et al. 2007; Jones et al. 2007), and shell middens in coastal sites suggest that people during this period practiced a mixed food procurement strategy. Faunal remains identified at Millingstone sites point to broad-spectrum hunting and gathering of shellfish, fish, birds, and mammals, though large faunal assemblages are uncommon. This mixed food procurement strategy demonstrates adaptation to regional and local environments.

Along the Central Coast, Millingstone Period sites are most common on terraces and knolls, typically set back from the current coastline (Erlandson 1994:46). However, 42 sites have been identified in various settings, including rocky coasts, estuaries, and nearshore interior valleys (Jones and Klar 2007). The larger sites usually contain extensive midden deposits, possible subterranean house pits, and cemeteries. Most of these sites probably reflect intermittent use over many years of local cultural habitation and resource exploitation.

Early Period (5000 - 2000 BCE)

The Early Period of the Northern Bight is marked by a lower frequency of radiocarbon dated archaeological sites as well as changes in artifact forms. Differences in artifact forms, particularly in ground stone implements, likely represent changes in subsistence (Glassow et al. 2007). The material culture recovered from Early Period sites within the Central Coast region provides evidence for continued exploitation of inland plant and coastal marine resource as well as the incorporation of "newly important food resources" found in specific habitats (Glassow et al. 2007:197). In addition to the use of metates and manos, prehistoric populations began to use mortars and pestles, such as those recovered from the Sweetwater Mesa (CA-LAN-267) and Aerophysics (CA-SBA-53) sites (Glassow et al. 2007).

Artifact assemblages recovered from Early Period sites also include bipointed bone gorge hooks used for fishing, *Olivella* beads, bone tools, and pendants made from talc schist. Square abalone shell (*Haliotis* spp.) beads have been found in Monterey Bay (Jones and Waugh 1995:122). The frequency of projectile points in Early Period assemblages also increased, while the style began to change from lanceolate forms to side-notched forms (Glassow et al. 2007). This projectile point style trend, first identified by David Banks Rogers in 1929, was confirmed by Greenwood (1972) at Diablo Canyon. The projectile point trend is apparent at numerous sites along the California coast as well as a few inland sites (e.g. CA-SBA-210 and CA-SBA-530). In many cases, manifestations of this trend are associated with the establishment of new and larger settlements, such as at the Aerophysics site (Glassow et al. 2007; Jones et al. 2007).

Middle Period (2000 BCE - 1 CE)

The Middle Period describes a pronounced trend toward greater adaptation to regional or local resources as well as the development of socioeconomic and political complexity in prehistoric populations (Glassow et al. 2007). The remains of fish, land mammals, and sea mammals are increasingly abundant and diverse in archaeological deposits along the coast.

Shell fishhooks were introduced, and projectile points changed from side-notched dart points to contracting stem styles. Flaked stone tools used for hunting and processing—such as large side- notched, stemmed, lanceolate or leaf-shaped projectile points, large knives, edge modified flakes, and drill-like implements—occurred in archaeological deposits in higher frequencies and are more morphologically diverse during the Middle Period. Bone tools, including awls, are more numerous than in the preceding period, and the use of asphaltum adhesive became common.

Circular fish hooks that date from between 1000 and 500 BCE, compound bone fish hooks that date between 300 and 900 CE, notched stone sinkers, and the tule reed or balsa raft, indicative of complex maritime technology, became part of the toolkit during this period (Arnold 1995; Glassow et al. 2007; Jones and Klar 2005:466; Kennett 1998:357; King 1990:87–88).

Populations continued to follow a seasonal settlement pattern until the end of the Middle Period; large, permanently occupied settlements with formal architecture, particularly in coastal areas, appear to have been the norm by the end of the Middle Period (Glassow et al. 2007; Kennett 1998). Prehistoric populations began to bury the deceased in formal cemeteries with artifacts that may represent changes in ideology and the development of ritual practices (Glassow et al. 2007).

Middle-Late Transition Period (1 - 1000 CE)

The Middle-Late Transition period is marked by major changes in settlement patterns, diet, and interregional exchange. Prehistoric populations continued to occupy more permanent settlements, with the continued use of formal cemeteries and the burial of goods with the deceased. The manufacture of the plank canoe, or *tomol*, allowed prehistoric populations to catch larger, deep-sea fish (Glassow et al. 2007). Following the introduction of the plank canoe, groups began to use harpoons. The plank canoe appears to have influenced “commerce between the mainland coast and the Channel Islands” (Glassow et al. 2007:204). Middle-Late Transition Period sites indicate that populations replaced atlatl (dart) technologies with the bow and arrow, which required smaller projectile points. Projectile points diagnostic of both the Middle and Late periods are found within the Central Coast region (Jones and Ferneau 2002:217). These projectile points include large, contracting-stemmed types typical of the Middle Period, as well as small, leaf- shaped Late Period projectile points, which likely reflect the introduction of the bow and arrow.

Late Period (1000 CE - Historic Contact)

Late Period sites are distinguished by small, finely worked projectile points and temporally diagnostic shell beads. Although shell beads were typical of coastal sites, trade brought many of these maritime artifacts to inland locations, especially during the latter part of the Late Period. Small, finely worked projectile points are typically associated with bow and arrow technology, which is believed to have been introduced to the area by the Takic migration from the deserts into southern California.

Common artifacts identified at Late Period sites include bifacial bead drills, bedrock mortars, hopper mortars, lipped and cupped *Olivella* shell beads, and steatite disk beads. The presence of beads and bead drills suggest that low-level bead production occurred throughout the Central Coast region (Jones and Klar 2007).

Unlike the large Middle Period shell middens, Late Period sites are more frequently single- component deposits. There are also more inland sites, with fewer and less visible sites along the Pacific shore during the Late Period. The settlement pattern and dietary reconstructions indicate less reliance on marine resources than observed during the Middle and Middle-Late Transition periods, as well as an increased preference for deer and rabbit. An increase in the number of Late Period sites with bedrock mortar features suggests that nuts and seeds began to take on a more significant dietary role in Late Period populations.

Ethnographic Setting

The Study Area lies within Chumash ethnographic territory, which extends from Malibu, north beyond San Luis Obispo, and inland as far as 68 kilometers (42 miles) (Glassow 1996). The Chumash also inhabited the northern Channel Islands. The Chumash spoke six closely related languages, divided into two broad groups – Northern Chumash, consisting of only Obispeño, and Southern Chumash, including Purisimeño, Ineseño, Barbareño, Ventureño, and Island Chumash (Mithun 1999).

The Chumash are divided into three main groups, including Interior, Coastal, and Northern Channel Islands Chumash. The coastal Barbareño Chumash referred to themselves as the *Wal-wa-ren-na*, and "occupied the narrow coastal plain from Point Conception to Punta Gorda in Ventura County" (Grant 1978:509). Chumash villages generally ranged between 30 and 200 people, with the largest settlements numbering anywhere from 500 to 800 people (Glassow 1996:14). Grant (1978) describes a typical Chumash village along the Santa Barbara Channel as consisting of "several houses, a sweathouse, store houses, a ceremonial enclosure, gaming area, and a cemetery usually placed well away from the living area." Archaeological investigations have recognized separate areas within cemeteries for elites and non-elites (King 1969).

Permanent Chumash villages included hemispherical or rounded mud-covered (insulated) pole and thatch dwellings arranged in close groups (Brown 2001). Thatching was made from tule, Carrizo grass, wild alfalfa, and fern (Grant 1978). Smaller Chumash groups correspondingly occupied short- term special-purpose camps throughout the year to acquire seasonal resources (Glassow 1996). Cooking fires were centered within the dwelling to allow smoke to ventilate through a hole in the roof (Grant 1978).

The Chumash are well-known for their wooden plank canoe, or *tomol*. The *tomol* facilitated the procurement of marine resources and the trade network between the mainland and the Channel Islands. Sea mammals were hunted with harpoons, while deep-sea fish were caught using nets and hooks and lines. In addition to marine resources, the Chumash subsistence focused on acorns, pine nuts, prickly pear cactus, and other plant resources, land animals such as mule deer, antelope, quail, dove, and other waterfowl (Brown 2001). The Chumash also manufactured various other utilitarian and non-utilitarian items. Eating utensils, ornaments, fishhooks, harpoons, and other items were made using bone and shell. *Olivella* shell beads were especially important for trade.

Spanish explorers first arrived in the Santa Barbara Channel region in 1542; however, the impact of colonization started in 1770 with the establishment of the missions. Mission life led to severe population decline and culture loss (Johnson 1987). Although the Chumash languages are no longer commonly spoken (Timbrook 1990), many descendants of the Chumash still live in the region and a cultural revitalization has been ongoing since the 20th century (Glassow et al. 2007). Today, the Santa Ynez Band of Chumash Indians, whose reservation is approximately 30 kilometers (19 miles) northwest of the Study Area, is the only federally recognized tribe in the Santa Barbara area.

Historic Overview

The post-contact history of California is generally divided into three time periods: the Spanish period (1769-1822), the Mexican period (1822-1848), and the American period (1848-present). Each of these periods is briefly described below.

Spanish Period (1769 - 1822)

The Santa Barbara Channel region was first visited by the Cabrillo Expedition in October 1542 (Chesnut 1993). A second Spanish expedition, consisting of two ships under the command of Sebastian Vizcaino, arrived in the Santa Barbara area in 1602. For more than 200 years, Cabrillo, Vizcaino and other Spanish, Portuguese, British, and Russian explorers sailed the Alta (upper) California coast and made limited inland expeditions, but they did not establish permanent settlements (Bean 1968; Rolle 2003).

The Spanish began to permanently occupy Alta California in the late eighteenth century. While the Spanish funded expeditions to claim Alta California for the Spanish government, Franciscan missionaries traveled to proselytize and convert the local populations to Catholicism for the Church. Gaspar de Portolá established the first Spanish settlement, a military fort named El Presidio Reál de San Diego, in Alta California in May 1769. The Presidio of San Diego was the first of four presidios that would be established throughout Alta California for the Spanish government. A year later, in June 1770, Portolá established the El Presidio Real de San Carlos de Monterrey, a bay originally identified by the Spanish explorer Sebastian Vizcaino in the early seventeenth century. Juan Bautista de Anza established El Presidio Real de San Francisco in June 1776. The Spanish established El Presidio de Santa Bárbara, the fourth and final presidio, in Alta California in 1782. The presidio was a temporary structure until construction of a permanent adobe structure began in 1784.

Franciscan Father Junípero Serra founded Misión San Diego de Alcalá in June 1769. The San Diego Mission was the first of 21 missions founded by the Franciscans in the late eighteenth and early nineteenth centuries. Misión Santa Barbara was the tenth mission founded by the Spanish, and was founded in 1786, four years after the establishment of the presidio. The Chumash that lived in the vicinity of the project area came under the control of the Spanish at Mission Santa Barbara. Other missions established along the central coast include Misión San Luis Obispo de Tolosa, founded in 1772, and Misión La Purisima Concepción, founded in 1787 (Weber 1992).

Mission Santa Barbara was reconstructed twice to enlarge the church in 1789 and 1793. The Spanish began to rebuild the church again in 1812 following damage from a major earthquake. The presidio and the mission were constructed using large adobe bricks shaped by a form and then sun dried. Large ceramic roof tiles called *tejas* were created by molding the clay on timbers until fully dried, creating the long, rounded shape seen at both the presidio and mission. Some floors were lined with clay tiles called *ladrillos* formed from the same clay used for the roof tiles, but mostly remained dirt. Mission Santa Barbara benefitted from construction of a dam and aqueduct system that diverted water from Mission Canyon. The Spanish relied on Chumash labor to construct the buildings, dam, and aqueduct system. Spanish families began to settle the area, becoming Pueblo Santa Barbara. These settlers began to use the Goleta Valley for ranching and agriculture, and Pueblo Santa Barbara became a center for hide and tallow trade.

Mission life led to severe population decline and culture loss among the Chumash. The Spanish brought with them diseases for which the Chumash had no immunity. Living and working in close proximity spread diseases throughout the native populations and killed many. The Spanish also introduced domestic plants and animals for labor and food. These non-native species vastly altered the landscape, forcing the Chumash to adopt new foods and lifeways.

Mexican Period (1822 - 1848)

Mexico's revolution against Spain achieved success in 1821. News of the victory reached California in 1822, marking the beginning of the Mexican period. The hallmarks of the Mexican period are the secularization of the missions, completely accomplished by 1836, and a greater distribution of private land grants to prominent citizens, including retired military personnel. The Secularization Act of 1833 enabled Mexican governors in California to distribute former mission lands to individuals in the form of land grants. "The intention of the secularization of the California missions in 1834 was to transform the mission centers into Pueblos; the Indians, with their knowledge of trade and agriculture, would become Mexican citizens in these Pueblos," Grant (1978:507) explains. Mexican governors made more than 700 land grants between 1833 and 1846, putting most of the state's lands into private ownership for the first time (Shumway 2007). Forty land grants were issued in Santa Barbara County, where its fertile valleys were ideal for the ranching and agriculture prevalent during this period (Avina 1976; Tompkins 1976, 1987; Chesnut 1993).

Although Pueblo Santa Barbara thrived on hide and tallow trade, ranchers soon identified a more prosperous market in providing beef for the growing gold-mining population. Daniel Hill applied for a land grant in the mid-1840s and was granted the land that he would name Rancho La Goleta after the adjacent Goleta Slough, an estuary that historically formed an island (Mescalitan) surrounded by wetlands and marshes. Modugno (2015) explains that "the area around the east side of the slough had already been nicknamed La Goleta, or the schooner, because some schooners had run aground in that area, and at least one schooner had been built there." The Map of the Rancho La Goleta, published in the 1840s, indicates a wreck at the mouth of the slough just south of the rancho (University of California Berkeley n.d.).

American Period (1848 - Present)

The discovery of gold in northern California in 1848 led to the California Gold Rush, despite the first California gold being discovered in Placerita Canyon in 1842 (Guinn 1915). Southern California remained dominated by cattle ranches in the early American Period, though droughts and increasing population resulted in farming and a growth in urban professions that increasingly supplanted ranching through the late 19th century. By 1853, the population of California exceeded 300,000. Thousands of settlers and immigrants continued to immigrate into the state, particularly after the completion of the transcontinental railroad in 1869.

The American Period officially began with the signing of the Treaty of Guadalupe Hidalgo in 1848, in which the United States agreed to pay Mexico $15 million for the conquered territory of California, Nevada, Utah, and parts of Colorado, Arizona, New Mexico, and Wyoming. In 1850, several months before California was admitted as the 31st state, the County of Santa Barbara was incorporated. Following the admittance of California to the union, the Goleta Valley became an agricultural center and was known as a prominent walnut, avocado, and lemon-growing region. Oil and gas extraction also took place in the area, with multiple wells established near the Study Area by the 1930s (State of California, Department of Conservation 2017).

During this period, Santa Barbara Airport began with a 3,000-foot graded landing strip running southwest from the corner of Hollister and Fairview Avenues constructed in 1928 (Coffman Associates Inc. 2017).

Frederick Stearns II established Santa Barbara Airways in the mid-1930s, constructing two hangars, two runways, and the first radio equipment at the airport by 1938. Commercial air service started in 1932 with Pacific Seaboard Airlines, and expanded to include United Airlines in 1936. In the 1940s the airport was temporarily owned by the United States government, which expanded the airport with additional terminals and the Marine Corps Air Station (Coffman Associates Inc. 2017). After the war, ownership of the airport was returned to the City of Santa Barbara which continued to expand the airport into what it is today.

Methodology

As part of the Cultural Resources Inventory, Rincon reviewed historical topographic maps and aerial imagery of the Study Area including the Environmental Inventory, Air Cargo, Support and Non-aero, and Airfield and Airspace areas, and the surrounding area to develop an understanding of the context and history of the area. Rincon also conducted a California Historical Resources Information System (CHRIS) records search to identify any previous cultural resources studies or previously recorded resources within the Study Area. A further review of the National Register of Historic Places (NRHP), the California Register of Historic Resource (CRHR), the California Built Environment Resource Directory (BERD), the City of Goleta Local Register of Historic Resources, and the City of Santa Barbara Register of Historic Resources was undertaken to identify any further cultural resources. Applied Earthworks, Inc. prepared a historic structures report for the Santa Barbara Municipal Airport in 2014 (Morlet and Hamilton 2014) which was also reviewed as part of this effort.

Existing Conditions

Historical Topographic Maps and Aerial Imagery Review

Rincon completed a review of historical topographic maps and aerial imagery to ascertain the development history of the Study Area that encompasses the Environmental Inventory, Air Cargo, Support and Non-aero, and Airfield and Airspace areas. The earliest historical topographic map from 1943 depicted the project area with undeveloped wetlands (NETR Online 2022). Several buildings are shown at the southern end of Hollister Road and the Southern Pacific Railroad runs north of the area; Goleta is depicted to the east with a dense city center (NETR Online 2022). The airport is shown with several hangers and buildings north of the runways along Hollister Road in a 1947 aerial of the area (NETR Online 2022). The airport maintains this appearance until a 1984 aerial which shows two new buildings at the eastern side of the airport, along South Fairview Avenue, and the runway extended to the west and south (NETR Online 2022). The area surrounding the airport also develops with single-family tracts north of State Highway 101 and east around Goleta. Between 1994 and 2002, the airport underwent several alterations with the construction of several new buildings, driveways, and paved areas throughout the property and demolition of some buildings (NETR Online 2022). Since 2002, more buildings have been demolished and constructed along Hollister Avenue and the surrounding area has continued to expand with new single-family and multi-family tracts north and east of the airport and industrial development west of the airport.

Environmental Inventory Area

The Environmental Inventory area consists of 331 acres throughout the Santa Barbara Airport.

Known Cultural Resources Studies

The CHRIS records search and background research identified 40 cultural resources studies within the Environmental Inventory Area of the project (**Appendix EC1**). The studies within this area have been conducted over the last 40 years, from 1983 to 2017. The studies within the Environmental Inventory Area consist of 26 Phase I archaeological studies, four construction monitoring reports, two extended Phase I studies, two resource evaluation reports, one Phase II testing program report, two Phase III testing program reports, and three programmatic documents (two Environmental Impact Reports, and a Negative Declaration).

Known Cultural Resources

The CHRIS records search and background research identified 16 cultural resources within the Environmental Inventory Area. Resources recorded in the area are listed in **Table 2-2** below. A discussion of each resource is included below the table.

Table 2-2: Known Cultural Resources – Environmental Inventory Area

Primary Number	Trinomial	Resource Type	Description	Recorder(s) and Year(s)	Eligibility Status	Extant
P-42-000049	CA-SBA-49	Prehistoric Site	Habitation site with lithic scatter and shell midden, and burials	1929 (Rogers); 1967 (Chartkoff et al.); 1981 (Erlandson & Wilcoxon)	Unevaluated	N/A
P-42-000052	CA-SBA-52	Prehistoric Site	Habitation site with shell midden and associated cemetery	1925 (Rogers); 1960 (Klug); 1962 (Klug); 1981 (Erlandson & Wicoxon); 1986 (Hudson)	Listed on NRHP as of 1993	N/A
P-42-001694	CA-SBA-1694	Prehistoric Site	Lithic and shell scatter	1981 (Erlandson & Wilcoxon)	Unevaluated	N/A
P-42-003860	CA-SBA-3860H	Historic-Period Site	Historic Trash Scatter	2006 (Siowick & Armstrong)	Unevaluated	N/A
P-42-003862	CA-SBA-3862	Prehistoric Site	Shell scatter	2006 (Armstrong et al.)	Unevaluated	N/A
P-42-038754	–	Prehistoric Isolate	Groundstone fragment	2006 (Shock)	Unevaluated	N/A
P-42-041023	–	Historic Building	Building 248, Old Hangar	1994 (Stone/ Triem)	3S	Yes
P-42-041024	–	Historic Building	Building 249, Old Hangar	1994 (Stone/ Triem)	3S	Yes

Primary Number	Trinomial	Resource Type	Description	Recorder(s) and Year(s)	Eligibility Status	Extant
P-42-041065	–	Historic Building	Building No. 260, Squadron Headquarters	1994 (Stone/ Triem)	5B1	No
P-42-041067	–	Historic Building	Building No. 270, Sewer Pump Building, Sewer Lift Station	1994 (Stone/ Triem)	6Z	No
P-42-041076	–	Historic Building	Building No. 306, Public Works Shops	1994 (Stone/ Triem)	6Z	Yes
P-42-041081	–	Historic Building	Building No. 323, Small Arms and Pyro. Magazine	1994 (Stone/ Triem)	5B1	No
P-42-041082	–	Historic Building	Building No. 325, High Explosives Magazine	1994 (Stone/ Triem)	5B1	Yes
P-42-041085	–	Historic Building	Building No. 345, Public Works Storehouse, City Slicker Deli	1994 (Stone/ Triem)	6Z	Yes
P-42-041086	–	Historic Building	Building No. 347, Airport Maintenance Yard	1994 (Stone/ Triem)	6Z	Yes
P-42-041087	–	Historic Building	Building No. 349, Public Works Paint Shop, Paint Storage Building	1994 (Stone/ Triem)	5B1	Yes

Source: CCIC 2022

3S: Appears eligible for NR as an individual property through survey evaluation.

6Z: Found ineligible for NR, CR or Local designation through survey evaluation.

5B1 (No longer a status code. Now 5B): Locally significant both individually (listed, eligible, or appears eligible) and as a contributor to a district that is locally listed, designated, determined eligible or appears eligible through survey evaluation.

Archaeological Resources

P-42-000049

Rogers initially recorded resource P-42-000049 in 1929, and Chartkoff et al. later revisited the site in 1967. Chartkoff et al. (1967) recorded the resource as a shell midden habitation site with flakes, a hammerstone, and fire-cracked rock along a bluff overlooking the slough. They suggested that the resource was likely highly disturbed but did not provide the nature of disturbance in their reporting. Later, Erlandson and Wilcoxon (1981a) updated the record, stating that there were four burials previously identified within the resource boundaries by Orr, and the shell midden was deep and relatively high density. Erlandson and Wilcoxon also noted shellfish remains, utilized flakes, shell beads, and hopper mortars. The resource has not been previously evaluated for listing on the NRHP or CRHR.

P-42-000052

Recorded by Rogers in 1929 and excavated later by Orr in 1950, and Desautels, Karon, and West between 1967 and 1969, resource P-42-0005052 is a prehistoric habitation site consisting of a deep shell midden, two burials, hearths, various lithic tools, and faunal remains of whales, seals, deer, bear, elk, coyote, and mountain lion. Each of these records notes heavy disturbance to the resource due to construction, agricultural activities, the development of a motorcycle track, and looting. Erlandson and Wilcoxon (1981b) later remapped the resource and provided more precise boundaries, as well as noting that a total of three burials had been identified within the resource. Hudson (1986) then added to the previous reporting, stating that excavations occurred within the site boundaries between 1985 and 1986 as part of a road widening project; however, excavation records were not provided to the CCIC assuming additional work would be conducted in the future. No such records were provided in the CCIC search. An application for listing on the NRHP was completed for the resource in 1991 for its potential to provide knowledge regarding California's prehistory. Resource P-42-000052 was listed on January 25, 1993, NRHP number 92001755.

P-42-001694

Erlandson and Wilcoxon (1981c) recorded resource P-42-001694 as a low-density shell and lithic scatter within a prehistoric shell midden. Lithic materials consisted of quartzite and chert flakes, as well as Monterey and Franciscan chert debitage. Shell materials consisted of extremely weathered *Haliotis* shell. Due to the identification of fill and debris, Erlandson and Wilcoxon (1981c) were unable to determine the full extent of the resource, and they did not evaluate the resource for inclusion in the NRHP or CRHR.

P-42-003860

Resource P-42-003860 consists of a historic-period trash scatter, recorded by Slowick and Armstrong in 2006 during construction monitoring activities. Slowick and Armstrong (2006) described the resource as various rusted metal pieces and melted or broken glass. Complete beer and wine bottles, and chemical jars were also noted within the scatter. Many of the bottles contained ash and dark spots, suggesting they had been burned in a pile, which was further evidenced by the identification of charcoal throughout the deposit. Other materials identified included rodent bone fragments and firearm bullets. Slowick and Armstrong (2006) summarized that the deposit was likely a trash fire to dispose of chemicals, with an added social element due to the beer and wine bottles, as well as the possibility that firearms were discharged into the burn pile; however, it is unknown if the firearms were discharged prior to or after the burn attempt.

P-42-003862

Armstrong et al. (2006) recorded resource P-42-003862 as a prehistoric shell scatter. The identification of the site during a preconstruction site visit for a Southern California Gas pipeline installation led to site testing. Armstrong et al. described the resource as a surface shell scatter measuring 110 by 90 meters. Identified shell species within the included *Tivela*, *Chione*, *Ostrea*, *Saxidomus*, *Haliotis*, and *Mytilu*s. Opaque black chert flakes as well as a chert core were identified during backhoe trenching and screening.

Based on the various types and extent of the scatter, Armstrong et al. (2006) inferred that the resource was likely a collection and processing site. The resource has not been evaluated for listing on the NRHP or CRHR.

P-42-038754

In 2006, Shock identified and recorded a possible groundstone fragment during construction monitoring efforts. No other information for the resource was provided. As the resource is considered an isolated artifact, it is unlikely that it would be eligible for listing on the NRHP.

Built Environment Resources

The records search identified 10 built environment cultural resources within the Environmental Inventory Area. The 10 resources were recorded and evaluated by Mitch Stone and Judith Triem of San Buenaventura Research Associates in 1994 as part of the *Historic Resources Report, Santa Barbara Municipal Airport* (Stone and Triem 1994). Two resources were recommended eligible for the NRHP as an individual property through survey evaluation, both of which are still extant (P-42-041023 and P-42-041024). Though the two sites were recommended for listing, they are not currently listed on the NRHP. Four other resources were recommended locally significant both individually and as a contributor to a district. Two of the buildings are still extant (P-42-041082 and P-42-041087) and two have been demolished (P-42-041065 and P-42-041081). Currently, P-42-041082 and P-42-041087 are not listed on the County of Santa Barbara Historic Landmarks List or Places of Merit. Four resources were found ineligible for listing to the NRHP, CRHR, and locally; one is no longer extant (P-42-041067) and three are still standing (P-42-041076, P-42-041085, and P-42-041086).

Air Cargo Area

The Air Cargo Area consists of 30 acres throughout the Santa Barbara Airport.

Known Cultural Resources Studies

The CHRIS records search and background research identified 21 cultural resources studies within the Air Cargo Area (**Appendix EC1**). The studies within this area have been conducted over the last 40 years, from 1983 to 2009. The studies within the Air Cargo Area consist of 15 Phase I archaeological studies, three construction monitoring reports, one extended Phase I study, one resource evaluation report, and one programmatic document.

Known Cultural Resources

The CHRIS records search and background research identified one cultural resource within the APE. The resource is listed in **Table 2-3** below and discussed further below the table.

Table 2-3: Known Cultural Resources – Air Cargo Area

Primary Number	Trinomial	Resource Type	Description	Recorder(s) and Year(s)	Eligibility Status	Extant
P-42-041057	-	Historic Building	Building No. 244/245, Lucas Engineering	1994 (Stone/ Triem)	6Z	Yes
Source: CCIC 2022 6Z: Found ineligible for NR, CR or Local designation through survey evaluation.						

Built Environment Resources

The records search identified one built environment resource within the project area, P-42-041057, recorded and evaluated by Mitch Stone and Judith Triem of San Buenaventura Research Associates in 1994 as part of the Historic Resources Report, Santa Barbara Municipal Airport (Stone and Triem 1994). The building was recommended ineligible for listing to the NRHP, CRHR, and locally, and the building is still extant.

Additional Information

Within the Air Cargo Area, one building over 45 years of age was identified as not previously recorded and evaluated. Addressed as 495 South Fairview Avenue, the one-story commercial building sits just northeast of P-42-041057 and was constructed circa 1969 (UCSB 2022).

Support and Non-Aero Area

The Support and Non-Aero Area consists of 21 acres throughout the Santa Barbara Airport.

Known Cultural Resources Studies

The CHRIS records search and background research identified 20 cultural resources studies within the Support and Non-Aero Area (**Appendix EC1**). The studies within this area have been conducted over the last 40 years, from 1983 to 2013. The studies within the Support and Non-Aero Area consist of 11 Phase I archaeological studies, three construction monitoring reports, one resource evaluation report, one Phase II testing program report, and four programmatic documents.

Known Cultural Resources

The CHRIS records search and background research identified 12 built environment cultural resources within the Support and Non-Aero Area. Resources recorded in the area are listed in **Table 2-4** below. A discussion of each resource is included below the table.

Table 2-4: Known Cultural Resources – Support and Non-Aero Area

Primary Number	Trinomial	Resource Type	Description	Recorder(s) and Year(s)	Eligibility Status	Extant
P-42-003817	CA-SBA-3817	Historic Structure	Firestone Ditch	2003 (Bass & Farmer)	Unevaluated	Yes
P-42-041031	-	Historic Building	Building No. 305, Squadron Headquarters, Dynasen Inc.	1994 (Stone & Triem)	6Z	Yes
P-42-041032	-	Historic Building	Building No. 310, US Forest Service	1994 (Stone & Triem)	6Z	No
P-42-041034	-	Historic Building	Building No. 314, Storehouse Building, Atlas Fence Co.	1994 (Stone & Triem)	6Z	Yes
P-42-041035	-	Historic Building	HP39	1994 (Stone & Triem)	6Z	Yes
P-42-041074	-	Historic Building	HP06	1994 (Stone & Triem)	6Z	Yes
P-42-041075	-	Historic Building	HP39	1994 (Stone & Triem)	6Z	Yes
P-42-041078	-	Historic Building	HP39	1994 (Stone & Triem)	6Z	Yes
P-42-041083	-	Historic Building	HP06	1994 (Stone & Triem)	6Z	Yes
P-42-041084	-	Historic Building	HP06	1994 (Stone & Triem)	6Z	Yes
P-42-041088	-	Historic Building	HP39	1994 (Stone & Triem)	6Z	Yes
P-42-041089	-	Historic Building	HP39	1994 (Stone & Triem)	6Z	Yes
Source: CCIC 2022 6Z: Found ineligible for NR, CR or Local designation through survey evaluation.						

Built Environment Resources

Within the Support and Non-Aero Area, 12 previously recorded built environment resources were identified through the records search. Eleven of the resources were recorded and evaluated by Mitch Stone and Judith Triem of San Buenaventura Research Associates in 1994 as part of the *Historic Resources Report,* *Santa Barbara Municipal Airport* (Stone and Triem 1994). These 11 resources, historic buildings formally and/or currently associated with the airport, were recommended ineligible for listing to the NRHP and CRHR. Ten of these 11 resources are still extant while one has been demolished (P-42-041032).

The Firestone Ditch (P-42-003817), which runs between Hollister Avenue and Firestone Road, was recorded in 2003 by B. Brass and R. Farmer of URS Corporation but not formally evaluated (Brass and Farmer 2003).

Airfield and Airspace Area

The Airfield and Airspace Area consists of 369 acres throughout the Santa Barbara Airport.

Known Cultural Resources Studies

The CHRIS records search and background research identified 47 cultural resources studies within the Airfield and Airspace Area (**Appendix EC1**). The studies within this area have been conducted over the last 40 years, from 1979 to 2017. The studies within the Airfield and Airspace Area consist of 25 Phase I archaeological studies, seven construction monitoring reports, four extended Phase I studies, three resource evaluation reports, three Phase II testing program reports, one Phase III testing program report, and four programmatic documents.

Known Cultural Resources

The CHRIS records search and background research identified six cultural resources within the Airfield and Airspace Area. Resources recorded in the APE are listed in **Table 2-5** below. A discussion of each resource is included below the table.

Table 2-5: Known Cultural Resources – Airfield and Airspace Area

Primary Number	Trinomial	Resource Type	Description	Recorder(s) and Year(s)	Eligibility Status	Extant
P-42-002579	CA-SBA-2579	Prehistoric Site	Lithic and shell scatter	1993 (Dugger)	Unevaluated	N/A
P-42-003742	CA-SBA-3742	Historic-Period Site	Household debris and burned fence posts	2004 (Gerber)	Unevaluated	No
P-42-003839	CA-SBA-3839	Prehistoric Site	Shell scatter and burials	2005 (Hacking, et.al); 2007 (Lebow)	6Y, due to secondary deposit	N/A
P-42-003861	CA-SBA-3861	Prehistoric Site	Shell scatter	2006 (Slowik)	Unevaluated	N/A
P-42-038755	–	Historic-Period Isolate	Glass jar	2006 (Slowik)	Unevaluated	N/A

Primary Number	Trinomial	Resource Type	Description	Recorder(s) and Year(s)	Eligibility Status	Extant
P-42-038756	–	Prehistoric Isolate	Franciscan chert flake	2006 (Slowik)	Unevaluated	N/A
Source: CCIC 2022 6Y: Determined ineligible for NRHP by consensus through Section 106 process – Not evaluated for CRHR or Local Listing						

Archaeological Resources

P-42-002579

In 1993, Dugger identified and recorded a low-density lithic scatter with shell and fish bone during subsurface testing. Lithic materials included Monterey chert flakes while shell materials consisted of *Chione* and *Protothaca*, and fish bones included that of sharks, rays, and porpoise. Dugger (1993) did identify disturbance to resource P-42-002579 due to airport and road construction. Dugger additionally inferred that the resource was likely a redeposit; however, Dugger did recommend further examination in daylight as project testing was conducted during the night. No further examination was provided for the resource. The resource has not been evaluated for listing on the NRHP or CRHR.

P-42-003742

Identified via aerial imagery and later backhoe trench testing, Gerber of Applied EarthWorks, Inc. (AE) recorded resource P-42-003742 as historic-period building remains and associated debris. Materials identified included burnt fence wood and laths, brick, China dish fragments, rusted metal, and a screw top bottle neck. Gerber (2004) stated that the resource lay under approximately 42 to 48 inches of artificial fill. Previous residents of the former residence are unknown as the land was part of a large holding by George Williams. No other information was provided for the resource. The resource has not been evaluated for listing on the NRHP or CRHR.

P-42-003839

Hacking et al. (2005) identified resource P-42-003839 during a Phase I archaeological survey and described the resource as shell beads, a stone bowl mortar, ornaments, shell fragments, lithic debitage, and human skeletal remains. The resource is eroded and highly disturbed due to a seasonal wetland and dense vegetation obscured the ground surface. Later, testing by AE in 2007 recovered human bone fragments from at least six individuals, associated mortuary materials, and groundstone artifacts (Lebow 2007). Given the level of disturbance and identification of the resource as a secondary deposit, Lebow (2007) stated that the resource lacked integrity and therefore was not eligible for listing on the NRHP. Although recommended ineligible for listing, Lebow indicated that excavations should be avoided within the area and recommended monitoring during topographic smoothing, the use of rubber-tired equipment within the boundaries, and the continued maintenance of the area with a rubber-tired mower to keep vegetation down.

P-42-003861

Slowick (2006a) identified resource P-42-003861 during construction monitoring and identified the resource as a low-density shell scatter. The shell species within the resource are identified as *Chione*, *Mytilus californianus*, and *Tivela*. Based on lack of stratigraphy in the cut area where the resource was identified, Slowick (2006) suggested that the resource was a secondary deposit from a nearby resource within the Santa Barbara Airport boundaries. No other information was provided for the resource. The resource has not been evaluated for listing on the NRHP or CRHR.

P-42-038755

Slowick (2006b) identified resource P-42-038755 during construction monitoring as an isolated glass jar. The jar is complete with a Hazel Atlas makers mark dating from 1923 to 1964. The jar measures 9.3 centimeters by 3.8 centimeters. As the resource is considered an isolated artifact, it is unlikely that it would be eligible for listing on the NRHP.

P-42-038756

Resource P-42-038756 consists of an isolated green Franciscan chert flake fragment identified by Slowick during construction monitoring in 2006c. As the resource is considered an isolated artifact, it is unlikely that it would be eligible for listing on the NRHP.

Cultural Resources sensitivity

Twelve archaeological sites are located within the Study Area that encompasses the Environmental Inventory, Air Cargo, Support and Non-aero, and Airfield and Airspace areas; one is listed on the NRHP (P-42-000052), one has been recommended as not eligible for inclusion on the NRHP (P-42-003839), and 10 have not been evaluated (P-42-000049, P-42-001694, P-42-003860, P-42-003862, P-42-038754, P-42-002579, P-42-003742, P-42-003861, P-42-038755, and P-42-038756). Twenty-three built environment resources, including a segment of the Firestone Ditch, are located within the Study Area; two have been recommended eligible for NRHP as an individual property through survey evaluation (P-42-041023 and P-42-041024), four have been recommended eligible for local listing (P-42-041065, P-42-041081, P-42-041082, and P-42-041087), 16 of the resources have been recommended ineligible for listing to the NRHP (P-42-041031, P-42-041032, P-42-041034, P-42-041035, P-42-041057, P-42-041067, P-42-041074, P-42-041075, P-42-041076, P-42-041078, P-42-041083, P-42-041084, P-42-041085, P-42-041086, P-42-041088, and P-42-041089), and one has not been evaluated (P-42-003817). One other built environment resource that is of historical age (45 years) but has not been formally recorded or evaluated were identified within the Study Area during review of aerial imagery.

Although the Study Area is not mapped within any of the City's six cultural resource sensitivity areas, the Environmental Inventory and Airfield and Airspace areas have an increased sensitivity for archaeological resources based on the results of the CHRIS records search.

The *City of Santa Barbara Master Environmental Assessment (MEA) - Guidelines for Archaeological Resources and Historic Structures and Sites* states preservation in place and avoidance are the preferred methods to mitigate effects on archaeological resources and, consequently, project redesign to avoid potential effects should be attempted whenever feasible. For proposed projects that involve suspected, but not necessarily confirmed, subsurface archaeological resources, the standard mitigation is monitoring of all ground disturbing activities by a qualified archaeologist. Damage or destruction of archaeological resources may be mitigated by implementation of a Phase 3 Data Recovery Program.

Two built environment resources have been recommended eligible for NRHP as an individual property through survey evaluation (P-42-041023 and P-42-041024) and could be potential constraints to future development within the Environmental Inventory area.

If a proposed project includes alteration or demolition of a known historic resource or resource over 50 years old, a Historic Structures/Sites Report should be prepared in accordance with Section 2.5 *Project Impact Evaluation Procedures* of the MEA. This will include field survey to identify on-site resources, preparation of a Historic Structures/Sites Report, summary of impacts, and recommendation of potential mitigation measures in accordance with those summarized in the MEA.

Limitations, Assumptions, and Use Reliance

This Cultural Resources Inventory was conducted in accordance with standard, accepted cultural resources practices conducted at this time and in this geographic area. The Cultural Resources Inventory is limited by the scope of work performed. The findings presented in this report are based on findings derived from the CHRIS CCIC records search, and specified historical and literature sources. Although Rincon assumes the data sources are reasonably reliable, Rincon cannot and does not guarantee the authenticity or reliability of the data sources it has used. Additionally, pursuant to our contract, the data sources reviewed included only those that are practically reviewable without the need for additional research and analysis.

Appendix C: Geotechnical Assessment

May 18, 2022

File No.: 300938-010

Mr. Bob Thayne, PE
Civil Engineer, Water
Mead & Hunt
9600 NE Cascades Parkway #100
Portland, OR 97220

PROJECT: SANTA BARBARA MUNICIPAL AIRPORT (SBP)
DRAINAGE MASTER PLAN
500 JAMES FOWLER ROAD
SANTA BARBARA, CALIFORNIA

SUBJECT: Geotechnical Memorandum – Drainage Master Plan

REF:

1) Soils Engineering Report, Santa Barbara Airport, Rehabilitation of Taxiways C, H, and J, Santa Barbara, California, by Earth Systems Pacific, Doc. No. 1207-089, dated July 16, 2012
2) Geotechnical Engineering Report, Santa Barbara Municipal Airport, Rehabilitation of Runway 15R-33L, Santa Barbara, California, by Earth Systems Pacific, Doc. No. 1306-028.SER, dated June 7, 2013
3) Geotechnical Information Summary Report, Santa Barbara Airport, Overlay Runway 7-25, Santa Barbara, California, by Earth Systems Pacific, Doc. No. 1702-114.SER, dated February 22, 2017
4) Geotechnical Engineering Report, Santa Barbara Airport, Hangar Apron and Taxiway Pavement, Santa Barbara, California, by Earth Systems Pacific, Doc. No. 1801-083.SER, dated January 25, 2018

Dear Mr. Thayne:

We are pleased to present this geotechnical memorandum and the attached figures to summarize the subsurface information gathered by this firm in previous explorations performed at the project site. Previous explorations used for this report are referenced above.

1.0 INTRODUCTION AND SCOPE OF SERVICES

Based upon our correspondence, we understand that geotechnical support is requested to review prior field investigations and laboratory testing, provide an overview of the project site including regional geology, drainage infiltration potential and limitations, probable groundwater depths, and soil erosion potential, and provide general considerations for construction. This geotechnical information summary report has been completed for the Santa Barbara Municipal Airport (SBA).

The scope of services as requested by the client included literature review of previously developed information by our firm. It is our intent that this report be used exclusively by the client in the preparation of plans and specifications. Application beyond this intent is strictly at the user's risk. As there may be geotechnical issues yet to be resolved, the geotechnical engineer should be retained to provide consultation as the project progresses, to assist in verifying that pertinent geotechnical issues have been addressed, and to aid in conformance with the intent of this report.

2.0 PREVIOUS FIELD INVESTIGATIONS AND LABORATORY TESTING

We reviewed previous geotechnical reports prepared by this firm dating back to 2012 and various field investigations dating back to 1989 for this memo. Field logs and laboratory test results are provided in the geotechnical reports referenced above. Beneath the surface and pavements, the previous explorations generally encountered fill and alluvium and were described as silty sand, clayey sand, poorly graded sand, well graded sand, and sandy lean clay. Varying amounts of gravel were also noted.

3.0 REGIONAL GEOLOGY

The site is located on the Santa Barbara Coastal Plain which forms the distil part of the southern flank of the Santa Ynez Mountains which are part of the transverse ranges geomorphic province of California (CGS, 2002). The Santa Ynez Mountains are a variably deformed sequence of marine and non-marine sedimentary rocks and deposits that range in age from Jurassic to present (Minor et al, 2007). The Santa Barbara Coastal Plain was formed by the deposition of alluvial sediments transported by local rivers and streams from the Santa Ynez mountains as tectonic forces thrust the mountains upwards along a complex system of faults and folds beginning in the Pliocene epoch (Dibblee, 1966).

The Santa Barbara Municipal Airport is constructed on an extensive mat of artificial fill which overlies estuarine deposits of Holocene age. The estuarine deposits, associated with Goleta Slough, are typically organic rich clay and silt with subordinate sand deposited in a peritidal environment (Minor et al, 2007). The estuarine deposits likely overly alluvial and colluvial deposits that formed a piedmont fan prior to the most recent transgression (rise in sea level).

4.0 DRAINAGE INFILTRATION POTENTIAL AND LIMITATIONS

Based on the variable subsurface conditions encountered during the previous field investigations, the soil can generally be classified as Hydrologic Group C, described as soils with "moderately high runoff potential when thoroughly wet. Water transmission through the soil is somewhat restricted. Group C soils typically have between 20 percent and 40 percent clay and less than 50 percent sand, and have loam, silty loam, sandy clay loam, clay loam, and silty clay loam textures." (USDA National Engineering Handbook, 2009).

As subsurface conditions are likely variable, this information should be used for planning purposes only. Site-specific infiltration testing should be performed as needed prior to construction. Subsurface conditions including hydrologic group classification should be further evaluated during a project- specific design level geotechnical investigation.

5.0 GROUNDWATER

Groundwater was encountered in several borings previously performed within the airport vicinity. In general, the soil borings performed at the Rehabilitation of Taxiways C, H, and J project site, encountered groundwater at depths ranging from about 5.0 to 8.5 feet below site grades in May 2012 (Earth Systems Pacific, 2012). Soil borings performed at the Rehabilitation of Runway 15R-33L project site, located in the northern and western portion of the property, encountered groundwater at depths ranging from about 7.0 to 9.0 feet below site grades in April 2013 (Earth Systems Pacific, 2013). Soil borings performed at the Overlay Runway 7-25 project site, located in the western and central portion of the property, encountered groundwater at depths ranging from about 7.5 to 8.5 feet in May 2012 and about 3.5 to 8.5 feet in June 1992 (Earth Systems Pacific, 2017). Soil borings performed at the Hangar Apron and Taxiway Pavement project, located in the northeastern portion of the property, encountered groundwater at depths ranging from about 6.0 to 9.0 feet below site grades in December 2017 (Earth Systems Pacific, 2018).

From the above information, depth to groundwater varies across the airport and generally may range from depths of about 3.5 to 9.0 feet below current site grades at the locations of our previous explorations.

6.0 SOIL EROSION POTENTIAL

The site soils are considered to be highly erodible. It is essential that all surface drainage be controlled and directed to appropriate discharge points, and that surface soils, particularly those disturbed during construction, are stabilized by vegetation or other means during and following construction. However, it should be noted airport staff have noted ponded areas in taxiway after rains.

7.0 GENERAL CONSTRUCTION CONSIDERATIONS

1. Due to the potential shallow groundwater seasonally, grading should consider the potential for soft/wet soils at shallow depths. Further, if basins are created to encourage infiltration and increase storage, these basins may create isolated groundwater mounding due to the removal of overburden pressures.

2. With the reported ponded water at taxiways during heavy rain events, stormwater infiltration during and immediately following rain events may be less than typical for Hydrologic Soil Group C.

3. Due to variation in the groundwater elevation floatation of piping should be considered. Further, the existing improved areas have been compacted and, in some locations, treated to increase structural support. Stormwater infiltration in these areas will also be reduced in comparison to unimproved areas.

4. The conclusions contained in this memo are based on a limited number of borings and rely on continuity of the subsurface conditions encountered.

8.0 CLOSURE

Our intent was to perform the investigation/file review in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing in the locality of this project and under similar conditions. No representation, warranty, or guarantee is either expressed or implied.

This report is intended for the exclusive use by the client as discussed in the "Scope of Services" section. Application beyond the stated intent is strictly at the user's risk. This report is valid for conditions as they exist at this time for the type of project described herein. The conclusions and recommendations contained in this report could be rendered invalid, either in whole or in part, due to changes in building codes, FAA regulations, standards of geotechnical or construction practice, changes in physical conditions, or the broadening of knowledge.

If changes with respect to development type or location become necessary, if items not addressed in this report are incorporated into plans, or if any of the assumptions used in the preparation of this report are not correct, this firm shall be notified for modifications to this report. Any items not specifically addressed in this report should comply with the FAA, the CBC and/or the requirements of the governing jurisdiction.

If you have any questions or require additional information, please contact me at your convenience.

Sincerely,

Earth Systems Pacific

REGISTERED PROFESSIONAL ENGINEER
ROBERT W. DOWN
No. 70206
CIVIL
STATE OF CALIFORNIA

Robert Down, PE
Principal Engineer

Sydney Johnson
Project Manager

Attachments: Site Vicinity and Exploration Location Maps (4 pages)

Doc. No.: 2305-061.LTR

NOT TO SCALE

BASE MAP PROVIDED BY: Google Earth (2023)

Earth Systems Pacific
4378 Old Santa Fe Road, San Luis Obispo, CA 93401
www.earthsystems.com
(805) 544-3276 • Fax (805) 544-1786

SITE VICINITY MAP
Santa Barbara Municipal Airport Drainage Master Plan
500 James Fowler Road
Santa Barbara, California

Date
May 2023

Project No.
300938-010

Figure 1

300939-010 SBA Drainage 050323maps.dwg

LEGEND

- B1 Taxiway C, J, and J Boring Location (Approx.) (ESP, 2012)
- A Runway 15R, 33L Boring Location (Approx.) (ESP, 2013)
- 16 Runway 7-25 Boring Location (Approx.) (ESP, 2012)
- 3 × Hangar Apron and Taxiway Boring Location (Approx.) (ESP, 2018)

BASE MAP PROVIDED BY: Google Earth (2023)

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EXPLORATION LOCATION MAP

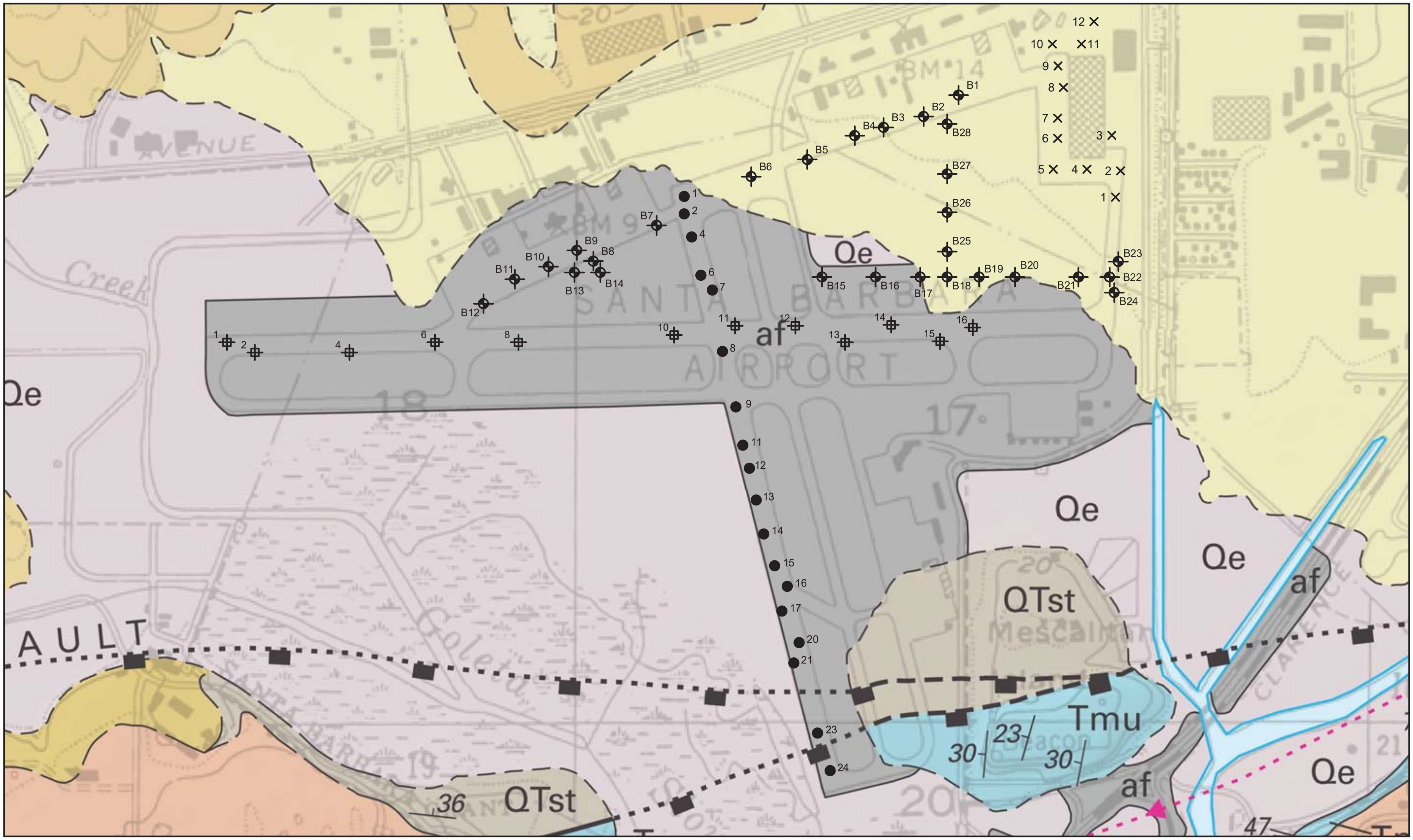
Santa Barbara Municipal Airport Drainage Master Plan
500 James Fowler Road
Santa Barbara, California

Date
May 2023

Project No.
300938-010

Figure 2

300939-010 SBA Drainage 050323maps.dwg



LEGEND

B1 Taxiway C, J, and J Boring Location (Approx.) (ESP, 2012)

A Runway 15R, 33L Boring Location (Approx.) (ESP, 2013)

16 Runway 7-25 Boring Location (Approx.) (ESP, 2012)

3 Hangar Apron and Taxiway Boring Location (Approx.) (ESP, 2018)

N

NOT TO SCALE

BASE MAP PROVIDED BY: GEOLOGIC MAP OF THE SANTA BARBARA COASTAL PLAIN AREA, SANTA BARBARA COUNTY, CALIFORNIA (2009)

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4378 Old Santa Fe Road, San Luis Obispo, CA 93401
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EXPLORATION LOCATION MAP

Santa Barbara Municipal Airport Drainage Master Plan
500 James Fowler Road
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Date
May 2023

Project No.
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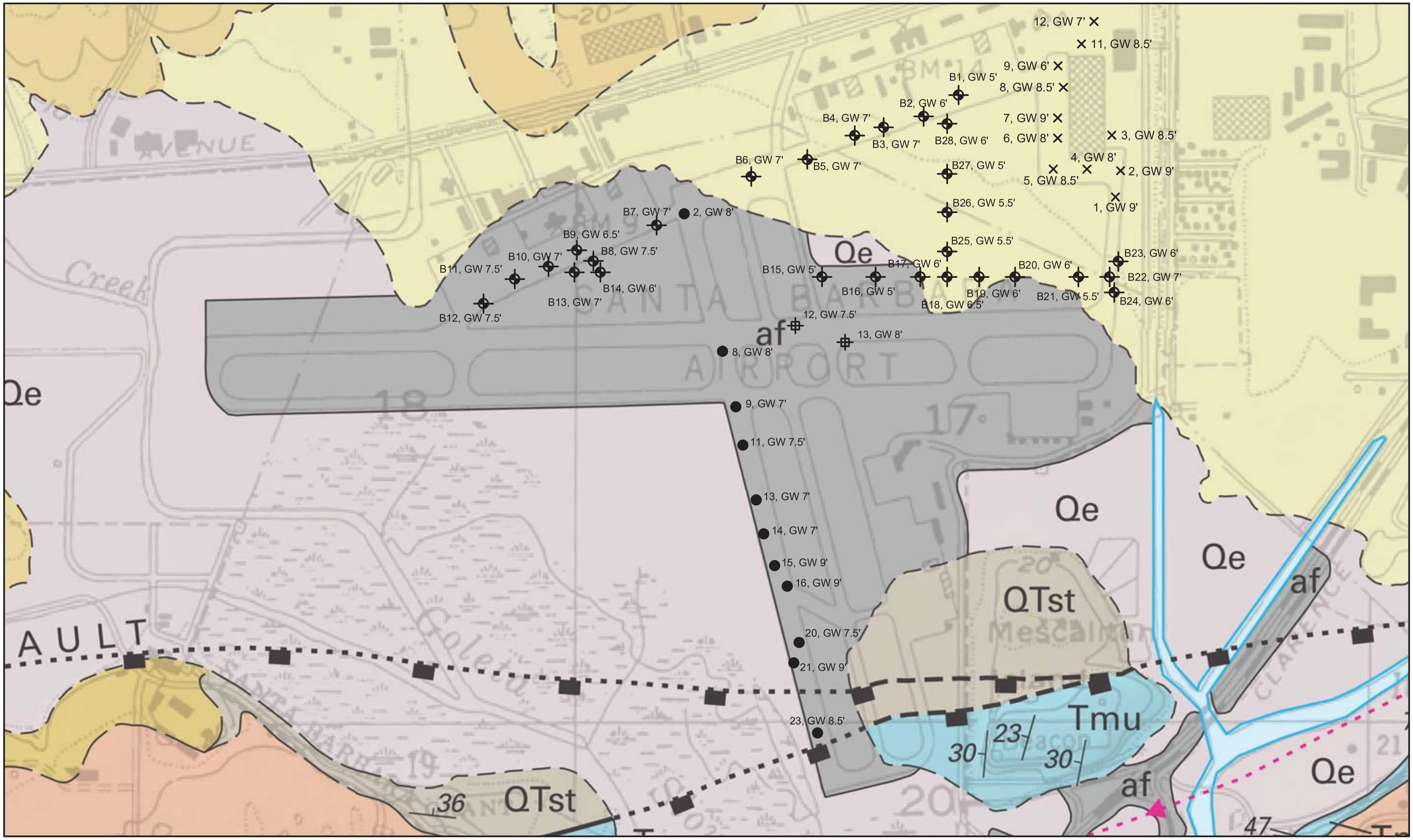
Figure 3

300939-010 SBA Drainage 050323maps.dwg



LEGEND

- B1 Taxiway C, J, and J Boring Location (Approx.) (ESP, 2012)
- A Runway 15R, 33L Boring Location (Approx.) (ESP, 2013)
- 16 Runway 7-25 Boring Location (Approx.) (ESP, 2012)
- 3 × Hangar Apron and Taxiway Boring Location (Approx.) (ESP, 2018)

NOT TO SCALE

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EXPLORATION LOCATION MAP

Santa Barbara Municipal Airport Drainage Master Plan
500 James Fowler Road
Santa Barbara, California

Date
May 2023

Project No.
300938-010

Figure 4

300939-010 SBA Drainage 050323maps.dwg

Appendix D: Existing Conditions Model Inputs

Model: Existing Conditions

Conveyance Links										Results		
										Free Discharge Conditions	5-Year Water Level Time Series	10-Year Water Level Time Series
Name	Drainage Area	Length (feet)	Shape	Diameter (	Roughness	Upstream Invert Elevation (feet)	Downstream Invert Elevation (feet)	Conduit Slope	Design Full Flow (cfs)	Max Flow (cfs)	Max Flow (cfs)	Max Flow (cfs)
Drainage Area 1												
P_DI-W07-024	1	403	Circular	2	0.013	4.95	4.228	0.179	9.575	15.599	13.273	13.669
P_DI-X07-028	1	179	Circular	1.25	0.013	7.35	6.86	0.274	3.38	4.728	4.765	4.725
P_DI-X07-029	1	122	Circular	1.25	0.013	7.43	7.25	0.148	2.481	3.912	3.908	3.884
P_DI-X07-28.5	1	265	Circular	1.25	0.013	7.25	6.86	0.147	2.478	3.909	3.905	3.882
P_W07-506	1	307	Circular	1.5	0.013	5.274	4.95	0.106	3.412	3.862	2.582	1.025
P_X07-025	1	498	Circular	1.5	0.013	5.17	4.95	0.044	2.208	5.356	2.036	1.174
P_X07-026	1	496	Circular	1.5	0.013	5.84	5.17	0.135	3.861	4.108	2.534	2.346
P_X07-027	1	581	Circular	1.5	0.013	6.86	5.84	0.176	4.401	4.056	3.906	3.806
Drainage Area 2												
P_DI-X06-509	2	50	Circular	1	0.013	9.99	10	-0.02	0.05	0.507	0.612	0.67
P_HW-X06	2	47	Circular	2	0.013	8.23	8	0.489	15.825	4.986	4.434	5.703
P_HW-X06-502	2	50	Circular	1	0.013	8.98	8.7	0.56	2.666	5.003	3.368	4.457
Drainage Area 5												
HW-Y06-410	5	51	Circular	2	0.013	10.78	10.51	0.529	16.46	7.627	7.925	10.086
P_CB-Y06-100	5	67	Circular	0.67	0.01	11.95	10.54	2.104	2.309	0.827	0.832	0.914
P_DI-Y06-060	5	405	Circular	1.5	0.013	8.64	7.96	0.168	3.997	4.415	-3.506	-3.943
P_DI-Y06-104	5	291	Circular	2.5	0.013	7.85	7	0	22.168	9.65	8.544	9.54
P_DI-Y06-105	5	54	Circular	1.5	0.013	7.96	7.92	0.074	2.859	-5.471	-5.699	-6.232
P_DI-Y06-121	5	174	Circular	1.5	0.013	9.98	8.64	0.77	9.218	7.316	7.206	7.232
P_DI-Y06-313-1	5	143	Circular	2	0.013	9.65	7.96	1.182	22.836	9.826	9.858	11.101
P_DI-Y06-314	5	223	Circular	0.67	0.01	12.45	11.95	0.224	0.754	0.833	0.84	0.917
P_DI-Y06-317	5	110	Circular	1	0.013	11.14	7.92	2.927	6.096	4.75	0	0
P_DI-Y06-332	5	435	Circular	1.5	0.013	12.09	11.18	0.209	4.804	6.195	6.144	6.022
P_DI-Y06-739	5	119	Circular	1.5	0.013	7.89	7.85	0.034	1.926	5.985	2.78	3.94
P_DI-Y07-?71	5	306	Circular	2.5	0.013	8.848	6.01	0.927	39.501	3.777	3.782	4.748
P_DI-Y07-059	5	350	Circular	1.75	0.013	6.54	5.956	0.167	6.472	-3.227	3.084	3.823
P_DI-Y07-096	5	534	Circular	2	0.013	5.885	5.692	0.036	4.301	5.599	5.966	5.965
P_DI-Y07-097	5	454	Circular	2	0.013	5.692	5.31	0.084	6.562	6.003	6.203	6.295
P_DI-Y07-101	5	326	Circular	2.5	0.013	6.04	5.42	0.19	17.888	25.901	11.381	12.347
P_DI-Y07-102	5	331	Circular	2.5	0.013	6.31	6.04	0.082	11.715	22.436	9.63	10.637
P_DI-Y07-X	5	100	Circular	1	0.013	8.5	8	0.5	2.339	4.554	3.727	3.862
P_DI-Z06-408	5	193	Circular	0.67	0.01	11.55	10.54	0.523	1.152	1.314	1.243	1.324
P_DI-Z07-098	5	396	Circular	2	0.024	5.31	6.35	-0.263	6.28	8.33	8.174	7.339
P_DI-Z07-100	5	246	Circular	2.5	0.013	5.42	5.41	0.004	2.615	35.263	20.039	19.51
P_DI-Z07-453	5	274	Circular	2	0.024	6.35	5.41	0.453	7.177	9.723	8.408	7.552
P_HW-Y06-022	5	167	Circular	2	0.013	10.34	9.65	0.413	14.541	10.912	10.706	11.788
P_HW-Y06-023	5	35	Circular	1.5	0.013	11.22	10.56	1.886	14.425	3.862	0	0
P_HW-Y06-419	5	42.5	Circular	2	0.013	11.31	10.96	0.824	20.529	17.485	17.481	22.108
P_HW-Z06-462	5	154	Circular	2.5	0.013	5.41	2.64	0	55.01	46.108	23.052	23.888
P_N-Y06-594	5	71	Circular	2.5	0.013	7	6.96	0	9.736	24.238	23.682	25.747
P_N-Y06-598	5	177	Circular	1.5	0.013	7.92	7.89	0.034	1.368	5.645	2.675	-2.683

Conveyance Links										Results		
										Free Discharge Conditions	5-Year Water Level Time Series	10-Year Water Level Time Series
Name	Drainage Area	Length (feet)	Shape	Diameter (	Roughness	Upstream Invert Elevation (feet)	Downstream Invert Elevation (feet)	Conduit Slope	Design Full Flow (cfs)	Max Flow (cfs)	Max Flow (cfs)	Max Flow (cfs)
P_N-Y06-600	5	325	Circular	2	0.013	8.5	7.38	0.345	13.28	7.301	7.19	6.997
P_N-Z06-336	5	475	Circular	1	0.013	14.21	11.22	0.629	2.827	2.743	2.706	2.775
P_Y06-313	5	373	Circular	2	0.013	9.65	7	0.71	19.068	7.771	9.858	11.101
P_Y07-095	5	452	Circular	1.5	0.013	6.54	5.827	0.158	4.172	2.715	4.057	3.756
P_Y07-103	5	350	Circular	2.5	0.013	6.96	6.31	0.186	17.676	17.972	13.073	12.41
Drainage Area 6												
P_DI-Y07-087	6	328	Circular	1.5	0.013	7.56	6.6	0.293	5.683	2.684	3.888	4.857
P_DI-Y07-089	6	401	Circular	1.75	0.013	5.728	5.483	0.037	3.917	7.19	8.684	8.962
P_DI-Y07-091	6	205	Circular	1.5	0.013	5.91	5.49	0.205	4.755	4.092	4.082	4.51
P_DI-Y07-092	6	300	Circular	1.75	0.013	5.24	4.98	0.087	4.665	10.414	9.912	11.84
P_DI-Y07-092A	6	53	Circular	1.5	0.013	5.483	5.483	0	0.332	5.764	4.612	6.216
P_DI-Z07-093	6	334	Circular	2.5	0.013	4.98	5.19	-0.063	10.285	13.985	23.139	30.63
P_DI-Z07-094	6	192	Circular	2.5	0.013	5.19	2.41	1.448	49.356	24.039	25.444	31.18
P_JS-Y07-090	6	300	Circular	1.75	0.013	5.483	5.24	0.081	4.51	8.403	9.678	11.152
P_Y07-089	6	400	Circular	1.5	0.013	6.6	5.728	0.218	4.905	4.124	4.793	4.747
Drainage Area 9												
P_DI-Y07-615	9B	78.6	Circular	1.33	0.012	5.88	4.93	1.209	9.078	2.128	2.111	5.504
P_DI-Y07-616	9B	65	Circular	1.33	0.012	5.562	4.6	1.48	10.045	5.001	6.486	5.802
P_DI-Y08-?65	9B	253	Circular	1.33	0.012	7.5	5.325	0.86	7.656	1.011	-2.048	1.191
P_DI-Y08-?67	9B	182	Circular	1	0.013	7	6.3	0.549	2.21	2.424	1.95	1.834
P_DI-Y08-?69	9B	300	Circular	1	0.013	6.38	6.3	0.027	0.582	2.161	1.321	1.151
P_DI-Y08-?71	9B	33	Circular	2	0.013	5.826	5.82	-0.618	3.05	5.7	5.404	9.231
P_DI-Y08-075	9B	293	Circular	2	0.013	5.82	5.76	0.024	3.237	9.39	4.745	6.609
P_DI-Y08-076	9B	350	Circular	2	0.013	5.96	5.49	0	8.29	13.666	6.238	8.679
P_DI-Y08-079	9B	300	Circular	2.5	0.013	5.49	5.2	0.097	12.753	17.007	10.213	10.919
P_DI-Y08-082	9B	650	Circular	2.5	0.013	5.2	2.979	0.342	23.976	24.192	13.52	13.983
P_DIY08-618	9B	62	Circular	1.33	0.012	5.276	4.49	1.268	9.297	9.751	6.528	7.007
P_DI-Y08-618-2	9B	220	Circular	0.5	0.013	6.624	6.441	0.083	0.162	0.424	6.528	7.007
P_DI-Y08-620	9B	68	Circular	1.33	0.012	5.325	4.12	1.772	10.992	9.111	6.856	7.154
P_DI-Y08-620-2	9B	220	Circular	0.5	0.013	6.355	6.13	0.102	0.179	-0.424	6.856	7.154
P_JS-Y08-069	9B	271	Circular	1	0.013	6.3	6.12	0.165	0.918	3.276	2.646	2.395
P_DI-Y07-?32	9C	176.2	Circular	2	0.012	8.02	7	0.579	18.647	4.878	0	0
P_DI-Y07-065	9c	173.5	Circular	2.5	0.012	6.97	4.93	1.176	48.183	6.055	4.741	5.924
P_DI-Y07-066	9C	80	Circular	1.33	0.012	7.05	4.93	2.65	13.442	6.689	4.702	4.546
P_DI-Y07-068	9C	77	Circular	1.33	0.012	6.63	4.49	2.627	13.765	7.348	3.754	5.02
P_DI-Y07-617	9C	81	Circular	1.33	0.012	7.05	4.6	3.025	14.36	4.065	4.255	5.065
P_DI-Y08-073	9C	71	Circular	1.33	0.012	6.66	4.12	3.577	15.618	5.646	-3.826	6.244
P_DI-Y08-074	9C	63	Circular	1.33	0.012	6.44	4.18	3.587	15.639	1.898	5.626	4.358
P_DI-Y08-077	9C	70	Circular	1.33	0.012	6.55	4.22	3.329	15.064	2.223	5.838	5.067
P_DI-Y08-080	9C	59	Circular	1.33	0.012	5.89	4.05	0	14.582	2.088	5.168	5.566
P_DI-Y08-081	9C	50	Circular	1.33	0.012	5.64	3.89	3.5	15.448	3.27	9.497	7.758
P_JS-Y07-?2	9C	143	Circular	2	0.012	7	6.97	0.021	3.55	5.543	4.782	5.957
P_JS-Y07-617	9C	214	Circular	2.5	0.012	4.6	4.49	0.051	10.074	11.034	8.185	7.776
P_JS-Y09-203	9C	33	Circular	1.5	0.013	5	4.42	1.758	13.926	3.492	3.212	3.293

Conveyance Links										Results		
										Free Discharge Conditions	5-Year Water Level Time Series	10-Year Water Level Time Series
Name	Drainage Area	Length (feet)	Shape	Diameter (	Roughness	Upstream Invert Elevation (feet)	Downstream Invert Elevation (feet)	Conduit Slope	Design Full Flow (cfs)	Max Flow (cfs)	Max Flow (cfs)	Max Flow (cfs)
P_MH-Y07-066	9C	217	Circular	2.5	0.012	4.93	4.6	0.152	17.328	7.59	5.374	5.784
P_MH-Y07-068	9C	350	Circular	2.67	0.012	4.49	4.12	0.106	17.218	17.502	9.202	10.798
P_MH-Y08-073	9C	361	Circular	2.67	0.012	4.12	4.18	-0.017	6.827	23.128	11.363	15.119
P_MH-Y08-074	9C	289	Circular	2.67	0.012	4.18	4.22	-0.014	6.23	24.082	13.532	15.336
P_MH-Y08-077	9C	350	Circular	3	0.012	4.22	4.05	0.049	15.925	25.207	14.305	17.929
P_MH-Y08-080	9C	301	Circular	3	0.012	4.05	3.89	0.053	16.659	27.054	15.98	22.129
P_MH-Y08-081	9C	657	Circular	3.5	0.012	3.89	2.979	0.139	40.586	30.02	18.155	27.741
Drainage Area 10												
P_DI-X07-035	10	173	Circular	1.25	0.013	5.42	4.04	0.798	5.769	4.997	3.213	3.115
P_DI-X07-041	10	571	Circular	3	0.013	4.59	4.04	0.096	20.7	34.589	29.468	32.886
P_DI-X07-045	10	148	Circular	1.5	0.013	6.98	5.99	0.669	8.591	7.395	6.189	5.591
P_DI-X07-046	10	217	Circular	1.5	0.013	5.99	4.92	0.493	7.376	6.318	4.529	4.356
P_DI-X07-046A	10	361	Circular	1.25	0.013	6.381	5.99	0.108	2.126	2.113	1.096	1.134
P_DI-X07-201	10	135	Circular	3.83	0.013	3.707	3.164	0.402	81.138	39.336	30.954	34.549
P_DI-Y06-048	10	311	Circular	2.5	0.013	5.47	5.21	0.084	11.86	14.135	12.747	14.151
P_DI-Y06-049	10	201	Circular	2.5	0.013	5.46	5.47	-0.005	2.893	13.498	12.032	13.243
P_DI-Y06-052	10	176	Circular	1.5	0.013	7.49	6.28	0.688	8.71	8.959	8.614	8.812
P_DI-Y06-200	10	220	Circular	2	0.013	7.38	6.28	0.5	15.996	13.153	13.081	14.583
P_DI-Y06-301	10	254	Circular	1.5	0.013	11.18	9.94	0.488	7.339	6.122	5.993	5.932
P_DI-Y06-303	10	363	Circular	1.5	0.013	13.02	12.09	0.256	5.317	6.033	6.015	5.925
P_DI-Y06-318	10	197	Circular	1.5	0.013	7.32	7.1	0	3.51	5.268	5.041	4.896
P_DI-Y06-319	10	300	Circular	1.5	0.013	8.04	7.32	0.24	5.146	5.428	5.379	5.264
P_DI-Y06-330	10	110	Circular	2	0.024	8.88	8.5	0.345	7.202	7.273	7.166	6.986
P_DI-Y06-331	10	156	Circular	1.5	0.024	9.94	8.88	0.679	4.69	7.26	7.156	6.981
P_DI-Y06-610	10	205	Circular	1	0.024	7.51	5.48	0.99	1.92	2.279	1.719	1.651
P_DI-Y07-?30	10	411	Circular	2	0.013	5.941	5.914	0.007	1.834	7.498	8.457	8.833
P_DI-Y07-?31	10	292	Circular	2	0.013	5.887	5.6	0.098	7.092	7.694	8.652	8.967
P_DI-Y07-044S	10	374	Circular	3	0.013	5.17	5.13	0.011	6.898	22.723	23.217	23.936
P_DI-Y07-047	10	393	Circular	2.5	0.013	5.21	5.17	0.01	4.138	14.638	13.142	14.332
P_DI-Y07-054	10	435	Circular	1.25	0.013	7.01	5.6	0.324	3.678	1.767	1.255	1.811
P_DI-Y07-055	10	374	Circular	2.5	0.013	5.6	5.17	0.115	13.908	12.884	10.911	11.491
P_N-X07-454	10	344	Circular	3	0.013	4.04	3.774	0.077	18.547	37.585	30.753	33.973
P_X07-042	10	384	Circular	3	0.013	4.92	4.59	0	19.553	27.757	25.461	27.276
P_Y06-050	10	300	Circular	2	0.013	5.88	5.46	0.14	8.465	8.525	8.375	9.227
P_Y06-051	10	300	Circular	2	0.013	6.28	5.88	0.133	8.261	7.58	6.495	6.982
P_Y06-053	10	121	Circular	1.5	0.013	7.94	7.49	0.372	6.406	5.916	5.424	5.18
P_Y06-145	10	150	Circular	1.5	0.013	7.1	6.74	0.24	5.146	3.757	3.769	3.805
P_Y06-211-1	10	138	Circular	1	0.024	9.03	7.94	0.79	1.715	1.402	1.278	1.237
P_Y06-211-2	10	138	Circular	1	0.024	9.03	7.94	0.79	1.715	1.402	1.278	1.237
P_Y07-043	10	301	Circular	3	0.013	5.13	4.92	0.07	17.617	23.18	23.598	24.423
P_Y07-058	10	321	Circular	1.5	0.013	6.74	5.942	0.249	5.237	7.266	8.02	8.025
Drainage Area 11												
P_DI-Y07-061	11	420	Circular	1.25	0.013	8.66	7.83	0.198	2.872	2.932	2.896	3.027
P_DI-Y07-131A	11	208	Circular	1.5	0.024	4.84	4.22	0.298	3.106	7.156	5.909	6.174

Conveyance Links										Results		
										Free Discharge Conditions	5-Year Water Level Time Series	10-Year Water Level Time Series
Name	Drainage Area	Length (feet)	Shape	Diameter (	Roughness	Upstream Invert Elevation (feet)	Downstream Invert Elevation (feet)	Conduit Slope	Design Full Flow (cfs)	Max Flow (cfs)	Max Flow (cfs)	Max Flow (cfs)
P_DI-Y07-131B	11	388	Circular	1.25	0.013	5.069	4.84	0.059	1.457	2.305	2.21	2.211
P_DI-Y08-130	11	504	Circular	1.5	0.013	6.29	5.88	0.081	2.996	2.493	2.95	3.136
P_DI-Y08-132	11	496	Circular	1	0.024	6.08	5.88	0.04	0.388	1.568	1.586	1.621
P_Y07-063	11	244	Circular	1.25	0.013	7.83	7.24	0.242	3.177	4.305	4.28	4.23
P_Y08-132	11	450	Circular	1	0.013	7.24	6.08	0.258	1.809	1.222	1.042	0.841
Drainage Area 12												
P_DI-X07-037	12	447	Circular	2	0.024	4.57	4.25	0.072	3.279	8.083	7.263	8.166
P_DI-X07-040	12	167	Circular	2	0.024	4.25	3.892	0.214	5.674	15.787	11.779	12.497
P_DI-Y07-039A	12	172	Circular	1.25	0.013	6.86	6.58	0.163	2.606	5.515	5.295	5.339
P_X07-036	12	316	Circular	1.25	0.013	6.05	4.57	0	4.421	3.675	3.714	4.22
P_Y07-038	12	289	Circular	1.25	0.013	6.07	4.57	0.519	4.321	3.496	3.428	3.521
P_Y07-039	12	300	Circular	1.25	0.013	6.58	6.07	0.17	2.663	2.405	2.516	2.639
Drainage Area 13												
P_DI-X07-032	13	262	Circular	2	0.013	4.9	4.33	0.218	9.798	15.175	11.731	12.279
P_DI-X07-202	13	122	Circular	2	0.013	4.33	4.017	0.257	10.64	18.07	12.126	12.702
P_X07-031	13	300	Circular	1.25	0.013	5.8	4.9	0.3	3.285	4.317	3.127	3.129
P_X07-033	13	300	Circular	1.25	0.013	5.33	4.9	0.143	2.271	4.167	2.754	2.855
P_X07-034	13	300	Circular	1.25	0.013	6.13	5.33	0.267	3.098	3.257	2.373	2.469
Drainage Area 14												
P_DI-W07-?2	14	366	Circular	2	0.013	5.652	5.331	0.088	6.7	11.364	5.08	9.98
P_DI-W07-504A	14	400	Circular	1.25	0.013	5.944	5.421	0.131	2.336	1.881	1.969	1.815
P_DI-W07-504A(2)	14	203	Circular	1.5	0.013	5.392	5.415	-0.011	1.118	2.967	2.928	2.763
P_DI-W07-504B	14	190	Circular	1.5	0.013	5.407	5.308	0.052	2.398	3.657	3.669	3.689
P_DI-W07-511	14	259	Circular	2	0.013	5.298	4.223	0.415	14.574	19.164	8.475	13.914
P_DI-X.1	14	264	Circular	1.25	0.013	5.879	5.69	0.072	1.728	4.744	1.699	2.759
P_W07-510	14	295	Circular	1.25	0.013	5.588	5.308	0.095	1.99	6.141	6.354	6.476
Drainage Area 17												
P_DI-Y07-131E	17	228	Circular	1.5	0.013	5.821	5.727	0.041	2.133	-4.491	-4.997	-5.526
P_DI-Y07-131F	17	212	Circular	1.5	0.013	5.726	5.54	0.088	2.889	4.909	4.621	4.935
P_DI-Y07-131G	17	159	Circular	1.5	0.013	5.54	5.47	0.044	2.047	5.256	4.776	5.095
P_DI-Y07-416	17	671	Circular	2	0.024	5.47	4.17	0.194	5.394	8.059	5.159	5.499
P_HW-Y08-415	17	190	Circular	2	0.013	6.83	4.01	1.484	25.592	7.668	7.675	10.134
P_Y07-131C	17	200	Circular	1.25	0.013	6.061	5.873	0.094	1.839	2.385	1.662	1.64
P_Y07-131D	17	300	Circular	1.25	0.013	5.845	5.826	0.006	0.514	3.216	3.079	3.341
Drainage Area 26												
P_DI-W07-?1	26	165	Circular	1.25	0.013	5.29	4.966	0.196	2.863	-1.559	-1.489	-2.108
P_DI-W07-507	26	89	Circular	2	0.013	4.966	5.965	-1.122	23.968	0	-7.345	-9.031
P_W07-509	26	300	Circular	1.25	0.013	6.4	5.67	0.243	3.187	1.08	1.089	1.099
P_WO7-508	26	300	Circular	1.25	0.013	5.641	4.966	0.225	3.064	1.467	0.603	-1.489
495 Fairview Hangars												
P_DI-Z06-134	495 FAIRVIEW	58	Circular	1	0.013	7.33	7.3	0.052	0.81	5.172	2.433	2.788
P_DI-Z06-135	495 FAIRVIEW	170	Circular	1	0.013	7.3	7.22	0.047	0.773	5.172	2.181	2.84
P_DI-Z06-343	495 FAIRVIEW	241	Circular	1	0.013	6.74	6.62	0.05	0.795	6.032	3.282	3.707
Northeast Corner												

Conveyance Links										Results		
										Free Discharge Conditions	5-Year Water Level Time Series	10-Year Water Level Time Series
Name	Drainage Area	Length (feet)	Shape	Diameter (	Roughness	Upstream Invert Elevation (feet)	Downstream Invert Elevation (feet)	Conduit Slope	Design Full Flow (cfs)	Max Flow (cfs)	Max Flow (cfs)	Max Flow (cfs)
P_CB-Z06-305	NE CORNER	56	Circular	1	0.013	12.022	11.933	0.159	1.42	2.838	2.451	2.897
Parking Areas												
P_DI-Y08-481	PARKING A	36	Circular	1	0.024	9.37	9.14	0.639	1.543	3.515	3.513	3.733
P_HW-Y08-483	PARKING A	33	Circular	1.5	0.013	9.25	9.16	0	5.486	3.513	3.511	3.727
P_HW-Y08-485	PARKING A	33	Circular	1.5	0.013	8.86	8.65	0.636	8.38	3.507	3.502	3.66
P_HW-Y08-487	PARKING A	33	Circular	1.5	0.013	8.26	8.14	0.364	6.334	3.5	3.43	3.472
P_HW-Y08-489	PARKING A	331	Circular	1.5	0.013	6.7	5	0.514	7.528	3.492	3.212	3.293
Link180	PARKING B	10	Circular	0.05	0.013	0.05	0	0	0	0	0	0
Link181	PARKING B	10	Circular	0.05	0.013	0.05	0	0	0	0	0	0
P_CB-Y07-439	PARKING B	280	Circular	1	0.024	8.37	7.78	0.211	0.886	2.003	0	0
P_DI-Y07-473	PARKING B	80	Circular	1.5	0.013	7.78	6.16	2.025	14.948	2.003	0	0
P_CB-Z07-353	PARKING C	98	Circular	1.67	0.013	6.37	6.37	0	0.442	4.321	4.587	6.365
P_DI-Z07-428	PARKING C	89	Circular	1	0.013	8.24	6.82	1.596	4.5	4.321	3.004	3.444
P_CB-Y07-?36	PARKING D	190	Circular	1.25	0.013	7.08	5.439	0.864	6.003	7.287	5.324	5.806
P_CB-Y08-?54	PARKING E	70	Circular	1	0.013	7.88	7.04	1.2	3.903	5.796	3.494	3.151

Model: Existing Conditions

Structure Nodes					Results		
					Free Discharge Conditions	5-Year Water Level Time Series	10-Year Water Level Time Series
Name	Drainage Area	Subcatchment	Area (acres)	Impervious Percentage %	Max Water Elevation (feet)	Max Water Elevation (feet)	Max Water Elevation (feet)
Drainage Area 1							
DI-W07-024	1	1	6.313	5	8.514	9.196	9.408
DI-W07-024	1	2	1.008	100		0	0
DI-W07-506	1	1	6.945	2	8.515	9.196	9.408
DI-W07-506	1	2	1.161	100		0	0
DI-X07-025	1	1	6.253	8	8.538	9.197	9.408
DI-X07-025	1	2	1.26	100		0	0
DI-X07-026	1	1	8.714	7	8.901	9.198	9.409
DI-X07-026	1	2	1.603	100		0	0
DI-X07-027	1	1	1.687	4	9.679	9.683	9.755
DI-X07-027	1	2	0.447	100		0	0
DI-X07-028	1	1	1.632	7	10.554	10	10.262
DI-X07-028	1	2	3.879	100		0	0
DI-X07-029	1	1	3.992	5	10.861	10.861	10.888
DI-X07-029	1	2	3.037	100		0	0
Drainage Area 2							
HW-X06-502	2	1	6.066	38	10.525	11.139	11.431
HW-X06-509	2	1	3.335	38	12.27	12.252	12.527
Drainage Area 5							
DI-Y06-060	5	1	3.072	0	11.158	11.188	11.397
DI-Y06-060	5	2	0.606	100		0	0
DI-Y06-103	5	1	1.233	7	11.338	11.458	11.55
DI-Y06-104	5	1	0.769	28	11.717	11.799	11.973
DI-Y06-105	5	1	0.655	33	11.604	11.661	11.81
DI-Y06-121	5	1	7.957	100	11.975	11.975	11.997
DI-Y06-313	5	1	3.288	92	11.997	12.073	12.291
DI-Y06-314	5	1	0.485	40	13.462	13.511	13.677

Structure Nodes					Results		
					Free Discharge Conditions	5-Year Water Level Time Series	10-Year Water Level Time Series
Name	Drainage Area	Subcatchment	Area (acres)	Impervious Percentage %	Max Water Elevation (feet)	Max Water Elevation (feet)	Max Water Elevation (feet)
DI-Y06-317	5	1	1.841	96	13.284	13.288	13.408
DI-Y06-739	5	1	0.783	27	11.707	11.784	11.962
DI-Y07-?71	5	1	0.511	0	9.37	11.148	11.237
DI-Y07-?71	5	2	1.027	100		0	0
DI-Y07-059	5	1	8.021	8	10.268	10.539	10.73
DI-Y07-095	5	1	2.768	0	10.226	10.517	10.709
DI-Y07-095	5	2	2.177	100		0	0
DI-Y07-096	5	1	3.162	0	10.226	10.517	10.709
DI-Y07-096	5	2	2.76	100		0	0
DI-Y07-097	5	1	2.699	100	10.157	10.521	10.784
DI-Y07-097	5	2	0.388	0		0	0
DI-Y07-101	5	1	4.835	0	9.944	11.16	11.248
DI-Y07-101	5	2	0.734	100		0	0
DI-Y07-102	5	1	5.592	0	10.789	11.235	11.338
DI-Y07-102	5	2	0.517	100		0	0
DI-Y07-X	5	1	4.686	85	12.288	12.386	12.616
DI-Z06-408	5	1	2.265	40	13.247	13.259	13.492
DI-Z07-098	5	1	3.862	0	10.032	10.521	10.708
DI-Z07-098	5	2	4.578	100		0	0
DI-Z07-099	5	1	1.963	0	7.163	11.148	11.237
DI-Z07-099	5	2	0.558	100		0	0
DI-Z07-100	5	1	2.192	0	9.184	11.155	11.241
DI-Z07-100	5	2	0.46	100		0	0
DI-Z07-453	5	1	1.348	0	8.772	10.914	11.043
DI-Z07-453	5	2	0.693	100		0	0
HW-Y06-024	5	1	3.206	92	0	0	0
HW-Y06-410	5	1	3.766	29	12.366	12.43	12.743
HW-Y06-419	5	1	14.803	57	12.7	12.743	13.075
N-Z06-336	5	1	2.369	83	15.058	15.06	15.468

Structure Nodes					Results		
					Free Discharge Conditions	5-Year Water Level Time Series	10-Year Water Level Time Series
Name	Drainage Area	Subcatchment	Area (acres)	Impervious Percentage %	Max Water Elevation (feet)	Max Water Elevation (feet)	Max Water Elevation (feet)
Drainage Area 6							
DI-Y07-087	6	1	0.945	100	9.097	10.103	10.245
DI-Y07-088	6	1	1.726	0	9.09	9.923	10.243
DI-Y07-088	6	2	2.361	100		0	0
DI-Y07-089	6	1	3.205	0	9.089	9.922	10.243
DI-Y07-089	6	2	5.098	100		0	0
DI-Y07-091	6	1	1.428	98	9.286	9.924	10.244
DI-Y07-092	6	1	1.632	0	8.417	10	10.262
DI-Y07-092	6	2	0.691	100		0	0
DI-Y07-092A	6	1	2.323	100	9.078	10	10.262
DI-Z07-093	6	1	1.389	0	7.138	10.514	10.695
DI-Z07-093	6	2	0.838	100		0	0
DI-Z07-094	6	1	1.433	0	6.686	10.499	10.641
DI-Z07-094	6	2	2.89	100		0	0
Drainage Area 9							
DI-Y07-615	9B	1	0.736	100	8.711	9.142	9.441
DI-Y07-616	9B	1	2.017	99	8.843	9.168	9.393
DI-Y08-?65	9B	1	0.349	92	9.108	9.447	9.722
DI-Y08-?67	9B	1	1.515	95	11.067	11.069	11.087
DI-Y08-?69	9B	1	1.143	0	10.735	10.775	10.891
DI-Y08-?71	9B	1	0.867	98	9.306	9.537	9.816
DI-Y08-075	9B	1	0.988	94	9.195	9.531	9.812
DI-Y08-076	9B	1	3.222	93	9.025	9.446	9.757
DI-Y08-079	9B	1	2.031	91	8.046	9.406	9.753
DI-Y08-082	9B	1	3	91	7.543	9.243	9.656
DI-Y08-618	9B	1	5.416	96	9.103	9.445	9.72
DI-Y08-620	9B	1	2.085	93	9.094	9.44	9.716
DI-Y07-?32	9C	1	0.56	0	8.829	9.142	9.436
DI-Y07-?32	9C	2	1.371	100		0	0

Structure Nodes					Results		
					Free Discharge Conditions	5-Year Water Level Time Series	10-Year Water Level Time Series
Name	Drainage Area	Subcatchment	Area (acres)	Impervious Percentage %	Max Water Elevation (feet)	Max Water Elevation (feet)	Max Water Elevation (feet)
DI-Y07-066	9C	1	1.023	0	8.675	9.141	9.378
DI-Y07-066	9C	2	1.109	100		0	0
DI-Y07-068	9C	1	0.657	0	8.666	9.142	9.378
DI-Y07-068	9C	2	0.076	100		0	0
DI-Y07-617	9C	1	0.539	0	8.67	9.141	9.378
DI-Y07-617	9C	2	0.045	100		0	0
DI-Y08-073	9C	1	1.269	0	8.329	8.967	9.278
DI-Y08-073	9C	2	0.224	100		0	0
DI-Y08-074	9C	1	0.791	0	7.712	8.966	9.277
DI-Y08-074	9C	2	0.248	100		0	0
DI-Y08-077	9C	1	0.959	0	7.069	8.633	9.118
DI-Y08-077	9C	2	0.301	100		0	0
DI-Y08-080	9C	1	0.9	0	6.701	8.632	9.118
DI-Y08-080	9C	2	0.321	100		0	0
DI-Y08-081	9C	1	1.021	0	6.286	8.631	9.118
DI-Y08-081	9C	2	0.612	100		0	0
Drainage Area 10							
DI-X07-035	10	1	1.196	0	8.527	9.567	9.866
DI-X07-035	10	2	1.571	100		0	0
DI-X07-041	10	1	2.123	0	9.405	9.897	10.136
DI-X07-041	10	2	1.86	100		0	0
DI-X07-042	10	1	2.454	0	9.533	9.909	10.144
DI-X07-042	10	2	1.409	100		0	0
DI-X07-045	10	1	10.647	89	10.598	10.609	10.676
DI-X07-046	10	1	0.253	0	10.126	10.287	10.416
DI-X07-046	10	2	0.771	100		0	0
DI-X07-046A	10	1	0.573	0	10.148	10.31	10.454
DI-X07-046A	10	2	1.107	100		0	0
DI-X07-201	10	1	0.409	19	6.079	9.146	9.454

Structure Nodes					Results		
					Free Discharge Conditions	5-Year Water Level Time Series	10-Year Water Level Time Series
Name	Drainage Area	Subcatchment	Area (acres)	Impervious Percentage %	Max Water Elevation (feet)	Max Water Elevation (feet)	Max Water Elevation (feet)
DI-X07-201	10	2	0.737	100		0	0
DI-Y06-048	10	1	0.554	0	10.094	10.336	10.57
DI-Y06-048	10	2	0.746	100		0	0
DI-Y06-049	10	1	2.046	1	10.242	10.408	10.58
DI-Y06-050	10	1	4.68	0	10.243	10.409	10.58
DI-Y06-050	10	2	1.026	100		0	0
DI-Y06-051	10	1	3.054	0	10.244	10.409	10.58
DI-Y06-051	10	2	1.291	100		0	0
DI-Y06-053	10	1	2.129	100	11.247	11.266	11.493
DI-Y06-145	10	1	0.278	0	9.998	10.421	10.71
DI-Y06-145	10	2	1.484	100		0	0
DI-Y06-200	10	1	1.939	0	10.552	10.642	10.931
DI-Y06-200	10	2	1.061	100		0	0
DI-Y06-211	10	1	6.075	98	11.247	11.266	11.493
DI-Y06-303	10	1	10.068	64	15.389	15.388	15.507
DI-Y06-318	10	1	2.541	0	10.384	10.699	10.978
DI-Y06-318	10	2	0.075	100		0	0
DI-Y06-319	10	1	1.105	0	11.086	11.182	11.396
DI-Y06-319	10	2	0.401	100		0	0
DI-Y06-610	10	1	7.818	81	10.931	10.931	10.96
DI-Y07-?30	10	1	1.265	0	9.982	10.409	10.701
DI-Y07-?30	10	2	1.462	100		0	0
DI-Y07-?31	10	1	0.642	0	10.007	10.251	10.601
DI-Y07-?31	10	2	1.512	100		0	0
DI-Y07-043	10	1	1.933	0	9.574	9.913	10.148
DI-Y07-043	10	2	1.539	100		0	0
DI-Y07-044S	10	1	1.941	0	9.726	10.058	10.367
DI-Y07-044S	10	2	1.218	100		0	0
DI-Y07-047	10	1	1.273	0	9.902	10.219	10.552

Structure Nodes					Results		
					Free Discharge Conditions	5-Year Water Level Time Series	10-Year Water Level Time Series
Name	Drainage Area	Subcatchment	Area (acres)	Impervious Percentage %	Max Water Elevation (feet)	Max Water Elevation (feet)	Max Water Elevation (feet)
DI-Y07-047	10	2	1.64	100		0	0
DI-Y07-054	10	1	2.426	0	10.049	10.166	10.458
DI-Y07-054	10	2	1.772	100		0	0
DI-Y07-055	10	1	1.815	0	9.877	10.129	10.439
DI-Y07-055	10	2	1.861	100		0	0
DI-Y07-058	10	1	6.193	0	9.998	10.421	10.71
DI-Y07-058	10	2	0.693	100		0	0
Drainage Area 11							
DI-Y07-061	11	1	1.538	0	11.362	11.362	11.515
DI-Y07-061	11	2	1.575	100		0	0
DI-Y07-063	11	1	1.159	0	10.638	10.639	10.68
DI-Y07-063	11	2	0.688	100		0	0
DI-Y07-064	11	1	1.768	0	9.901	9.961	10.169
DI-Y07-064	11	2	0.803	100		0	0
DI-Y07-131A	11	1	5.165	4	9.21	9.663	10.074
DI-Y07-131A	11	2	2.165	0		0	0
DI-Y07-131B	11	1	3.432	5	9.452	9.796	10.184
DI-Y07-131B	11	2	1.542	100		0	0
DI-Y08-130	11	1	6.633	0	9.642	9.814	10.079
DI-Y08-130	11	2	2.759	100		0	0
DI-Y08-132	11	1	3.997	0	9.901	9.961	10.169
DI-Y08-132	11	2	1.291	100		0	0
Drainage Area 12							
DI-X07-036	12	1	2.675	0	9.444	9.612	9.786
DI-X07-036	12	2	1.573	100		0	0
DI-X07-037	12	1	0.75	0	9.443	9.612	9.786
DI-X07-037	12	2	0.505	100		0	0
DI-X07-040	12	1	11.445	2	9.023	9.422	9.628
DI-X07-040	12	2	1.584	100		0	0

Structure Nodes					Results		
					Free Discharge Conditions	5-Year Water Level Time Series	10-Year Water Level Time Series
Name	Drainage Area	Subcatchment	Area (acres)	Impervious Percentage %	Max Water Elevation (feet)	Max Water Elevation (feet)	Max Water Elevation (feet)
DI-Y07-038	12	1	2.627	0	9.474	9.613	9.786
DI-Y07-038	12	2	1.483	100		0	0
DI-Y07-039	12	1	1.038	0	9.498	9.614	9.786
DI-Y07-039A	12	1	1.032	0	10.664	10.689	10.801
DI-Y07-039A	12	2	1.995	100		0	0
Drainage Area 13							
DI-X07-031	13	1	1.352	0	8.826	9.31	9.529
DI-X07-031	13	2	2.673	100		0	0
DI-X07-032	13	1	2.48	0	8.661	9.309	9.529
DI-X07-032	13	2	1.866	100		0	0
DI-X07-033	13	1	0.931	0	8.77	9.31	9.529
DI-X07-033	13	2	0.563	100		0	0
DI-X07-034	13	1	2.999	0	9.009	9.311	9.53
DI-X07-034	13	2	3.156	100		0	0
DI-X07-202	13	1	2.447	77	7.349	9.227	9.482
Drainage Area 14							
DI-W07-?2	14	1	1.329	0	9.439	9.826	10.087
DI-W07-?2	14	2	2.654	100		0	0
DI-W07-504A	14	1	1.088	75	9.366	10.379	10.467
DI-W07-504A(2)	14	1	0.458	77	9.035	10.094	10.271
DI-W07-504B	14	1	0.283	74	8.875	9.949	10.138
DI-W07-510	14	1	1.174	4	9.193	9.873	10.09
DI-W07-510	14	2	0.261	100		0	0
DI-W07-511	14	1	0.53	15	8.651	9.742	10.001
DI-W07-511	14	2	0.881	100		0	0
DI-X	14	1	1.331	0	9.486	9.827	10.087
DI-X	14	2	1.834	100		0	0
Drainage Area 17							
DI-Y07-131C	17	1	0.91	0	9.154	9.395	9.72

Structure Nodes					Results		
					Free Discharge Conditions	5-Year Water Level Time Series	10-Year Water Level Time Series
Name	**Drainage Area**	**Subcatchment**	**Area (acres)**	**Impervious Percentage %**	**Max Water Elevation (feet)**	**Max Water Elevation (feet)**	**Max Water Elevation (feet)**
DI-Y07-131C	17	2	1.295	100		0	0
DI-Y07-131D	17	1	1.221	0	9.153	9.394	9.72
DI-Y07-131D	17	2	0.839	100		0	0
DI-Y07-131E	17	1	1.251	0	9.152	9.394	9.72
DI-Y07-131E	17	2	0.717	100		0	0
DI-Y07-131F	17	1	1.478	0	9.359	9.707	10.117
DI-Y07-131F	17	2	1.316	100		0	0
DI-Y07-131G	17	1	0.587	0	9.339	9.759	10.369
DI-Y07-131G	17	2	0.633	100		0	0
DI-Y07-416	17	1	2.884	0	9.157	9.756	10.384
DI-Y07-416	17	2	0.291	100		0	0
HW-Y08-415	17	1	5.243	0	7.661	8.884	9.701
HW-Y08-415	17	2	0.88	100		0	0
Drainage Area 26							
DI-W07-?1	26	1	1.762	3	9.271	9.878	10.099
DI-W07-507	26	1	4.623	8	9.258	9.874	10.092
DI-W07-508	26	1	6.973	4	9.277	9.875	10.092
DI-W07-509	26	1	3.952	4	9.29	9.875	10.092
495 Fairview Hangars							
DI-Z06-134	495 FAIRVIE	1	3.023	99	13.492	14.309	14.603
DI-Z06-135	495 FAIRVIEW		0	0	12.335	0	0
DI-Z06-343	495 FAIRVIE	1	6.229	85	14.982	15.479	15.802
Northeast Corner							
CB-Z06-305	NE CORNER	1	3.695	18	13.481	14.783	15.275
Parking Areas							
DI-Y08-481	PARKING A	1	2.88	81	11.102	11.101	11.273
CB-Y07-439	PARKING B	1	6.334	88	12.841	12.975	13.611
DI-Z07-428	PARKING C	1	3.298	80	9.967	10.705	10.944
CB-Y07-?36	PARKING D	1	3.298	94	9.631	10.705	10.944

Structure Nodes					Results		
					Free Discharge Conditions	5-Year Water Level Time Series	10-Year Water Level Time Series
Name	Drainage Area	Subcatchment	Area (acres)	Impervious Percentage %	Max Water Elevation (feet)	Max Water Elevation (feet)	Max Water Elevation (feet)
CB-Y08-?54	PARKING E	1	2.859	81	10.699	10.979	11.213

Appendix E: Water Level Time Series

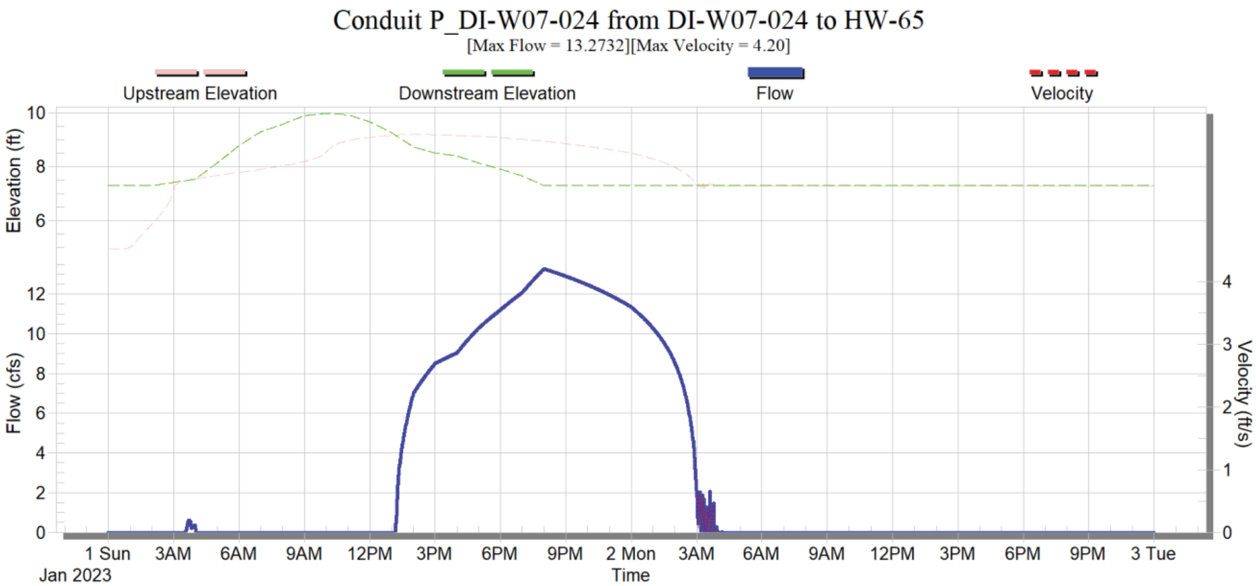
Water Levels (ft NAVD88): Current 5-year Storm, 0 ft SLR																		
Time (hours)	Outfall																	
	2	1	26	14	13	10	12	17	11	9	Northeast Corner	495 Fairview	5	6	Parking C	Parking B	Parking D	Parking E
0	8.40	7.30	6.25	6.00	5.75	5.50	5.25	5.00	5.00	3.90	12.45	9.90	7.05	5.27	4.84	4.41	3.99	3.56
1	8.40	7.30	6.25	6.00	5.75	5.50	5.25	5.00	5.00	3.90	12.45	9.90	7.05	5.27	4.84	4.41	3.99	3.56
2	8.40	7.30	6.25	6.00	5.75	5.50	5.25	5.00	5.00	3.90	12.45	9.90	7.05	5.27	4.84	4.41	3.99	3.56
3	8.51	7.42	6.40	6.16	5.90	5.66	5.42	5.16	5.16	4.11	12.67	10.07	7.30	5.52	5.10	4.68	4.27	3.85
4	8.62	7.54	6.56	6.31	6.06	5.82	5.59	5.32	5.31	4.31	12.89	10.24	7.56	5.78	5.35	4.95	4.55	4.14
5	9.16	8.14	7.31	7.09	6.81	6.62	6.44	6.11	6.08	5.62	13.98	11.09	8.80	7.02	6.62	6.26	6.18	6.12
6	9.74	8.78	8.13	7.91	7.62	7.47	7.39	7.11	7.05	7.05	15.14	11.99	10.14	8.38	8.19	8.08	8.03	7.93
7	10.20	9.30	8.78	8.62	8.37	8.32	8.30	7.93	7.85	7.85	16.07	12.72	11.21	9.65	9.39	9.24	9.18	9.04
8	10.45	9.57	9.17	9.02	8.74	8.68	8.66	8.24	8.14	8.14	16.56	13.10	11.77	10.18	9.89	9.73	9.65	9.50
9	10.75	9.90	9.56	9.39	9.07	9.00	8.98	8.50	8.39	8.39	17.16	13.57	12.46	10.73	10.39	10.20	10.12	9.94
10	10.82	9.98	9.64	9.46	9.13	9.06	9.04	8.54	8.43	8.43	17.31	13.68	12.63	10.84	10.49	10.30	10.21	10.03
11	10.78	9.93	9.60	9.42	9.10	9.03	9.01	8.52	8.41	8.41	17.23	13.61	12.53	10.78	10.43	10.24	10.16	9.98
12	10.54	9.67	9.30	9.14	8.85	8.79	8.77	8.33	8.23	8.23	16.74	13.24	11.98	10.36	10.05	9.88	9.80	9.64
13	10.18	9.27	8.75	8.58	8.34	8.28	8.27	7.90	7.82	7.82	16.03	12.69	11.16	9.60	9.34	9.20	9.13	9.00
14	9.70	8.74	8.07	7.86	7.56	7.41	7.29	7.02	6.97	6.97	15.06	11.93	10.04	8.26	8.07	7.97	7.92	7.82
15	9.49	8.51	7.78	7.56	7.27	7.10	6.96	6.60	6.55	6.50	14.64	11.60	9.56	7.78	7.42	7.34	7.30	7.22
16	9.40	8.40	7.65	7.42	7.14	6.97	6.81	6.46	6.41	6.26	14.45	11.46	9.35	7.56	7.17	7.03	7.00	6.92
17	9.16	8.14	7.31	7.08	6.81	6.61	6.43	6.11	6.07	5.61	13.97	11.08	8.79	7.01	6.61	6.25	6.17	6.11
18	8.95	7.91	7.02	6.78	6.51	6.30	6.11	5.80	5.77	4.97	13.55	10.75	8.31	6.53	6.12	5.74	5.39	5.34
19	8.73	7.66	6.71	6.46	6.20	5.98	5.76	5.48	5.46	4.51	13.10	10.41	7.80	6.02	5.60	5.20	4.82	4.45
20	8.40	7.30	6.25	6.00	5.75	5.50	5.25	5.00	5.00	3.90	12.45	9.90	7.05	5.27	4.84	4.41	3.99	3.98
21	8.40	7.30	6.25	6.00	5.75	5.50	5.25	5.00	5.00	4.51	12.45	9.90	7.05	5.27	4.84	4.83	4.81	4.78
22	8.40	7.30	6.25	6.00	5.75	5.50	5.25	5.00	5.00	5.13	12.45	9.90	7.05	5.72	5.63	5.59	5.56	5.52
23	8.40	7.30	6.25	6.00	5.75	5.50	5.25	5.00	5.00	4.89	12.45	9.90	7.05	5.27	5.34	5.30	5.28	5.24
24	8.40	7.30	6.25	6.00	5.75	5.50	5.25	5.00	5.00	4.86	12.45	9.90	7.05	5.27	5.29	5.25	5.23	5.19
48	8.40	7.30	6.25	6.00	5.75	5.50	5.25	5.00	5.00	3.90	12.45	9.90	7.05	5.27	4.84	4.41	3.99	3.56

Water Levels (ft NAVD88): Current 10-year Storm, 0 ft SLR																		
Time (hours)	Outfall																	
	2	1	26	14	13	10	12	17	11	9	Northeast Corner	495 Fairview	5	6	Parking C	Parking B	Parking D	Parking E
0	8.58	7.51	6.55	6.31	6.08	5.84	5.59	5.56	5.67	4.57	12.94	10.33	7.62	5.78	5.31	4.86	4.43	3.98
1	8.58	7.51	6.55	6.31	6.08	5.84	5.59	5.56	5.67	4.57	12.94	10.33	7.62	5.78	5.31	4.86	4.43	3.98
2	8.58	7.51	6.55	6.31	6.08	5.84	5.59	5.56	5.67	4.57	12.94	10.33	7.62	5.78	5.31	4.86	4.43	3.98
3	8.69	7.63	6.70	6.47	6.23	6.00	5.76	5.72	5.83	4.78	13.16	10.50	7.87	6.03	5.57	5.13	4.71	4.27
4	8.80	7.75	6.86	6.62	6.39	6.16	5.93	5.88	5.98	4.98	13.38	10.67	8.13	6.29	5.82	5.40	4.99	4.56
5	9.34	8.35	7.61	7.40	7.14	6.96	6.78	6.67	6.75	6.29	14.47	11.52	9.37	7.53	7.09	6.71	6.62	6.54
6	9.92	8.99	8.43	8.22	7.95	7.81	7.73	7.67	7.72	7.72	15.63	12.42	10.71	8.89	8.66	8.53	8.47	8.35
7	10.38	9.51	9.08	8.93	8.70	8.66	8.64	8.49	8.52	8.52	16.56	13.15	11.78	10.16	9.86	9.69	9.62	9.46
8	10.63	9.78	9.47	9.33	9.07	9.02	9.00	8.80	8.81	8.81	17.05	13.53	12.34	10.69	10.36	10.18	10.09	9.92
9	10.93	10.11	9.86	9.70	9.40	9.34	9.32	9.06	9.06	9.06	17.65	14.00	13.03	11.24	10.86	10.65	10.56	10.36
10	11.00	10.19	9.94	9.77	9.46	9.40	9.38	9.10	9.10	9.10	17.80	14.11	13.20	11.35	10.96	10.75	10.65	10.45
11	10.96	10.14	9.90	9.73	9.43	9.37	9.35	9.08	9.08	9.08	17.72	14.04	13.10	11.29	10.90	10.69	10.60	10.40
12	10.72	9.88	9.60	9.45	9.18	9.13	9.11	8.89	8.90	8.90	17.23	13.67	12.55	10.87	10.52	10.33	10.24	10.06
13	10.36	9.48	9.05	8.89	8.67	8.62	8.61	8.46	8.49	8.49	16.52	13.12	11.73	10.11	9.81	9.65	9.57	9.42
14	9.88	8.95	8.37	8.17	7.89	7.75	7.63	7.58	7.64	7.64	15.55	12.36	10.61	8.77	8.54	8.42	8.36	8.24
15	9.67	8.72	8.08	7.87	7.60	7.44	7.30	7.16	7.22	7.17	15.13	12.03	10.13	8.29	7.89	7.79	7.74	7.64
16	9.58	8.61	7.95	7.73	7.47	7.31	7.15	7.02	7.08	6.93	14.94	11.89	9.92	8.07	7.64	7.48	7.44	7.34
17	9.34	8.35	7.61	7.39	7.14	6.95	6.77	6.67	6.74	6.28	14.46	11.51	9.36	7.52	7.08	6.70	6.61	6.53
18	9.13	8.12	7.32	7.09	6.84	6.64	6.45	6.36	6.44	5.64	14.04	11.18	8.88	7.04	6.59	6.19	5.83	5.76
19	8.91	7.87	7.01	6.77	6.53	6.32	6.10	6.04	6.13	5.18	13.59	10.84	8.37	6.53	6.07	5.65	5.26	4.87
20	8.58	7.51	6.55	6.31	6.08	5.84	5.59	5.56	5.67	4.57	12.94	10.33	7.62	5.78	5.31	4.86	4.43	4.40
21	8.58	7.51	6.55	6.31	6.08	5.84	5.59	5.56	5.67	5.18	12.94	10.33	7.62	5.78	5.31	5.28	5.25	5.20
22	8.58	7.51	6.55	6.31	6.08	5.84	5.59	5.56	5.67	5.80	12.94	10.33	7.62	6.23	6.10	6.04	6.00	5.94
23	8.58	7.51	6.55	6.31	6.08	5.84	5.59	5.56	5.67	5.56	12.94	10.33	7.62	5.78	5.81	5.75	5.72	5.66
24	8.58	7.51	6.55	6.31	6.08	5.84	5.59	5.56	5.67	5.53	12.94	10.33	7.62	5.78	5.76	5.70	5.67	5.61
48	8.58	7.51	6.55	6.31	6.08	5.84	5.59	5.56	5.67	4.57	12.94	10.33	7.62	5.78	5.31	4.86	4.43	3.98

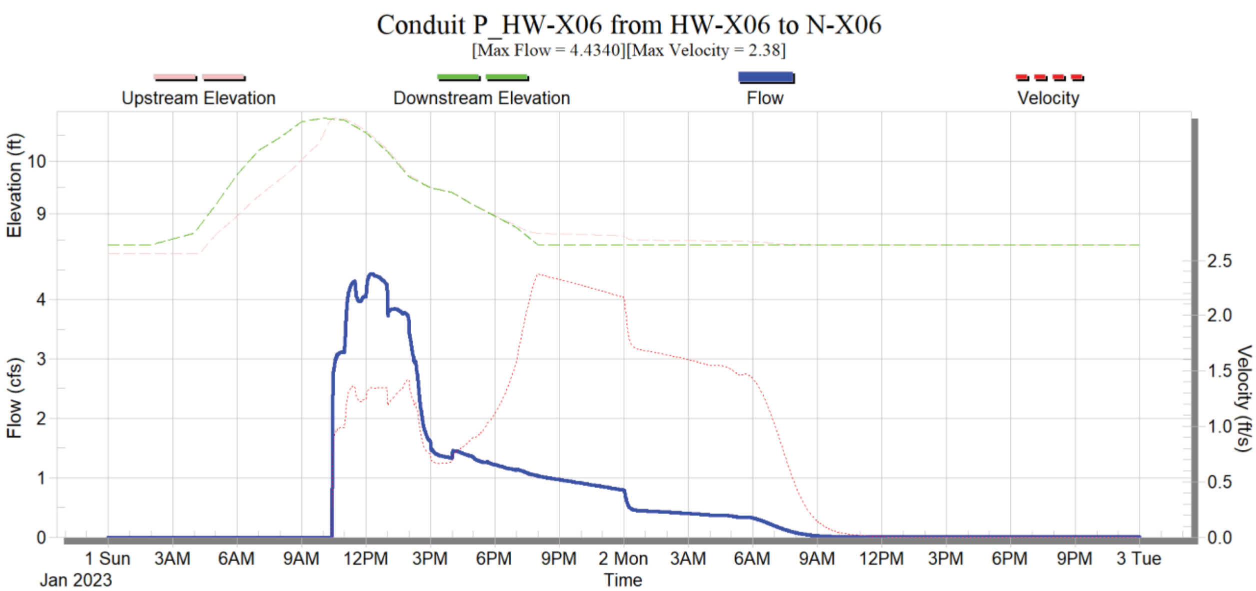
Appendix F: Existing Hydrographs

Appendix F1: 5-year Fixed Backwater Results

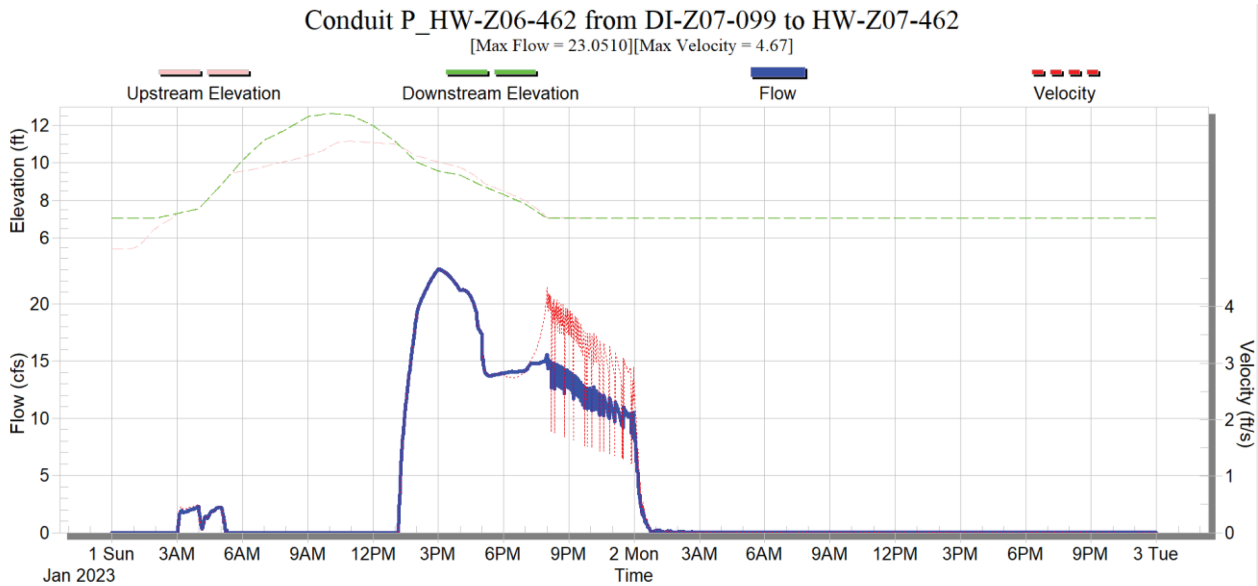
Outfall 1



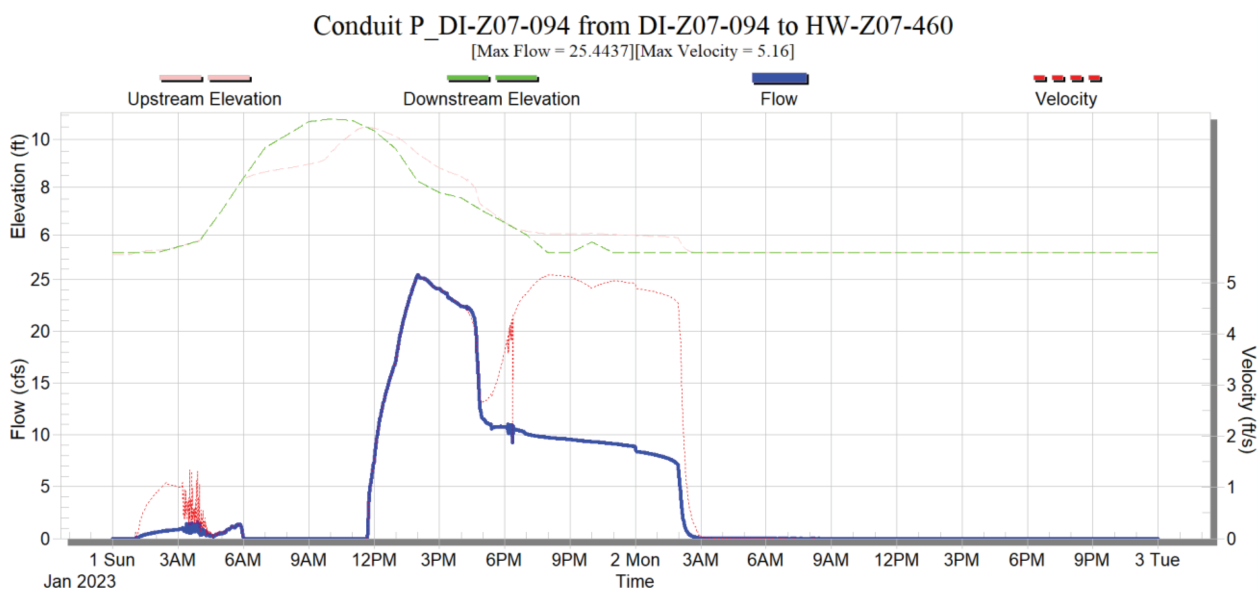
Outfall 2



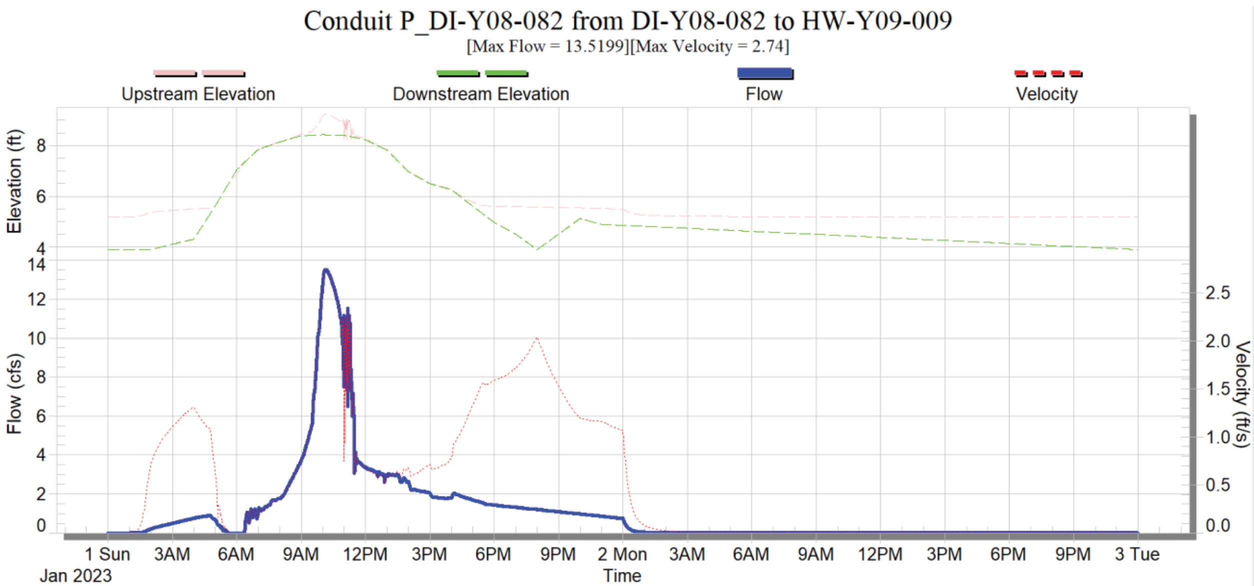
Outfall 5



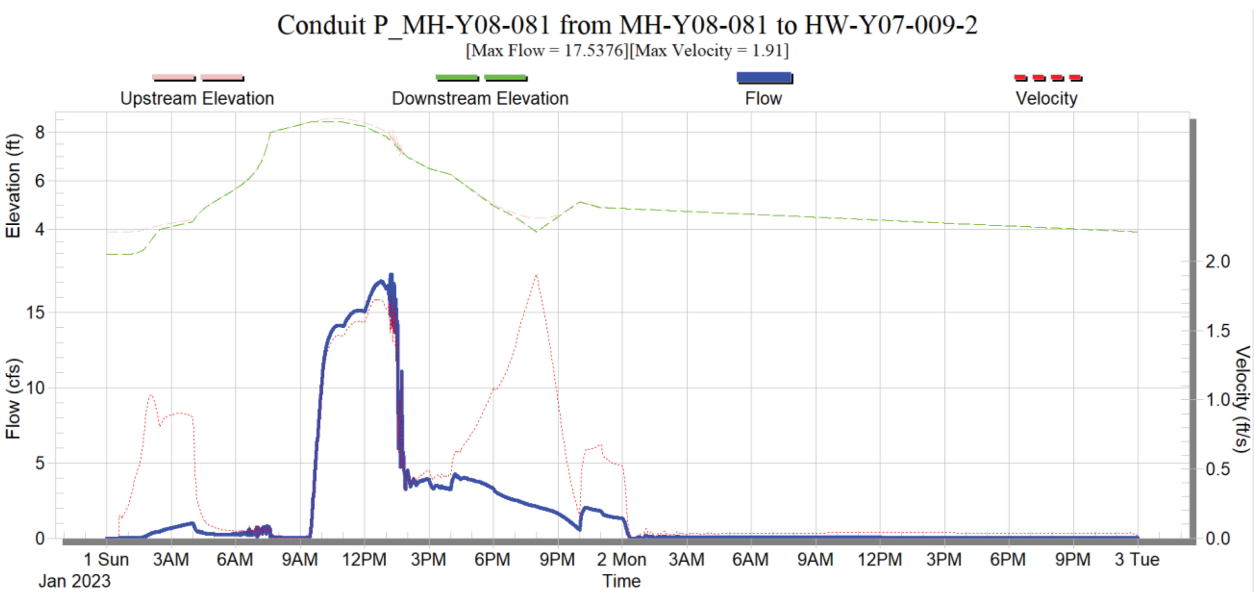
Outfall 6



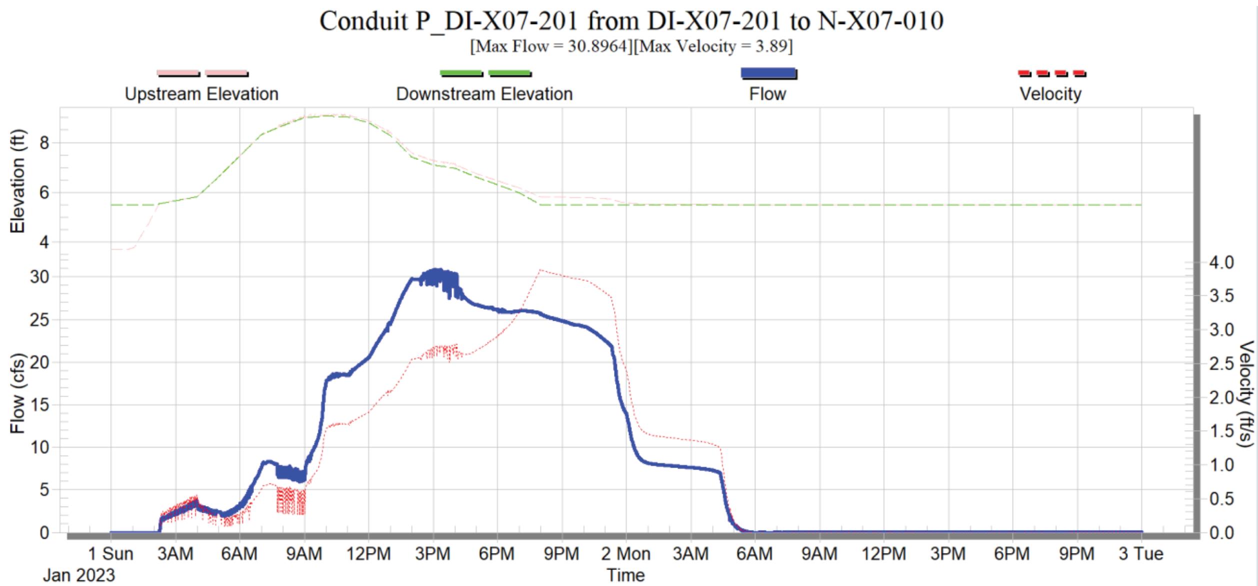
Outfall 9B



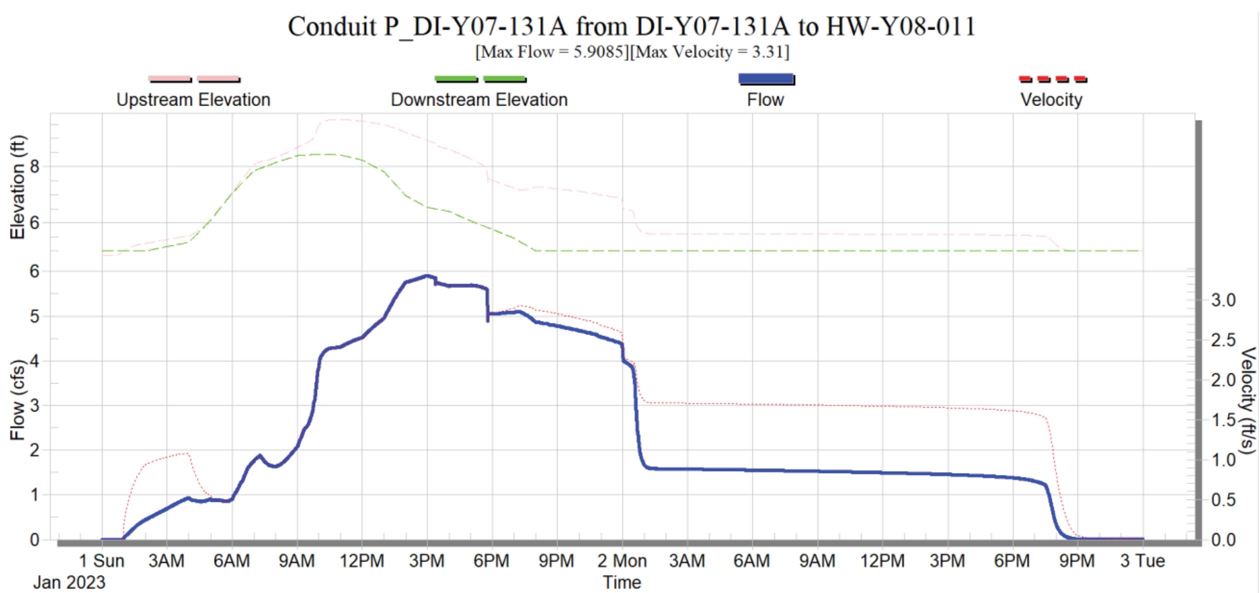
Outfall 9C



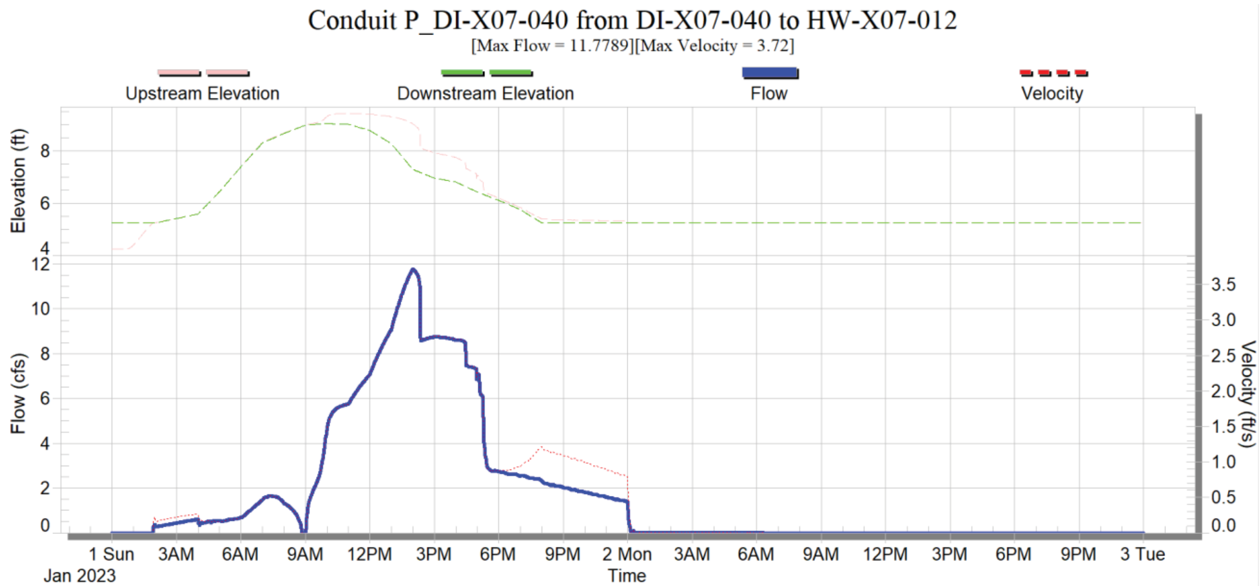
Outfall 10



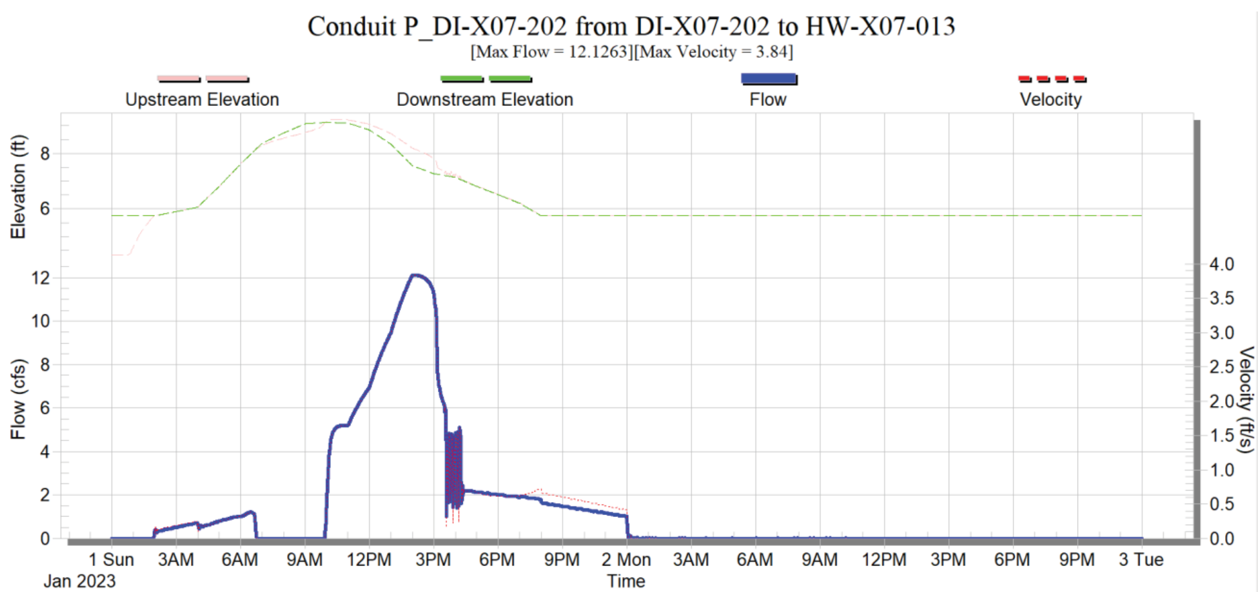
Outfall 11



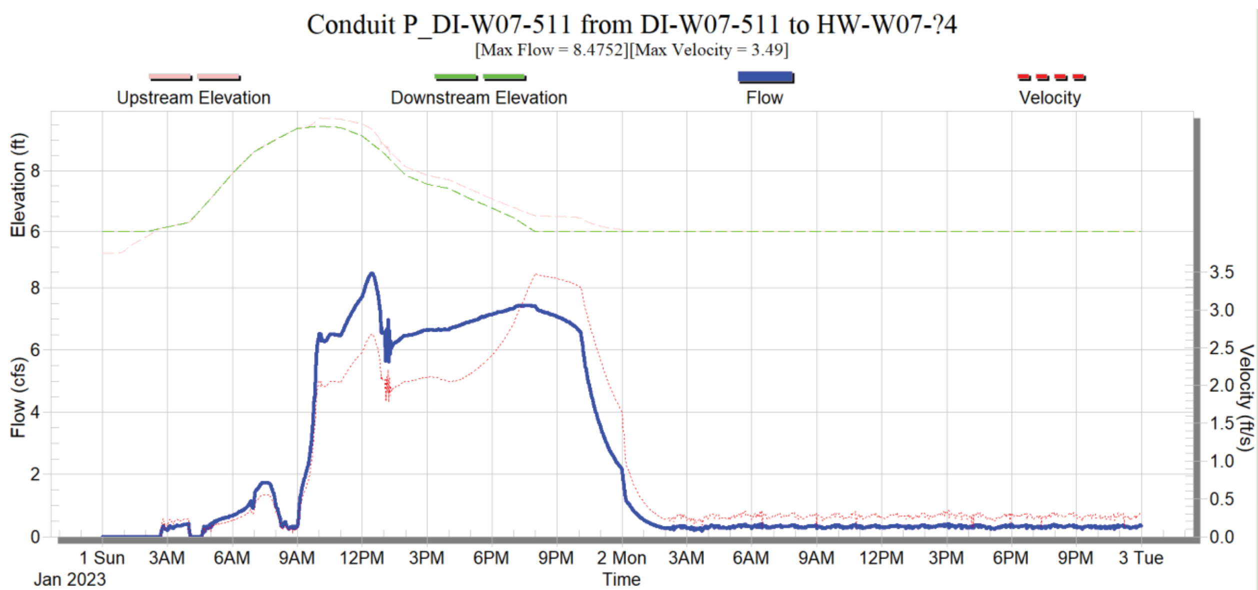
Outfall 12



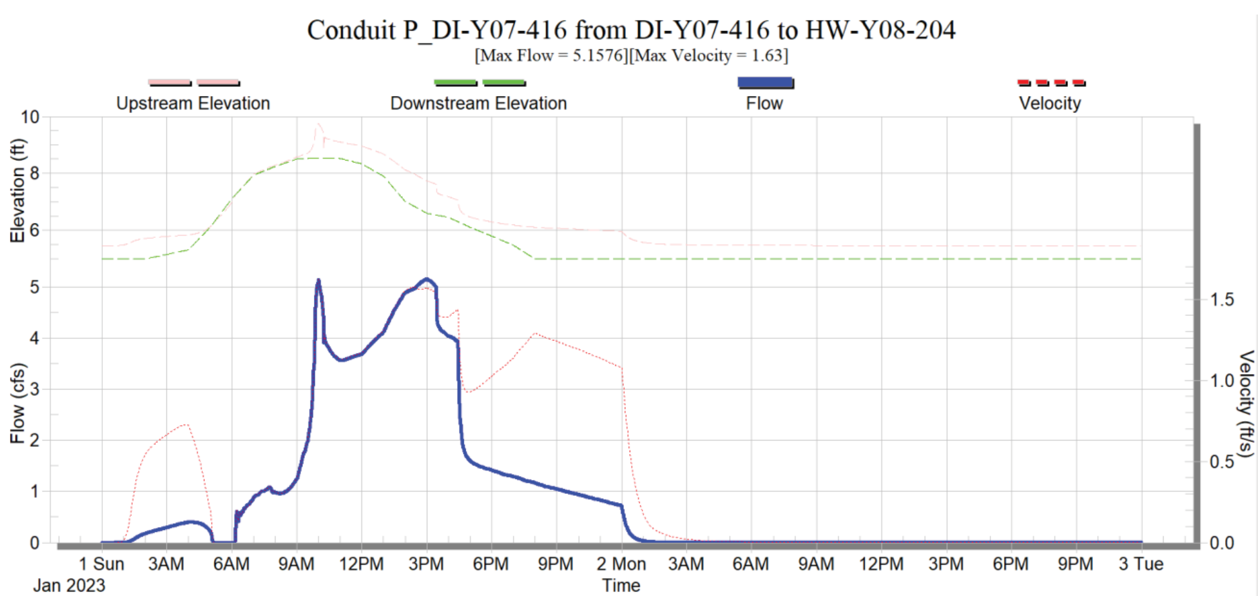
Outfall 13



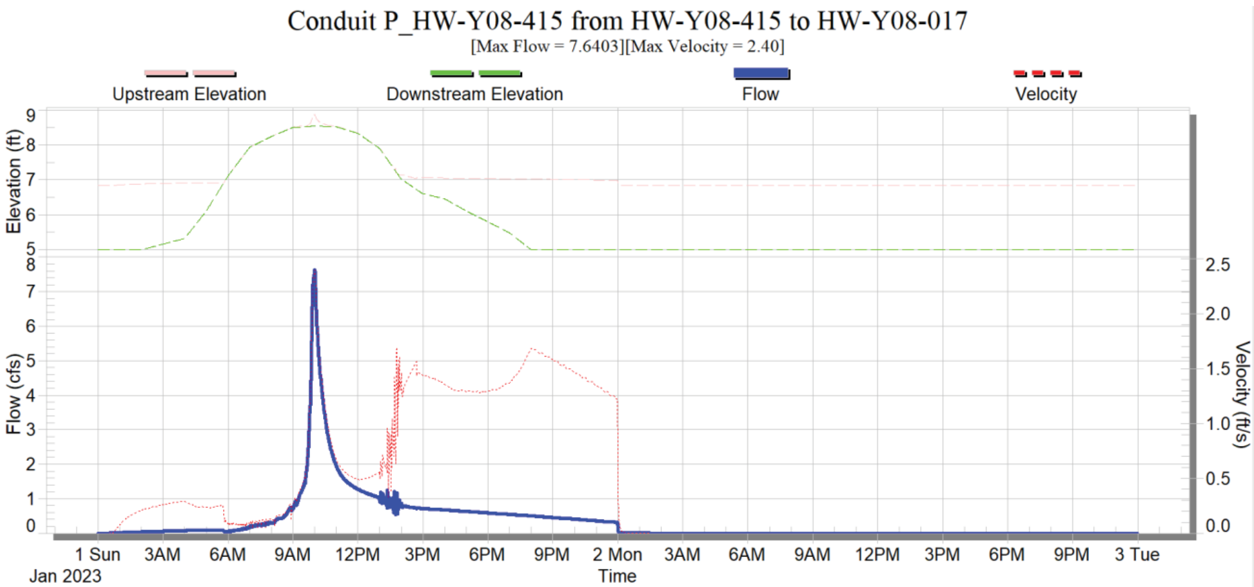
Outfall 14



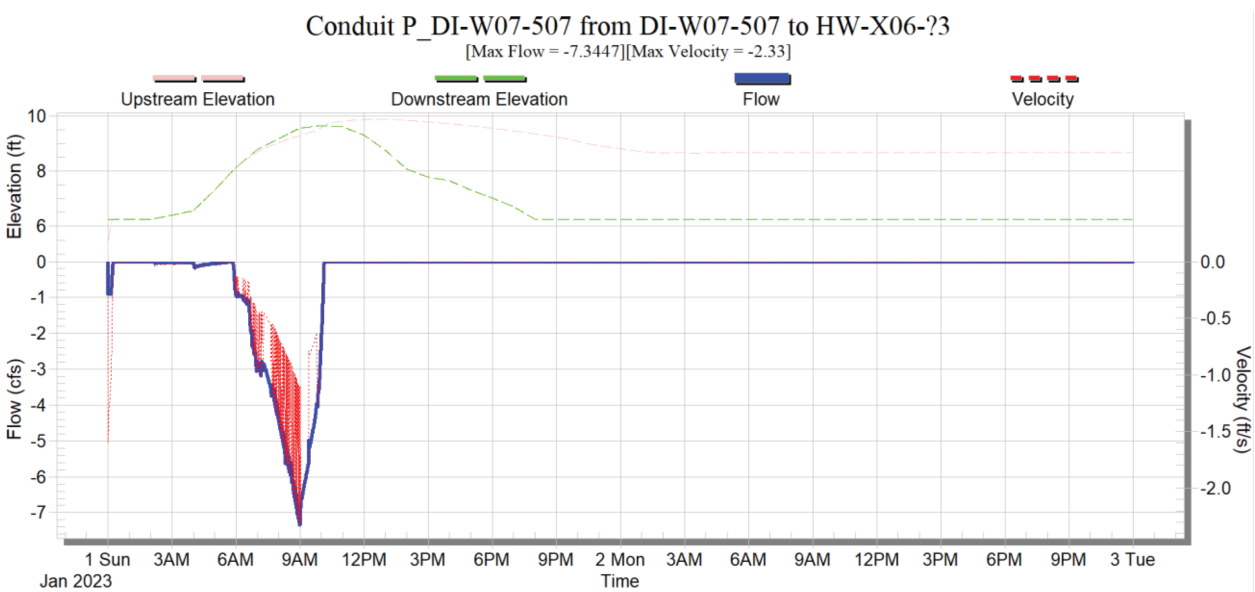
Outfall 17A



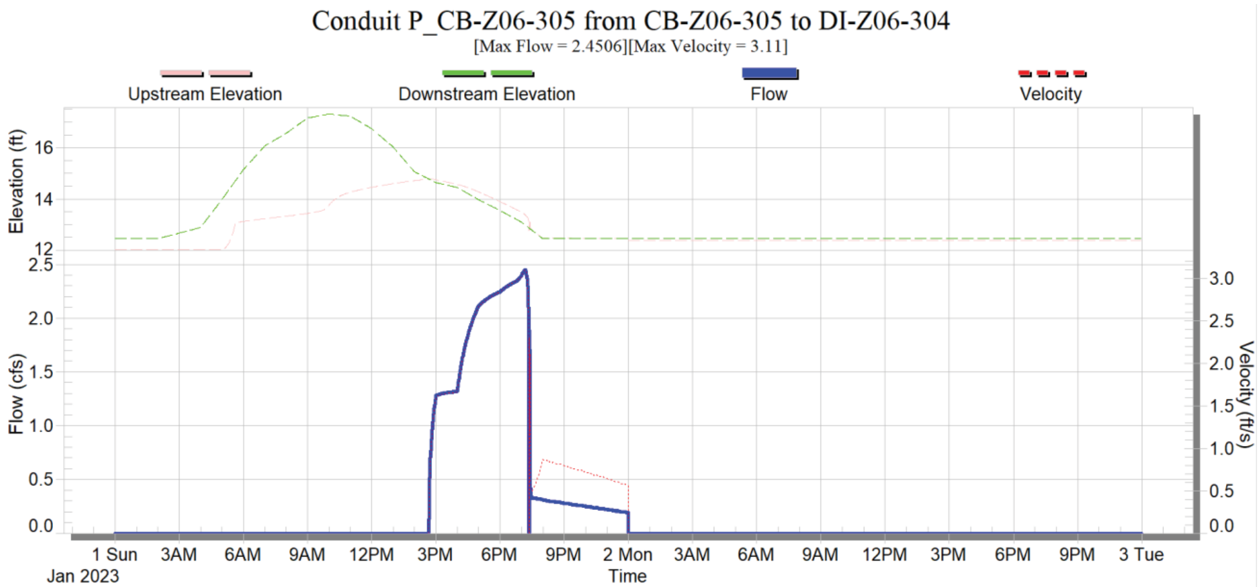
Outfall 17B



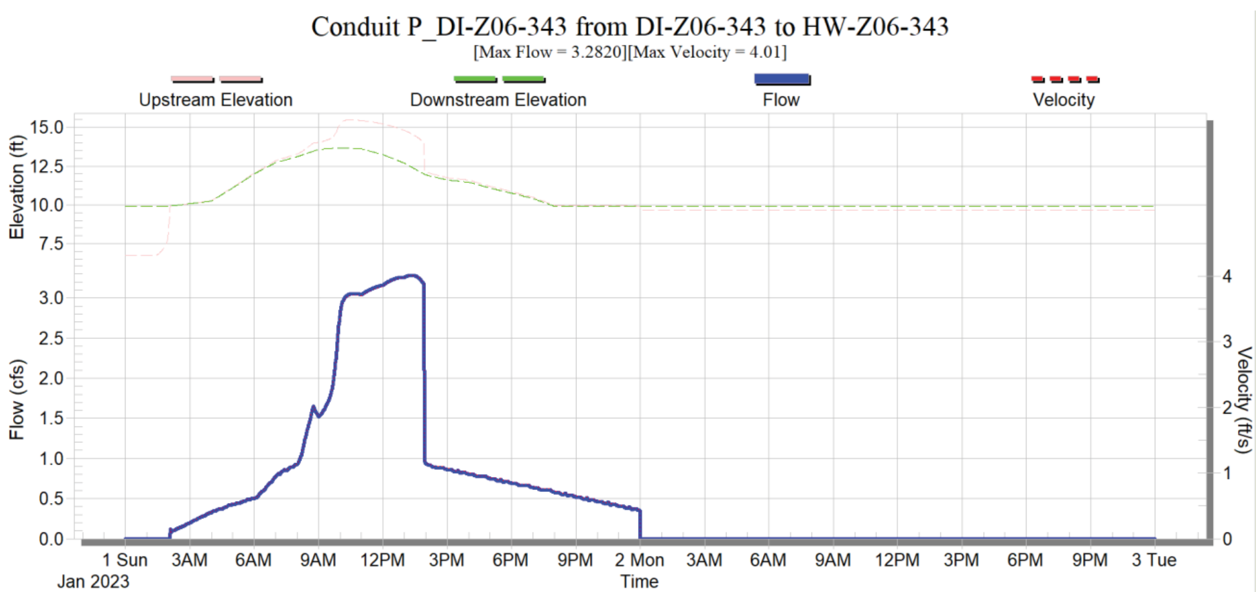
Outfall 26



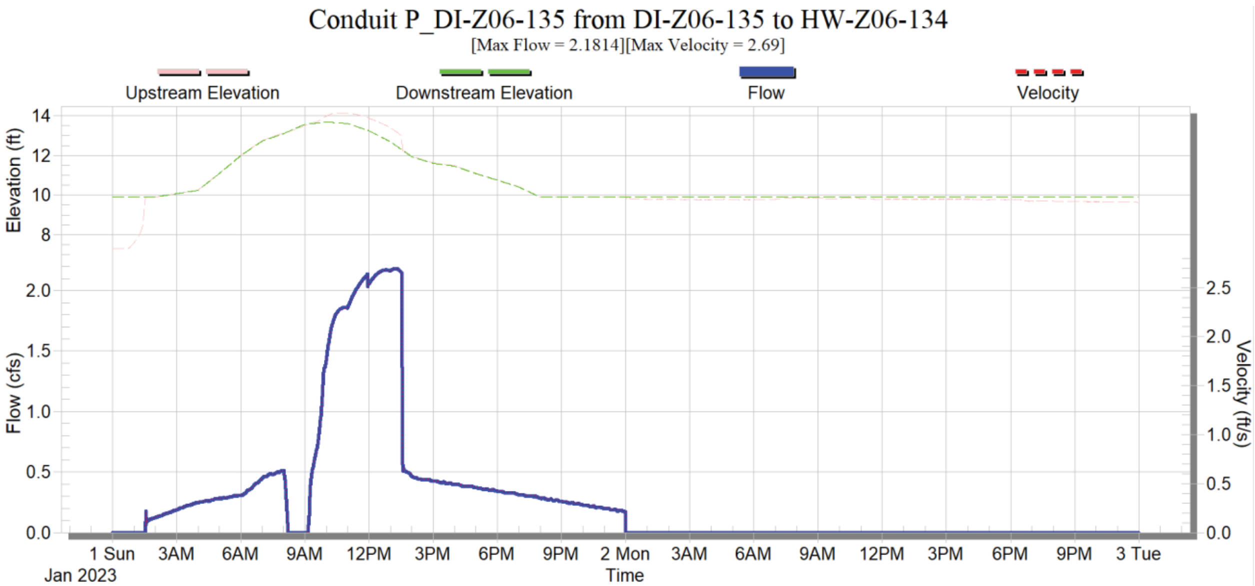
Outfall Northeast Corner



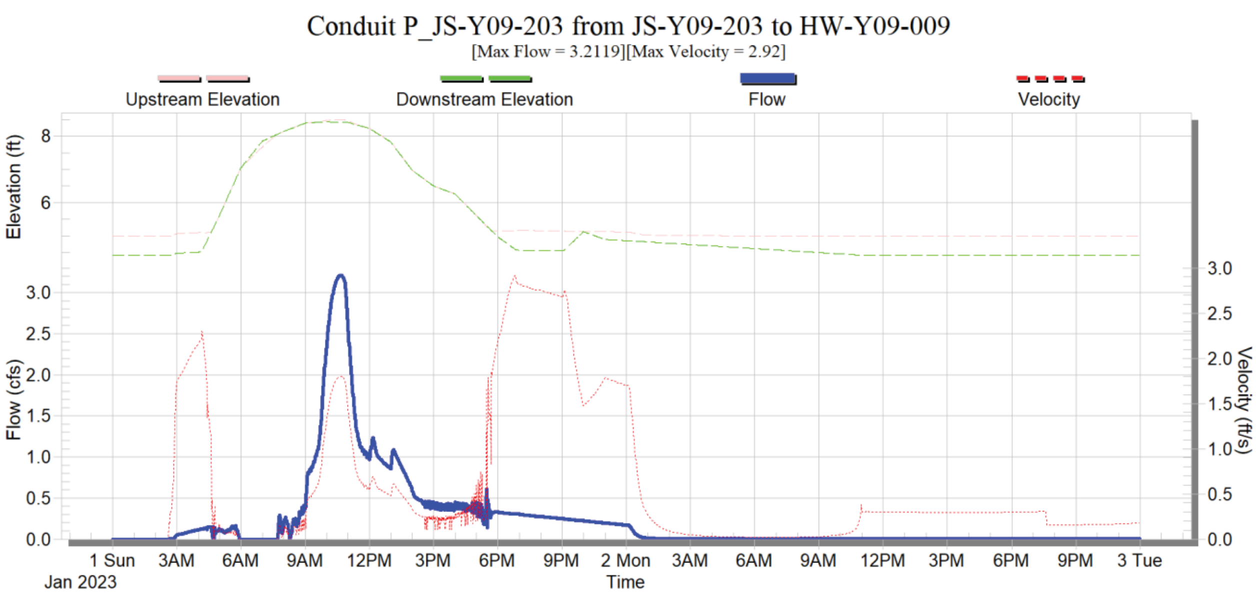
Outfall 495 Fairview – 1



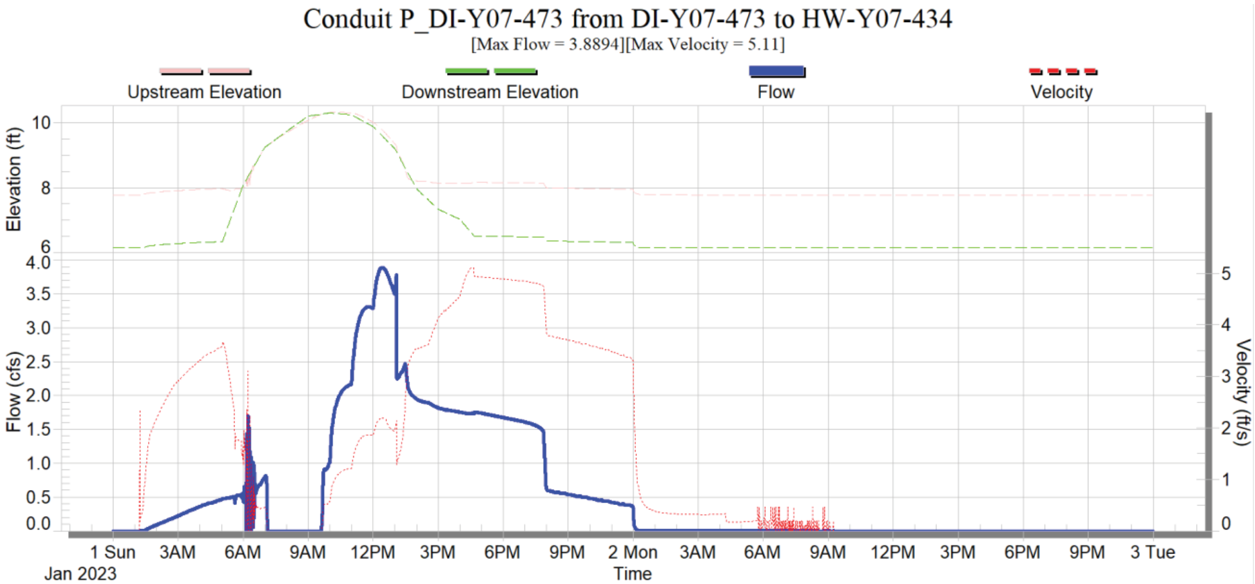
Outfall 495 Fairview – 2



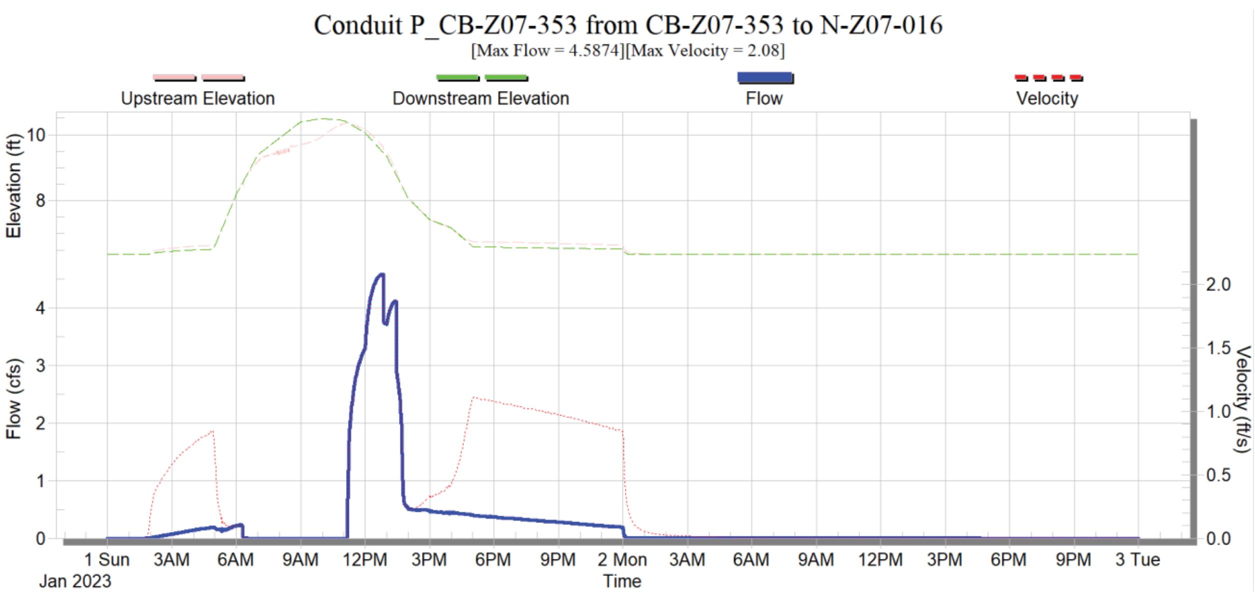
Outfall Parking A



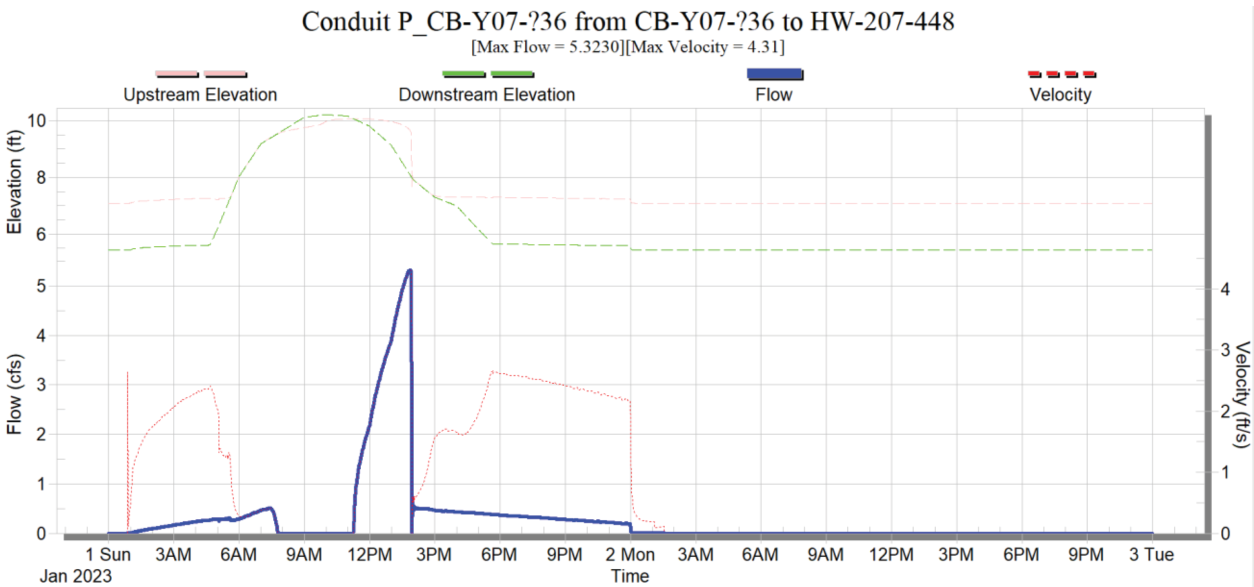
Outfall Parking B



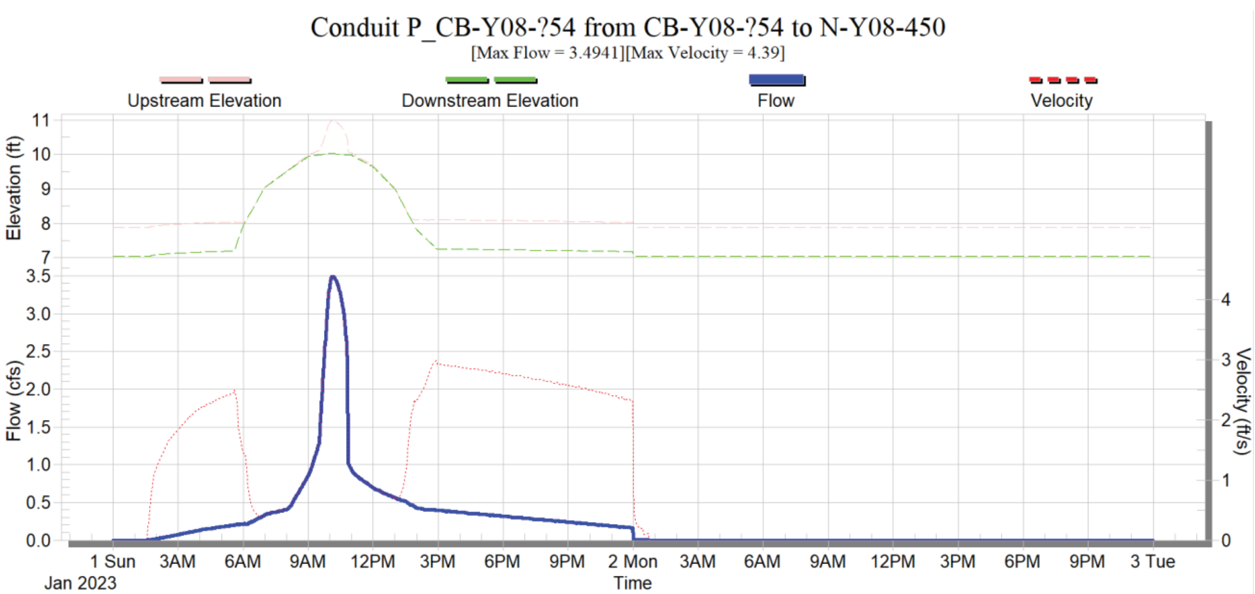
Outfall Parking C



Outfall Parking D

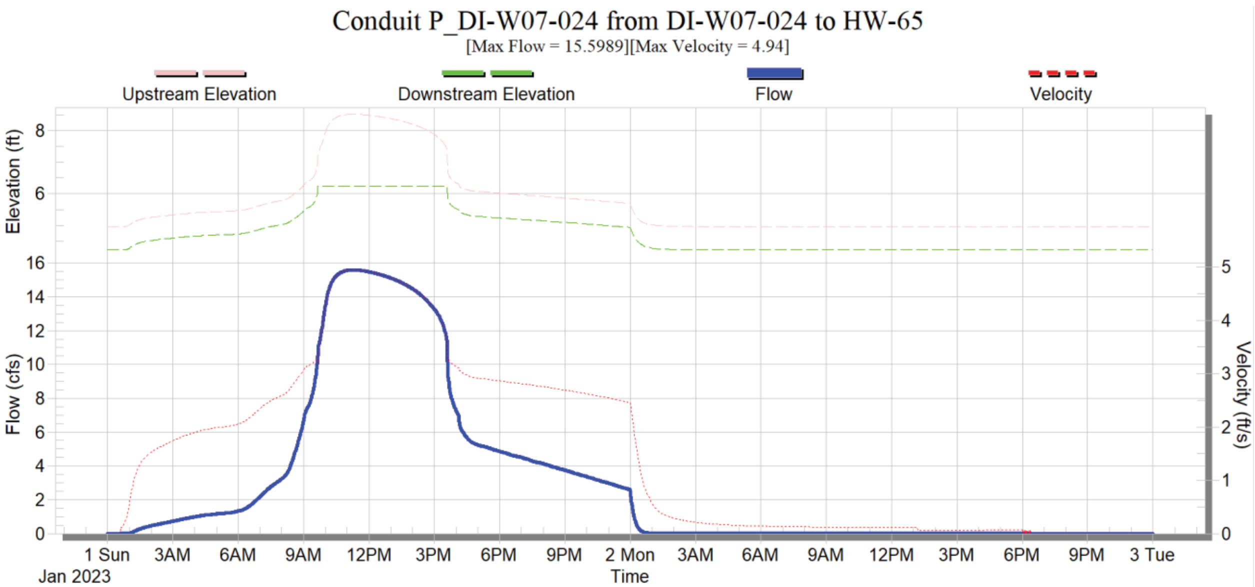


Outfall Parking E

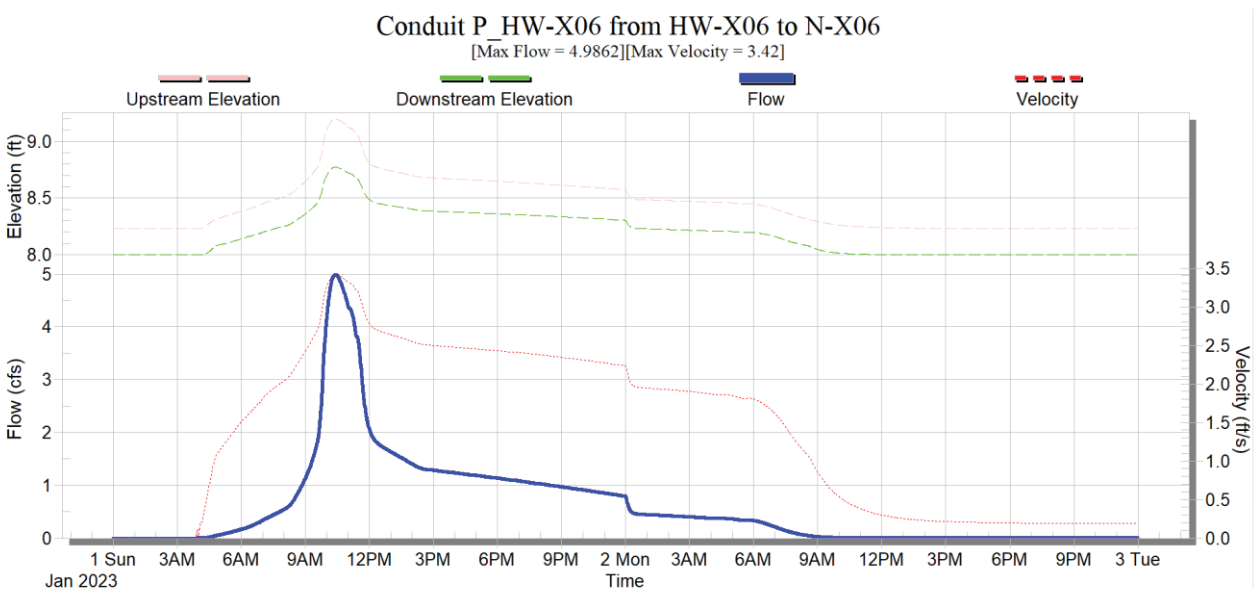


Appendix F2: 5-year Free Results

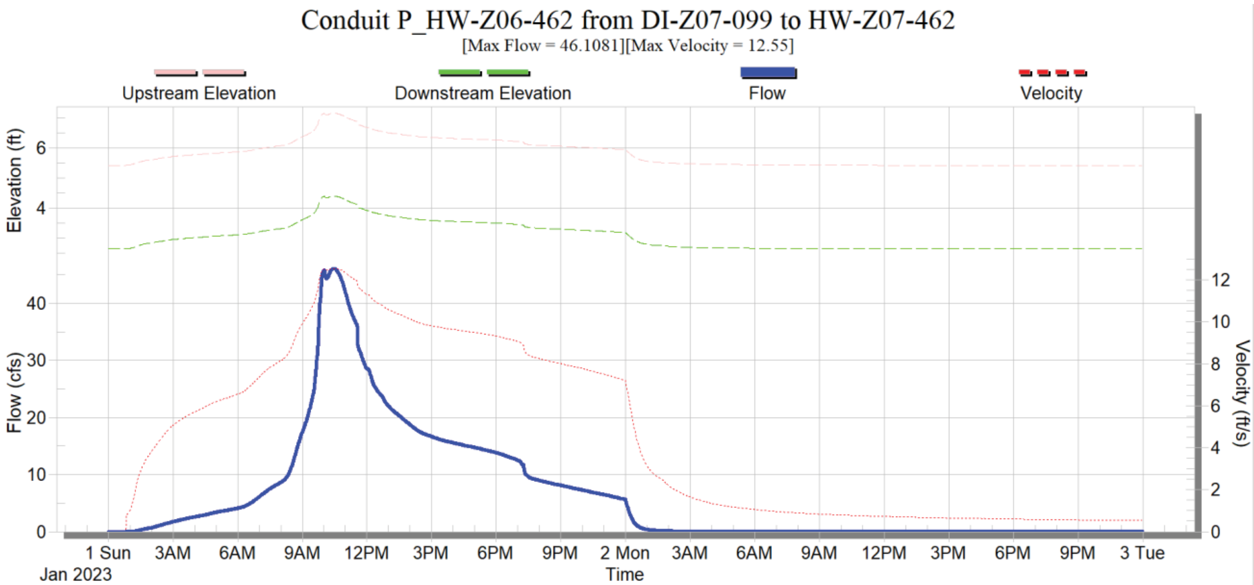
Outfall 1



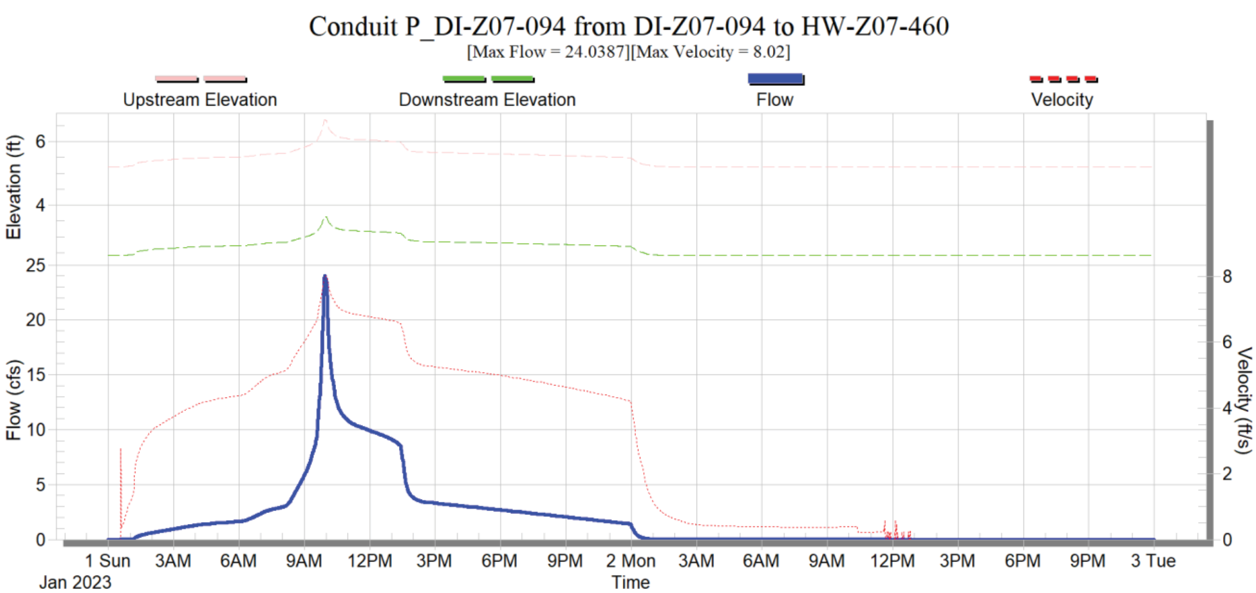
Outfall 2



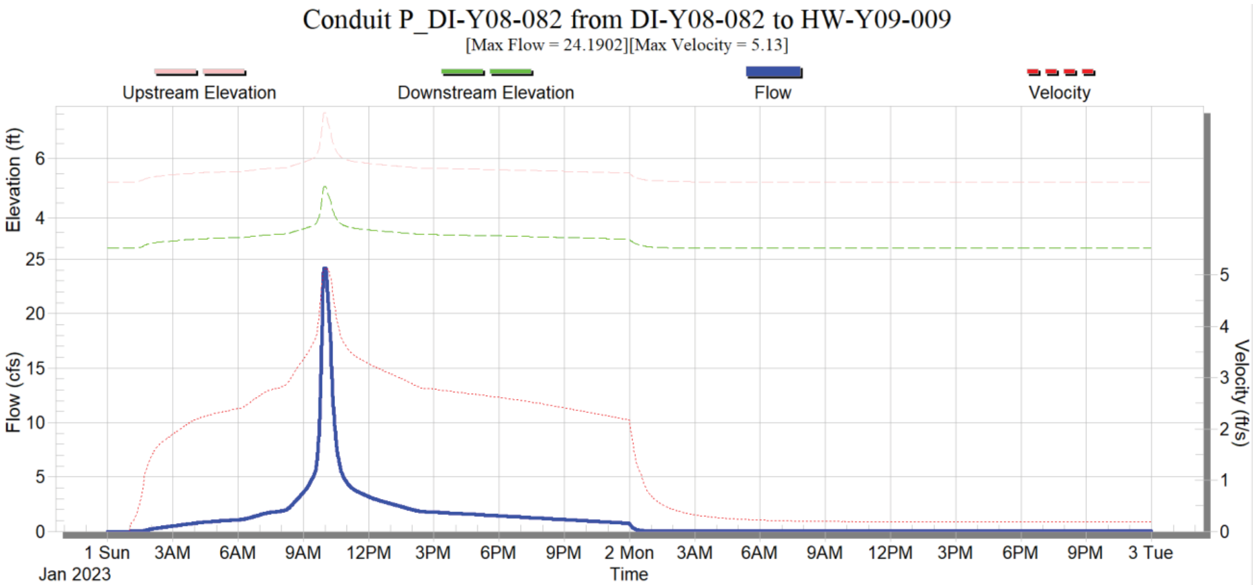
Outfall 5



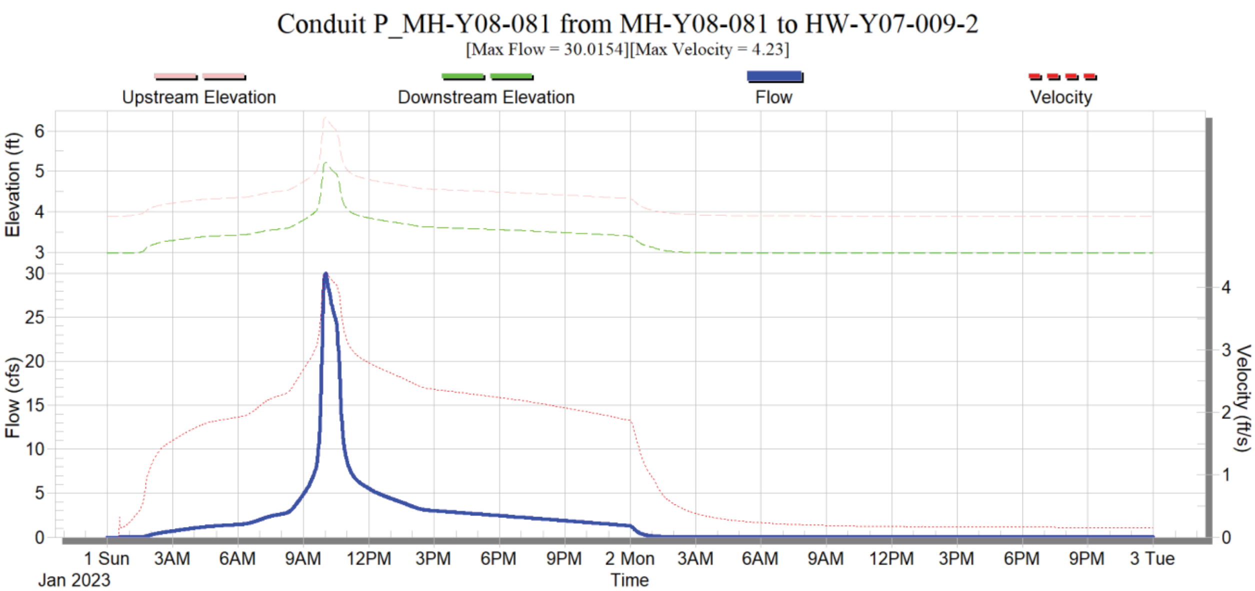
Outfall 6



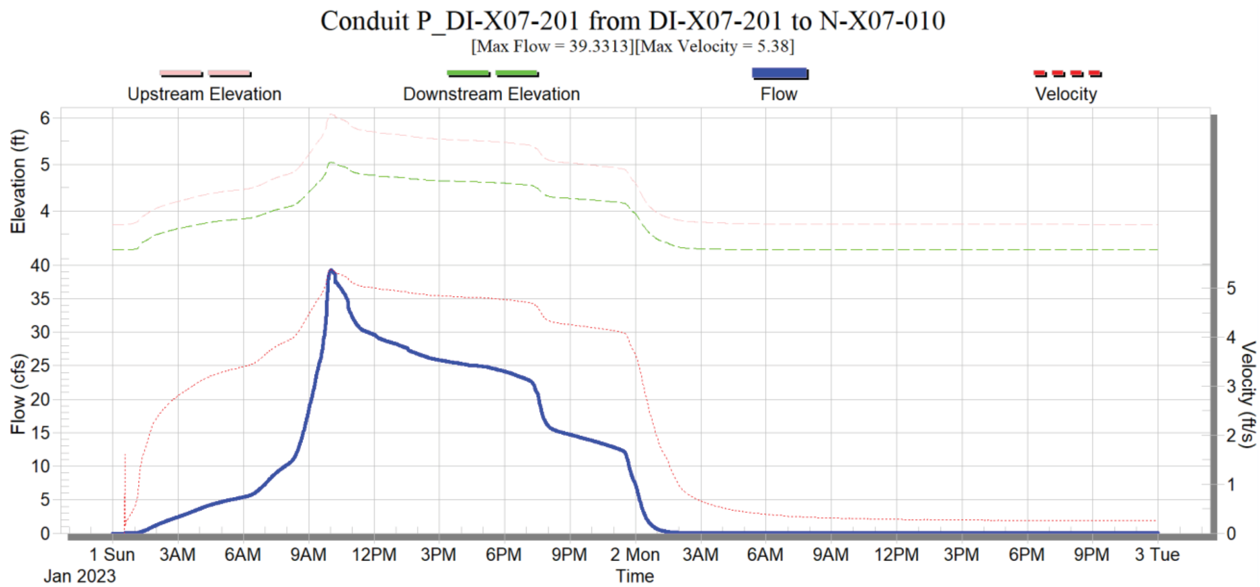
Outfall 9B



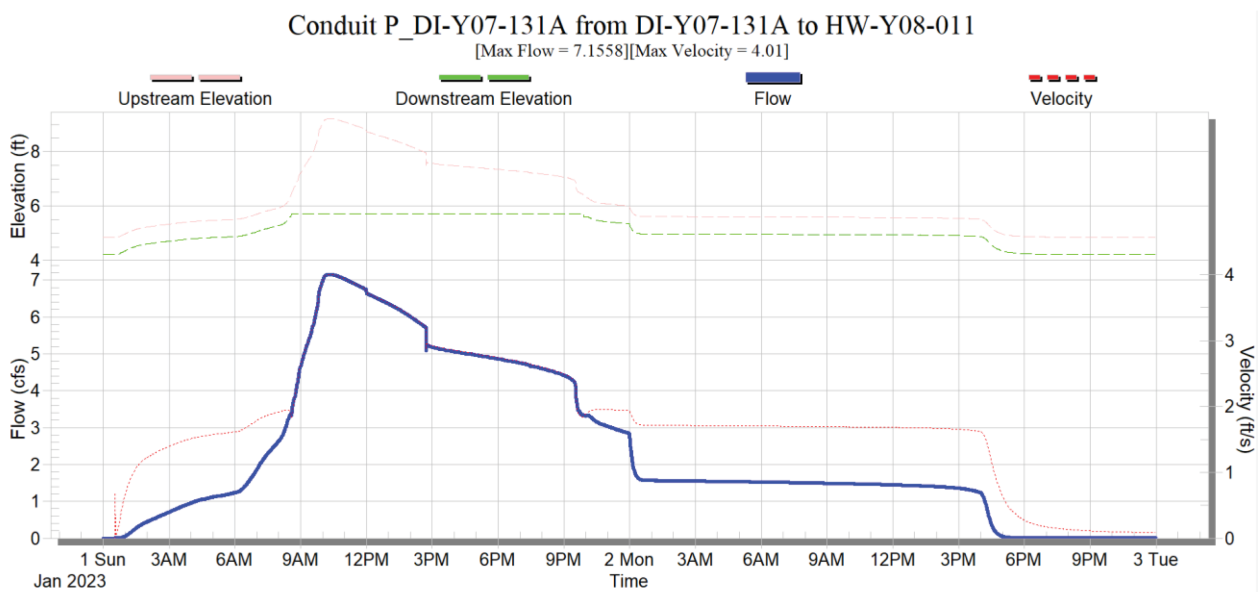
Outfall 9C



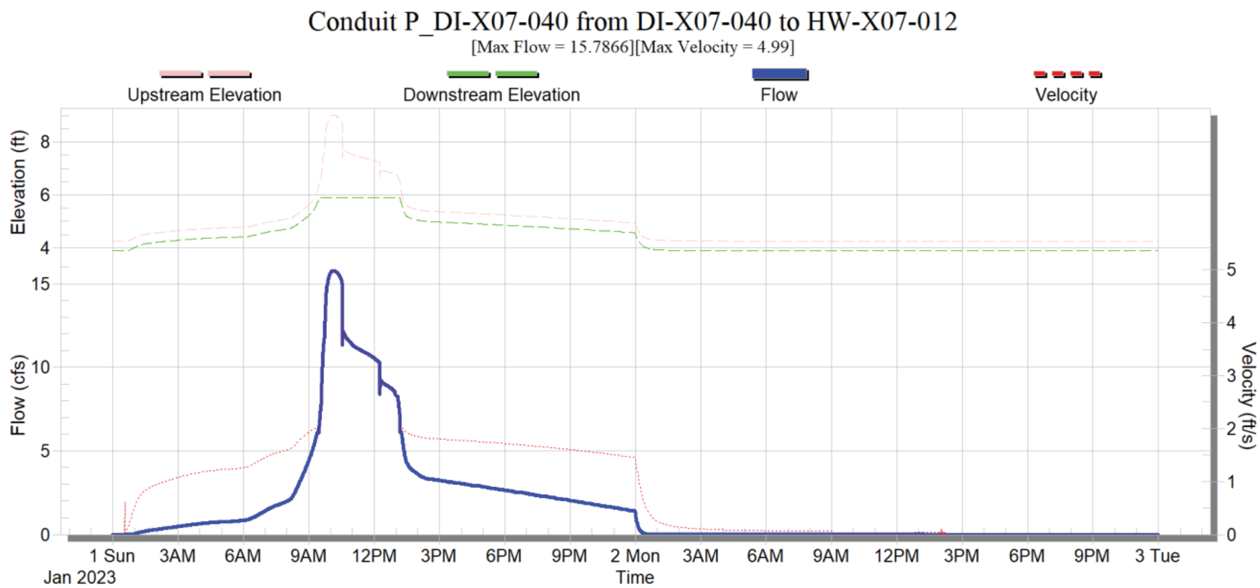
Outfall 10



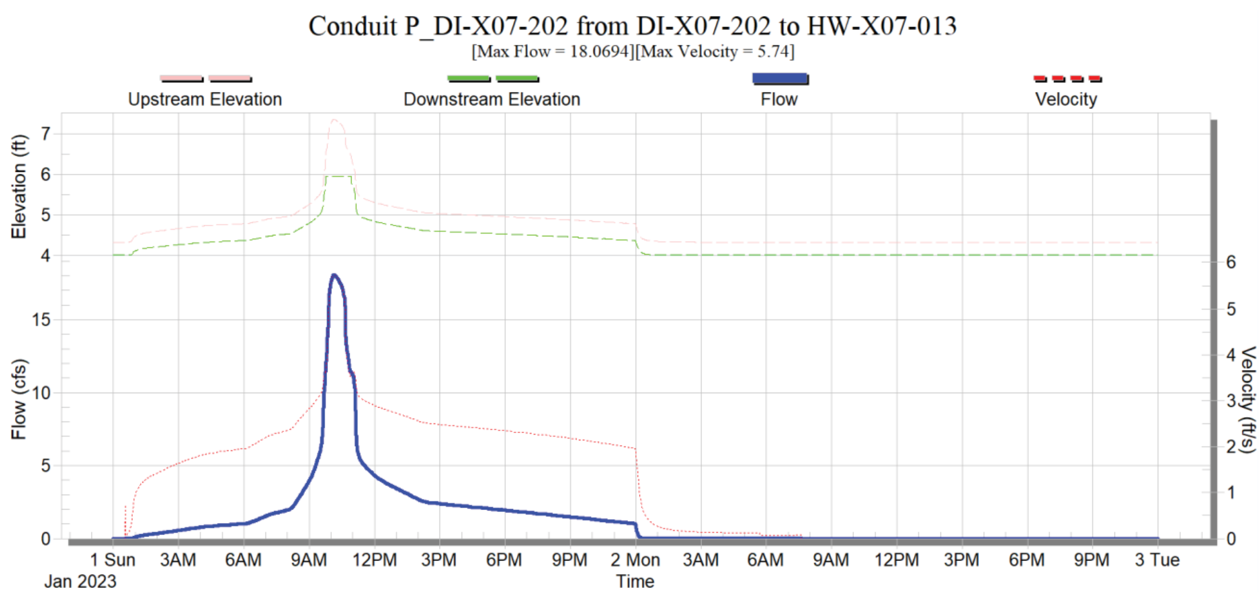
Outfall 11



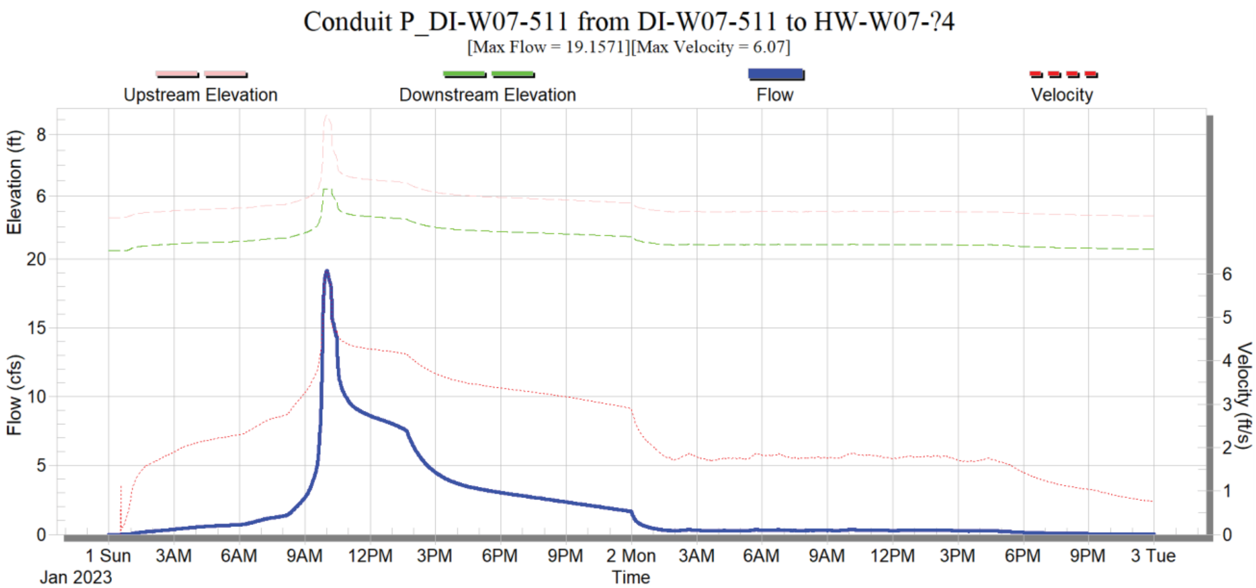
Outfall 12



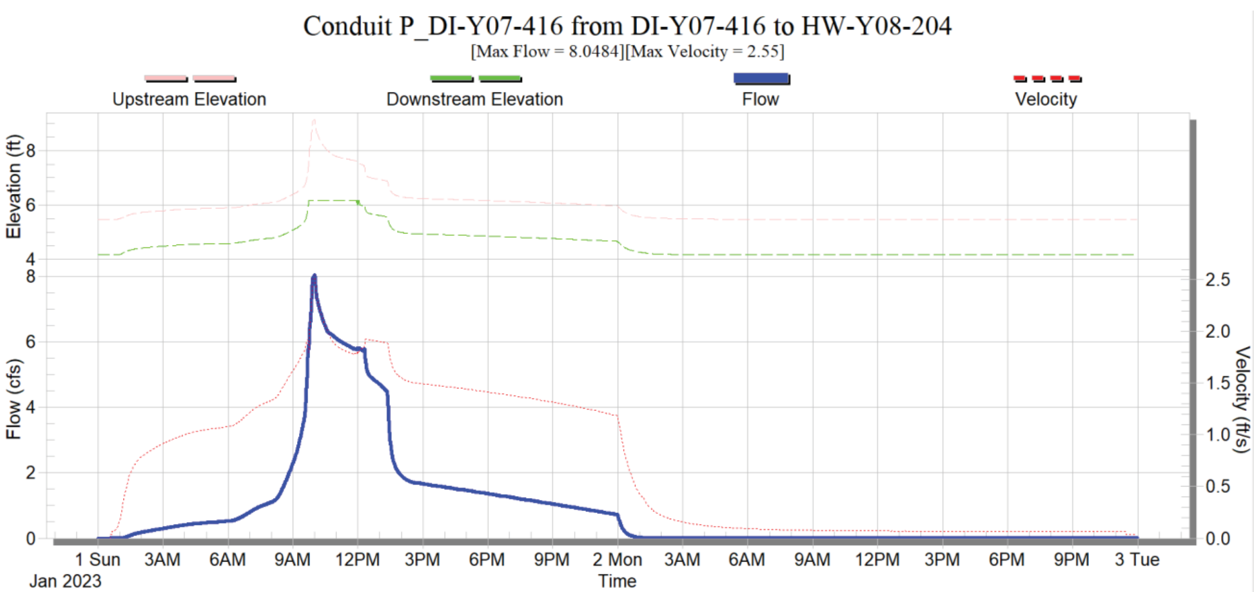
Outfall 13



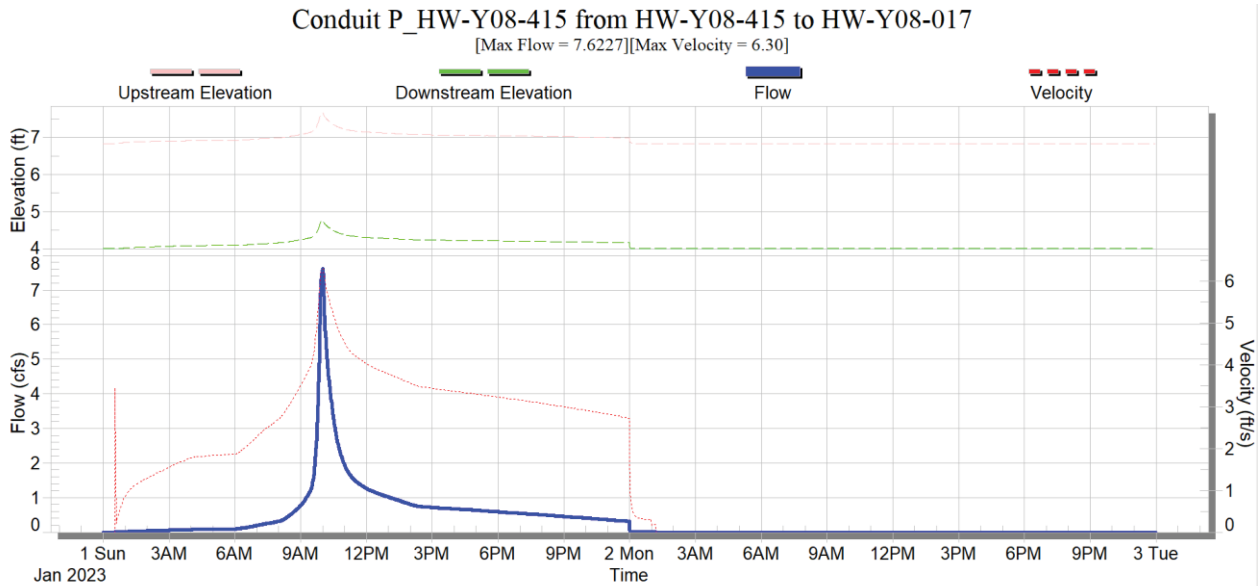
Outfall 14



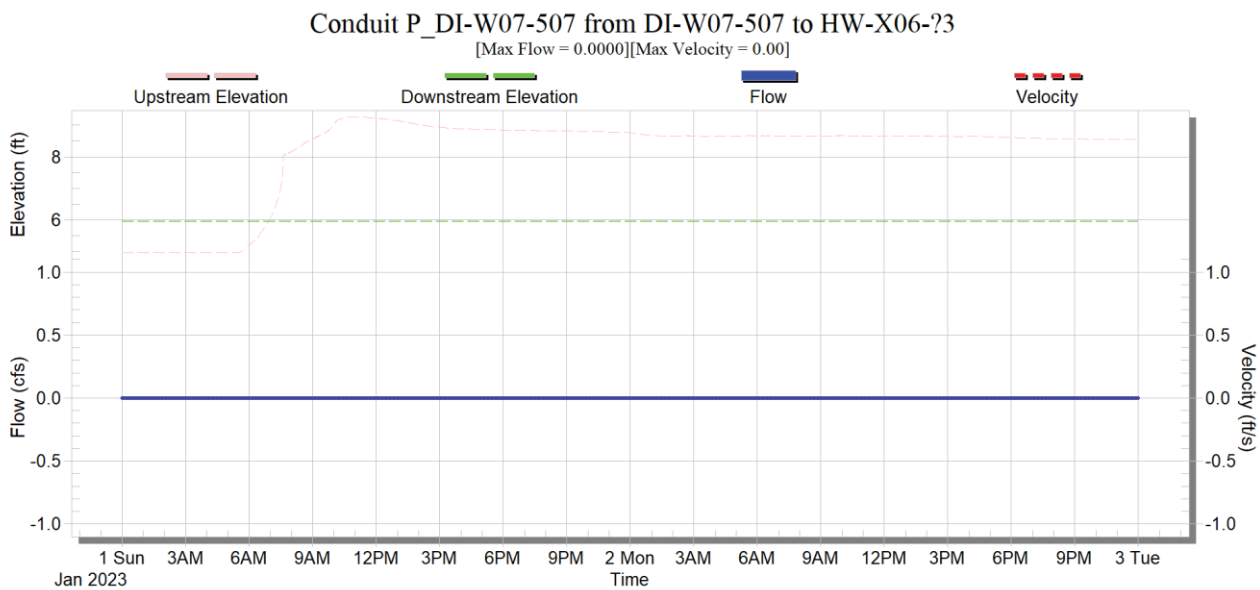
Outfall 17A



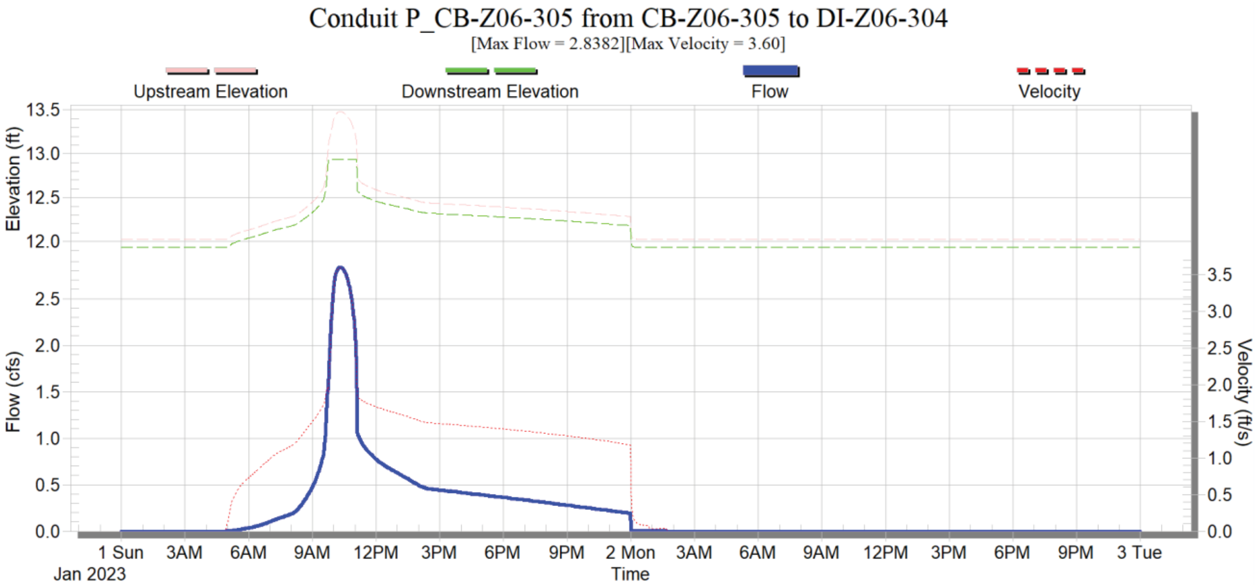
Outfall 17B



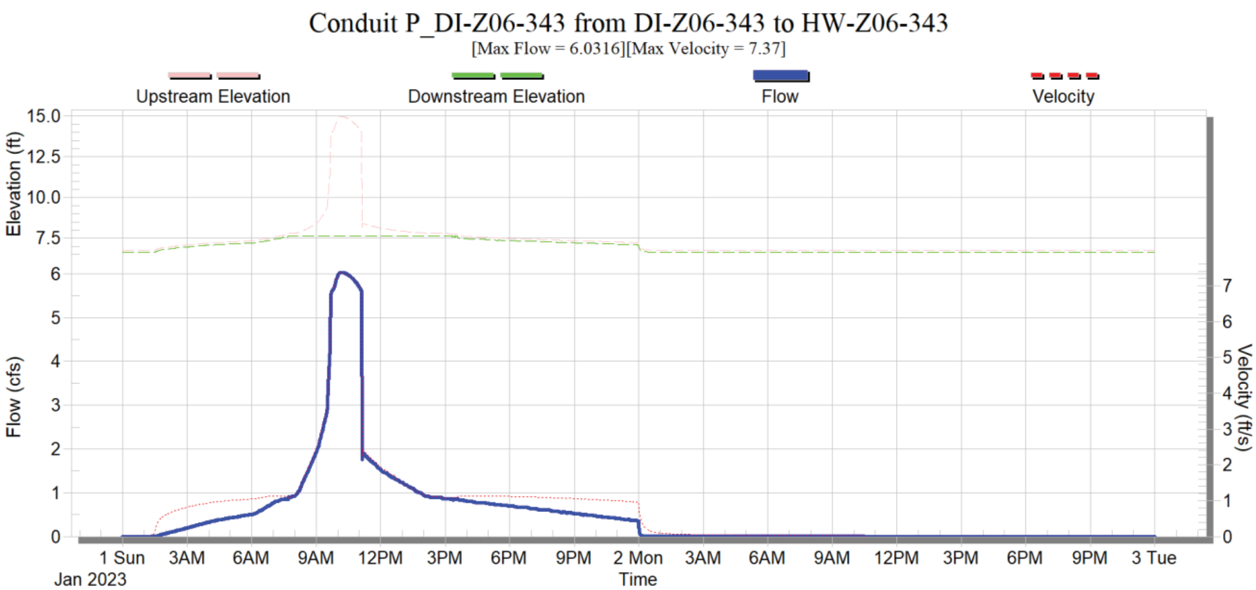
Outfall 26



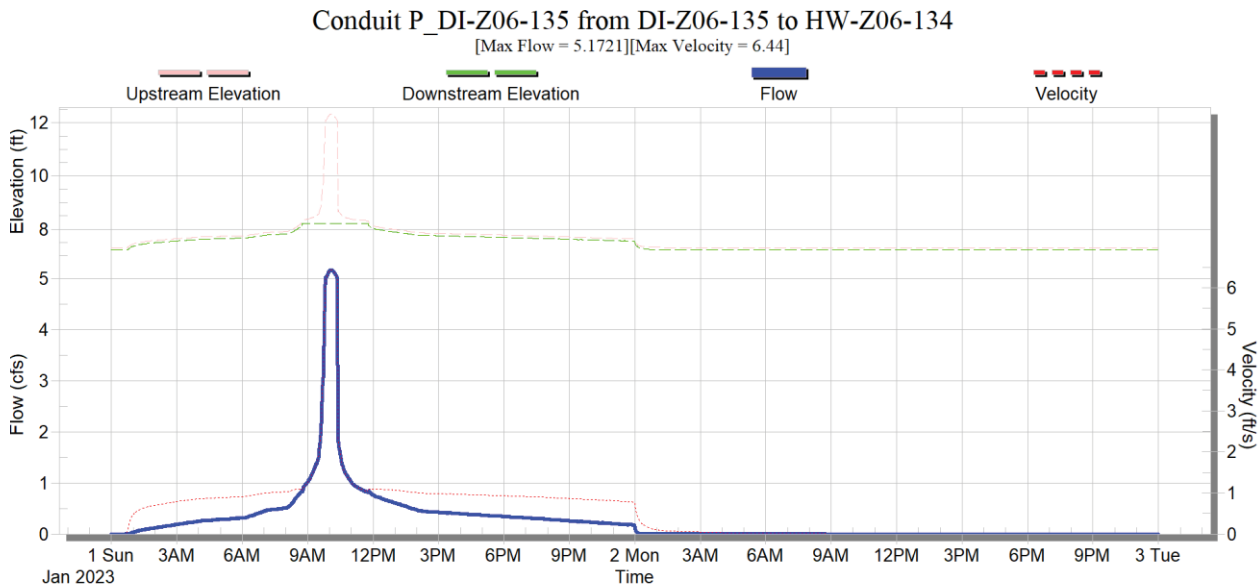
Outfall Northeast Corner



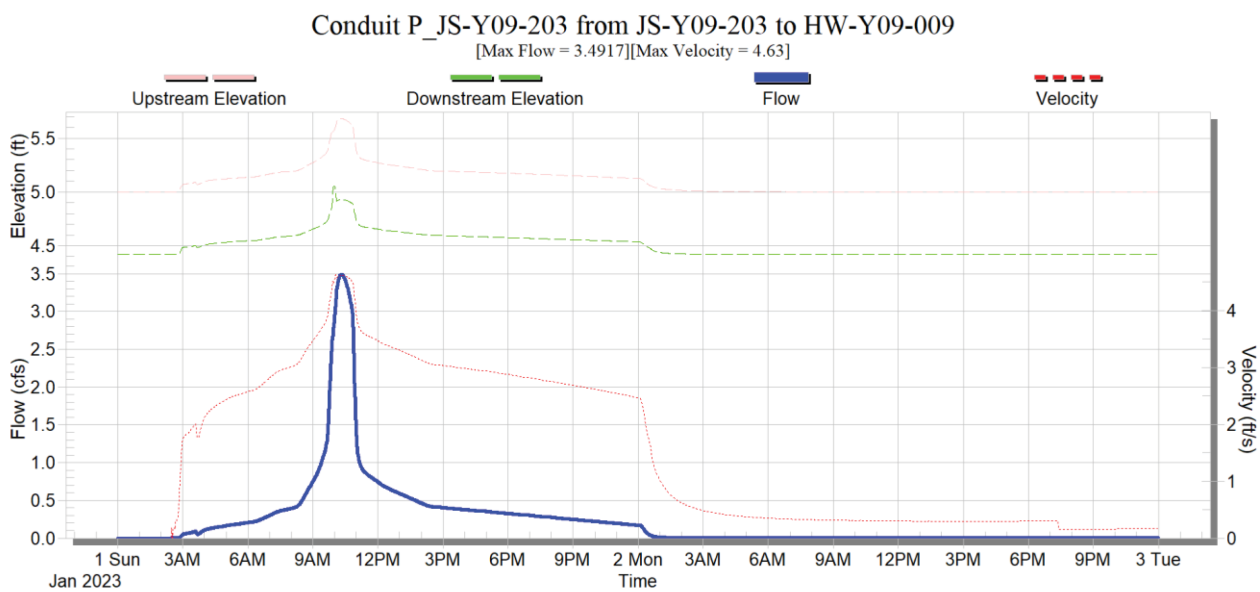
Outfall 495 Fairview – 1



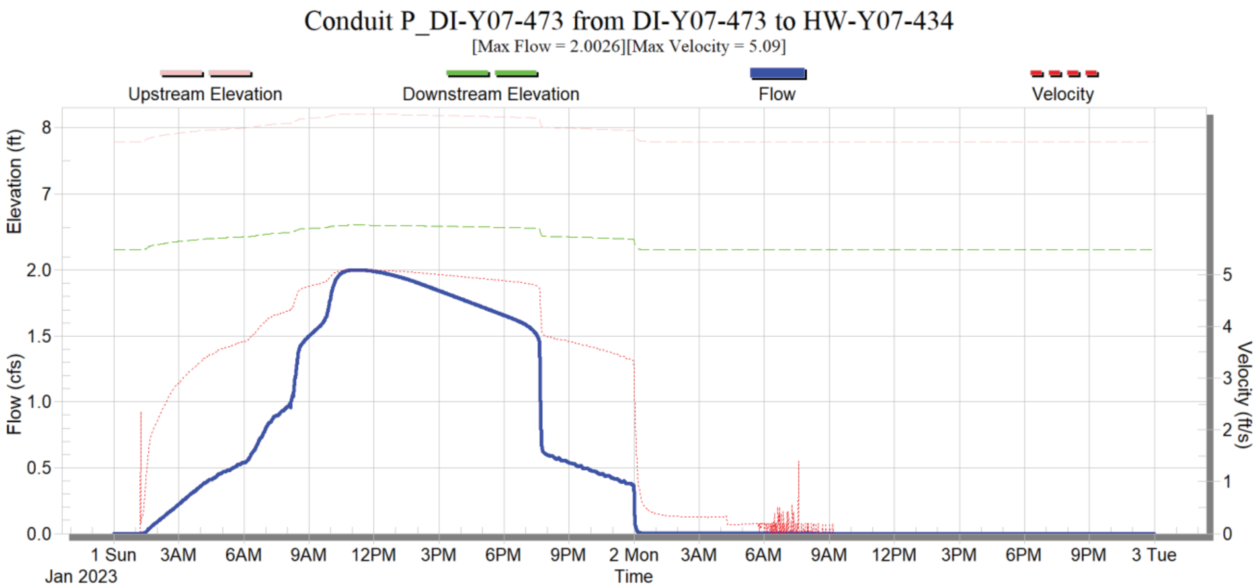
Outfall 495 Fairview – 2



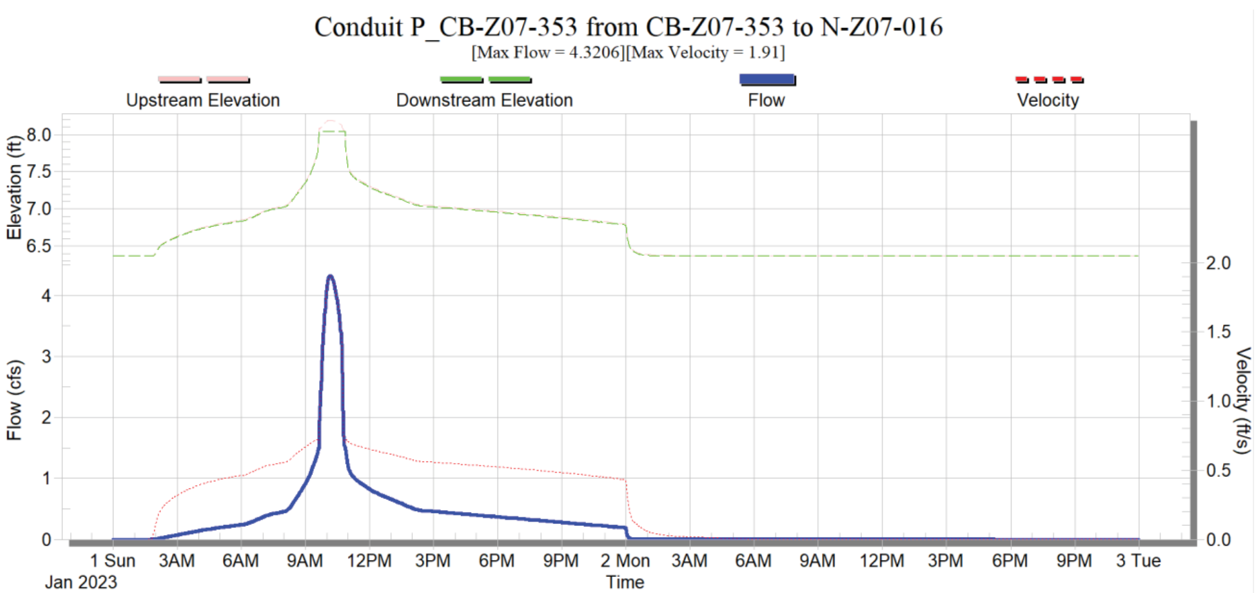
Outfall Parking A



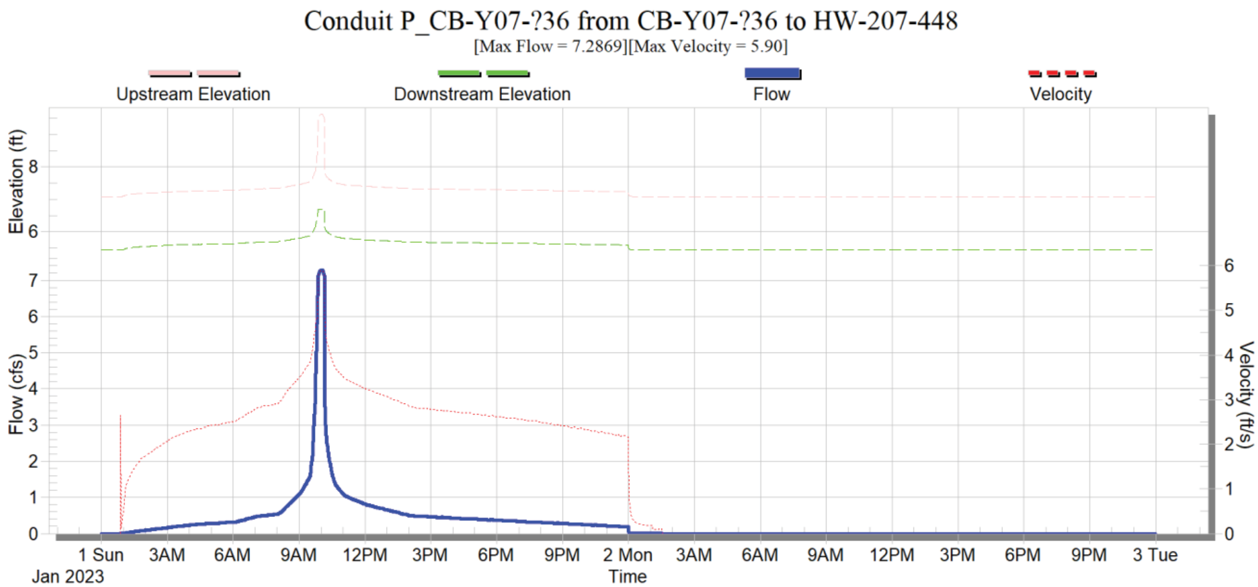
Outfall Parking B



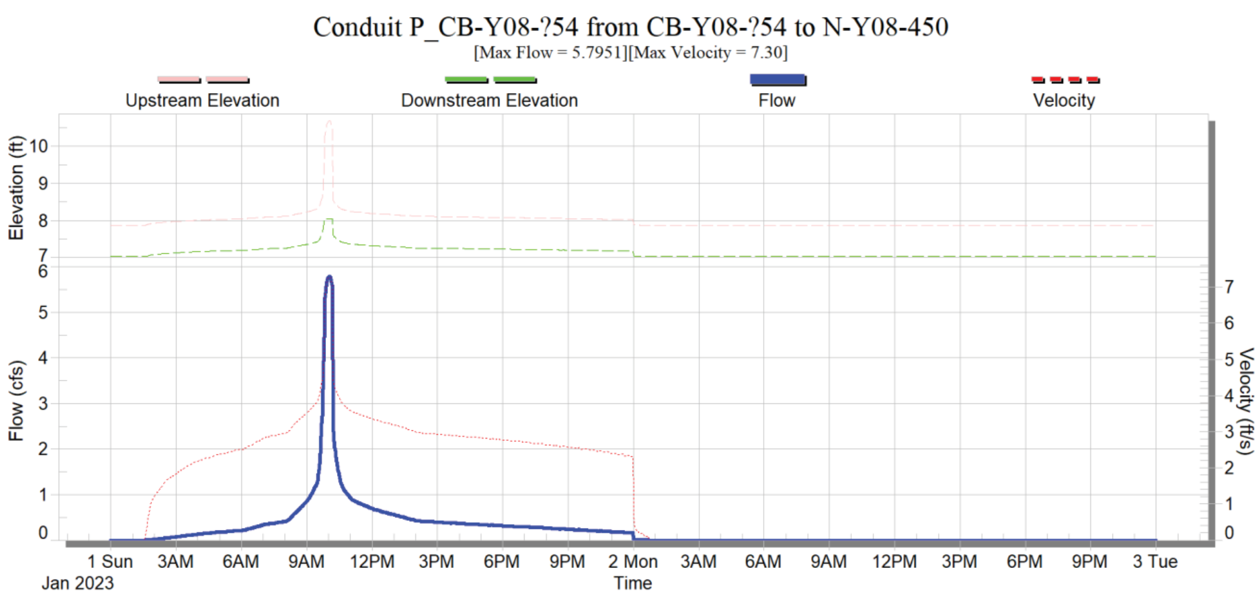
Outfall Parking C



Outfall Parking D

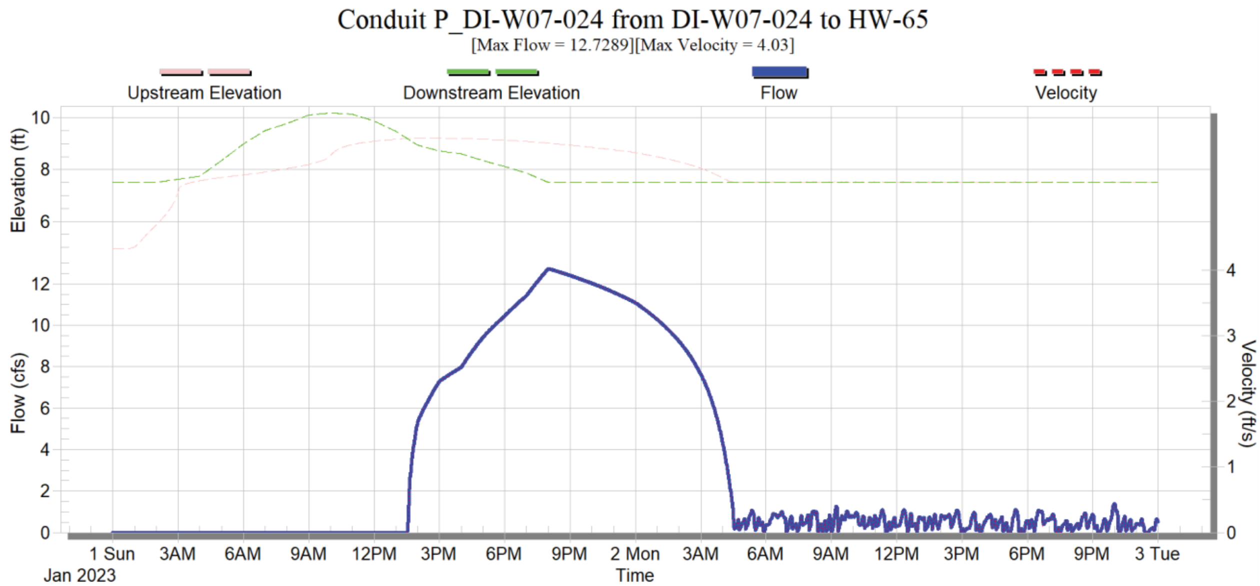


Outfall Parking E

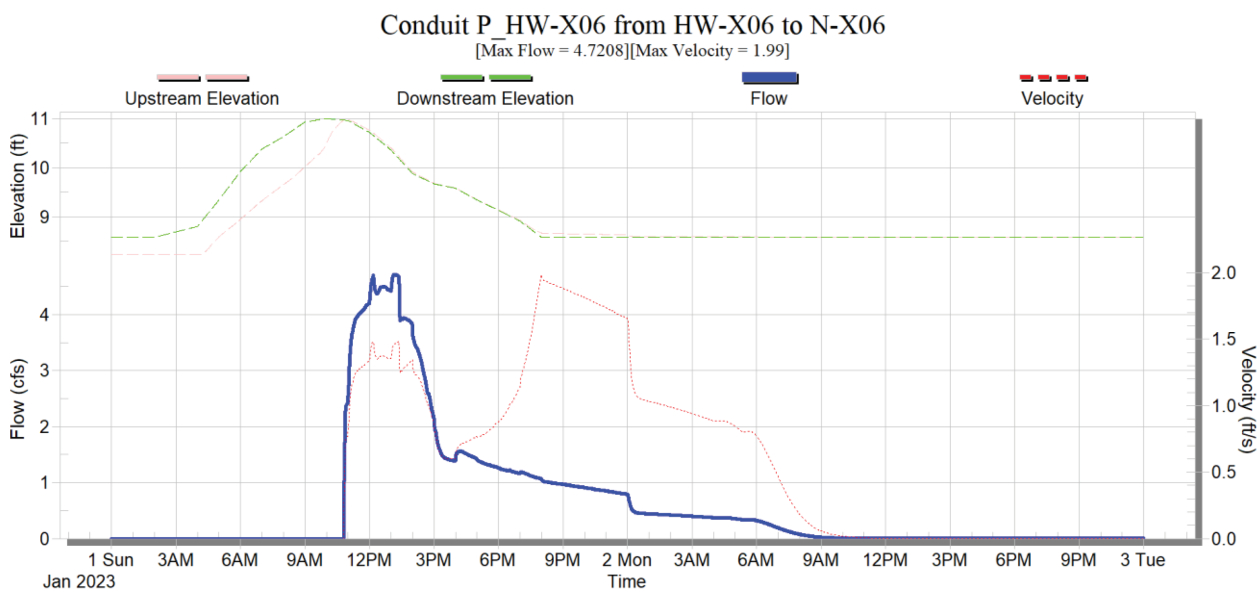


Appendix F3: 10-year Results

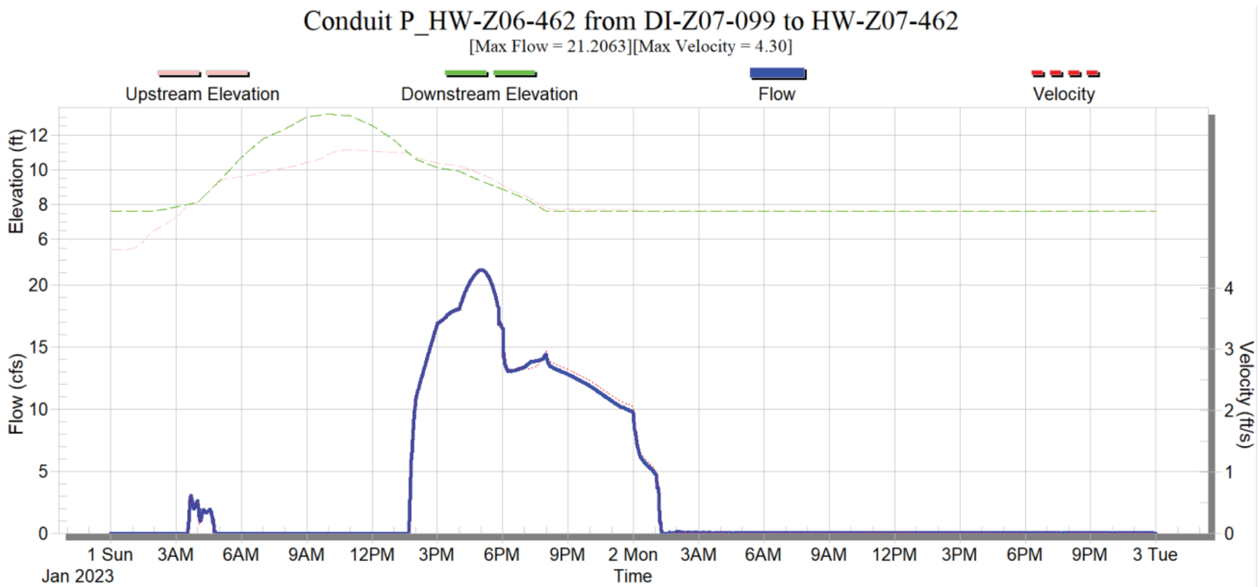
Outfall 1



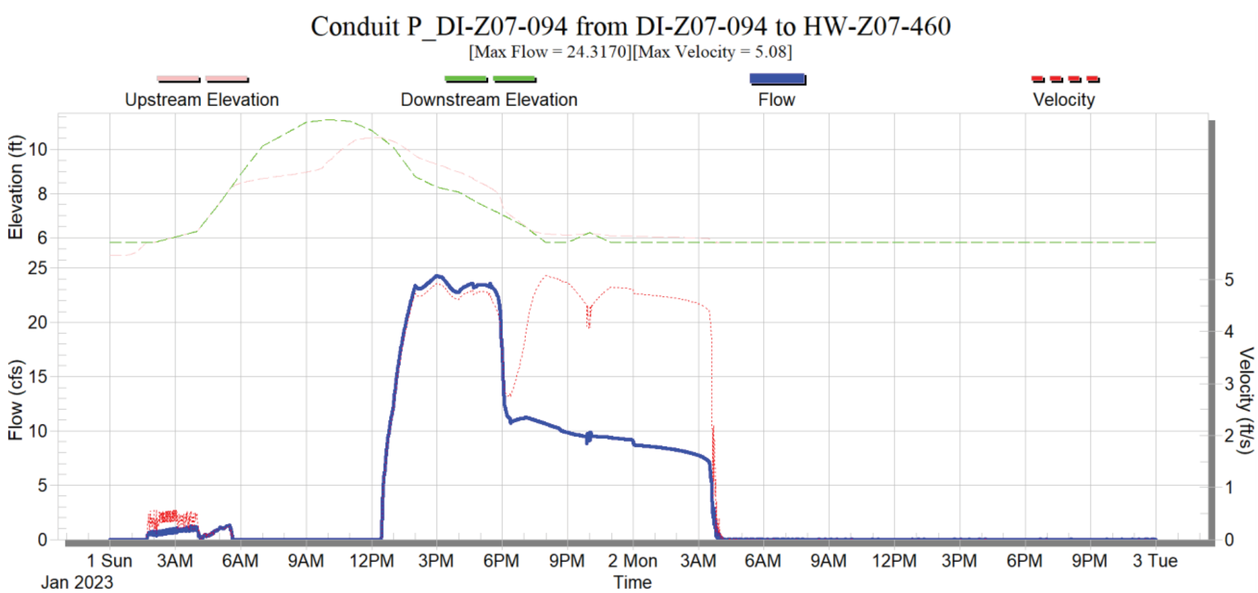
Outfall 2



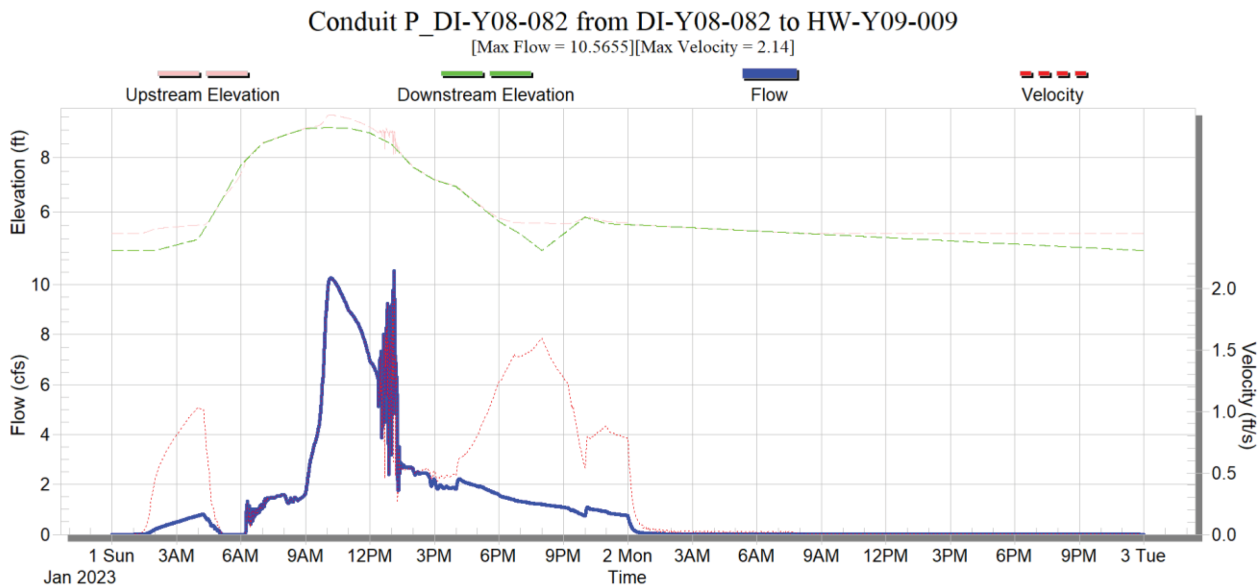
Outfall 5



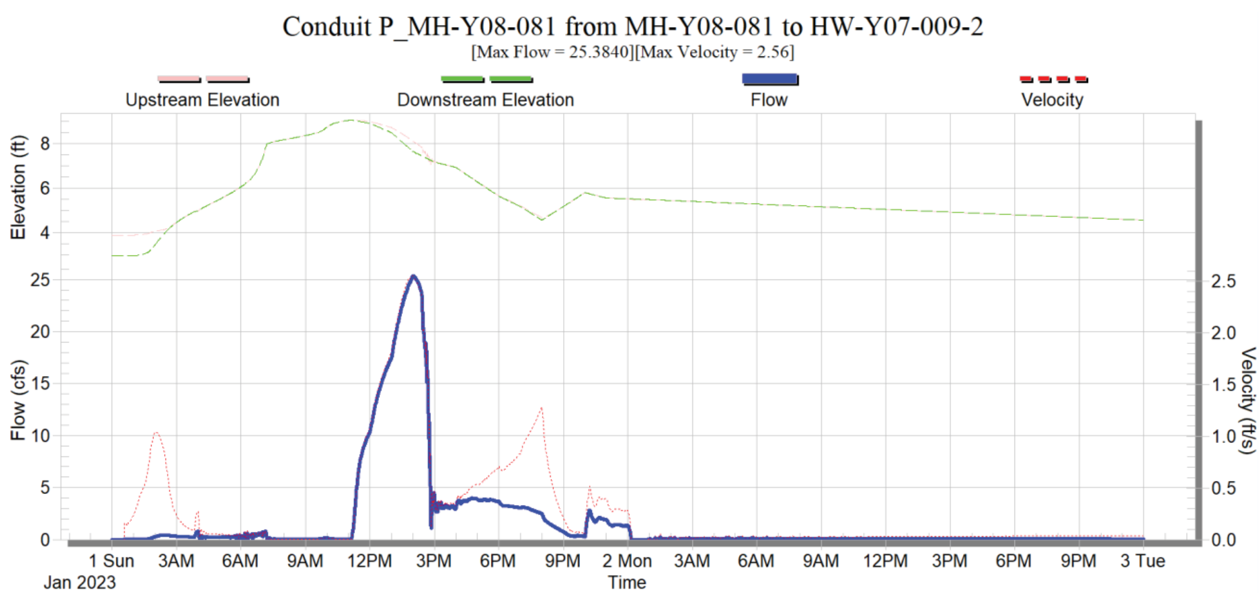
Outfall 6



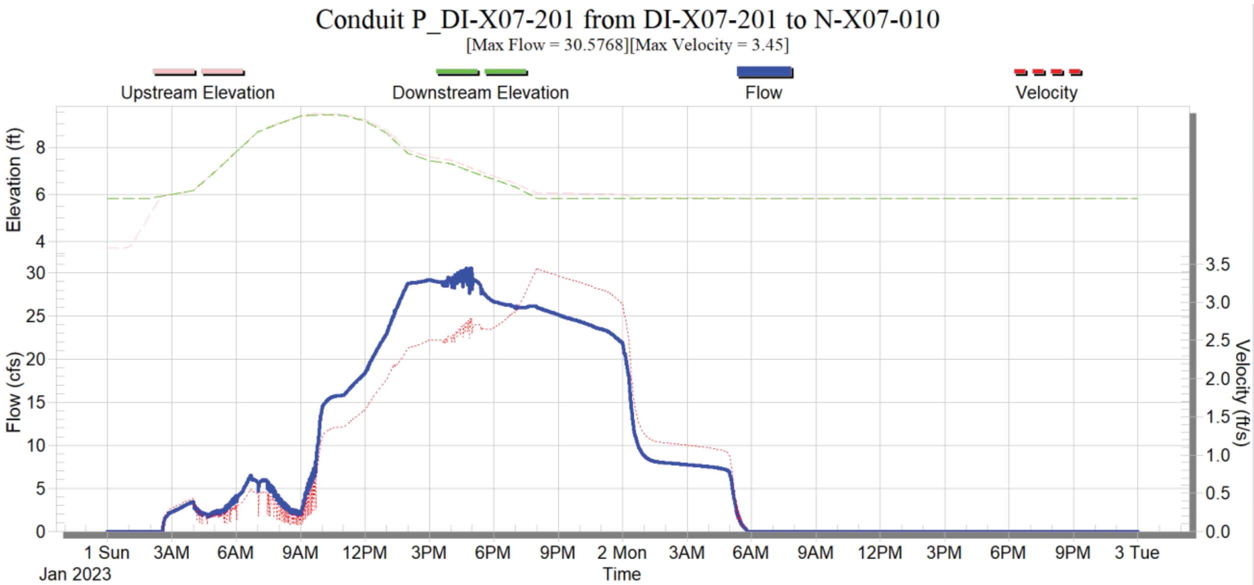
Outfall 9B



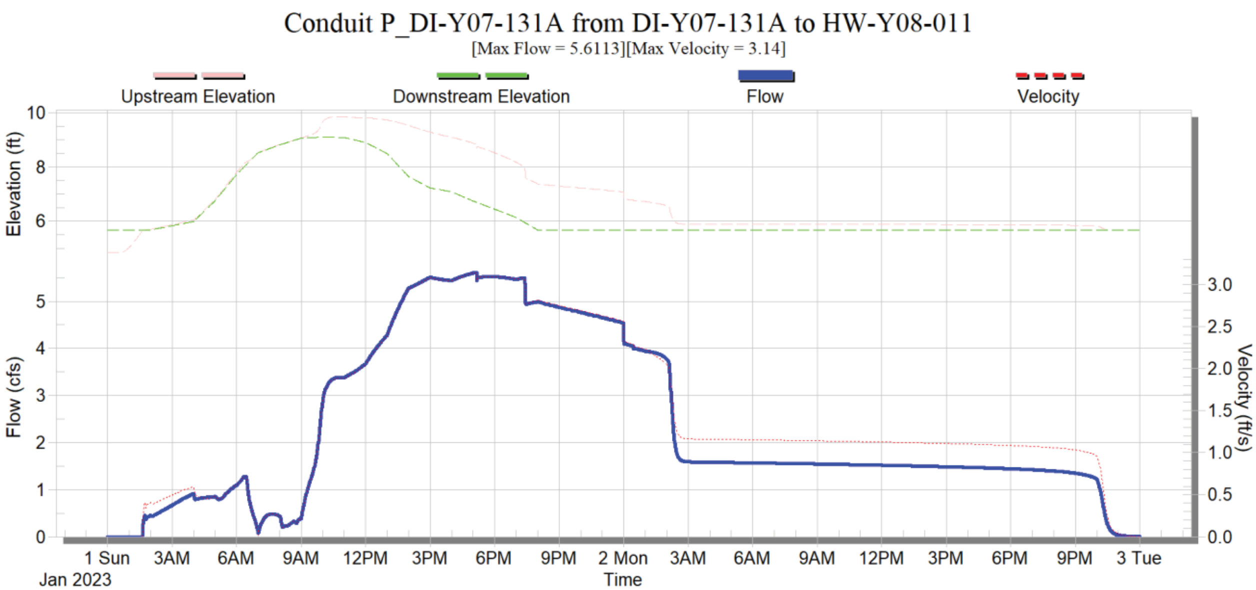
Outfall 9C



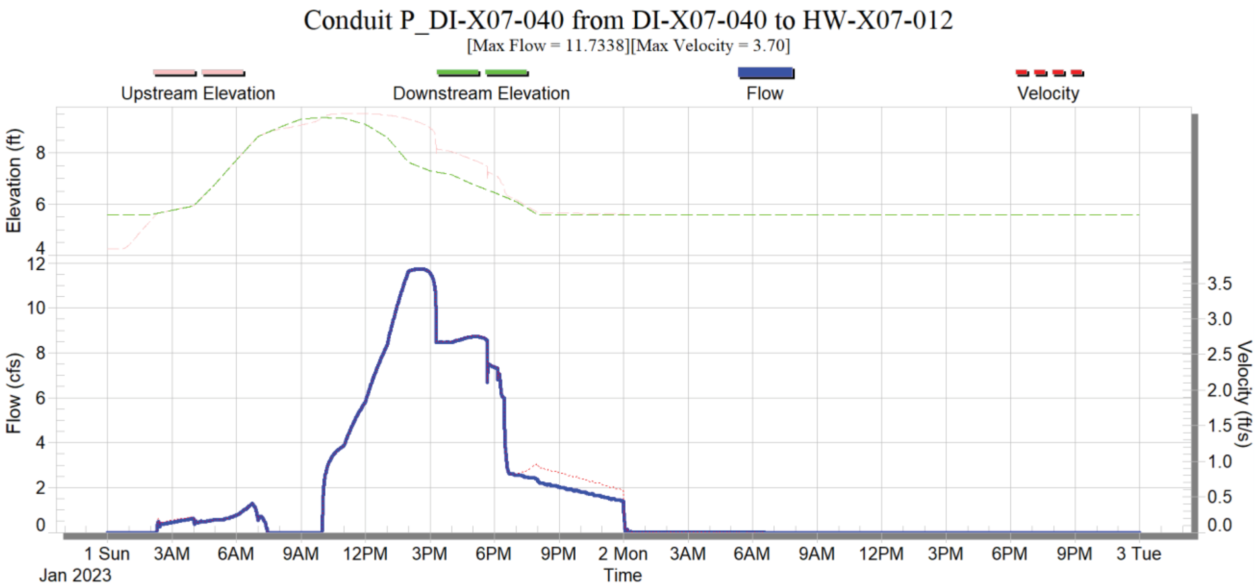
Outfall 10



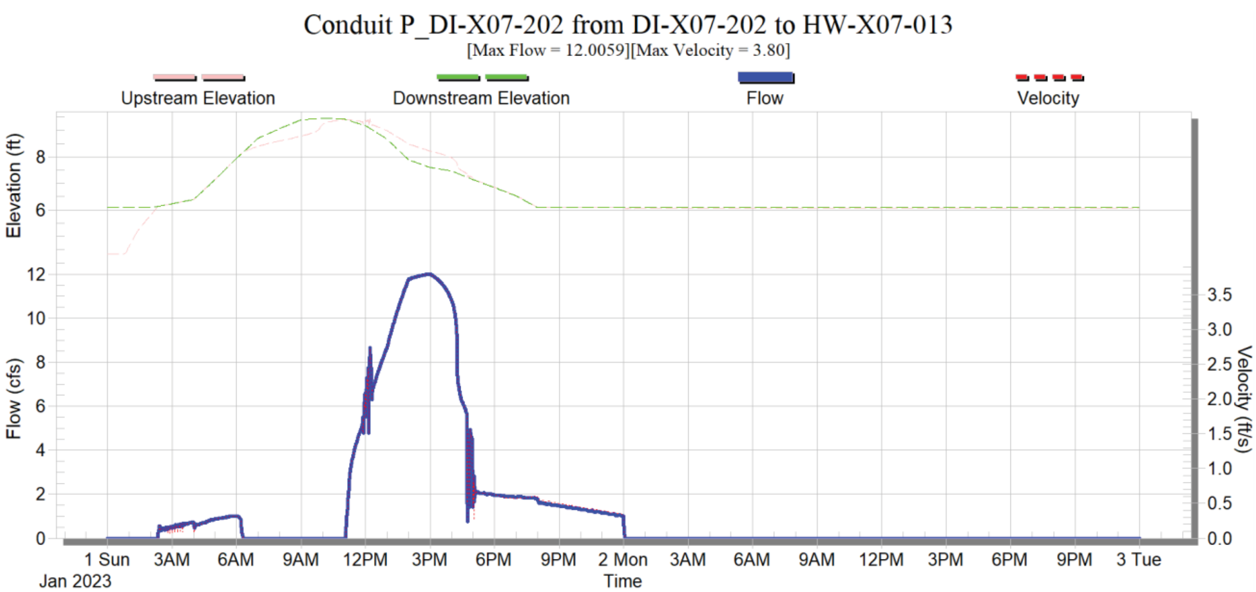
Outfall 11



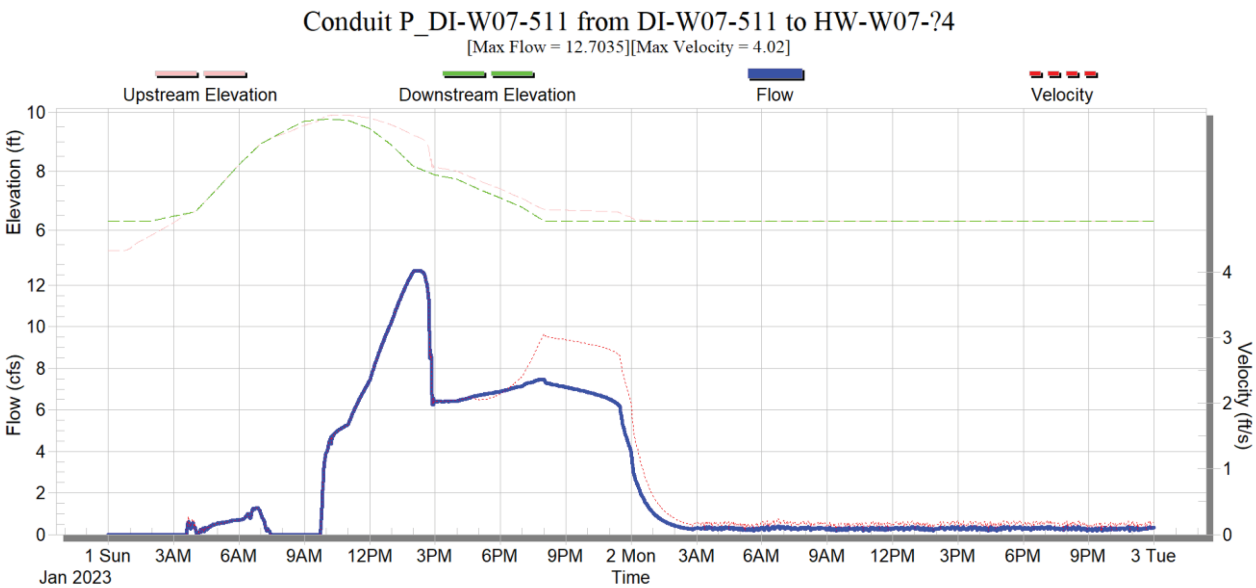
Outfall 12



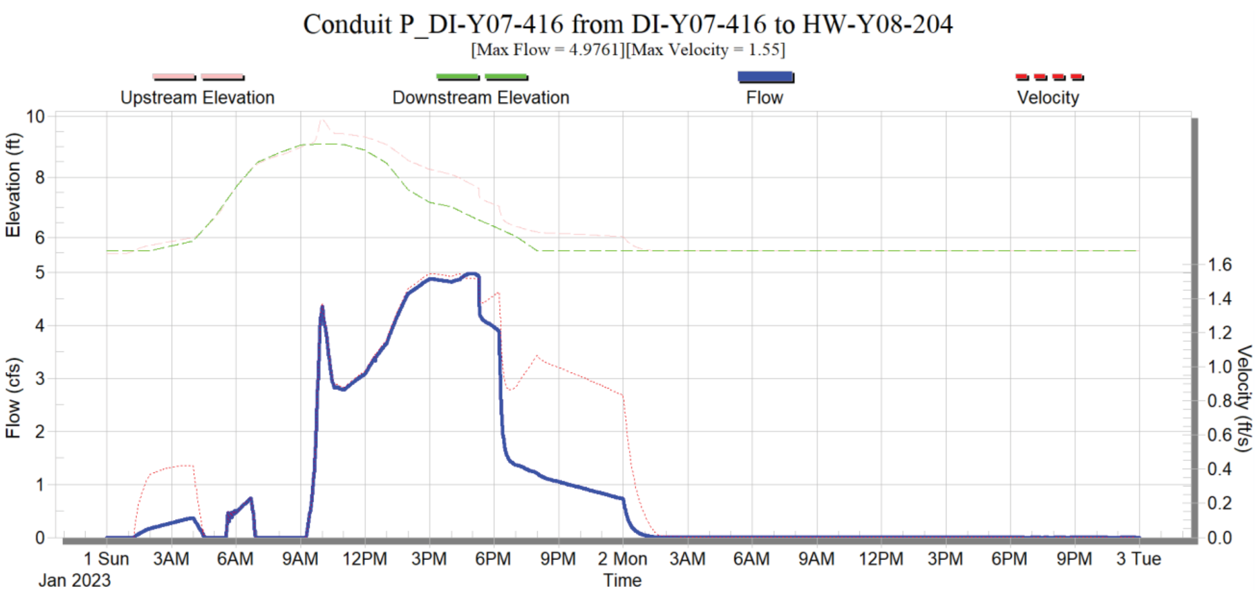
Outfall 13



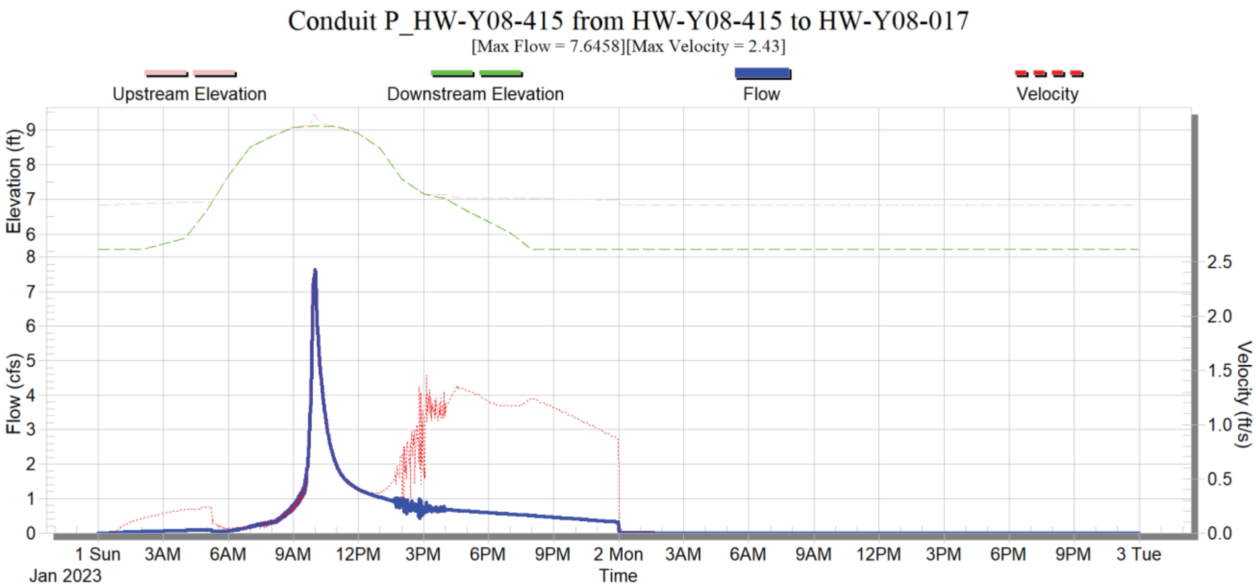
Outfall 14



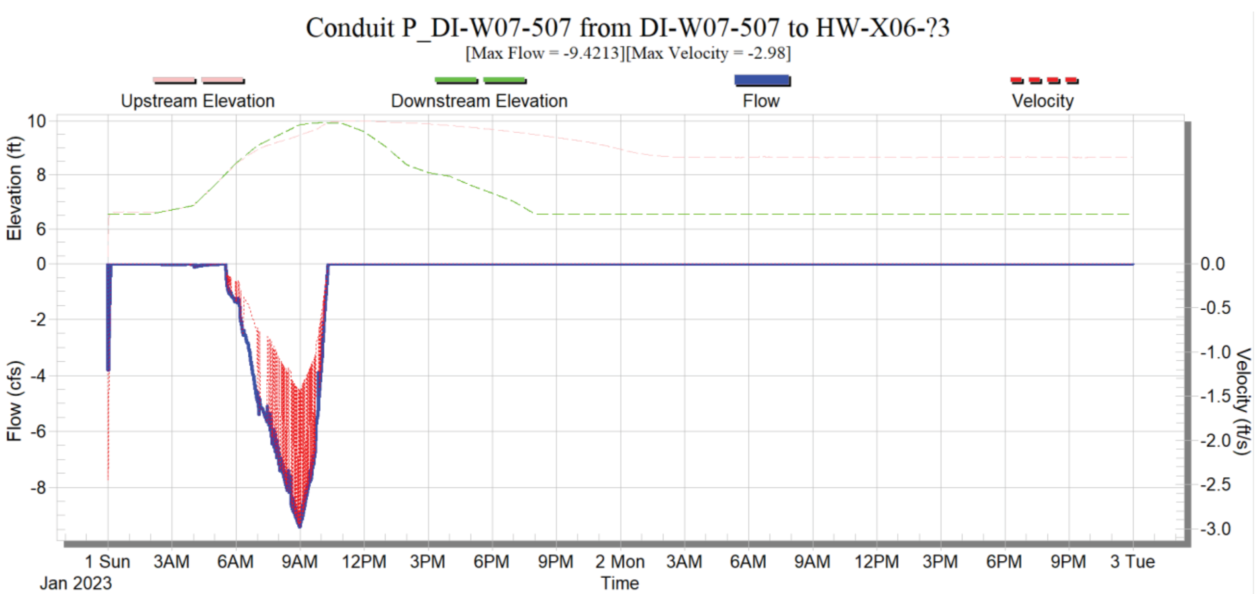
Outfall 17A



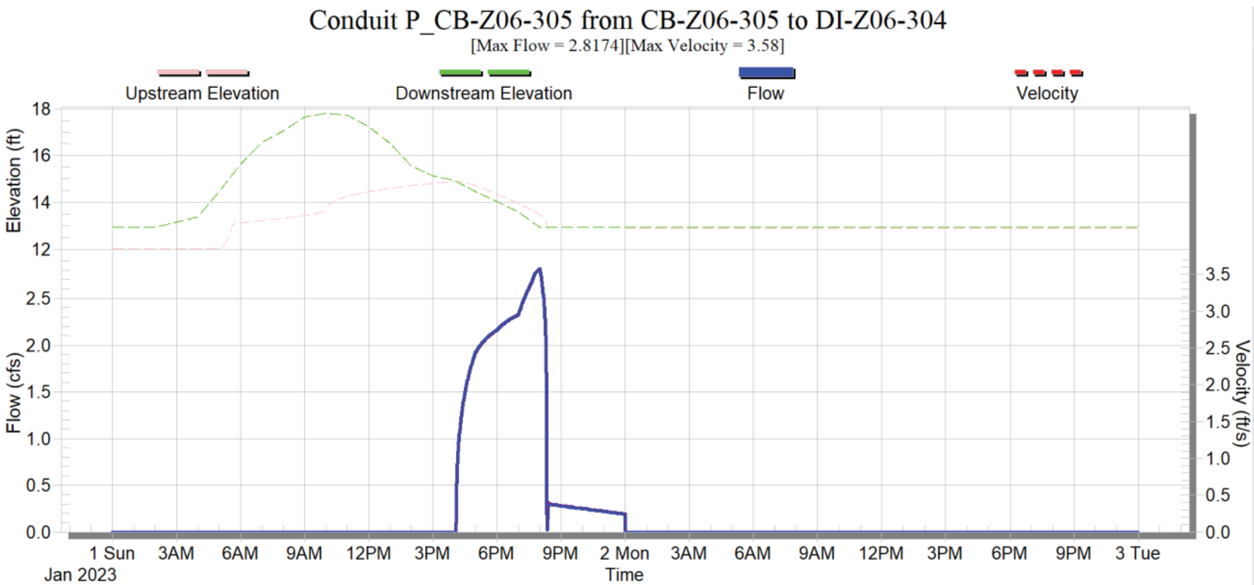
Outfall 17B



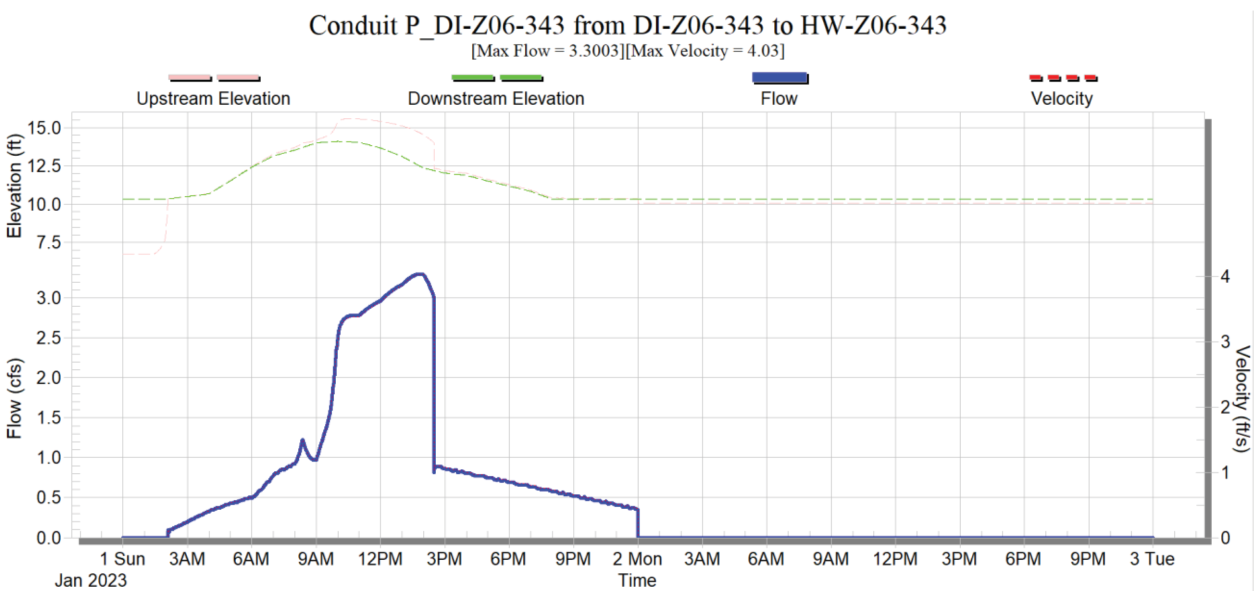
Outfall 26



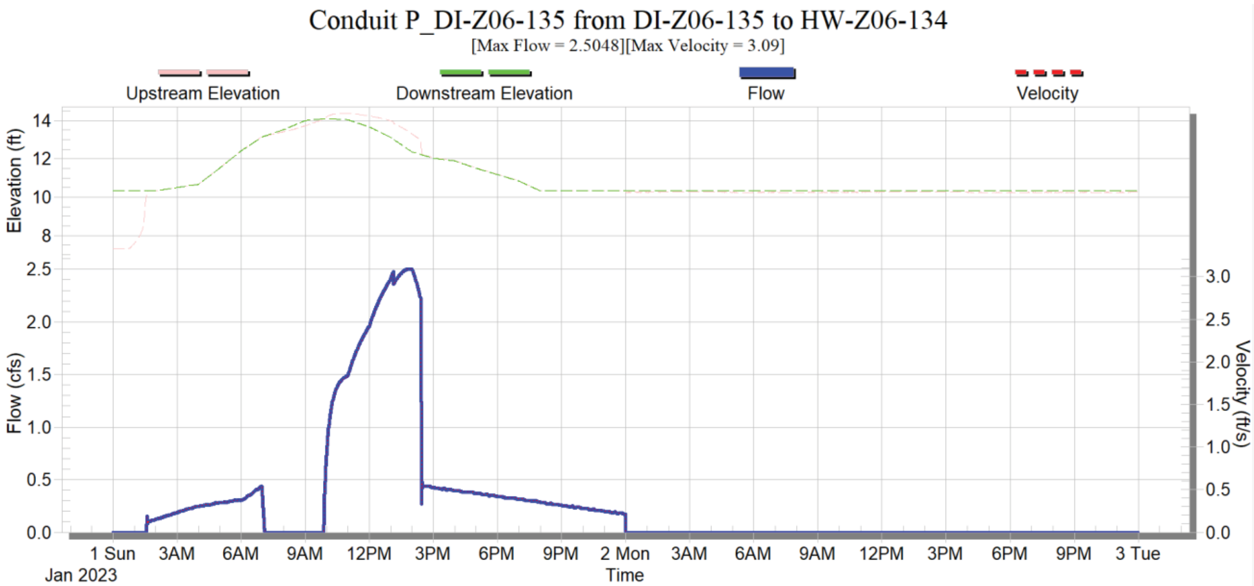
Outfall Northeast Corner



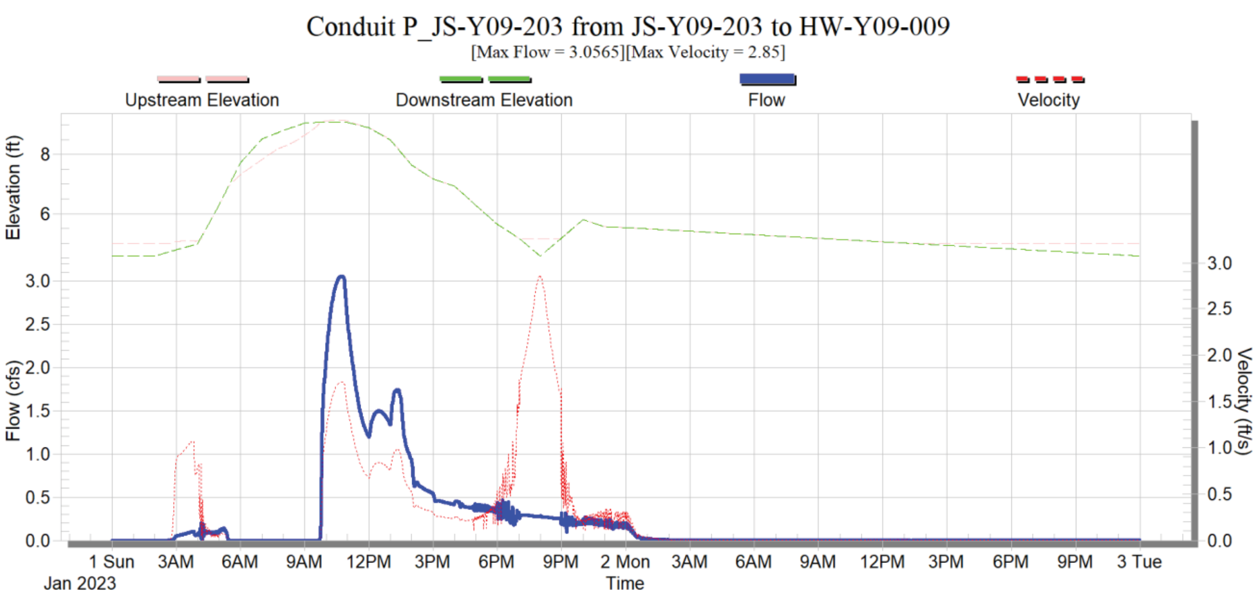
Outfall 495 Fairview – 1



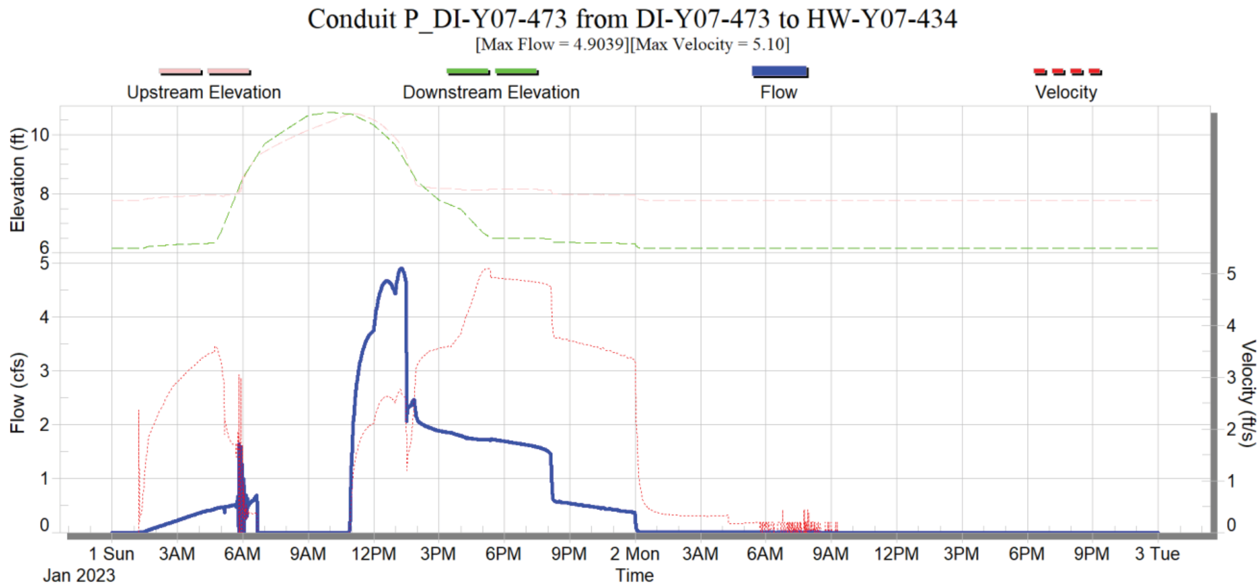
Outfall 495 Fairview – 2



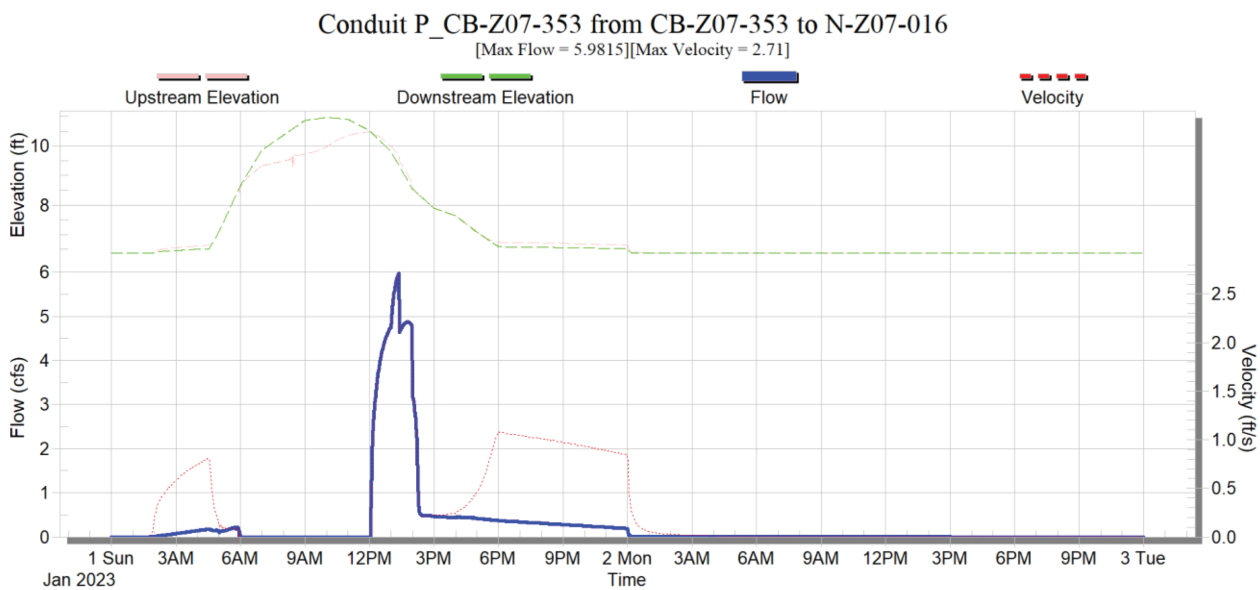
Outfall Parking A



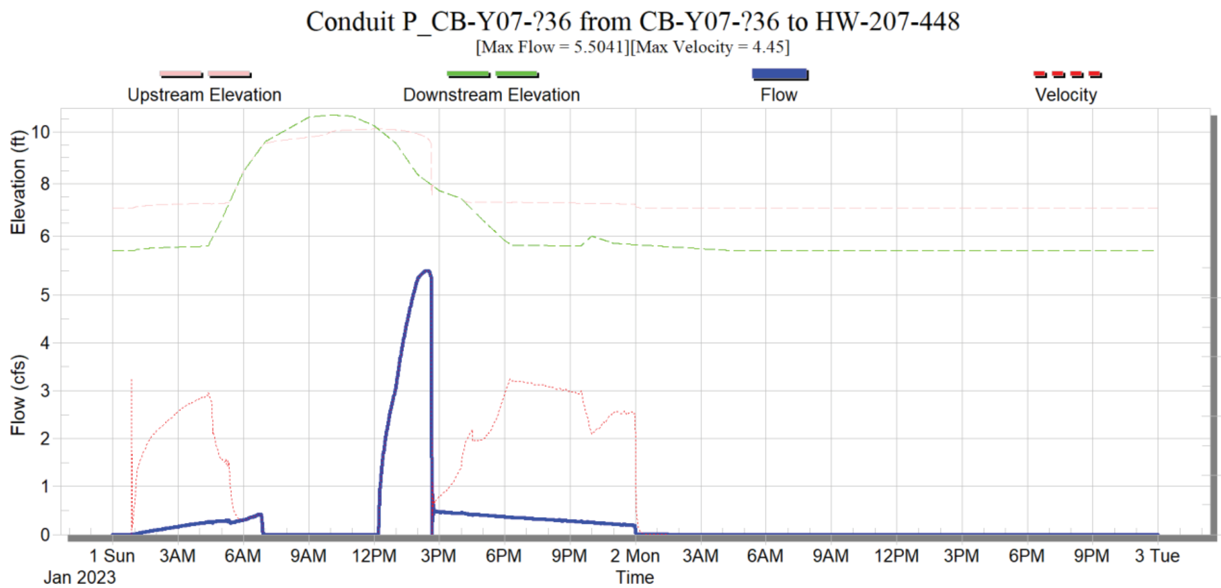
Outfall Parking B



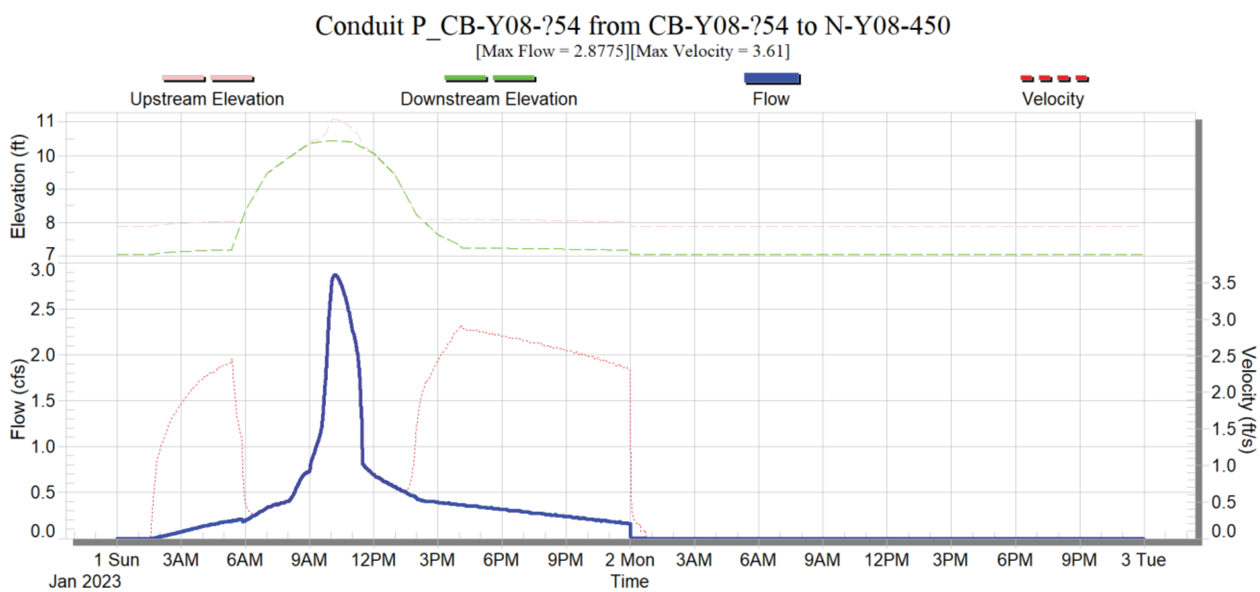
Outfall Parking C



Outfall Parking D



Outfall Parking E



Appendix G: Proposed Condition Model Inputs

Model: Proposed Conditions

Conveyance Links										Results		
										Free Discharge Conditions	5-Year Water Level Time Series	10-Year Water Level Time Series
Name	Drainage Area	Length (feet)	Shape	Diameter (Height) ft	Roughness	Upstream Invert Elevation (feet)	Downstream Invert Elevation (feet)	Conduit Slope	Design Full Flow (cfs)	Max Flow (cfs)	Max Flow (cfs)	Max Flow (cfs)
Drainage Area 1												
P_DI-W07-001	1	343	Circular	1.5	0.013	5.617	5.274	0.1	3.322	7.773	6.888	6.88
P_DI-W07-002	1	498	Circular	1.5	0.013	4.918	4.42	0.1	3.084	7.376	4.872	4.788
P_DI-W07-003	1	102	Circular	2	0.013	4.42	4.228	0.188	9.815	20.963	13.858	13.356
P_DI-W07-024	1	295	Circular	2	0.013	4.95	4.421	0.179	9.58	14.736	12.864	12.362
P_DI-X07-027	1	581	Circular	1.5	0.013	6.86	5.84	0.176	4.401	5.486	5.298	5.295
P_DI-X07-028	1	179	Circular	1.25	0.013	7.35	6.86	0.274	3.38	2.85	2.877	2.886
P_DI-X07-029	1	122	Circular	1.5	0.013	7.43	7.25	0.148	4.035	2.857	2.854	2.853
P_DI-X07-28.5	1	265	Circular	1.5	0.013	7.25	6.86	0.147	4.03	2.855	2.851	2.851
P_W07-506	1	307	Circular	1.5	0.013	5.274	4.95	0.106	3.412	3.865	0.625	0.499
P_X07-025	1	498	Circular	1.5	0.013	5.17	4.95	0.044	2.208	5.097	1.597	1.19
P_X07-026	1	496	Circular	1.5	0.013	5.84	5.17	0.135	3.861	4.105	1.961	1.938
Drainage Area 2												
P_HW-X06-509	2	50	Circular	1	0.13	9.99	9.8	0.38	0.22	0.723	0.706	0.705
P_HW-X06	2	47	Circular	2	0.013	8.23	8	0.489	15.825	6.204	6.156	6.494
P_HW-X06-502	2	50	Circular	1	0.013	8.98	8.7	0.56	2.666	6.209	5.063	4.998
Drainage Area 5												
P_DI-Y07-X	5	100	Circular	1	0.013	8.5	8	0.5	2.339	4.6	3.359	3.358
P_DI-Y06-313	5	373	Circular	2	0.013	9.65	7	0.71	19.068	7.574	9.703	9.709
P_CB-Y06-100	5	67	Circular	0.67	0.01	11.95	10.54	2.104	2.309	0.831	0.855	0.854
P_DI-Y06-060	5	405	Circular	1.5	0.013	8.64	7.96	0.168	3.997	4.491	-3.715	-3.715
P_DI-Y06-104	5	291	Circular	2.5	0.013	7.85	7	0	22.168	9.516	6.974	6.972
P_DI-Y06-105	5	54	Circular	1.5	0.013	7.96	7.92	0.074	2.859	5.465	-3.013	-4.122
P_DI-Y06-121	5	174	Circular	1.5	0.013	9.98	8.64	0.77	9.218	7.322	7.212	7.212
P_DI-Y06-313-1	5	143	Circular	2	0.013	9.65	7.96	1.182	22.836	9.58	9.703	9.709
P_DI-Y06-314	5	223	Circular	0.67	0.01	12.45	11.95	0.224	0.754	0.84	0.861	0.861
P_DI-Y06-739	5	119	Circular	1.5	0.013	7.89	7.85	0.034	1.926	5.743	2.662	5.953
P_DI-Y07-?71	5	306	Circular	2.5	0.013	8.848	5.41	1.124	43.477	3.825	3.867	3.867
P_DI-Y07-059	5	350	Circular	1.75	0.013	6.54	5.956	0.167	6.472	4.896	3.034	2.821
P_DI-Y07-096	5	534	Circular	2	0.013	5.885	5.692	0.036	4.301	6.393	4.978	4.579
P_DI-Y07-097	5	454	Circular	2	0.013	5.692	5.11	0.128	8.1	7.614	6.284	5.735
P_DI-Y07-101	5	326	Circular	2.5	0.013	6.04	5.42	0.19	17.888	30.474	19.286	19.294
P_DI-Y07-102.1	5	331	Circular	2.5	0.013	6.31	6.04	0.082	11.715	23.625	9.988	9.31
P_DI-Z06-408	5	193	Circular	0.67	0.01	11.55	10.54	0.523	1.152	1.259	1.132	1.131
P_DI-Z07-098	5	396	Circular	1.9	0.013	5.11	6.35	-0.313	11.041	9.998	6.971	6.42
P_DI-Z07-100	5	246	Circular	2.5	0.013	5.42	5.41	0.004	2.615	31.438	17.67	15.658
P_DI-Z07-453	5	274	Circular	1.9	0.013	6.35	5.41	0.343	11.556	11.134	7.213	6.611
P_HW-Y06-023	5	35	Circular	1.5	0.013	11.22	10.56	1.886	14.425	4.022	0	0
P_HW-Y06-024	5	35	Circular	1.5	0.013	11.22	10.56	1.886	0	0	0	0
P_HW-Y06-419	5	42.5	Circular	2	0.013	11.31	10.96	0.824	20.529	17.589	17.585	17.585
P_HW-Z06-462	5	154	Circular	2.5	0.013	5.41	2.64	0	55.01	47.444	20.255	18.96
P_N-Y06-594	5	71	Circular	2.5	0.013	7	6.96	0	9.736	23.382	21.282	21.296
P_N-Y06-598	5	177	Circular	1.5	0.013	7.92	7.89	0.034	1.368	5.45	-3.003	-4.193
P_N-Y06-600	5	325	Circular	2	0.013	8.5	7.38	0.345	13.28	6.763	5.911	5.891
P_N-Z06-336	5	475	Circular	1	0.013	14.21	11.22	0.629	2.827	2.783	2.697	2.698

Conveyance Links										Results		
										Free Discharge Conditions	5-Year Water Level Time Series	10-Year Water Level Time Series
Name	Drainage Area	Length (feet)	Shape	Diameter (Height) ft	Roughness	Upstream Invert Elevation (feet)	Downstream Invert Elevation (feet)	Conduit Slope	Design Full Flow (cfs)	Max Flow (cfs)	Max Flow (cfs)	Max Flow (cfs)
P_Y07-095	5	452	Circular	2	0.013	6.54	5.827	0.158	8.985	-4.224	2.99	2.619
P_Y07-103	5	350	Circular	2.5	0.013	6.96	6.31	0.186	17.676	18.029	10.38	10.346
Drainage Area 6												
P_DI-Y07-092A	6	300	Circular	1.75	0.013	5.24	4.98	0.087	4.665	11.274	13.314	13.499
P_DI-Y07-087	6	328	Circular	1.5	0.013	7.56	6.6	0.293	5.683	2.726	4.432	2.945
P_DI-Y07-088-2	6	200	Circular	1.5	0.013	8.42	8.02	0.2	4.698	3.487	4.032	3.733
P_DI-Y07-089	6	401	Circular	1.75	0.013	5.728	5.483	0.037	3.917	6.984	8.671	8.767
P_DI-Y07-091	6	255	Circular	1.5	0.013	5.91	5.49	0.165	4.263	3.938	4.181	4.26
P_DI-Y07-092A	6	53	Circular	1.5	0.013	5.483	5.483	0	0.332	3.933	5.33	5.339
P_DI-Z07-093	6	334	Circular	2.5	0.013	4.98	5.19	-0.063	10.285	14.547	23.955	24.304
P_DI-Z07-094	6	192	Circular	2.5	0.013	4.9	2.41	1.297	46.71	22.556	25.177	25.304
P_JS-Y07-090	6	300	Circular	1.75	0.013	5.483	5.24	0.081	4.51	8.595	10.645	10.758
Drainage Area 9												
P_DI-Y07-616	9B	245	Circular	0.5	0.013	6.662	6.624	0.016	0.07	-0.184	5.002	5.002
P_DI-Y07-615	9B	245	Circular	0.5	0.013	6.945	6.662	0.116	0.191	0.091	2.104	2.103
P_DI-Y07-012	9B	125	Circular	0.75	0.013	6	5.2	0.64	1.323	3.111	2.091	1.774
P_DI-Y07-615	9B	78.6	Circular	1.5	0.012	5.88	4.93	1.209	12.511	2.17	2.104	2.103
P_DI-Y07-616	9B	65	Circular	1.5	0.012	5.562	4.6	1.48	13.844	5.059	5.002	5.002
P_DI-Y08-?65	9B	253	Circular	1.33	0.012	7.5	5.325	0.86	7.656	0.726	0.758	0.768
P_DI-Y08-?67	9B	182	Circular	1.25	0.013	7	6.3	0.549	4.006	3.513	3.513	3.516
P_DI-Y08-?71	9B	33	Circular	2	0.013	6.1	6.03	0.212	10.419	7.164	-11.42	4.803
P_DI-Y08-075	9B	293	Circular	2	0.013	6.03	5.96	0.024	3.497	8.465	4.63	4.276
P_DI-Y08-076	9B	350	Circular	2	0.013	5.96	5.49	0	8.29	12.777	6.339	4.73
P_DI-Y08-079	9B	300	Circular	2.5	0.013	5.49	5.2	0.097	12.753	14.584	8.52	6.356
P_DI-Y08-082	9B	650	Circular	2.5	0.013	5.2	2.979	0.342	23.976	20.414	11.236	9.527
P_DIY08-618	9B	62	Circular	1.5	0.012	5.276	4.49	1.268	12.813	9.58	8.268	8.142
P_DI-Y08-618-2	9B	220	Circular	0.5	0.013	6.624	6.441	0	0.162	0.28	8.268	8.142
P_DI-Y08-620	9B	68	Circular	1.5	0.012	5.325	4.12	1.772	15.149	9.711	6.214	6.024
P_DI-Y08-620-2	9B	220	Circular	0.5	0.013	6.355	6.13	0	0.179	0.416	6.214	6.024
P_JS-Y08-069	9B	271	Circular	1.25	0.013	6.3	5.853	0.165	2.624	3.509	3.508	3.514
P_DI-Y07-?32	9C	176.2	Circular	2	0.012	8.02	7	0.579	18.647	6.549	0	0
P_DI-Y07-065	9c	173.5	Circular	2.5	0.012	6.97	4.93	1.176	48.183	6.573	4.313	4.314
P_DI-Y07-066	9C	80	Circular	1.33	0.012	7.05	4.93	2.65	13.442	3.265	-3.428	-3.651
P_DI-Y07-068	9C	77	Circular	1.33	0.012	6.63	4.49	2.627	13.765	6.556	5.246	5.415
P_DI-Y07-617	9C	81	Circular	1.33	0.012	7.05	4.6	3.025	14.36	-2.643	-3.596	-3.754
P_DI-Y08-073	9C	71	Circular	1.33	0.012	6.66	4.12	3.577	15.618	7.134	5.196	6.003
P_DI-Y08-074	9C	63	Circular	1.33	0.012	6.44	4.18	3.587	15.639	1.993	4.009	4.907
P_DI-Y08-077	9C	70	Circular	1.33	0.012	6.55	4.22	3.329	15.064	7.567	3.39	-3.449
P_DI-Y08-080	9C	59	Circular	1.33	0.012	5.89	4.05	0	14.582	2.084	4.735	6.145
P_DI-Y08-081	9C	50	Circular	1.33	0.012	5.64	3.89	3.5	15.448	5.005	5.173	7.716
P_JS-Y07-?2	9C	143	Circular	2	0.012	7	6.97	0.021	3.55	6.581	4.341	4.342
P_JS-Y09-203	9C	33	Circular	1.5	0.013	5	4.42	1.758	13.926	7.268	6.795	6.577
P_JS-Y07-617	9C	214	Circular	2.5	0.012	4.6	4.49	0.051	10.074	10.616	7.505	7.082
P_MH-Y07-066	9C	217	Circular	2.5	0.012	4.93	4.6	0.152	17.328	7.532	5.116	5.618
P_MH-Y07-068	9C	350	Circular	2.67	0.012	4.49	4.12	0.106	17.218	15.587	9.892	10.003
P_MH-Y08-073	9C	361	Circular	2.67	0.012	4.12	4.18	-0.017	6.827	22.188	13.164	14.429
P_MH-Y08-074	9C	289	Circular	2.67	0.012	4.18	4.22	-0.013	6.23	23.515	13.51	15.824

Conveyance Links										Results		
										Free Discharge Conditions	5-Year Water Level Time Series	10-Year Water Level Time Series
Name	Drainage Area	Length (feet)	Shape	Diameter (Height) ft	Roughness	Upstream Invert Elevation (feet)	Downstream Invert Elevation (feet)	Conduit Slope	Design Full Flow (cfs)	Max Flow (cfs)	Max Flow (cfs)	Max Flow (cfs)
P_MH-Y08-077	9C	350	Circular	3	0.012	4.22	4.05	0.049	15.925	28.543	16.38	18.684
P_MH-Y08-080	9C	301	Circular	3	0.012	4.05	3.89	0.053	16.659	29.954	18.675	22.211
P_MH-Y08-081	9C	657	Circular	3.5	0.012	3.89	2.979	0.139	40.586	34.304	20.96	27.519
Drainage Area 10												
P_DI-Y07-047	10	393	Circular	2.5	0.013	5.21	5.17	0.01	4.138	14.283	13.226	12.806
P_DI-Y06-303	10	363	Circular	1.5	0.013	13.02	12.09	0.256	5.317	6.043	6.051	6.042
P_DI-X07-035	10	173	Circular	1.25	0.013	5.42	4.04	0.798	5.769	4.33	32.375	32.434
P_DI-X07-041	10	571	Circular	3	0.013	4.59	4.04	0.096	20.7	34.634	30.884	31.453
P_DI-X07-045	10	148	Circular	1.5	0.013	6.98	5.99	0.669	8.591	7.455	6.111	5.635
P_DI-X07-046	10	217	Circular	1.5	0.013	5.99	4.92	0.493	7.376	6.425	4.398	4.185
P_DI-X07-046A	10	361	Circular	1.25	0.013	6.381	5.99	0.108	2.126	2.207	-1.013	1.211
P_DI-X07-201	10	135	Circular	3.83	0.013	3.707	3.164	0.402	81.138	35.761	32.664	32.809
P_DI-Y06-048	10	311	Circular	2.5	0.013	5.47	5.21	0.084	11.86	13.84	12.862	12.441
P_DI-Y06-049	10	201	Circular	2.5	0.013	5.46	5.47	-0.005	2.893	13.279	12.029	11.612
P_DI-Y06-301	10	254	Circular	1.5	0.013	11.18	9.94	0.488	7.339	9.603	9.221	9.216
P_DI-Y06-318	10	197	Circular	1.5	0.013	7.32	7.1	0	3.51	6.828	6.055	6.005
P_DI-Y06-319	10	300	Circular	1.5	0.013	8.04	7.32	0.24	5.146	5.74	4.876	4.849
P_DI-Y06-330	10	110	Circular	2	0.024	8.88	8.5	0.345	7.202	6.765	5.911	5.89
P_DI-Y06-331	10	156	Circular	1.5	0.024	9.94	8.88	0.679	4.69	6.767	5.91	5.891
P_DI-Y06-610	10	205	Circular	1	0.024	7.51	5.48	0.99	1.92	2.388	1.706	1.655
P_DI-Y07-?30	10	411	Circular	2	0.013	5.941	5.914	0.007	1.834	7.356	10.75	11.31
P_DI-Y07-?31	10	292	Circular	2	0.013	5.887	5.6	0.098	7.092	7.566	10.79	11.336
P_DI-Y07-044S	10	374	Circular	3	0.013	5.17	5.13	0.011	6.898	22.242	23.983	24.04
P_DI-Y07-054	10	435	Circular	1.25	0.013	7.01	5.6	0.324	3.678	1.651	2.661	2.005
P_DI-Y07-055	10	374	Circular	2.5	0.013	5.6	5.17	0.115	13.908	9.424	12.421	11.661
P_HW-Y06-612	10	33	Circular	1.5	0.013	11.7	11.5	0.606	8.178	4.711	4.711	4.711
P_N-X07-454	10	344	Circular	3	0.013	4.04	3.774	0.077	18.547	34.635	32.375	32.434
P_X07-042	10	384	Circular	3	0.013	4.92	4.59	0	19.553	28	26.257	26.581
P_Y06-050	10	300	Circular	2	0.013	5.88	5.46	0.14	8.465	8.492	7.623	8.184
P_Y06-051	10	300	Circular	2	0.013	6.28	5.88	0.133	8.261	7.792	15.441	15.221
P_Y06-053	10	121	Circular	1.5	0.013	7.94	7.49	0.372	6.406	5.903	2.985	2.878
P_Y06-145	10	150	Circular	1.5	0.013	7.1	6.74	0.24	5.146	3.795	3.766	3.799
P_Y06-211-1	10	138	Circular	1	0.024	9.03	7.94	0.79	1.715	1.401	1.074	1.037
P_Y06-211-2	10	138	Circular	1	0.024	9.03	7.94	0.79	1.715	1.401	1.074	1.037
P_Y07-043	10	301	Circular	3	0.013	5.13	4.92	0.07	17.617	22.676	24.6	25.049
P_Y07-058	10	321	Circular	1.5	0.013	6.74	5.942	0.249	5.237	6.946	8.043	8.029
Drainage Area 11												
P_DI-Y07-005	11	150	Circular	1.5	0.013	7.2	7.05	0.1	3.322	3.124	3.147	3.167
P_DI-Y07-006	11	150	Circular	1.5	0.013	7.2	7.05	0.1	3.322	2.661	2.685	2.69
P_DI-Y07-007	11	150	Circular	1.5	0.013	6.81	6.66	0.1	3.322	6.354	6.364	6.364
P_DI-Y07-008	11	150	Circular	1.5	0.013	6.7	6.55	0.1	3.322	6.063	6.02	6.02
P_DI-Y07-061	11	420	Circular	1.5	0.013	7.862	7.19	0.16	4.202	2.554	2.415	2.389
P_DI-Y07-131A	11	208	Circular	1.5	0.024	4.84	4.22	0.298	3.106	7.079	5.693	5.381
P_DI-Y07-131B	11	388	Circular	1.25	0.013	5.069	4.84	0.059	1.457	2.315	2.222	1.977
P_DI-Y08-008	11	150	Circular	1.5	0.013	5.673	5.64	0.1	1.558	1.781	1.833	2.027
P_DI-Y08-130	11	504	Circular	1.5	0.013	6.29	5.88	0.081	2.997	2.087	2.783	2.784
P_DI-Y08-132	11	496	Circular	1.5	0.024	6.08	5.546	0.108	1.868	2.365	1.551	1.574

Conveyance Links										Results		
										Free Discharge Conditions	5-Year Water Level Time Series	10-Year Water Level Time Series
Name	Drainage Area	Length (feet)	Shape	Diameter (Height) ft	Roughness	Upstream Invert Elevation (feet)	Downstream Invert Elevation (feet)	Conduit Slope	Design Full Flow (cfs)	Max Flow (cfs)	Max Flow (cfs)	Max Flow (cfs)
P_Y07-063	11	244	Circular	1.5	0.013	7.19	6.8	0.16	4.202	5.206	4.034	4.015
P_Y08-132	11	450	Circular	1.5	0.013	6.8	6.08	0.16	4.202	2.731	1.062	1.085
Drainage Area 12												
P_DI-X07-037	12	447	Circular	2	0.024	4.57	4.25	0.072	3.279	8.205	6.752	6.915
P_DI-X07-040	12	167	Circular	2	0.024	4.25	3.892	0.214	5.674	15.512	11.738	11.913
P_DI-Y07-039	12	470	Circular	1.25	0.013	6.86	6.07	0.168	2.648	3.344	3.453	3.44
P_X07-036	12	316	Circular	1.25	0.013	6.05	4.57	0	4.421	4.374	3.443	3.483
P_Y07-038	12	289	Circular	1.25	0.013	6.07	4.57	0.519	4.321	4.707	3.042	3.088
Drainage Area 13												
P_DI-X07-032	13	262	Circular	2	0.013	4.9	4.33	0.218	9.798	14.162	11.583	11.558
P_DI-X07-202	13	122	Circular	2	0.013	4.33	4.017	0.257	10.64	17.253	11.995	11.913
P_X07-031	13	300	Circular	1.25	0.013	5.8	4.9	0.3	3.285	4.363	3.139	3.048
P_X07-033	13	300	Circular	1.25	0.013	5.33	4.9	0.143	2.271	4.096	2.732	2.532
P_X07-034	13	300	Circular	1.25	0.013	6.13	5.33	0.267	3.098	3.264	1.57	2.01
Drainage Area 14												
P_DI-W07-?2	14	509	Circular	2	0.013	5.652	5.331	0.063	5.681	11.526	4.851	6.389
P_DI-W07-504A	14	400	Circular	1.25	0.013	5.944	5.421	0.131	2.336	1.906	1.981	1.753
P_DI-W07-504A(2)	14	203	Circular	1.5	0.013	5.392	5.415	-0.011	1.118	3.003	2.783	2.526
P_DI-W07-504B	14	300	Circular	1.5	0.013	5.407	5.308	0.033	1.908	3.716	3.53	3.277
P_DI-W07-511	14	259	Circular	2	0.013	5.298	4.223	0.415	14.574	18.762	10.116	12.515
P_DI-X.1	14	264	Circular	1.25	0.013	5.879	5.69	0.072	1.728	5.208	1.697	2.297
P_W07-510	14	294	Circular	1.5	0.013	5.588	5.308	0.095	3.242	3.201	8.365	8.963
Drainage Area 17												
P_DI-Y07-131E	17	228	Circular	1.5	0.013	5.821	5.727	0.041	2.133	4.255	-4.981	-4.567
P_DI-Y07-131F	17	212	Circular	1.5	0.013	5.726	5.54	0.088	2.889	4.934	4.554	4.413
P_DI-Y07-416	17	671	Circular	2	0.024	5.47	4.17	0.194	5.394	7.98	5.086	4.884
P_HW-Y08-415	17	190	Circular	2	0.013	6.83	4.01	1.484	25.592	7.698	7.705	7.71
P_Y07-131C	17	200	Circular	1.25	0.013	6.061	5.873	0.094	1.839	2.426	2.363	2.377
P_Y07-131D	17	300	Circular	1.25	0.013	5.845	5.826	0.006	0.514	3.216	3.073	3.056
Drainage Area 26												
P_DI-W07-?1	26	165	Circular	1.5	0.013	5.29	4.966	0.196	4.655	1.695	-1.568	-1.905
P_DI-W07-507	26	89	Circular	2	0.013	4.966	4.8	0.187	9.77	15.494	-6.426	-8.992
P_W07-509	26	300	Circular	1.25	0.013	6.4	5.67	0.243	3.187	3.683	1.146	1.18
P_WO7-508	26	300	Circular	1.5	0.013	5.641	4.966	0.225	4.983	7.427	0.618	-1.489
495 Fairview Hangars												
P_DI-Z06-134	495 FAIRVIEW	58	Circular	1	0.013	7.33	7.3	0.052	0.81	5.162	2.402	2.484
P_DI-Z06-135	495 FAIRVIEW	170	Circular	1	0.013	7.3	7.22	0.047	0.773	5.162	2.167	2.487
P_DI-Z06-343	495 FAIRVIEW	241	Circular	1	0.013	6.74	6.62	0.05	0.795	6.031	3.282	3.298
Northeast Corner												
P_CB-Z06-305	NE CORNER	56	Circular	1	0.013	12.489	12.4	0.159	1.42	0.539	2.46	2.828
Parking Areas												
P_DI-Y07-010	PARKING A	100	Circular	1.5	0.013	9.5	9.37	0.394	3.787	11.841	11.842	11.841
P_DI-Y08-481	PARKING A	36	Circular	1	0.024	9.37	9.14	0.639	1.543	4.711	4.705	4.668
P_HW-Y08-483	PARKING A	33	Circular	1.5	0.013	9.25	9.16	0	5.486	4.711	4.704	4.645
P_HW-Y08-485	PARKING A	33	Circular	1.5	0.013	8.86	8.65	0.636	8.38	4.709	4.679	4.474
P_HW-Y08-487	PARKING A	33	Circular	1.5	0.013	8.26	8.14	0.364	6.334	4.708	4.499	4.224
P_HW-Y08-489	PARKING A	331	Circular	1.5	0.013	6.7	5	0.514	7.528	4.704	4.524	4.493

Conveyance Links										Results		
										Free Discharge Conditions	5-Year Water Level Time Series	10-Year Water Level Time Series
Name	Drainage Area	Length (feet)	Shape	Diameter (Height) ft	Roughness	Upstream Invert Elevation (feet)	Downstream Invert Elevation (feet)	Conduit Slope	Design Full Flow (cfs)	Max Flow (cfs)	Max Flow (cfs)	Max Flow (cfs)
P_CB-Y07-439	PARKING B	280	Circular	1	0.024	8.37	7.78	0.211	0.886	0.678	0	0
P_DI-Y07-473	PARKING B	80	Circular	1.5	0.013	7.78	6.16	2.025	14.948	0.678	0	0
P_CB-Z07-353	PARKING C	98	Circular	1.67	0.013	6.37	6.37	0	0.442	2.399	5.877	5.918
P_DI-Z07-428	PARKING C	89	Circular	1	0.013	8.24	6.82	1.596	4.5	2.399	3.028	3.241
P_CB-Y07-?36	PARKING D	190	Circular	1.25	0.013	7.08	5.439	0.864	6.003	2.777	2.982	2.937
P_CB-Y08-?54	PARKING E	70	Circular	1	0.013	7.88	7.04	1.2	3.903	2.862	3.547	2.947

Model: Proposed Conditions

Structure Nodes					Results		
					Free Discharge Conditions	5-Year Water Level Time Series	10-Year Water Level Time Series
Name	Drainage Area	Subcatchment	Area (acres)	Impervious Percentage %	Max Water Elevation (feet)	Max Water Elevation (feet)	Max Water Elevation (feet)
Drainage Area 1							
DI-W07-001	1	1	6.623	3	10.094	10.161	10.35
DI-W07-001	1	2	1.459	100	0	0	0
DI-W07-002	1	1	7.686	8	9.786	10.239	10.308
DI-W07-002	1	2	3.192	100	0	0	0
DI-W07-024	1	1	2.948	0	8.449	9.186	9.378
DI-W07-024	1	2	1.504	100	0	0	0
DI-W07-506	1	1	1.455	0	8.451	9.186	9.378
DI-W07-506	1	2	1.453	100	0	0	0
DI-X07-025	1	1	3.051	0	8.465	9.186	9.378
DI-X07-025	1	2	1.744	100	0	0	0
DI-X07-026	1	1	2.314	0	8.662	9.187	9.379
DI-X07-026	1	2	2.003	100	0	0	0
DI-X07-027	1	1	2.037	0	10.138	10.139	10.167
DI-X07-027	1	2	1.752	100	0	0	0
DI-X07-028	1	1	2.982	0	10.471	10.481	10.52
DI-X07-028	1	2	2.347	100	0	0	0
DI-X07-029	1	1	3.947	7	10.872	10.872	10.898
DI-X07-029	1	2	3.33	100	0	0	0
Drainage Area 2							
HW-X06-502	2	1	6.097	38	11.026	11.687	12.015
HW-X06-509	2	1	4.022	61	12.598	12.6	12.62
Drainage Area 5							
DI-Y06-003	5	1	0.383	57	0	0	0
DI-Y06-060	5	1	1.772	0	11.154	11.3	11.525
DI-Y06-060	5	2	0.836	100	0	0	0

Structure Nodes					Results		
					Free Discharge Conditions	5-Year Water Level Time Series	10-Year Water Level Time Series
Name	Drainage Area	Subcatchment	Area (acres)	Impervious Percentage %	Max Water Elevation (feet)	Max Water Elevation (feet)	Max Water Elevation (feet)
DI-Y06-103	5	1	1.264	5	11.335	11.775	12.034
DI-Y06-104	5	1	0.757	27	11.681	11.904	12.181
DI-Y06-105	5	1	3.159	21	11.609	11.714	11.946
DI-Y06-121	5	1	7.889	100	11.973	11.973	11.994
DI-Y06-313	5	1	3.286	92	11.952	12.117	12.398
DI-Y06-314	5	1	0.485	45	13.403	13.501	13.676
DI-Y06-739	5	1	0.799	20	11.664	11.988	12.104
DI-Y07-?71	5	1	0.543	0	9.349	11.045	11.148
DI-Y07-?71	5	2	1.026	100	0	0	0
DI-Y07-059	5	1	5.452	20	10.087	10.35	10.533
DI-Y07-095	5	1	2.553	0	10.051	10.343	10.523
DI-Y07-095	5	2	1.697	100	0	0	0
DI-Y07-096	5	1	2.978	0	10.057	10.345	10.525
DI-Y07-096	5	2	3.286	100	11.952	12.117	12.398
DI-Y07-101	5	1	5.273	25	10.513	11.746	12.013
DI-Y07-102	5	1	7.155	19	10.89	11.754	12.02
DI-Y07-X	5	1	4.676	84	12.254	12.394	12.648
DI-Z06-408	5	1	2.265	24	13.172	13.189	13.432
DI-Z07-098	5	1	6.783	0	10.108	10.426	10.625
DI-Z07-098	5	2	1.561	100	9.339	9.737	9.893
DI-Z07-099	5	1	1.404	0	7.168	11.027	11.127
DI-Z07-099	5	2	0.558	100	0	0	0
DI-Z07-100	5	1	3.285	16	8.696	11.036	11.086
DI-Z07-453	5	1	1.512	0	8.861	10.959	11.062
DI-Z07-453	5	2	0.528	100	0	0	0
HW-Y06-024	5	1	3.206	92	0	0	0
HW-Y06-410	5	1	1.846	24	12.305	12.433	12.76
HW-Y06-414	5	1	1.537	31	12.365	12.481	12.829

Structure Nodes					Results		
					Free Discharge Conditions	5-Year Water Level Time Series	10-Year Water Level Time Series
Name	Drainage Area	Subcatchment	Area (acres)	Impervious Percentage %	Max Water Elevation (feet)	Max Water Elevation (feet)	Max Water Elevation (feet)
HW-Y06-419	5	1	14.803	58	12.667	12.731	13.07
N-Z06-336	5	1	2.356	83	15.05	15.053	15.451
Drainage Area 6							
DI-Y07-087	6	1	0.945	100	10.043	10.194	10.372
DI-Y07-088	6	1	1.799	0	9.977	10.194	10.372
DI-Y07-088	6	2	2.025	100	0	0	0
DI-Y07-089	6	1	2.988	0	9.46	10.193	10.372
DI-Y07-089	6	2	5.559	100	0	0	0
DI-Y07-091	6	1	1.433	98	9.355	10.191	10.369
DI-Y07-092	6	1	1.621	0	8.377	10.266	10.44
DI-Y07-092	6	2	0.554	100	0	0	0
DI-Y07-092A	6	1	2.877	96	9.309	10.185	10.36
DI-Z07-093	6	1	1.399	0	7.091	10.414	10.613
DI-Z07-093	6	2	0.828	100	0	0	0
DI-Z07-094	6	1	2.536	0	6.618	10.373	10.539
DI-Z07-094	6	2	1.784	100	0	0	0
JS-Y07-090	6	1	2.877	96	9.309	10.185	10.36
Drainage Area 9							
DI-Y07-615	9B	1	0.736	98	8.763	9.213	9.452
DI-Y07-616	9B	1	2.017	99	8.919	9.385	9.638
DI-Y08-?65	9B	1	0.266	100	9.019	9.484	9.828
DI-Y08-?67	9B	1	1.23	97	10.028	10.685	10.912
DI-Y08-?71	9B	1	0.805	98	8.814	9.509	9.6
DI-Y08-012	9B	1	2.949	100	10.5	10.5	10.5
DI-Y08-075	9B	1	0.967	94	8.797	9.507	9.597
DI-Y08-076	9B	1	2.313	90	8.543	9.467	9.54
DI-Y08-079	9B	1	0.899	79	7.541	9.453	9.529
DI-Y08-082	9B	1	1.315	82	7.14	9.401	9.462

Structure Nodes					Results		
					Free Discharge Conditions	5-Year Water Level Time Series	10-Year Water Level Time Series
Name	Drainage Area	Subcatchment	Area (acres)	Impervious Percentage %	Max Water Elevation (feet)	Max Water Elevation (feet)	Max Water Elevation (feet)
DI-Y08-618	9B	1	5.146	94	9.018	9.482	9.826
DI-Y08-620	9B	1	2.085	93	9.01	9.479	9.821
DI-Y07-?32	9C	1	1.499	0	8.817	9.225	9.5
DI-Y07-?32	9C	2	0.679	100	0	0	0
DI-Y07-066	9C	1	1.121	0	8.729	9.212	9.383
DI-Y07-066	9C	2	0.659	100	0	0	0
DI-Y07-068	9C	1	0.705	0	8.597	9.212	9.382
DI-Y07-068	9C	2	0.068	100	0	0	0
DI-Y07-617	9C	1	0.537	0	8.677	9.212	9.383
DI-Y07-617	9C	2	0.047	100	0	0	0
DI-Y08-073	9C	1	1.381	0	8.597	9.212	9.382
DI-Y08-073	9C	2	0.115	100	0	0	0
DI-Y08-074	9C	1	0.791	0	8.022	9.211	9.382
DI-Y08-074	9C	2	0.248	100	0	0	0
DI-Y08-077	9C	1	0.959	0	8.02	9.111	9.178
DI-Y08-077	9C	2	0.301	100	0	0	0
DI-Y08-080	9C	1	0.9	0	7.086	9.111	9.178
DI-Y08-080	9C	2	0.321	100	0	0	0
DI-Y08-081	9C	1	1.021	0	6.61	9.111	9.178
DI-Y08-081	9C	2	0.62	100	0	0	0
JS-Y09-203	9C	1	6.774	26	6.116	9.398	9.492
Drainage Area 10							
DI-X07-035	10	1	1.931	0	9.003	9.727	9.83
DI-X07-035	10	2	1.106	100	0	0	0
DI-X07-041	10	1	2.621	0	9.338	10.046	10.172
DI-X07-041	10	2	1.363	100	0	0	0
DI-X07-042	10	1	2.535	0	9.5	10.053	10.177
DI-X07-042	10	2	1.328	100	0	0	0

Structure Nodes					Results		
					Free Discharge Conditions	5-Year Water Level Time Series	10-Year Water Level Time Series
Name	Drainage Area	Subcatchment	Area (acres)	Impervious Percentage %	Max Water Elevation (feet)	Max Water Elevation (feet)	Max Water Elevation (feet)
DI-X07-045	10	1	10.79	89	10.521	10.538	10.587
DI-X07-046	10	1	0.337	0	10.113	10.318	10.404
DI-X07-046	10	2	0.687	100	0	0	0
DI-X07-046A	10	1	0.476	0	10.132	10.339	10.44
DI-X07-046A	10	2	1.204	100	0	0	0
DI-X07-201	10	1	0.692	11	6.061	9.447	9.446
DI-X07-201	10	2	0.453	100	0	0	0
DI-Y06-048	10	1	0.431	0	10.116	10.446	10.609
DI-Y06-048	10	2	0.293	100	0	0	0
DI-Y06-049	10	1	2.452	10	10.264	10.487	10.618
DI-Y06-050	10	1	3.545	0	10.265	10.487	10.618
DI-Y06-050	10	2	0.203	100	0	0	0
DI-Y06-051	10	1	6.874	25	11.263	11.333	11.636
DI-Y06-053	10	1	2.2	98	11.344	11.385	11.58
DI-Y06-145	10	1	1.494	0	10.037	10.364	10.533
DI-Y06-145	10	2	0.345	100	0	0	0
DI-Y06-211	10	1	6.075	98	11.344	11.386	11.58
DI-Y06-303	10	1	10.068	64	15.393	15.393	15.501
DI-Y06-318	10	1	2.532	0	10.463	10.742	10.941
DI-Y06-318	10	2	0.083	100	0	0	0
DI-Y06-319	10	1	1.031	0	11.11	11.298	11.524
DI-Y06-319	10	2	0.475	100	0	0	0
DI-Y06-610	10	1	7.818	79	10.937	10.938	10.965
DI-Y07-?30	10	1	2.932	0	10.001	10.36	10.532
DI-Y07-?30	10	2	1.71	100	0	0	0
DI-Y07-?31	10	1	0.678	0	10.047	10.341	10.522
DI-Y07-?31	10	2	1.493	100	0	0	0
DI-Y07-043	10	1	1.983	0	9.552	10.057	10.18

Structure Nodes					Results		
					Free Discharge Conditions	5-Year Water Level Time Series	10-Year Water Level Time Series
Name	Drainage Area	Subcatchment	Area (acres)	Impervious Percentage %	Max Water Elevation (feet)	Max Water Elevation (feet)	Max Water Elevation (feet)
DI-Y07-043	10	2	1.49	100	0	0	0
DI-Y07-044S	10	1	1.224	0	9.756	10.184	10.341
DI-Y07-044S	10	2	1.916	100	0	0	0
DI-Y07-047	10	1	1.639	0	9.919	10.38	10.594
DI-Y07-047	10	2	1.006	100	0	0	0
DI-Y07-054	10	1	1.581	0	9.993	10.362	10.533
DI-Y07-054	10	2	1.538	100	0	0	0
DI-Y07-055	10	1	2.078	0	9.879	10.241	10.405
DI-Y07-055	10	2	1.457	100	0	0	0
DI-Y07-058	10	1	6.818	0	10.036	10.364	10.533
DI-Y07-058	10	2	0.327	100	0	0	0
HW-Y06-612	10	1	2.02	50	12.517	12.517	12.649
Drainage Area 11							
DI-Y07-005	11	1	0.668	0	8.826	9.214	9.388
DI-Y07-005	11	2	0.819	100	0	0	0
DI-Y07-006	11	1	0.335	0	8.728	9.213	9.385
DI-Y07-006	11	2	0.771	100	0	0	0
DI-Y07-007	11	1	0.821	0	8.828	9.44	9.835
DI-Y07-007	11	2	1.883	100	0	0	0
DI-Y07-008	11	1	1.1	0	8.469	9.194	9.568
DI-Y07-008	11	2	1.789	100	0	0	0
DI-Y07-061	11	1	2.089	0	10.722	10.775	11.01
DI-Y07-061	11	2	1.148	100	0	0	0
DI-Y07-063	11	1	0.629	0	10.382	10.476	10.589
DI-Y07-063	11	2	0.77	100	0	0	0
DI-Y07-064	11	1	0.921	0	9.815	9.964	10.154
DI-Y07-064	11	2	0.608	100	0	0	0
DI-Y07-131A	11	1	5.169	4	9.074	9.783	9.993

Structure Nodes					Results		
					Free Discharge Conditions	5-Year Water Level Time Series	10-Year Water Level Time Series
Name	Drainage Area	Subcatchment	Area (acres)	Impervious Percentage %	Max Water Elevation (feet)	Max Water Elevation (feet)	Max Water Elevation (feet)
DI-Y07-131A	11	2	2.176	0	0	0	0
DI-Y07-131B	11	1	3.496	5	9.322	9.903	10.12
DI-Y07-131B	11	2	1.468	100	0	0	0
DI-Y08-009	11	1	0.204	0	6.68	9.111	9.179
DI-Y08-009	11	2	0.529	100	0	0	0
DI-Y08-130	11	1	3.857	0	9.419	9.762	9.922
DI-Y08-130	11	2	2.303	100	0	0	0
DI-Y08-132	11	1	2.497	0	9.815	9.964	10.154
DI-Y08-132	11	2	1.254	100	0	0	0
Drainage Area 12							
DI-X07-036	12	1	2.831	0	9.092	9.728	9.831
DI-X07-036	12	2	1.418	100	0	0	0
DI-X07-037	12	1	0.437	0	9.274	9.728	9.831
DI-X07-037	12	2	0.818	100	0	0	0
DI-X07-040	12	1	12.265	2	8.913	9.574	9.657
DI-X07-040	12	2	0.963	100	0	0	0
DI-Y07-038	12	1	2.773	0	9.905	9.73	9.833
DI-Y07-038	12	2	2.375	93	0	0	0
DI-Y07-039A	12	1	1.247	0	10.841	10.846	10.92
DI-Y07-039A	12	2	1.78	100	0	0	0
Drainage Area 13							
DI-X07-031	13	1	1.638	0	8.823	9.406	9.506
DI-X07-031	13	2	2.386	100	0	0	0
DI-X07-032	13	1	2.674	0	8.43	9.406	9.506
DI-X07-032	13	2	1.672	100	0	0	0
DI-X07-033	13	1	0.964	0	8.657	9.406	9.507
DI-X07-033	13	2	0.53	100	0	0	0
DI-X07-034	13	1	3.821	0	8.907	9.407	9.507

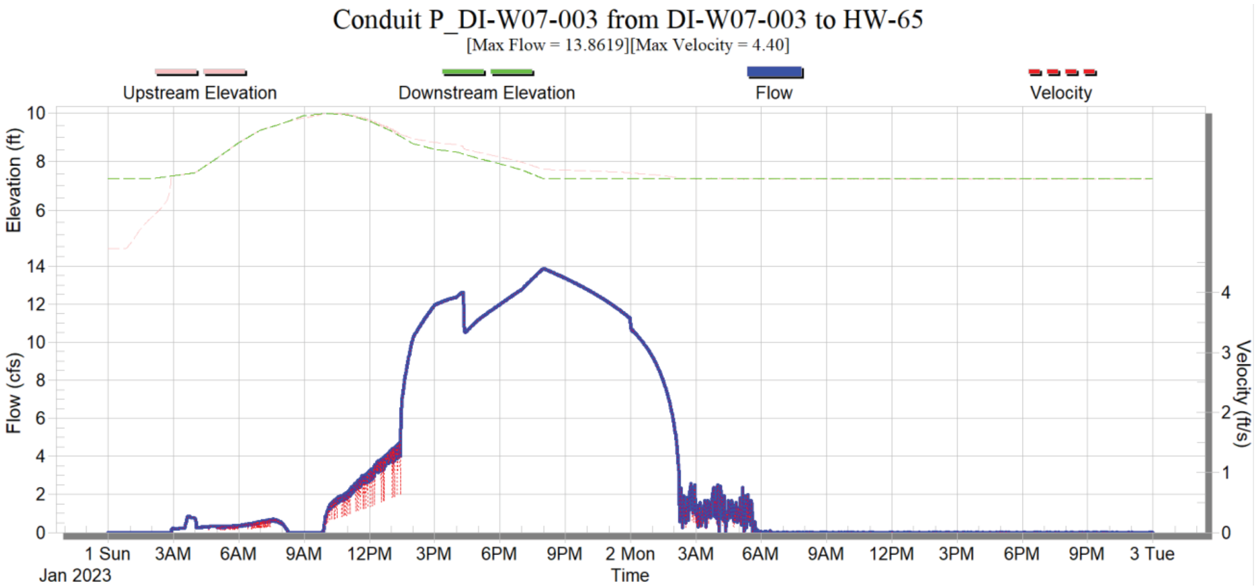
Structure Nodes					Results		
					Free Discharge Conditions	5-Year Water Level Time Series	10-Year Water Level Time Series
Name	Drainage Area	Subcatchment	Area (acres)	Impervious Percentage %	Max Water Elevation (feet)	Max Water Elevation (feet)	Max Water Elevation (feet)
DI-X07-034	13	2	2.064	100	0	0	0
DI-X07-202	13	1	2.44	88	7.243	9.455	9.467
Drainage Area 14							
DI-W07-?2	14	1	1.749	0	9.509	9.951	10.027
DI-W07-?2	14	2	2.234	100	0	0	0
DI-W07-504A	14	1	1.087	54	9.582	10.421	10.471
DI-W07-504A(2)	14	1	0.458	59	9.244	10.236	10.334
DI-W07-504B	14	1	0.274	59	9.08	10.125	10.219
DI-W07-510	14	1	1.073	0	9.161	10.049	10.192
DI-W07-510	14	2	0.779	100	0	0	0
DI-W07-511	14	1	1.208	6	8.72	9.926	10.005
DI-W07-511	14	2	0.853	100	0	0	0
DI-X	14	1	1.694	0	9.535	9.951	10.027
DI-X	14	2	1.694	100	0	0	0
Drainage Area 17							
DI-Y07-131C	17	1	1.098	0	9.103	9.539	9.688
DI-Y07-131C	17	2	1.098	100	9.103	9.539	9.688
DI-Y07-131D	17	1	1.326	0	9.103	9.539	9.688
DI-Y07-131D	17	2	0.734	100	0	0	0
DI-Y07-131E	17	1	1.427	0	9.102	9.539	9.688
DI-Y07-131E	17	2	0.542	100	0	0	0
DI-Y07-131F	17	1	1.712	0	9.156	9.759	9.999
DI-Y07-131F	17	2	1.083	100	0	0	0
DI-Y07-416	17	1	3.734	0	9.1	9.945	10.396
DI-Y07-416	17	2	0.632	100	0	0	0
HW-Y08-415	17	1	5.28	0	7.663	9.449	9.706
HW-Y08-415	17	2	0.877	100	0	0	0
Drainage Area 26							

Structure Nodes					Results		
					Free Discharge Conditions	5-Year Water Level Time Series	10-Year Water Level Time Series
Name	**Drainage Area**	**Subcatchment**	**Area (acres)**	**Impervious Percentage %**	**Max Water Elevation (feet)**	**Max Water Elevation (feet)**	**Max Water Elevation (feet)**
DI-W07-?1	26	1	1.762	3	9.264	10.054	10.198
DI-W07-507	26	1	4.623	8	9.246	10.05	10.193
DI-W07-508	26	1	6.973	3	9.287	10.051	10.193
DI-W07-509	26	1	4.614	5	9.307	10.051	10.193
495 Fairview Hangars							
DI-Z06-134	495 FAIRVIEW	1	3.025	99	13.473	14.461	14.588
DI-Z06-343	495 FAIRVIEW	1	6.229	85	14.98	15.585	15.801
Northeast Corner							
CB-Z06-305	NE CORNER	1	3.728	20	13.49	14.942	15.309
Parking Areas							
DI-Y08-010	PARKING A	1	4.32	83	12.845	12.844	13.154
DI-Y08-481	PARKING A	1	2.253	74	12.089	12.087	12.344
CB-Y07-439	PARKING B	1	6.337	88	12.842	13.025	13.612
DI-Z07-428	PARKING C	1	3.298	80	9.967	10.691	10.932
CB-Y07-?36	PARKING D	1	3.298	80	9.967	10.691	10.932
CB-Y08-?54	PARKING E	1	3.001	83	10.741	11.118	11.253

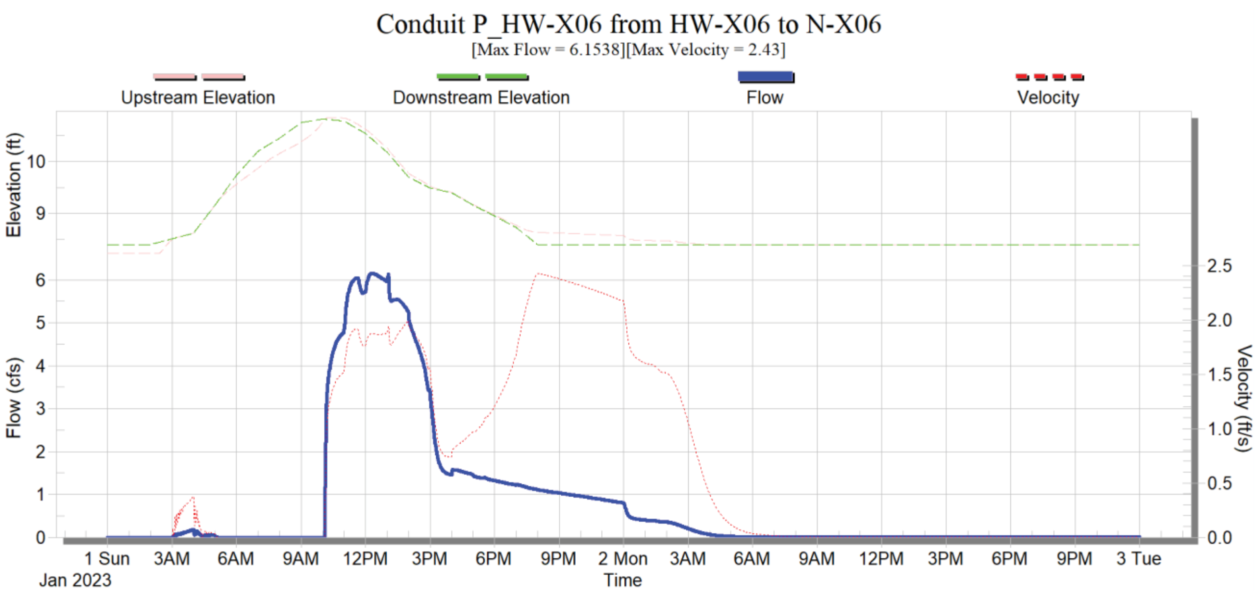
Appendix H: Proposed Hydrographs

Appendix H3: 5-year Fixed Backwater Results

Outfall 1



Outfall 2



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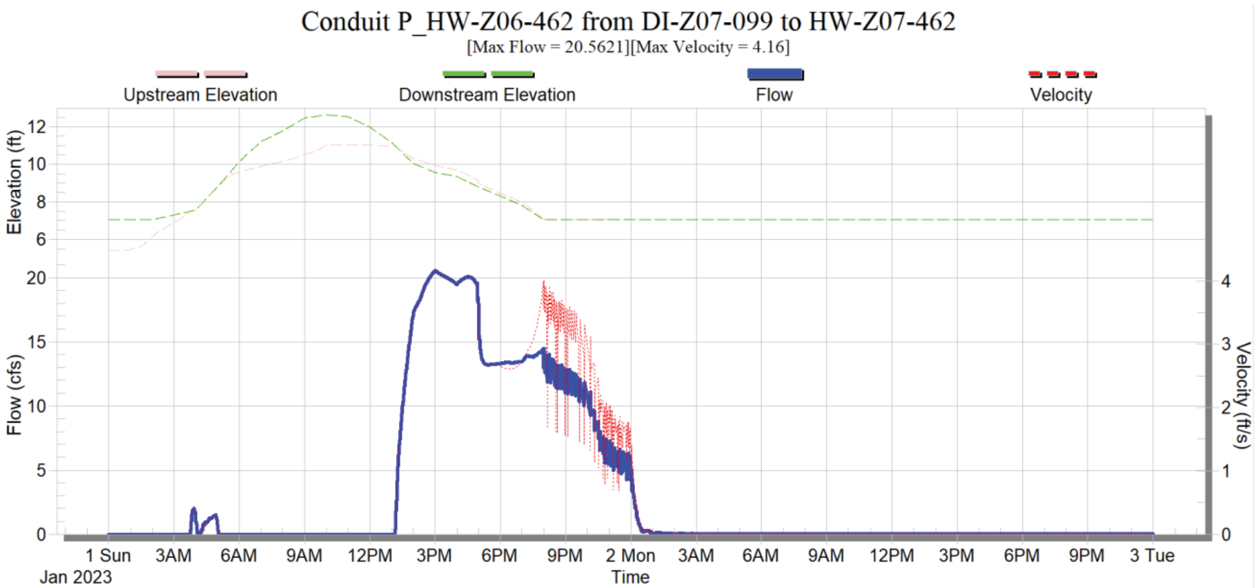
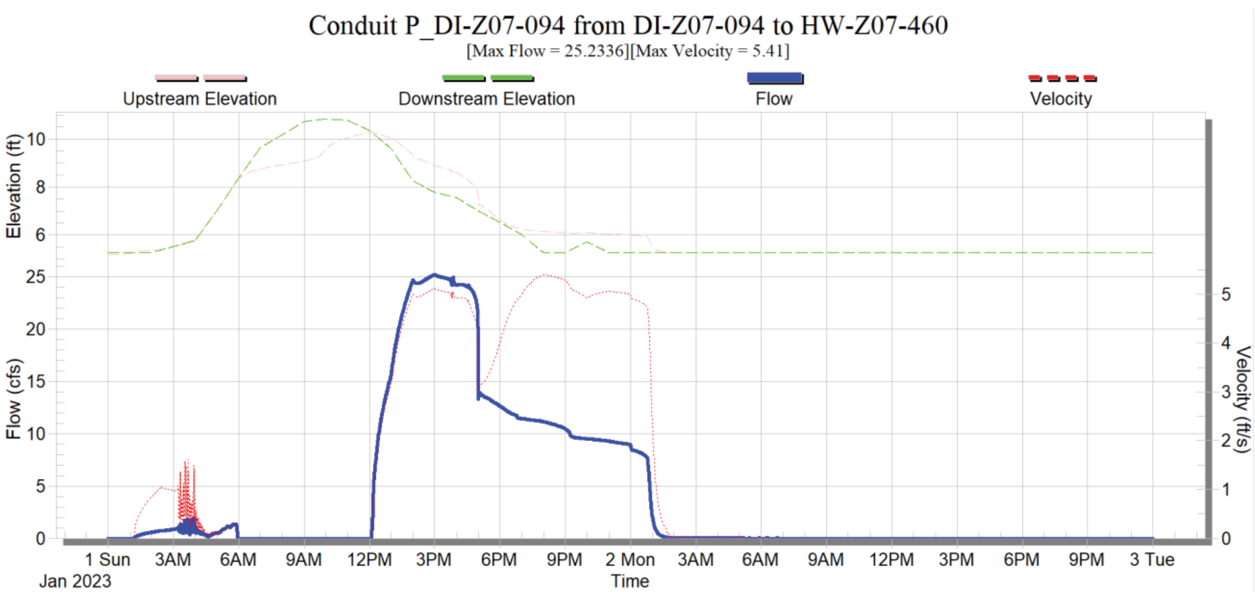
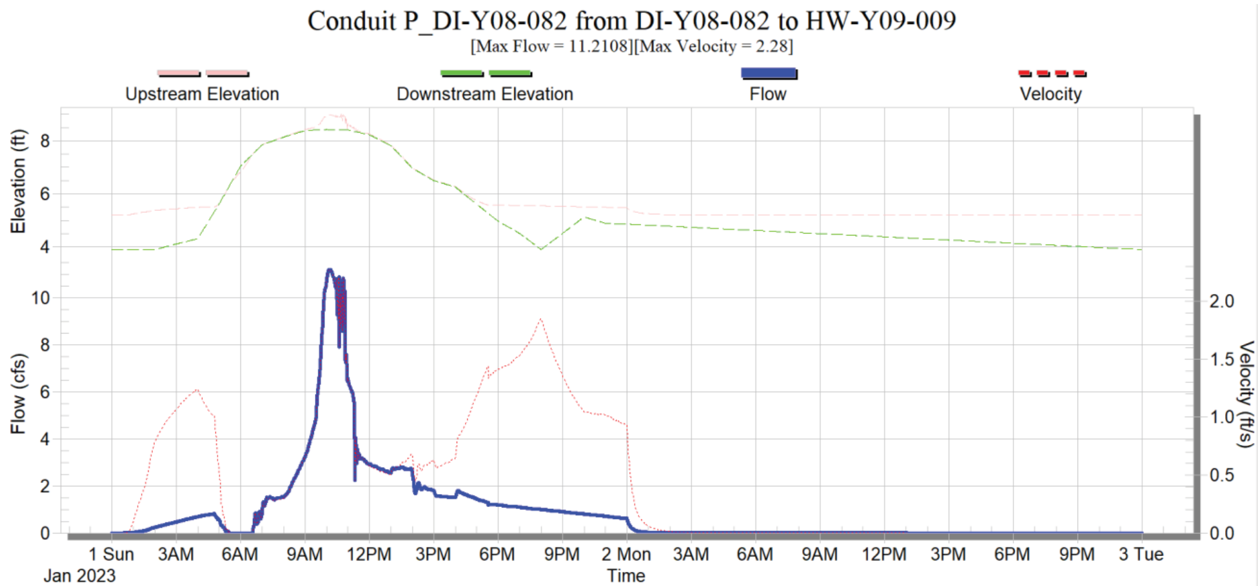


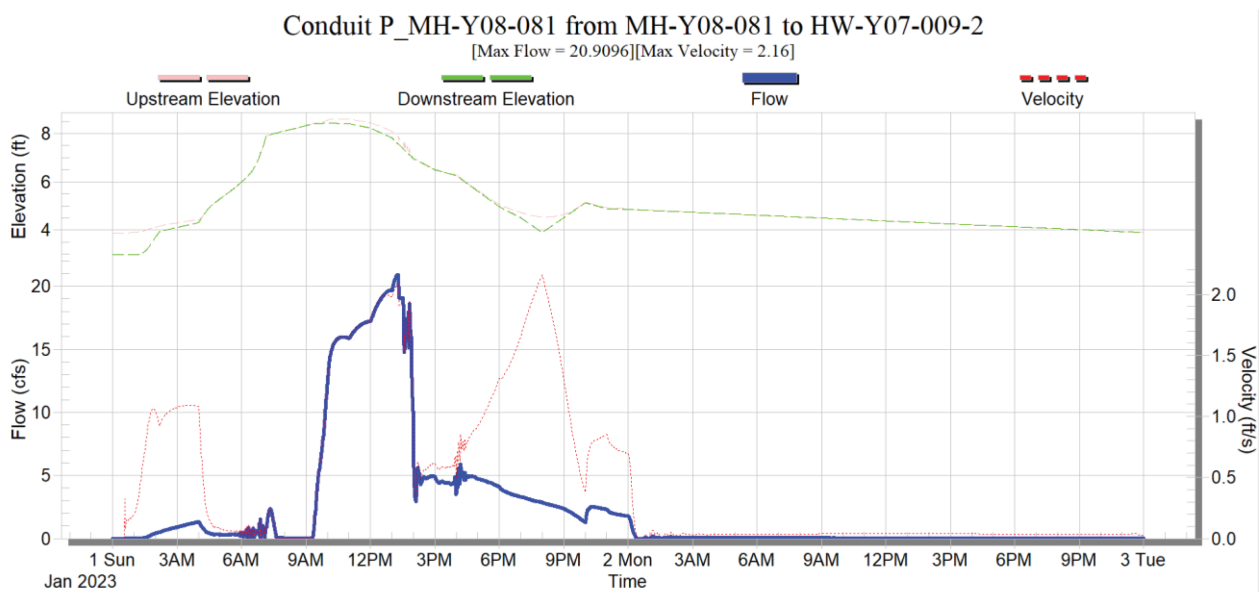
Outfall 6



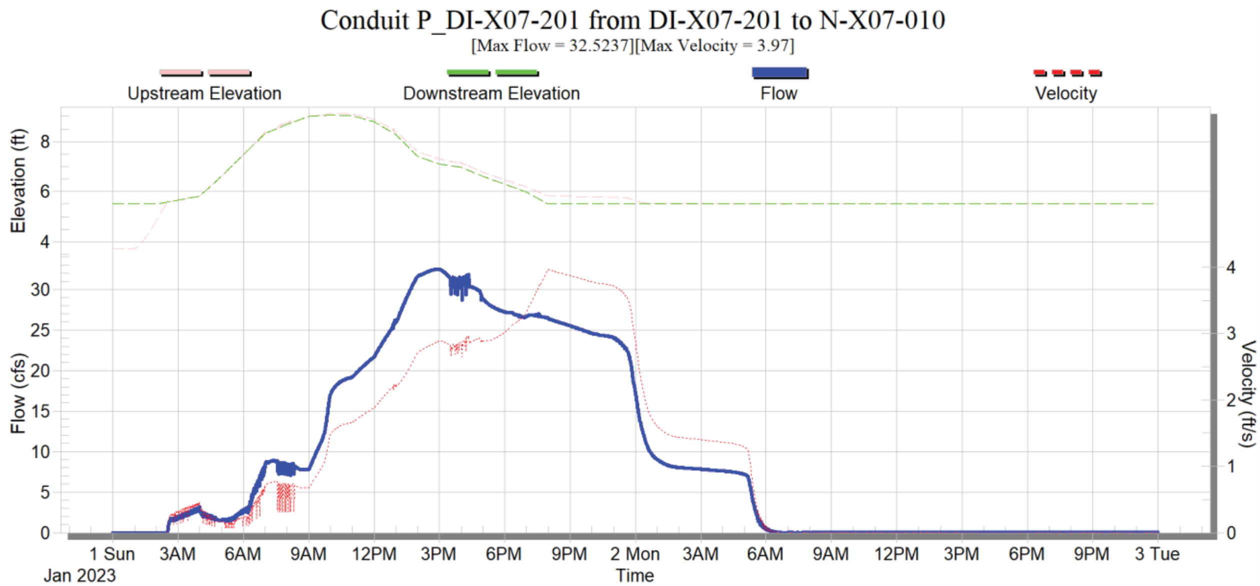
Outfall 9B



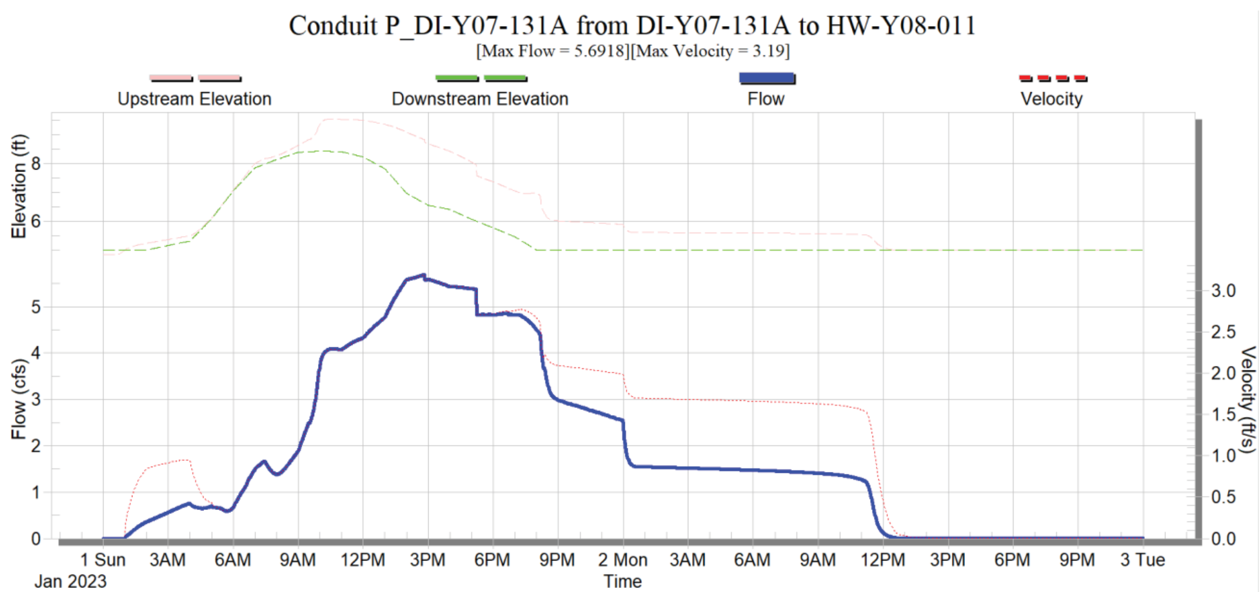
Outfall 9C



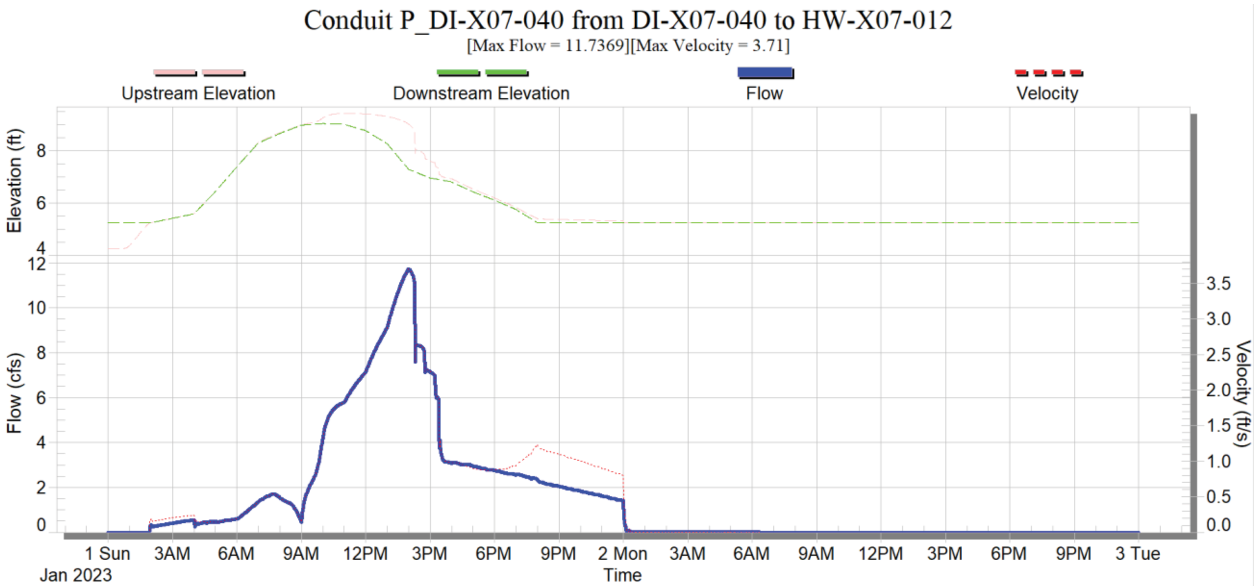
Outfall 10



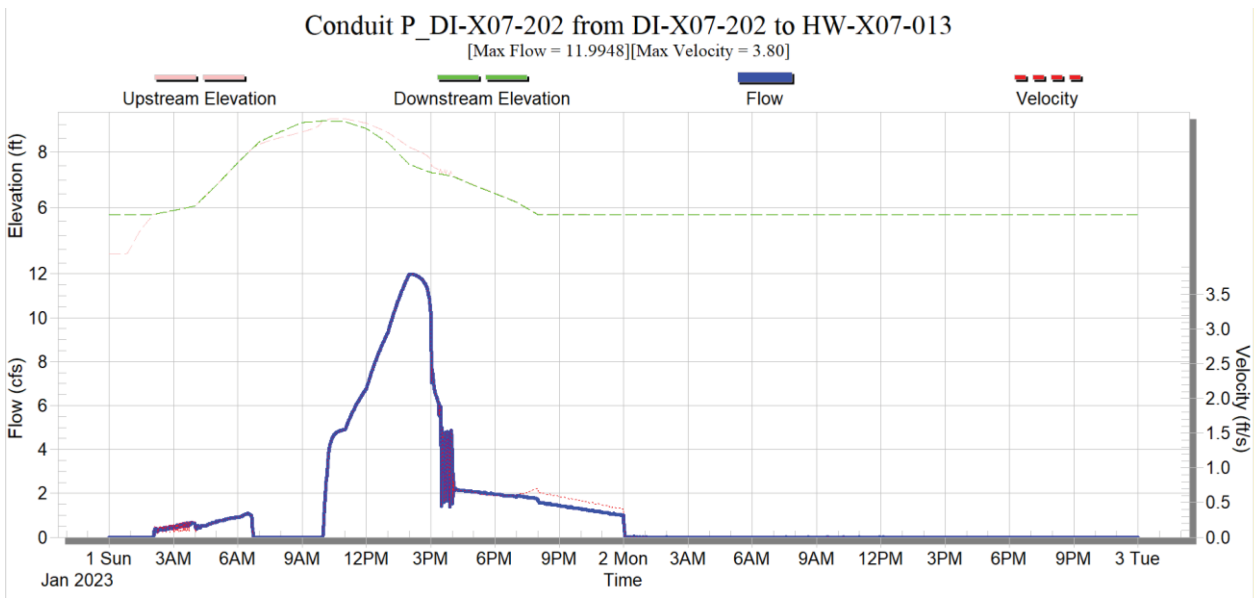
Outfall 11



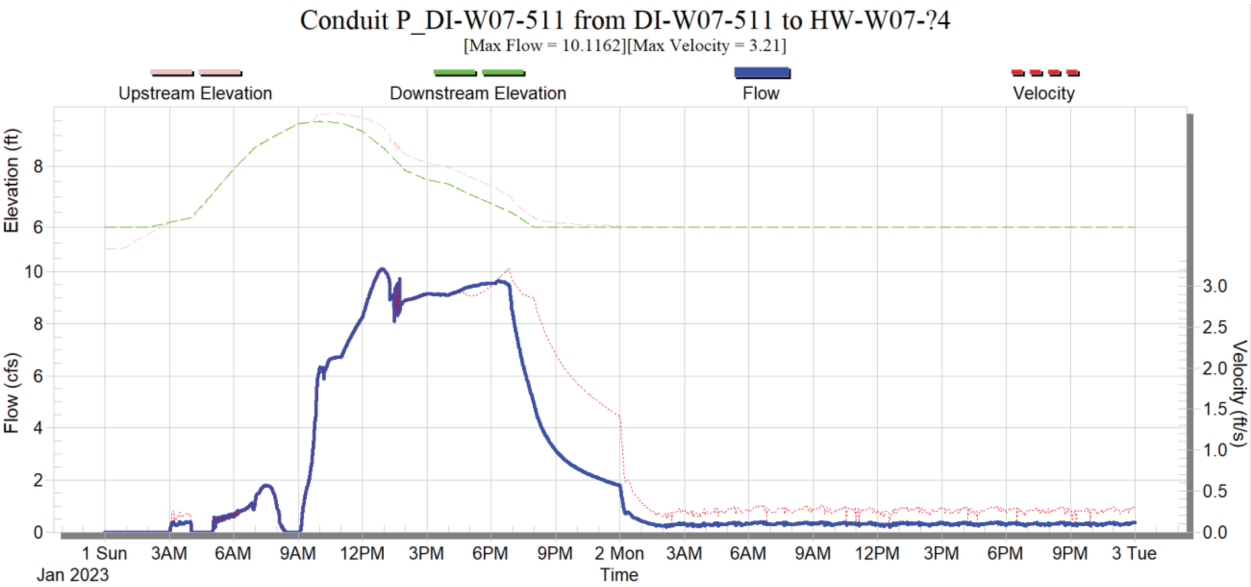
Outfall 12



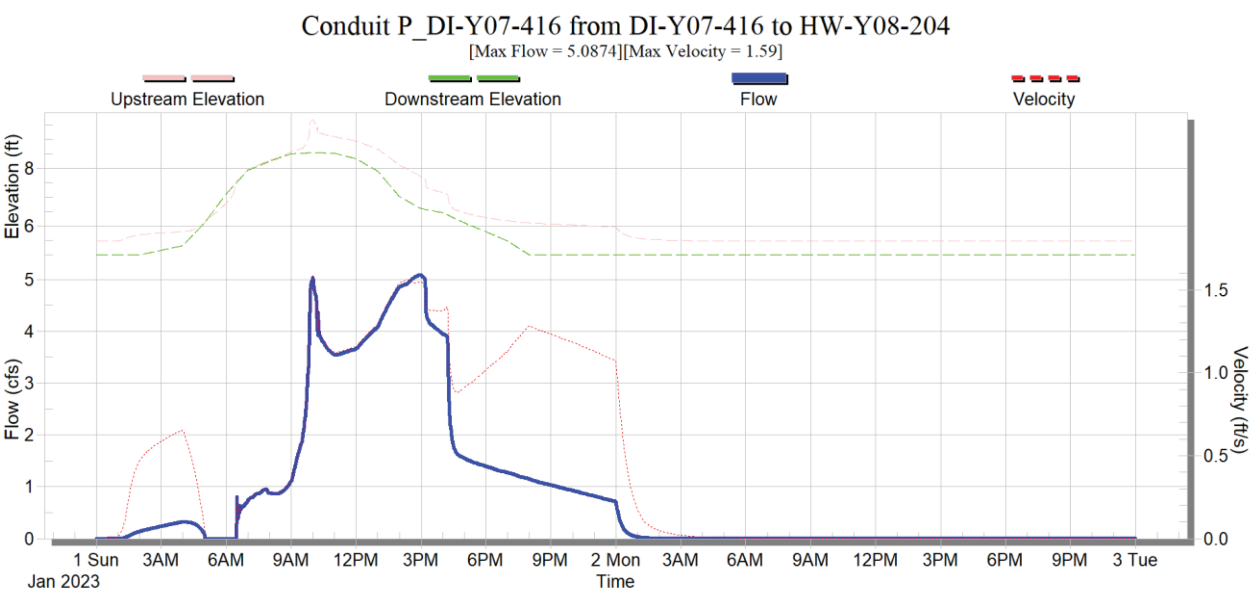
Outfall 13



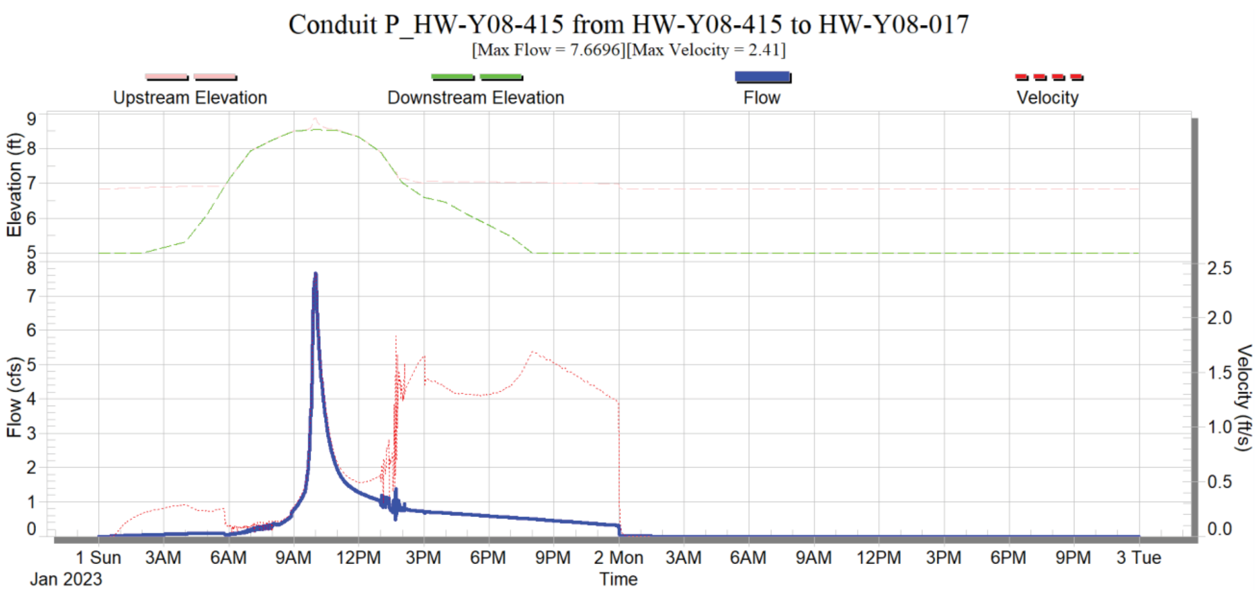
Outfall 14



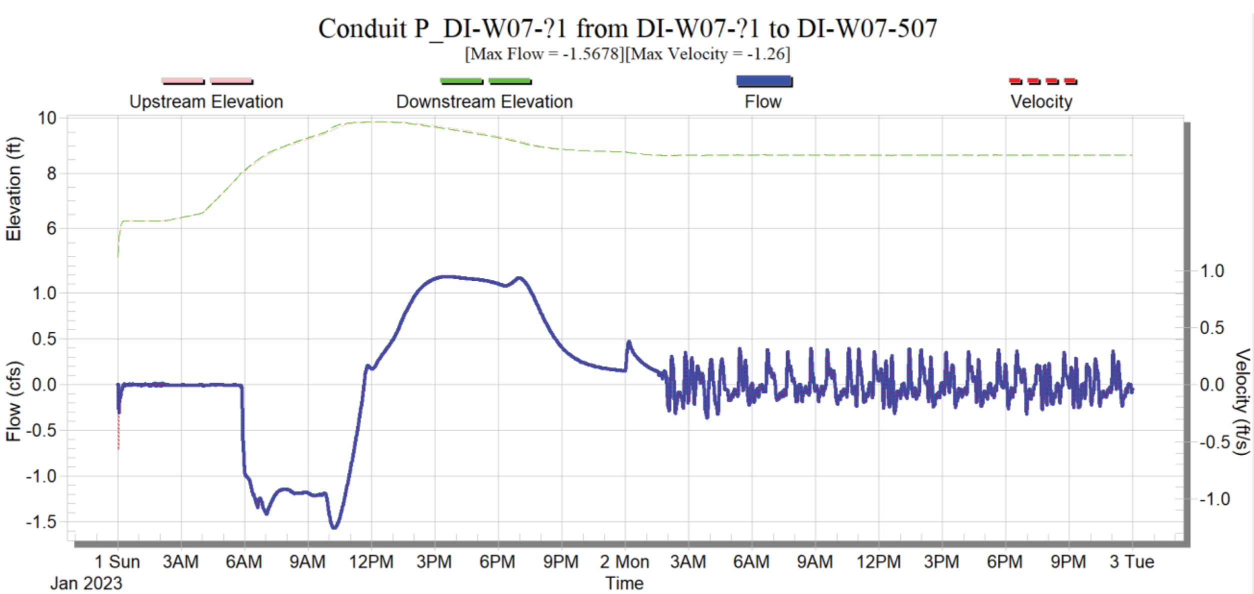
Outfall 17A



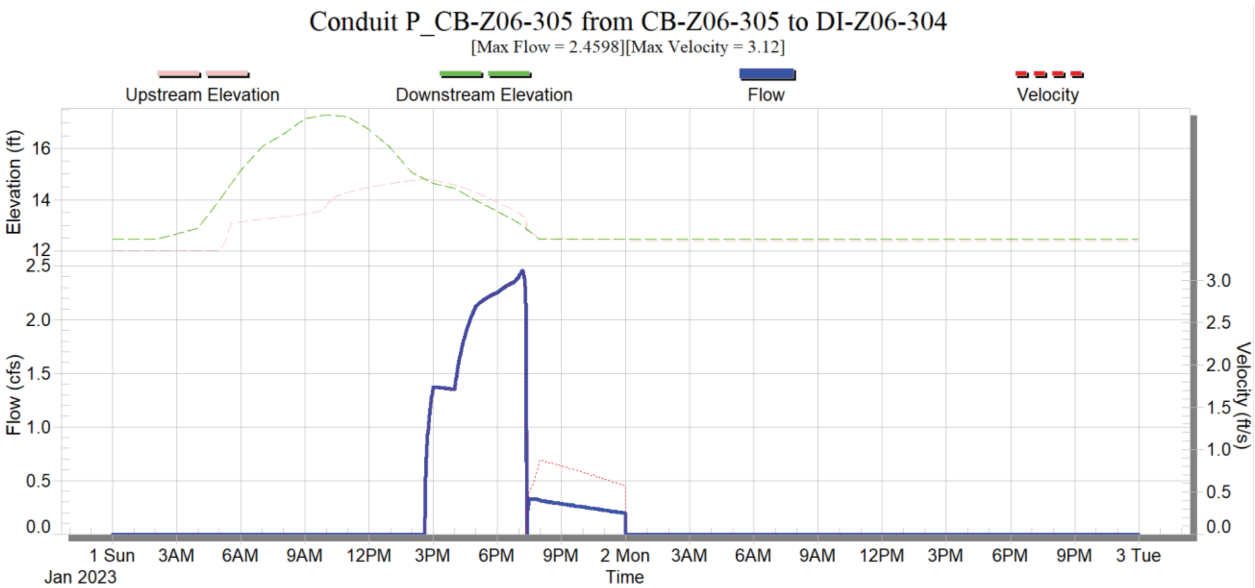
Outfall 17B



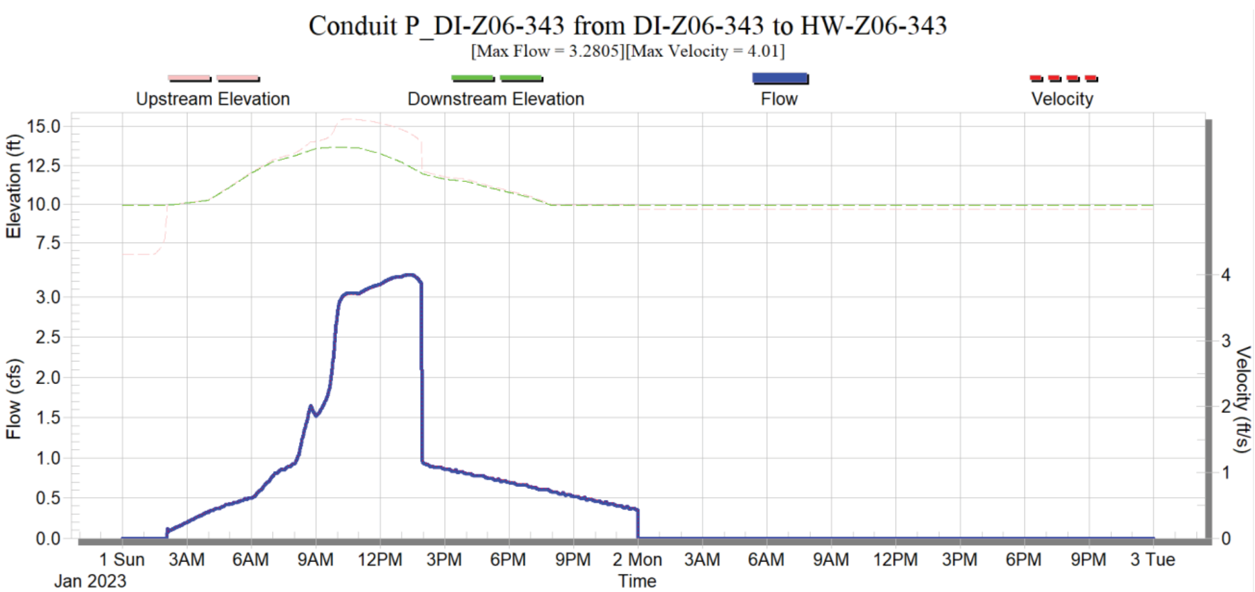
Outfall 26



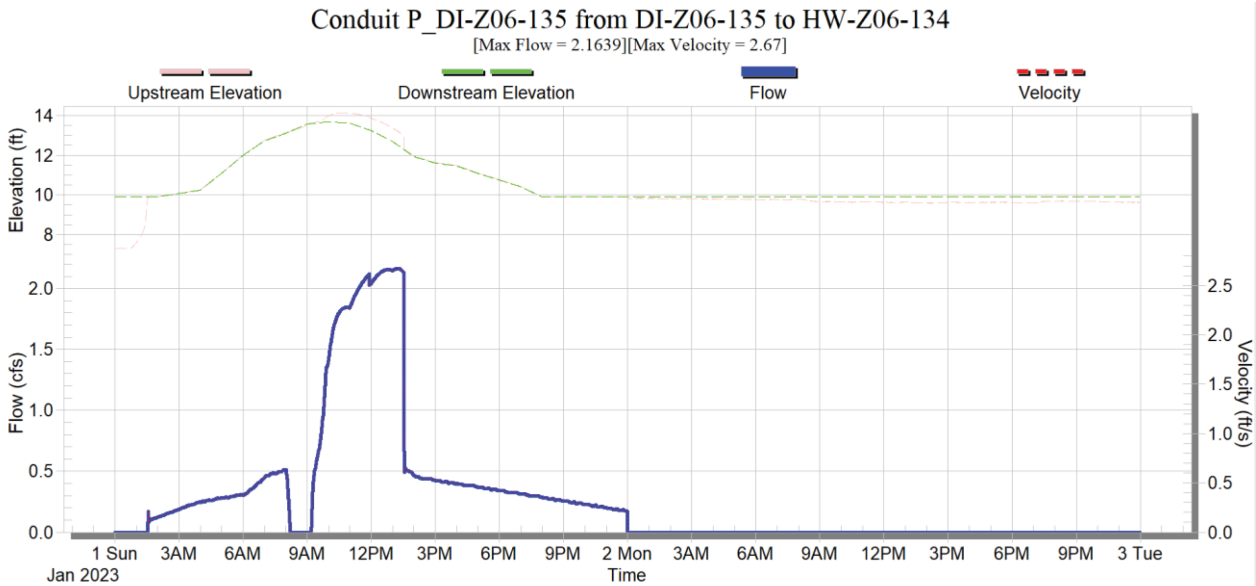
Outfall Northeast Corner



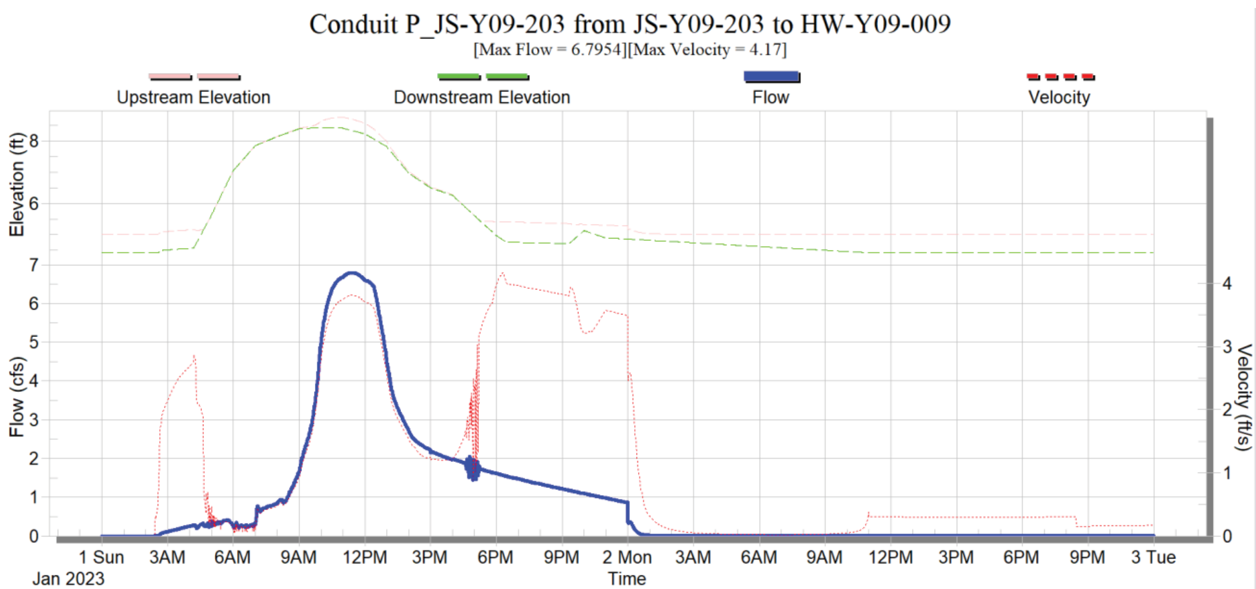
Outfall 495 Fairview – 1



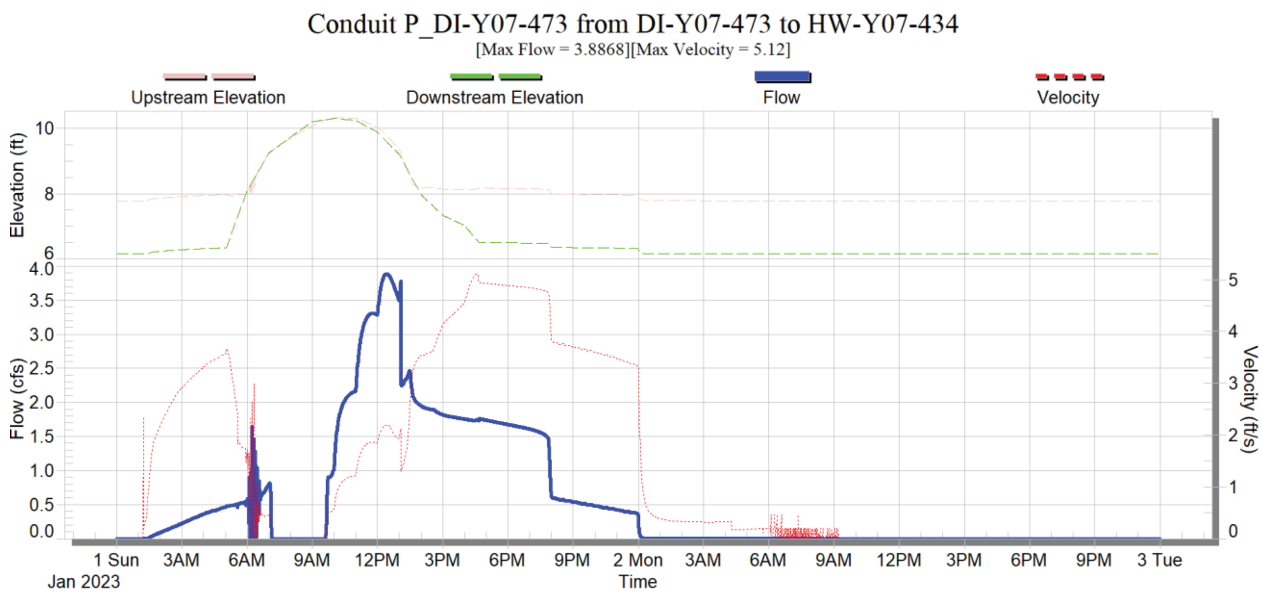
Outfall 495 Fairview – 2



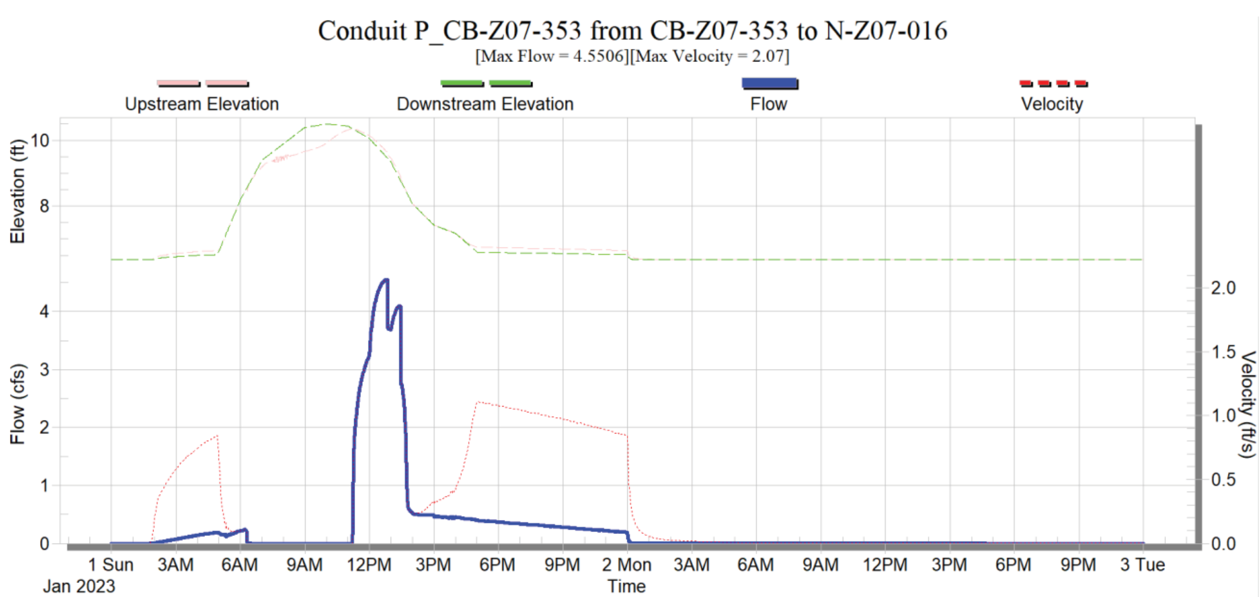
Outfall Parking A



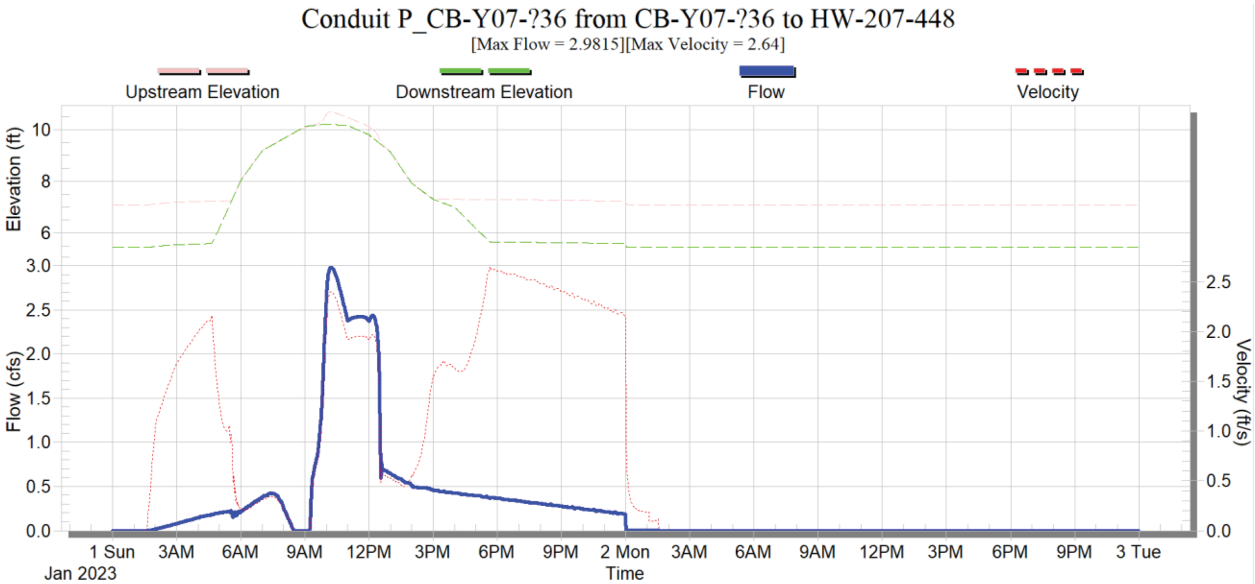
Outfall Parking B



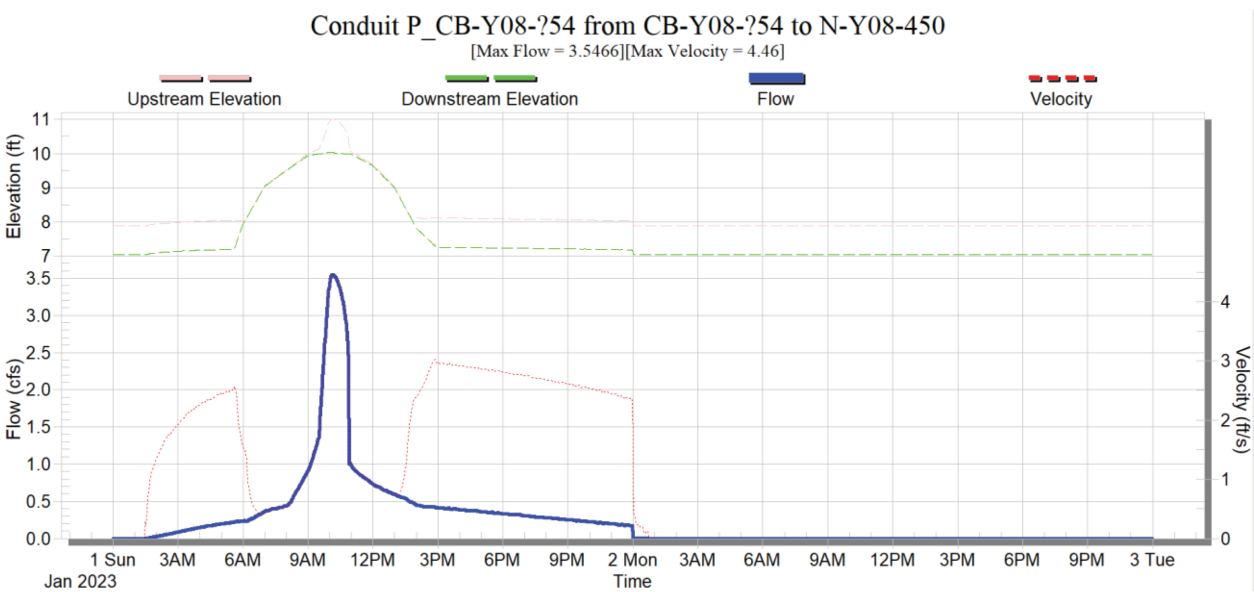
Outfall Parking C



Outfall Parking D

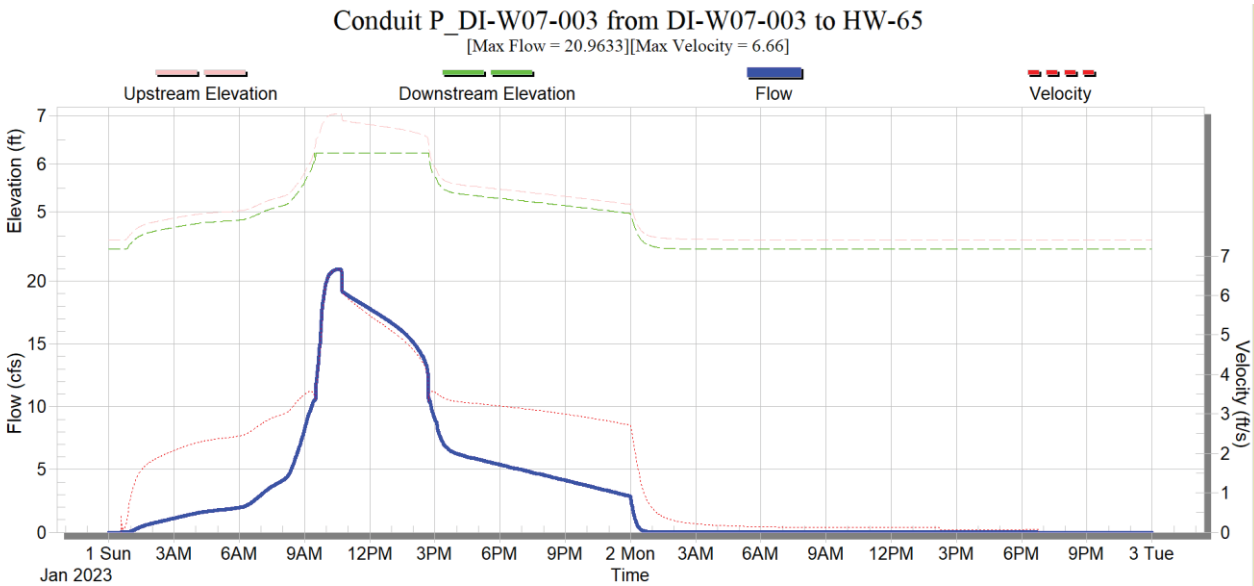


Outfall Parking E

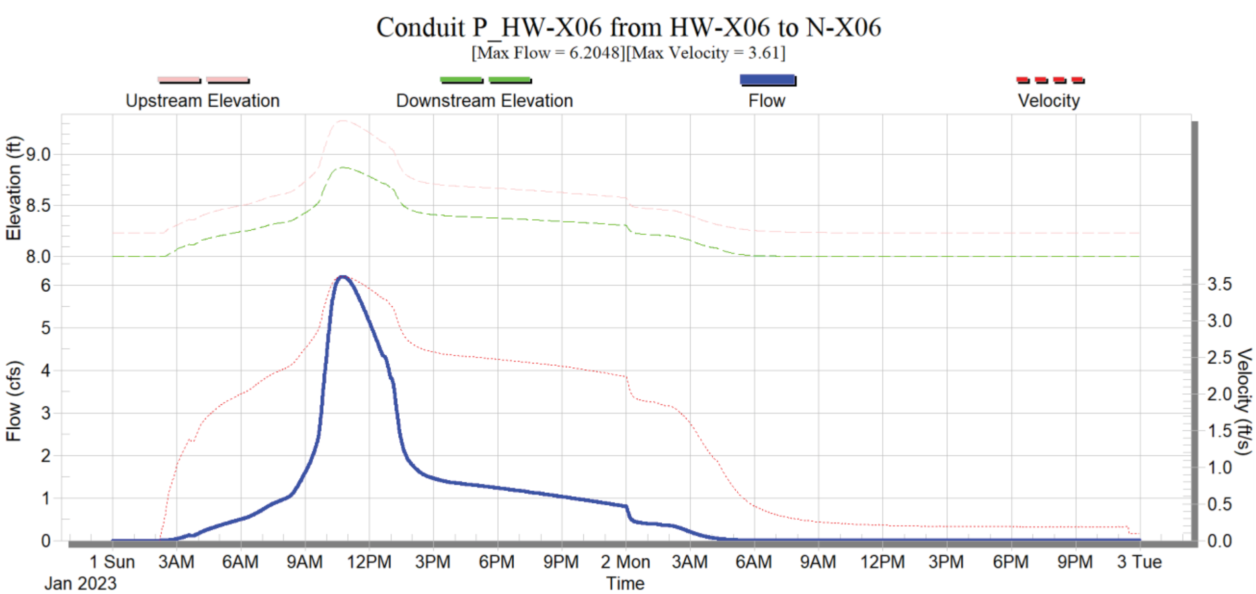


Appendix H2: 5-year Free Results

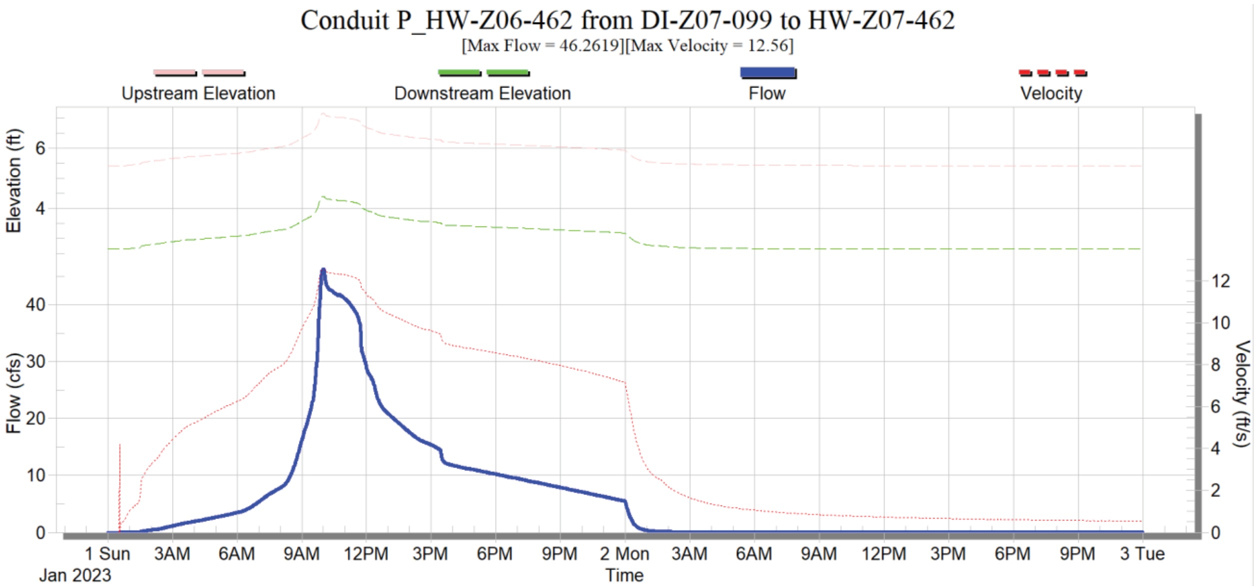
Outfall 1



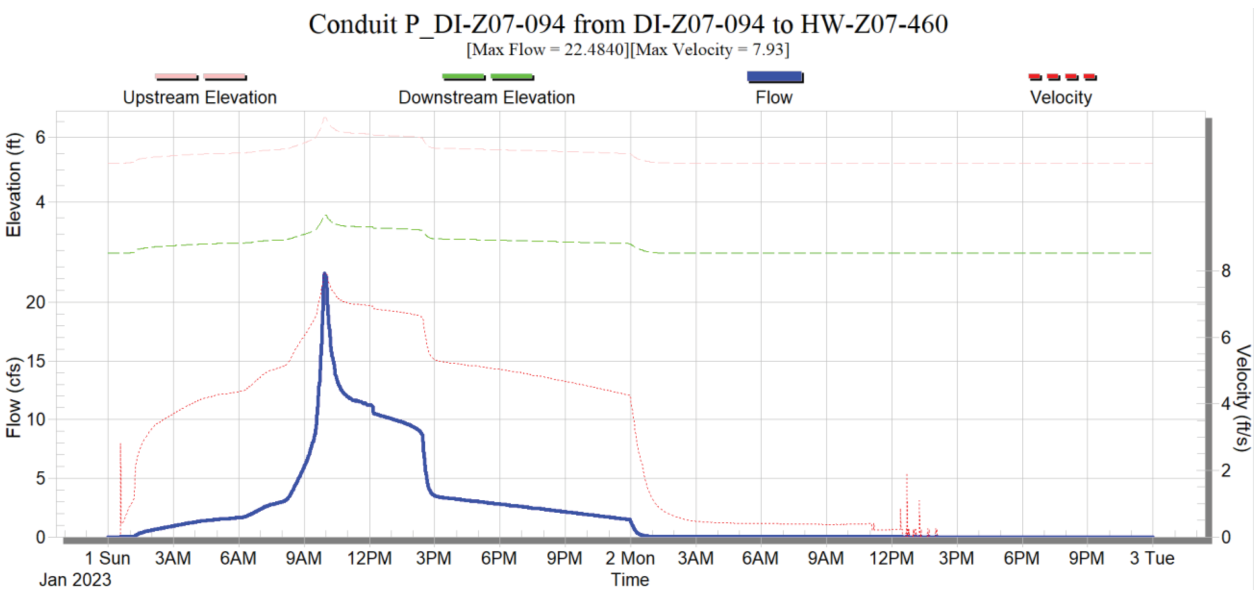
Outfall 2



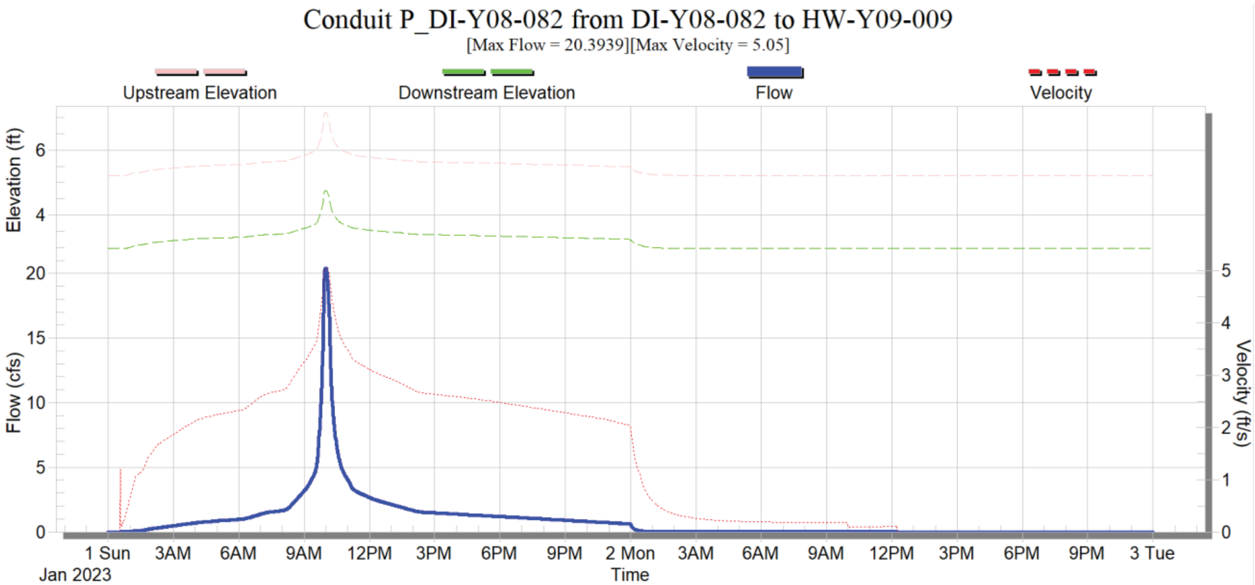
Outfall 5



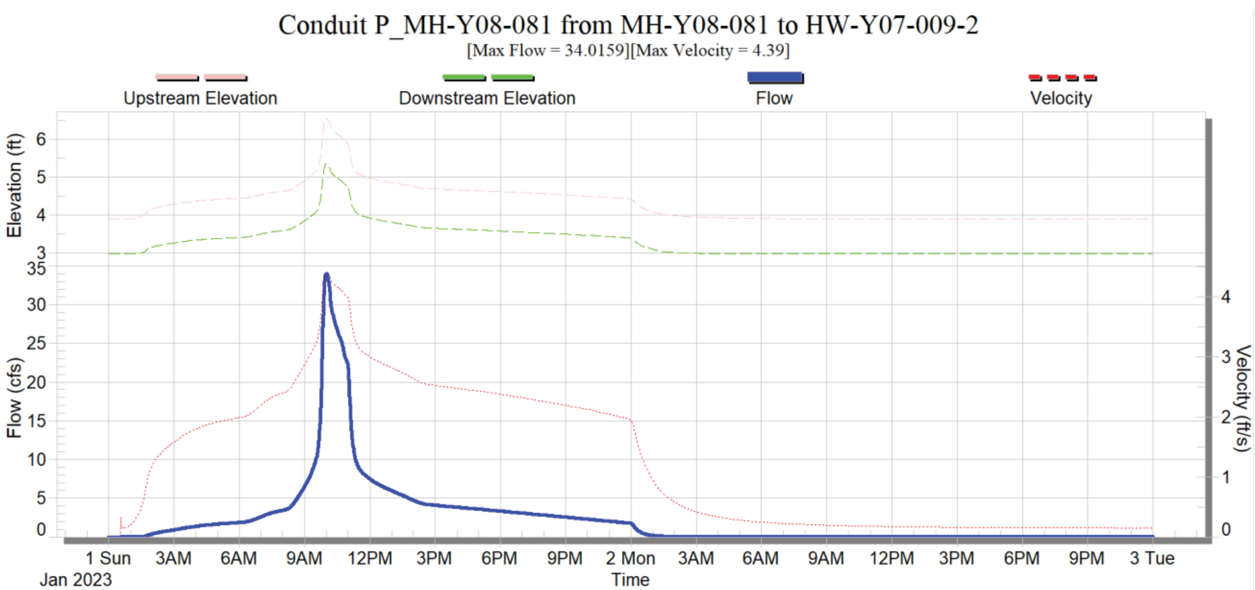
Outfall 6



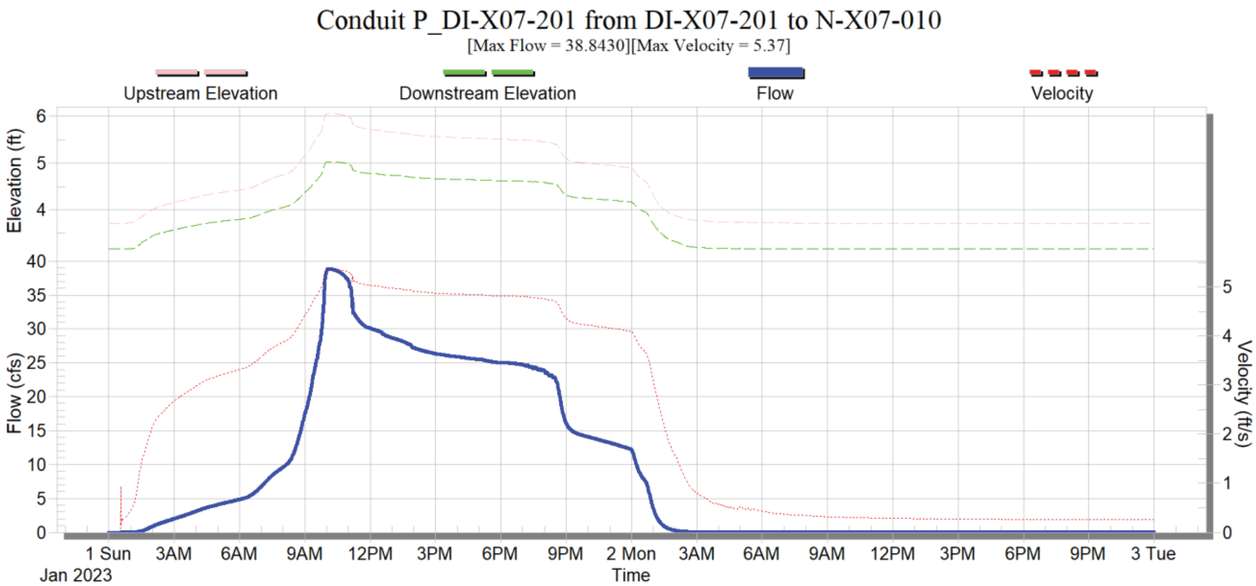
Outfall 9B



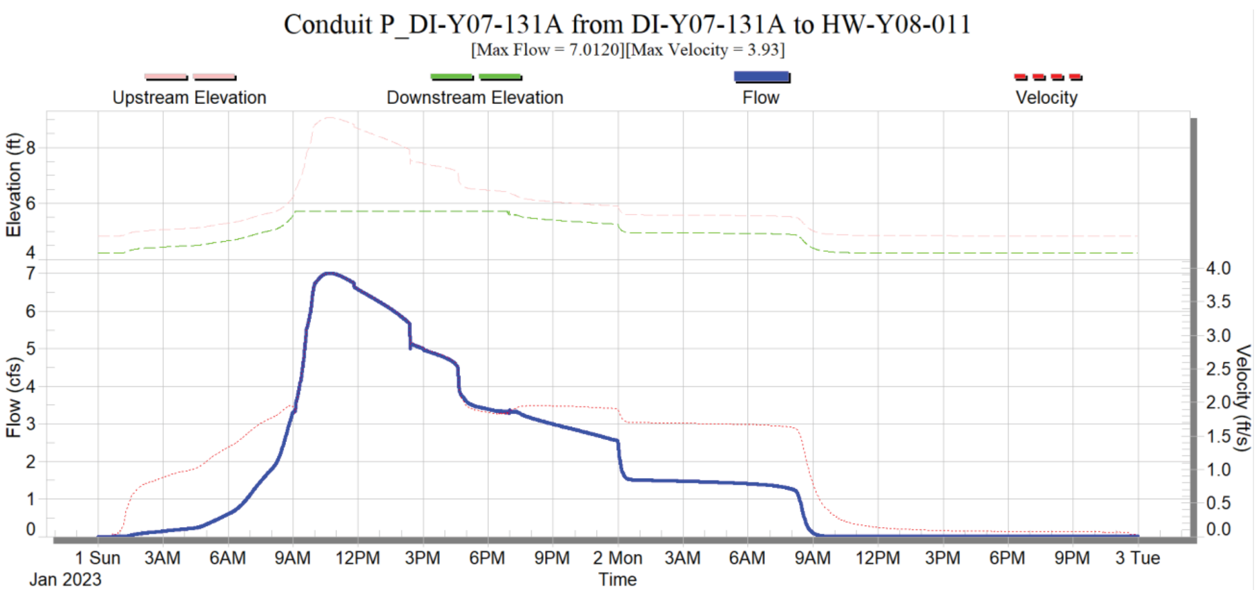
Outfall 9C



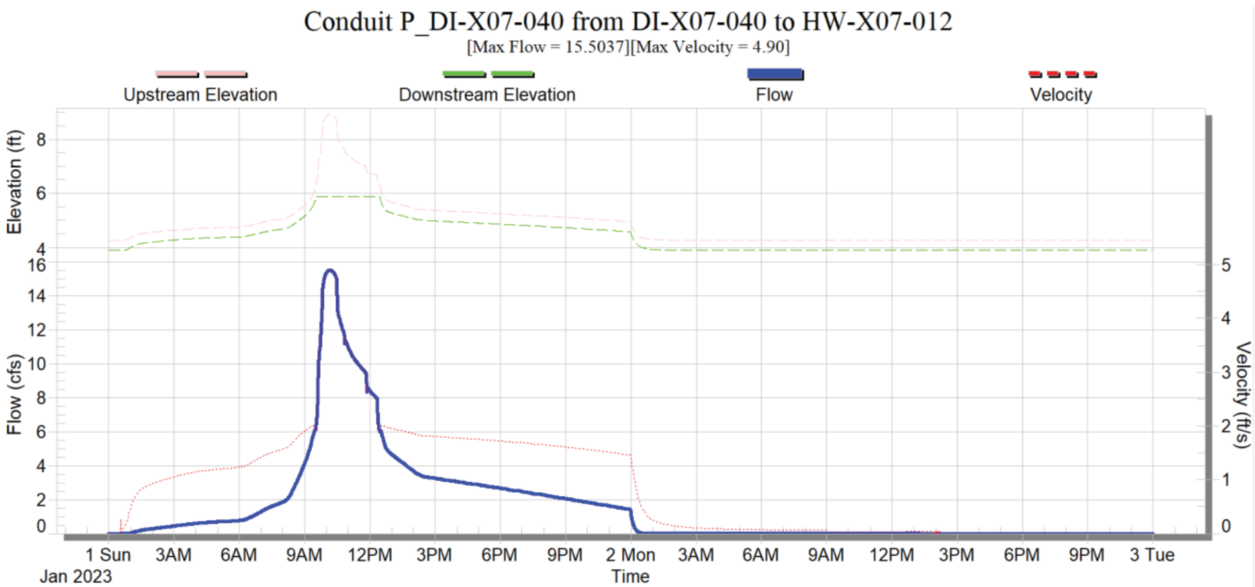
Outfall 10



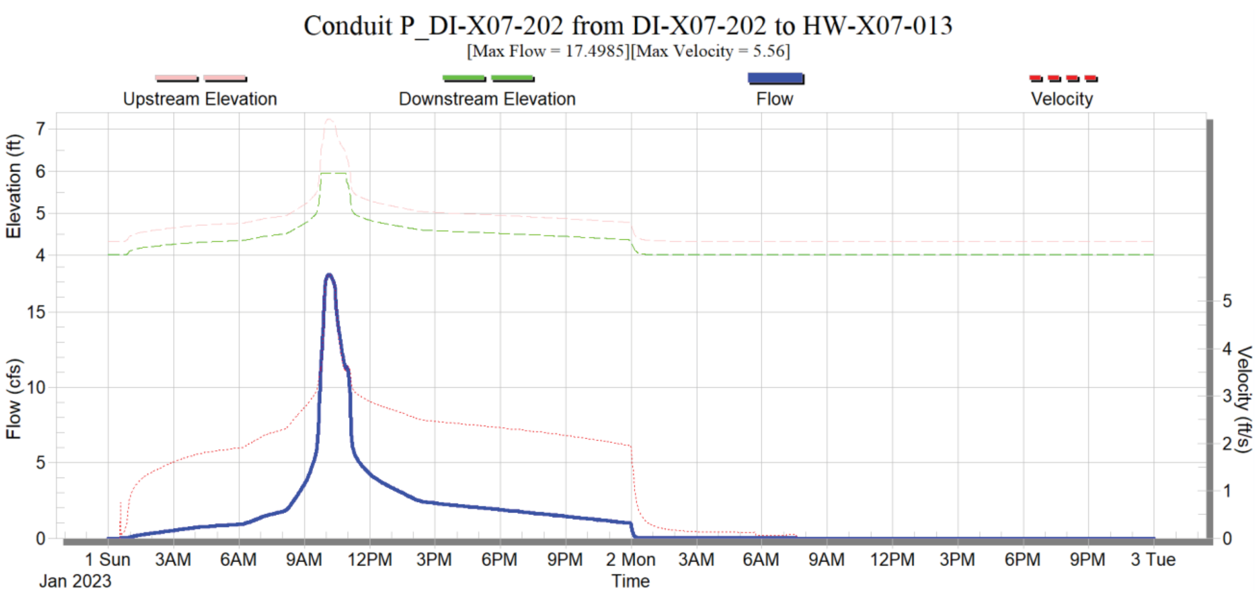
Outfall 11



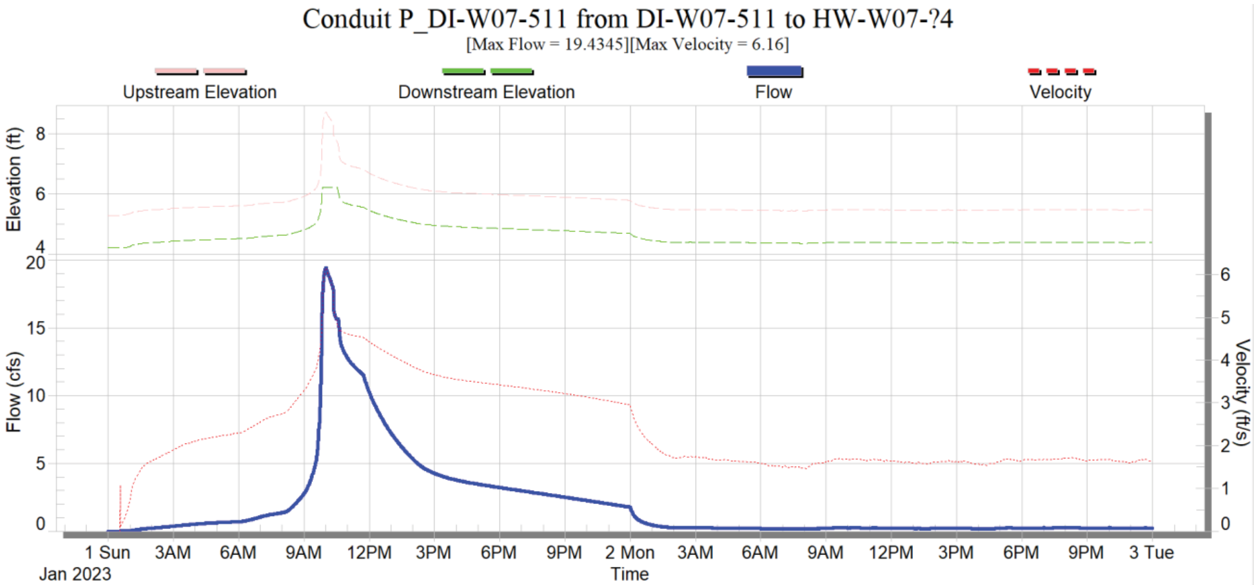
Outfall 12



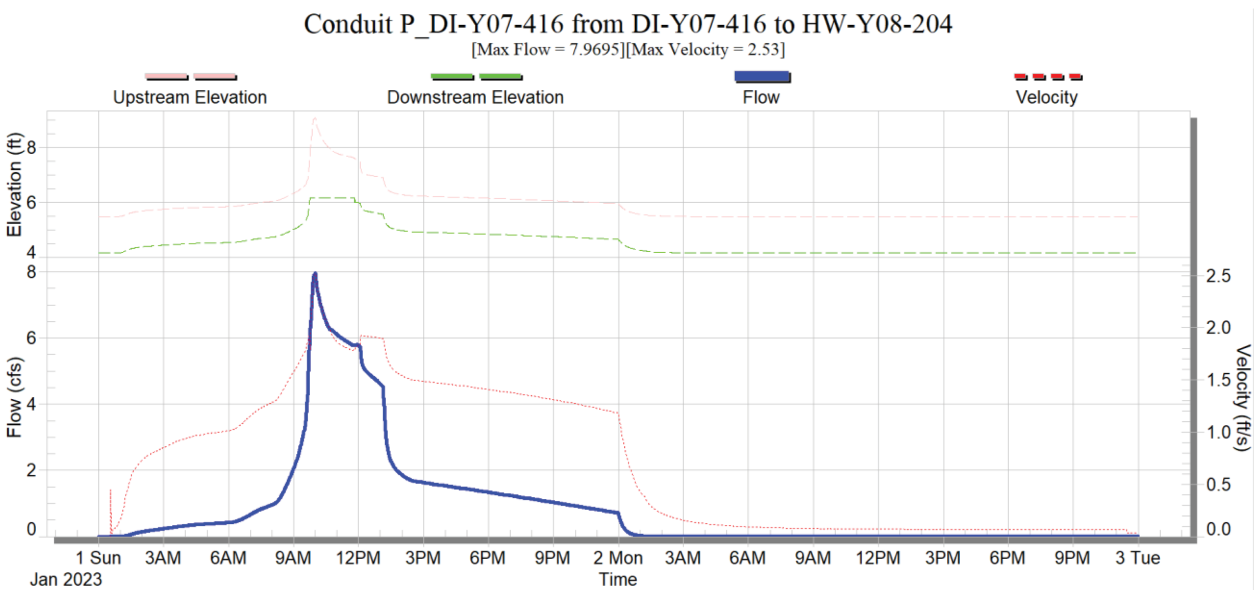
Outfall 13



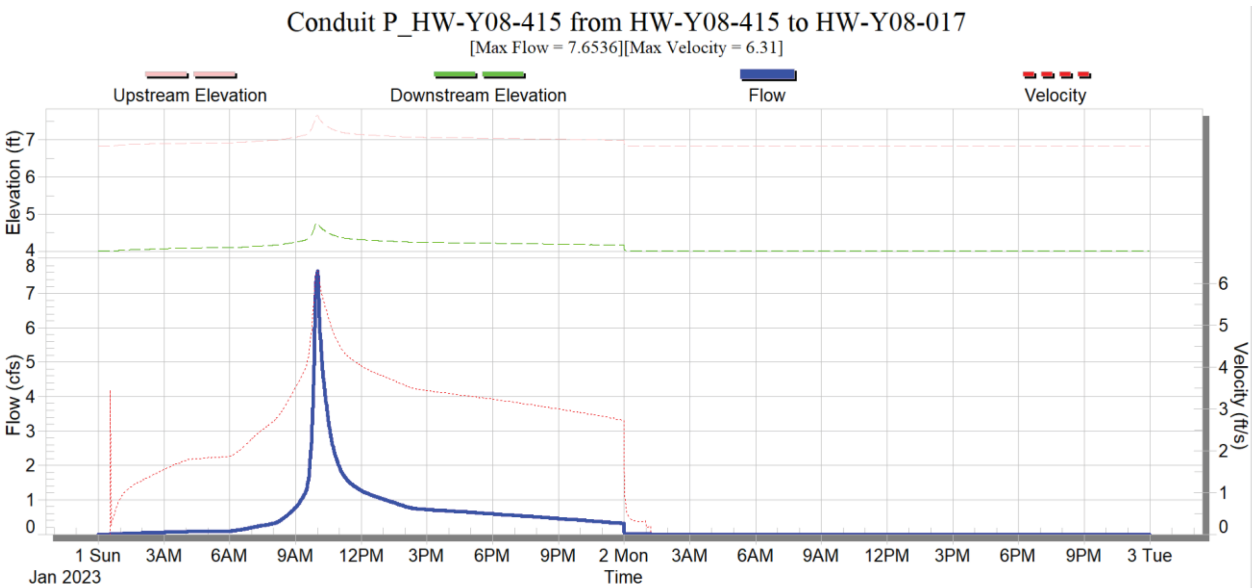
Outfall 14



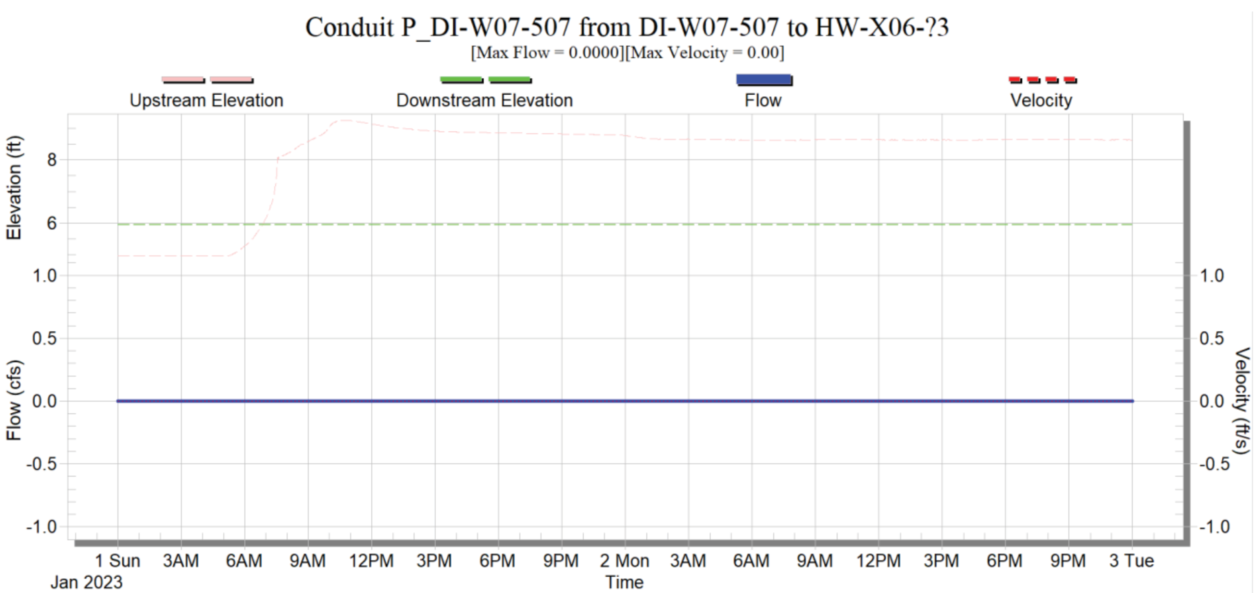
Outfall 17A



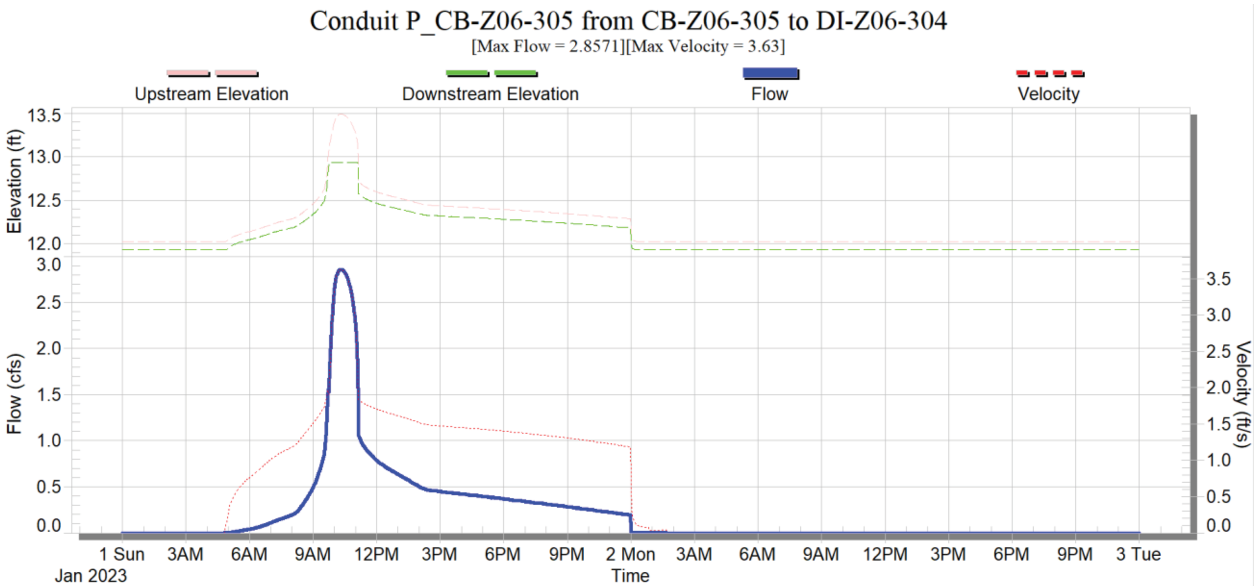
Outfall 17B



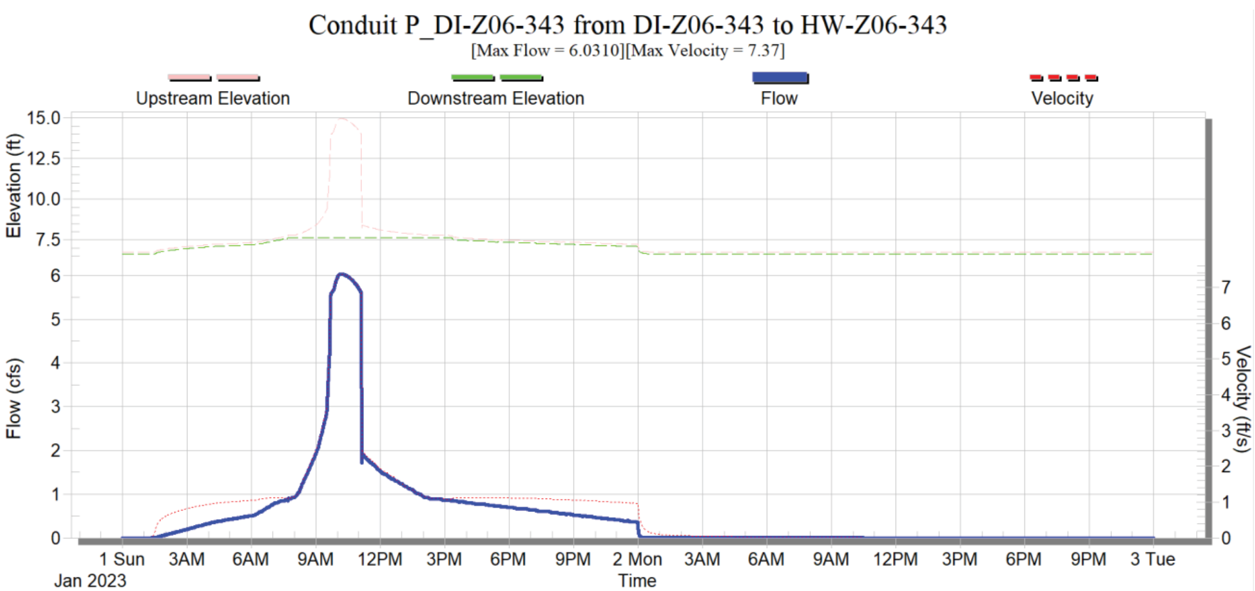
Outfall 26



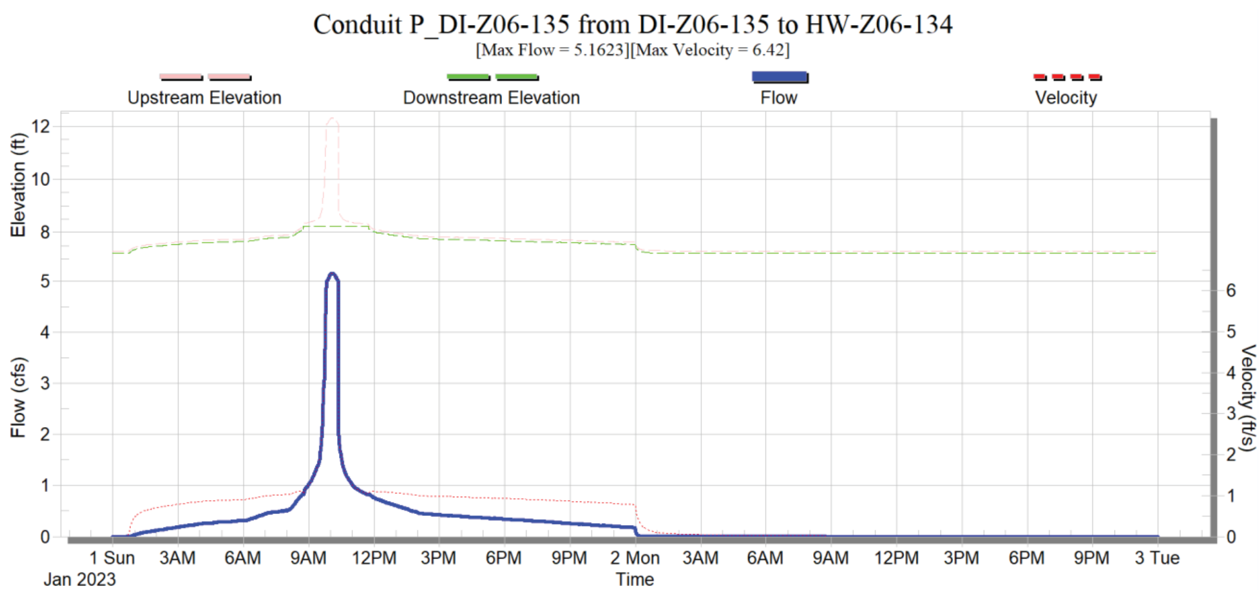
Outfall Northeast Corner



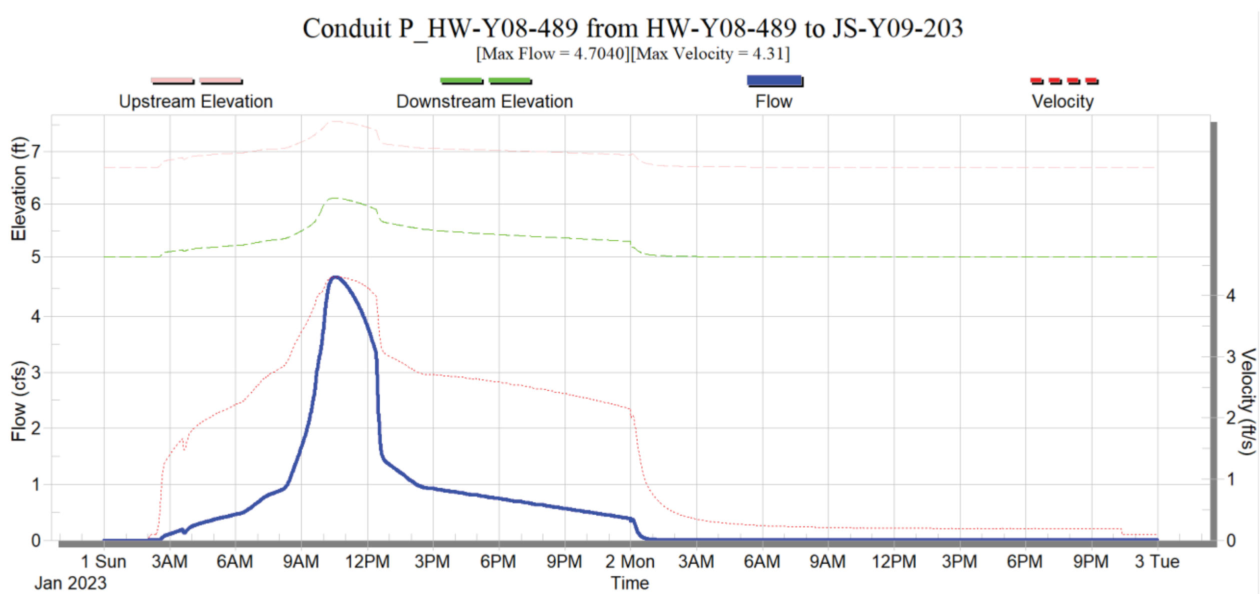
Outfall 495 Fairview – 1



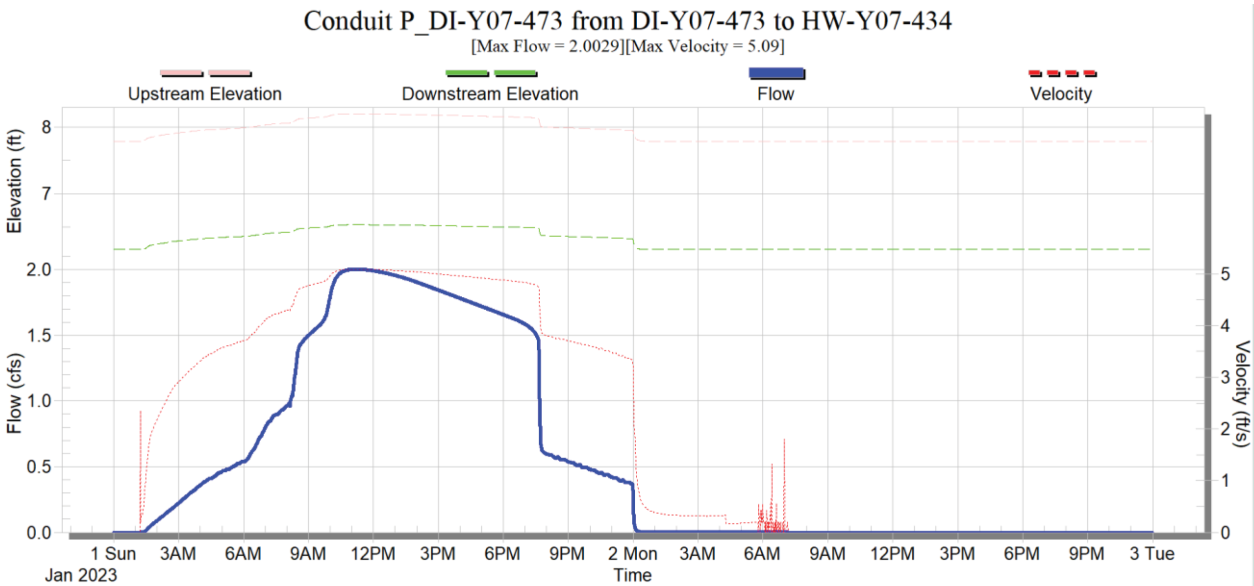
Outfall 495 Fairview – 2



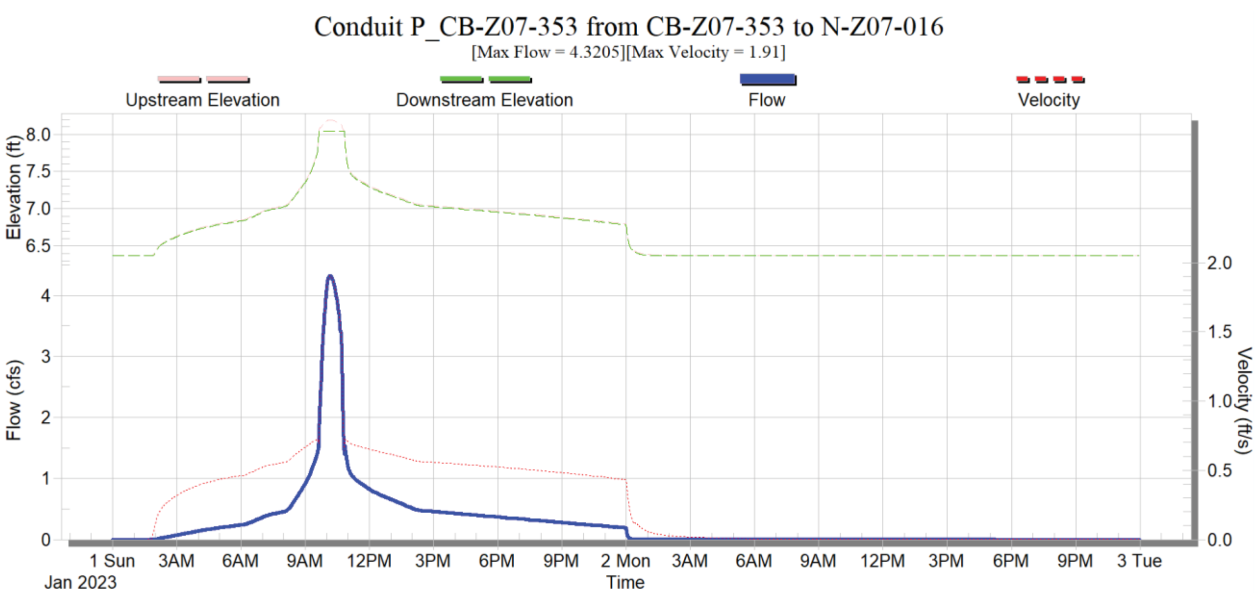
Outfall Parking A



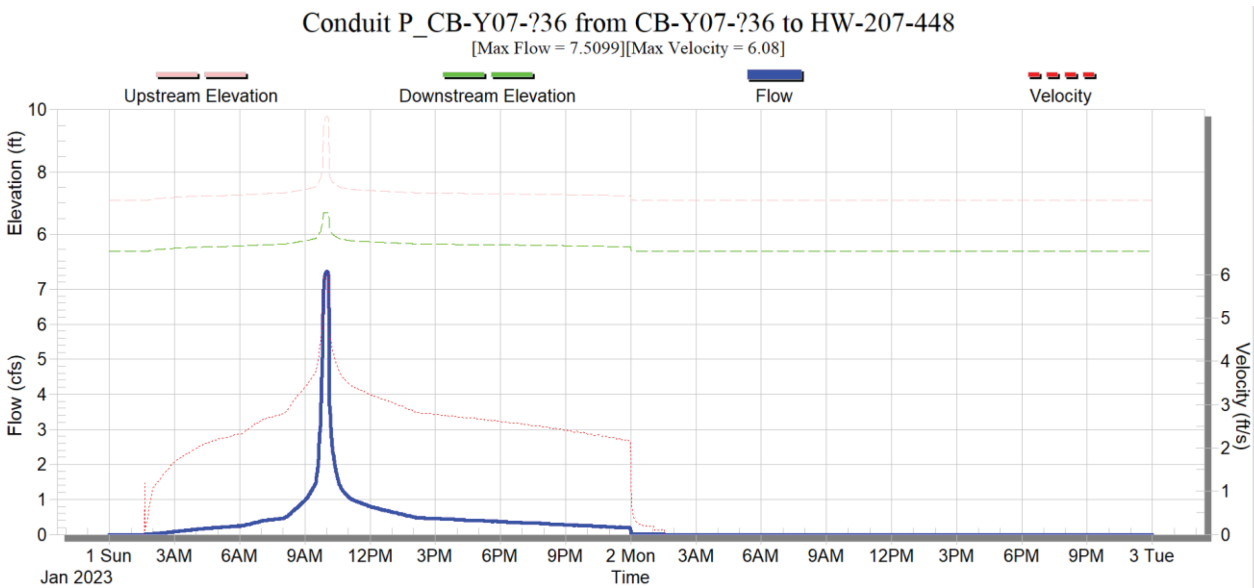
Outfall Parking B



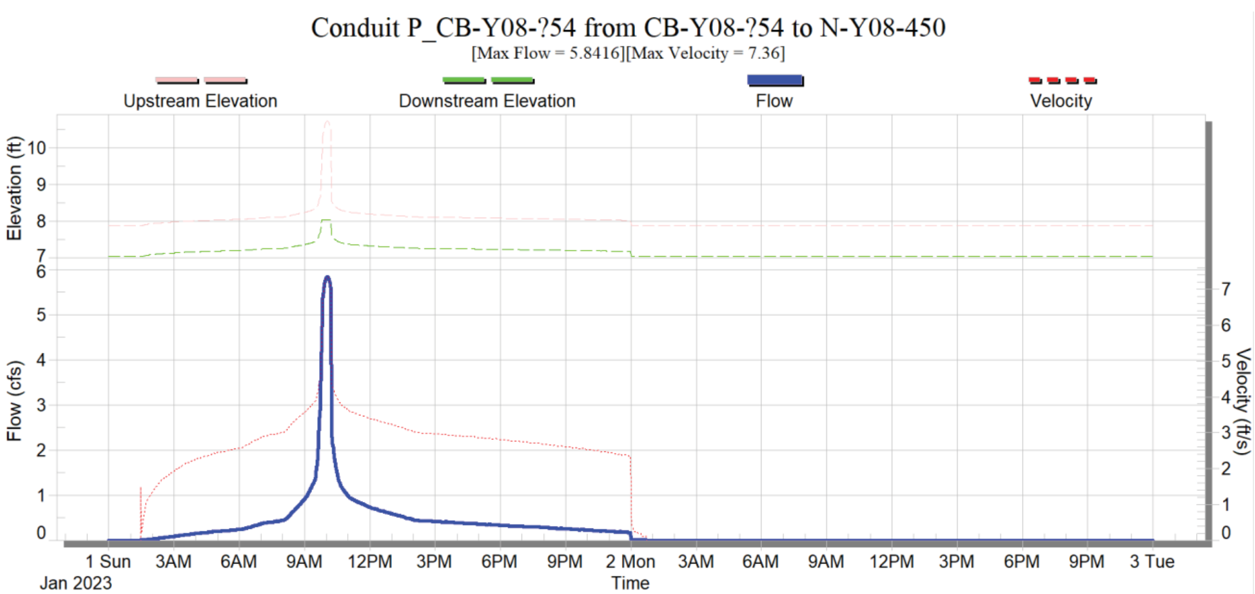
Outfall Parking C



Outfall Parking D

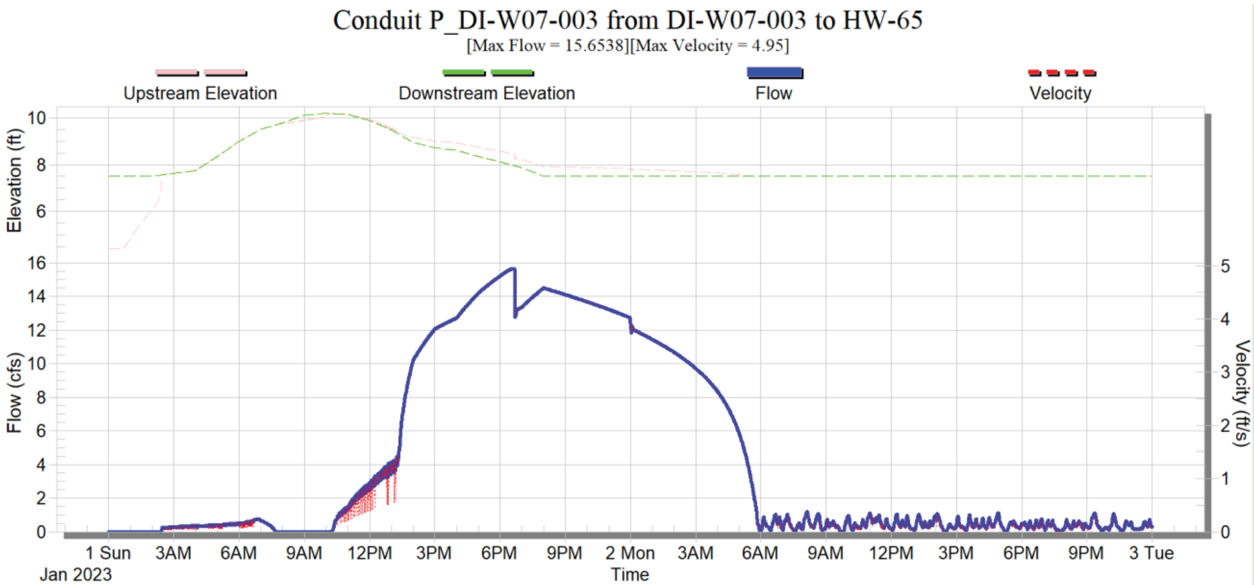


Outfall Parking E

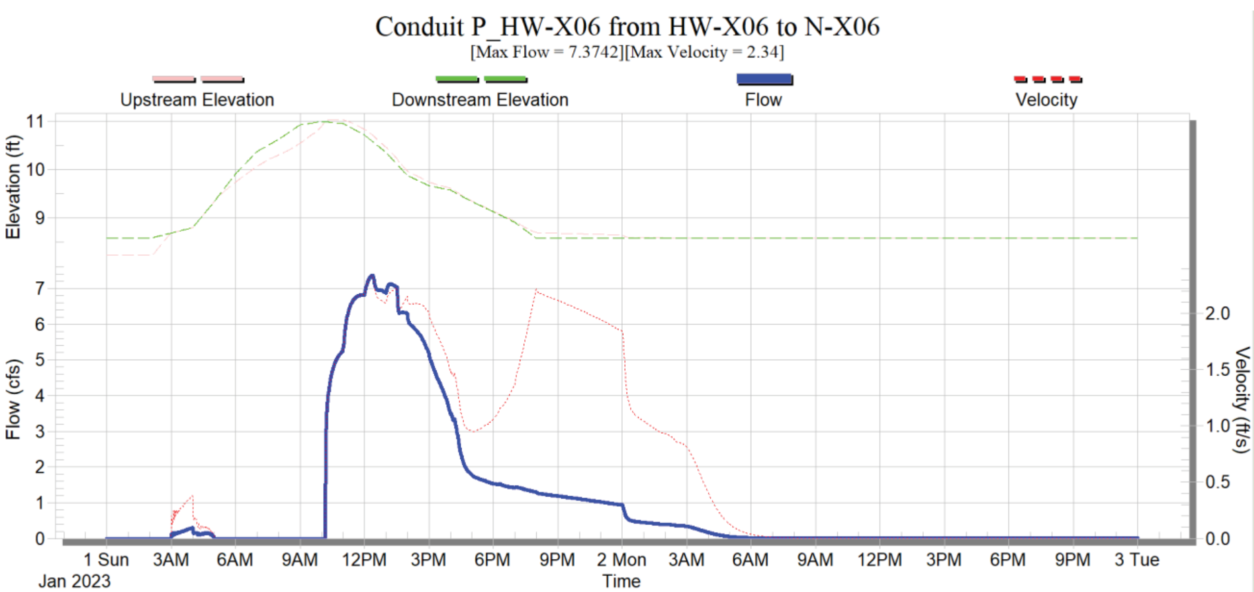


Appendix H3: 10-year Results

Outfall 1



Outfall 2



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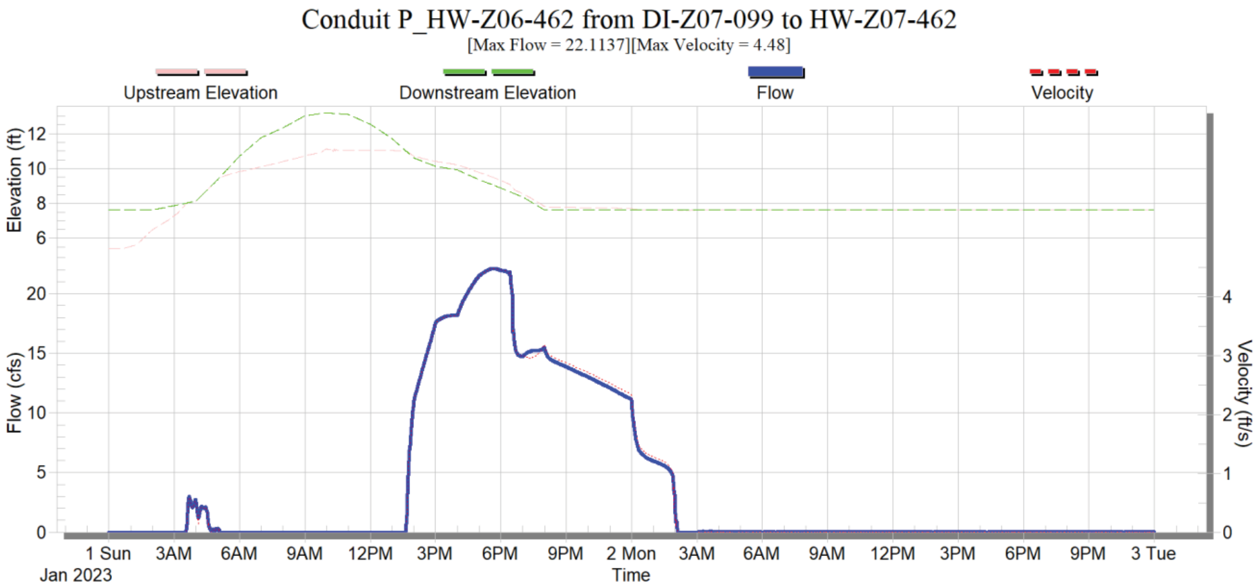
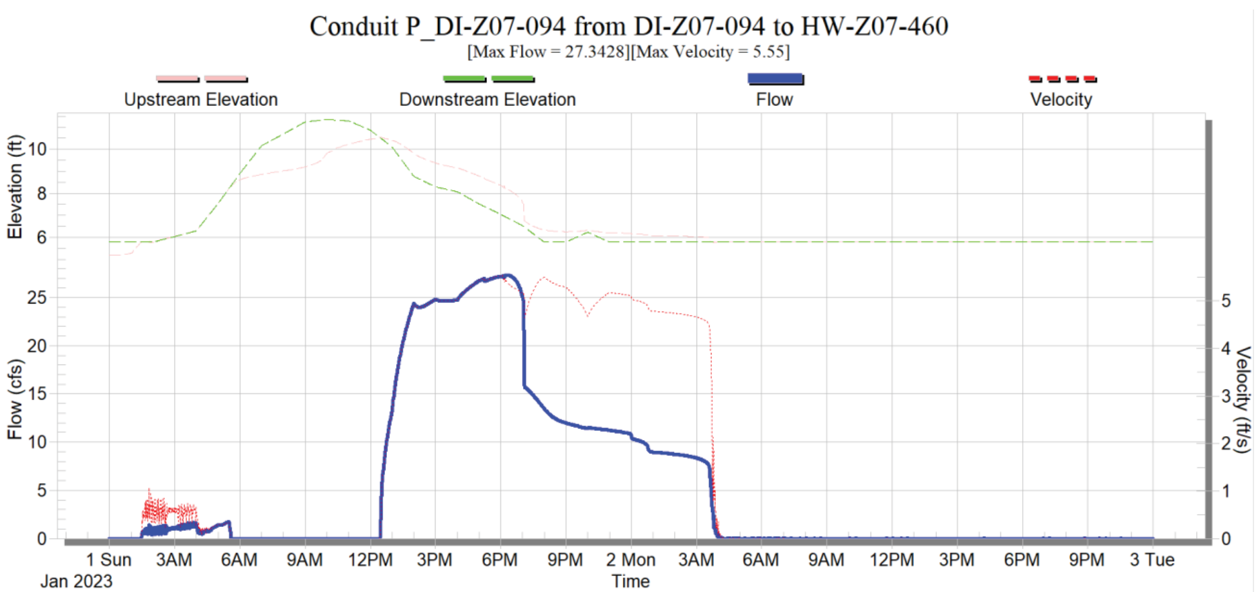
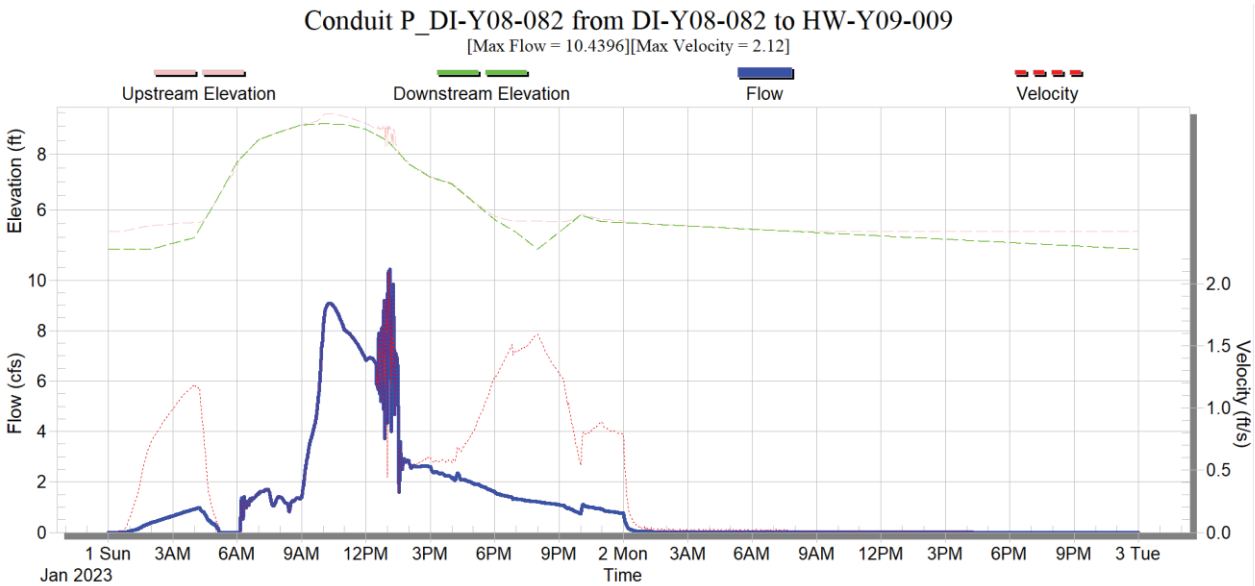


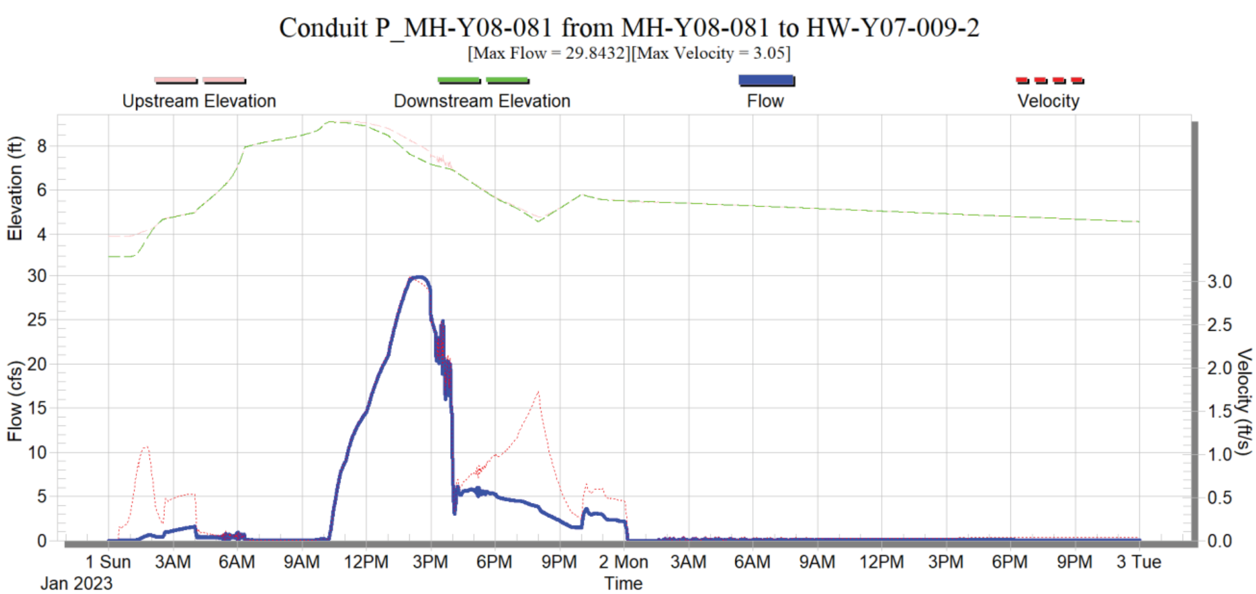
Outfall 6



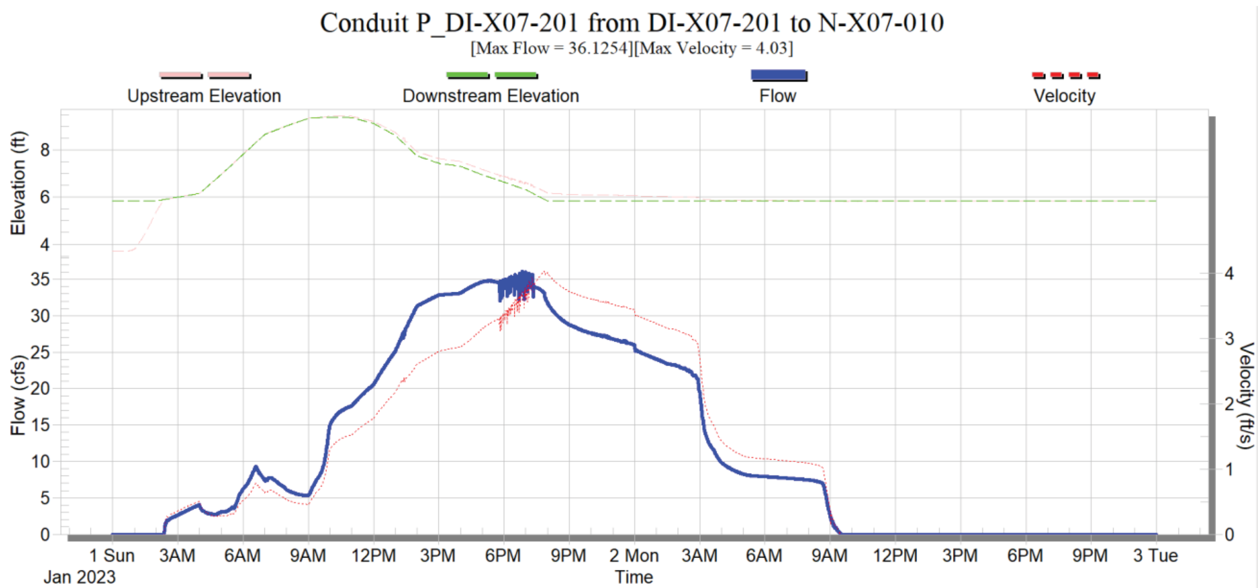
Outfall 9B



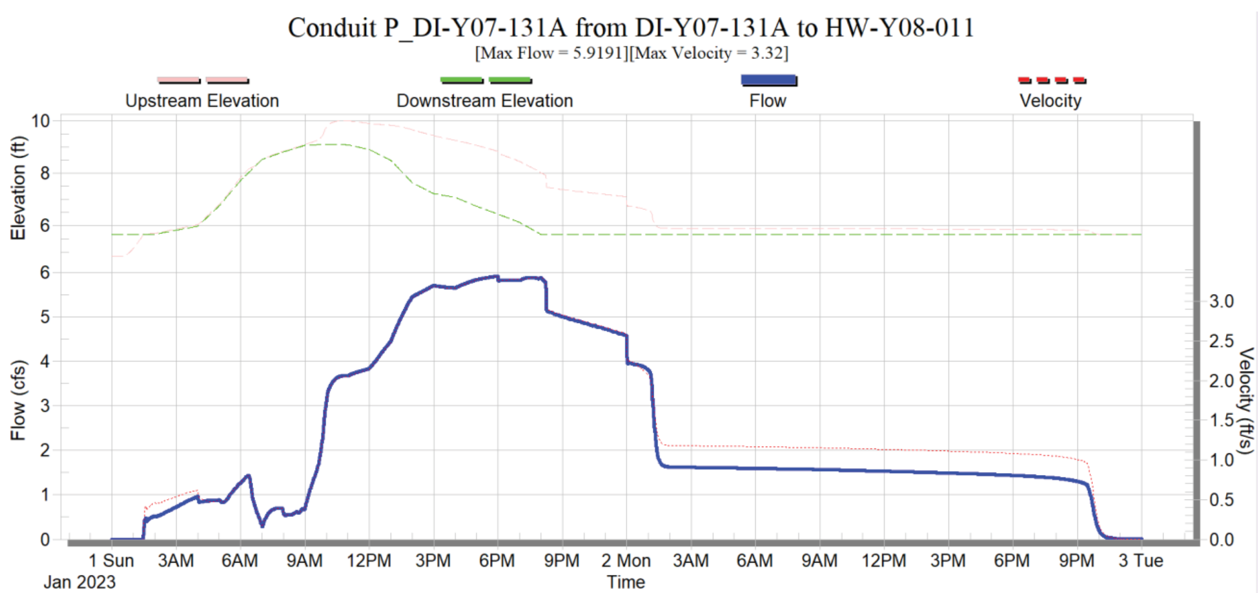
Outfall 9C



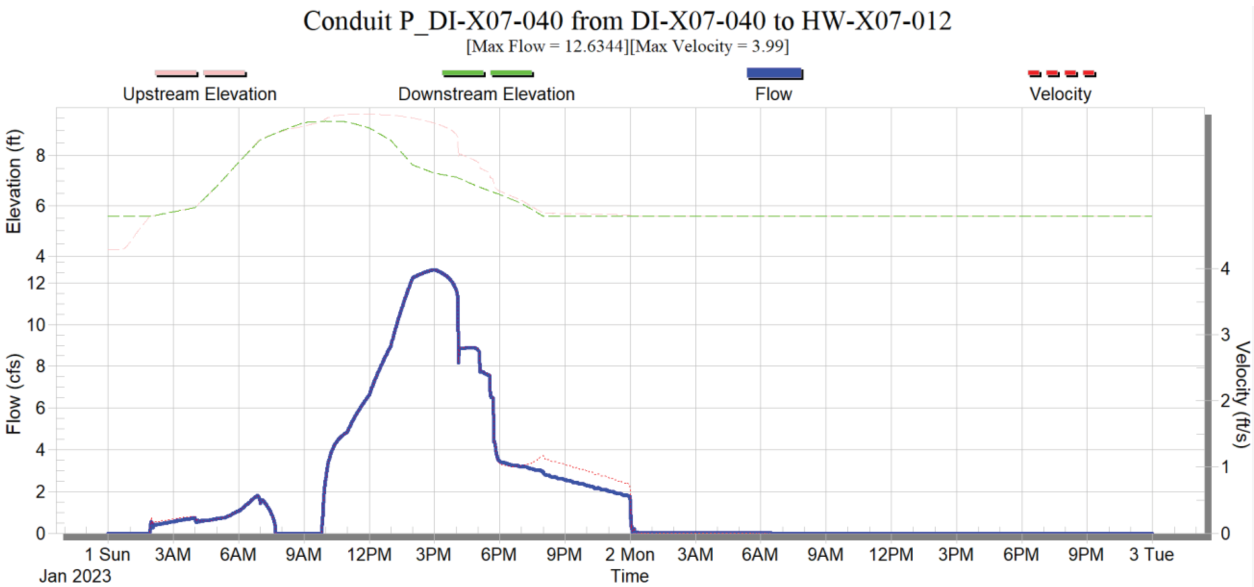
Outfall 10



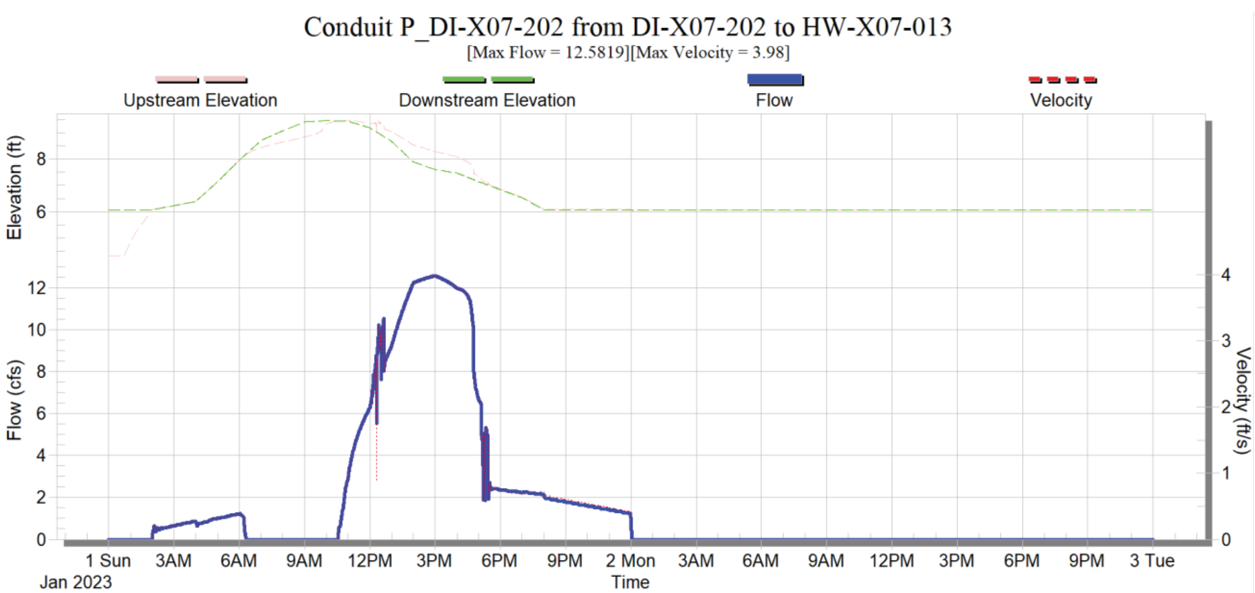
Outfall 11



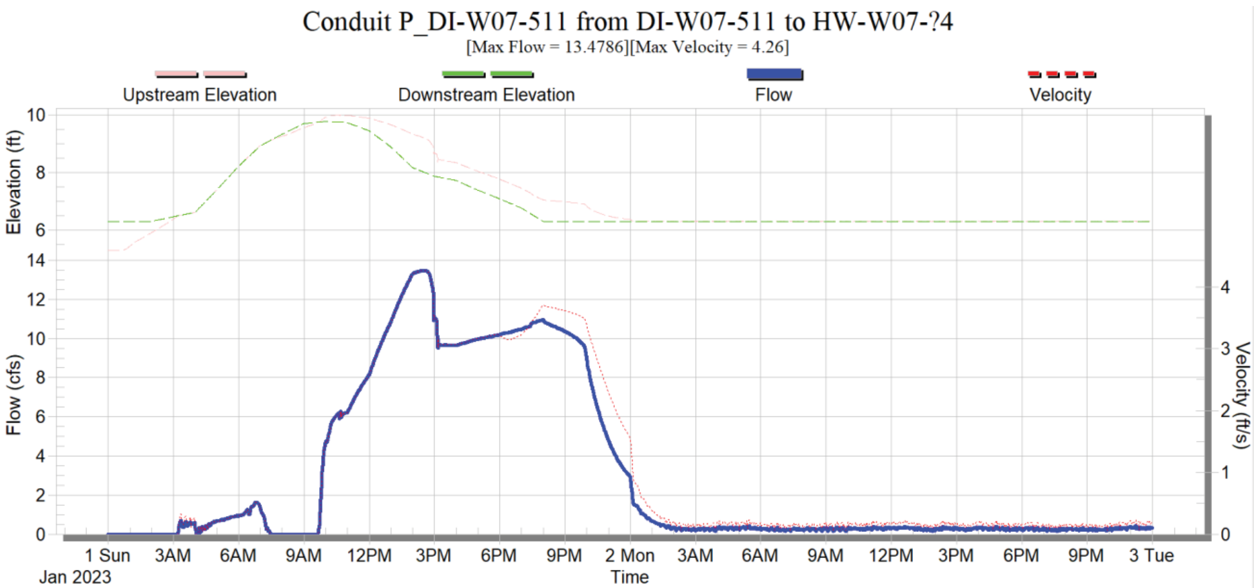
Outfall 12



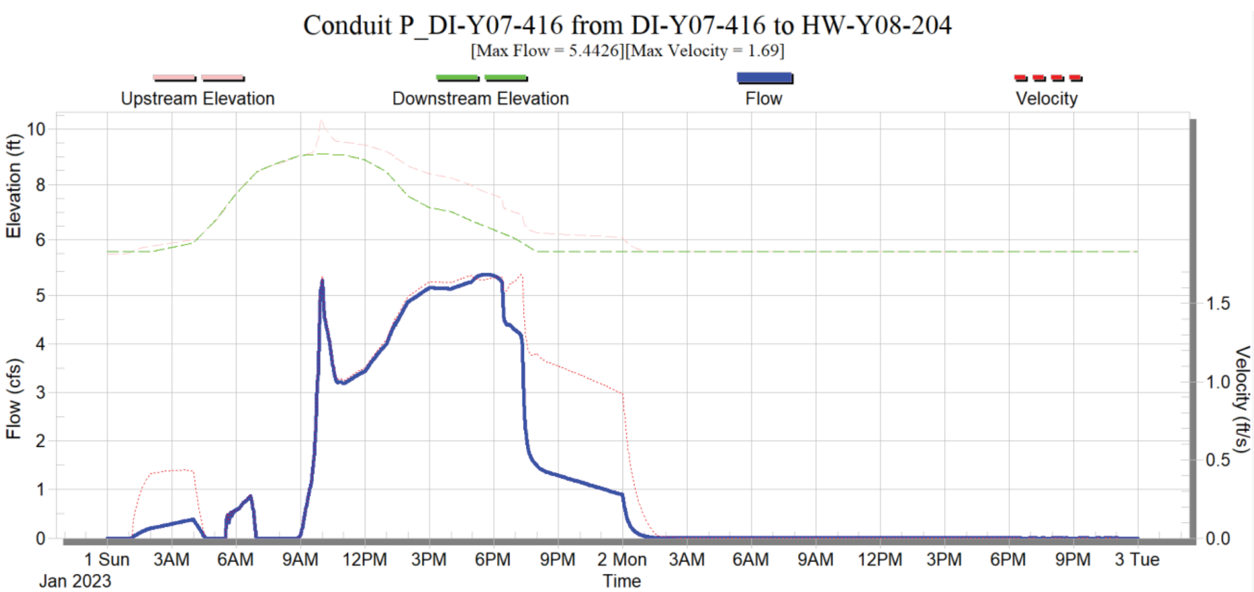
Outfall 13



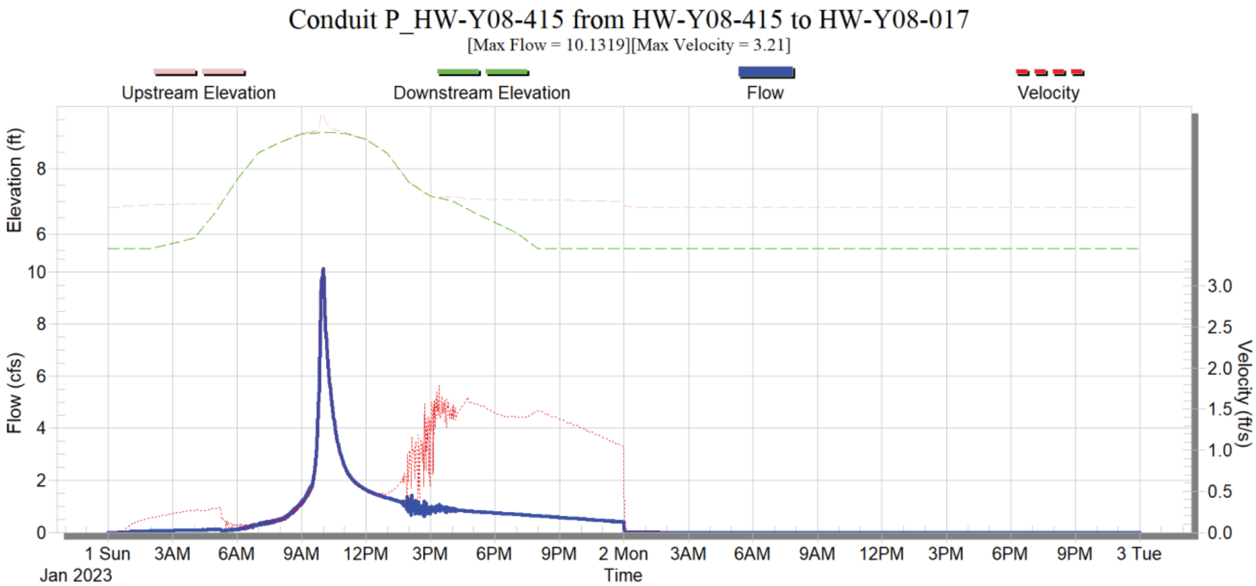
Outfall 14



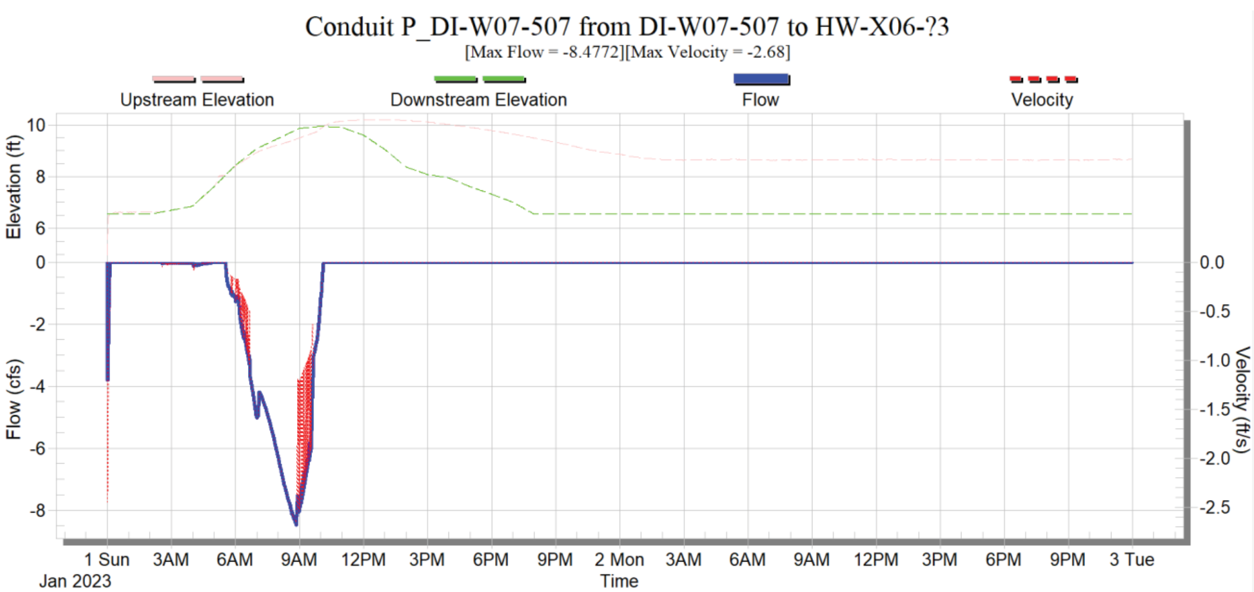
Outfall 17A



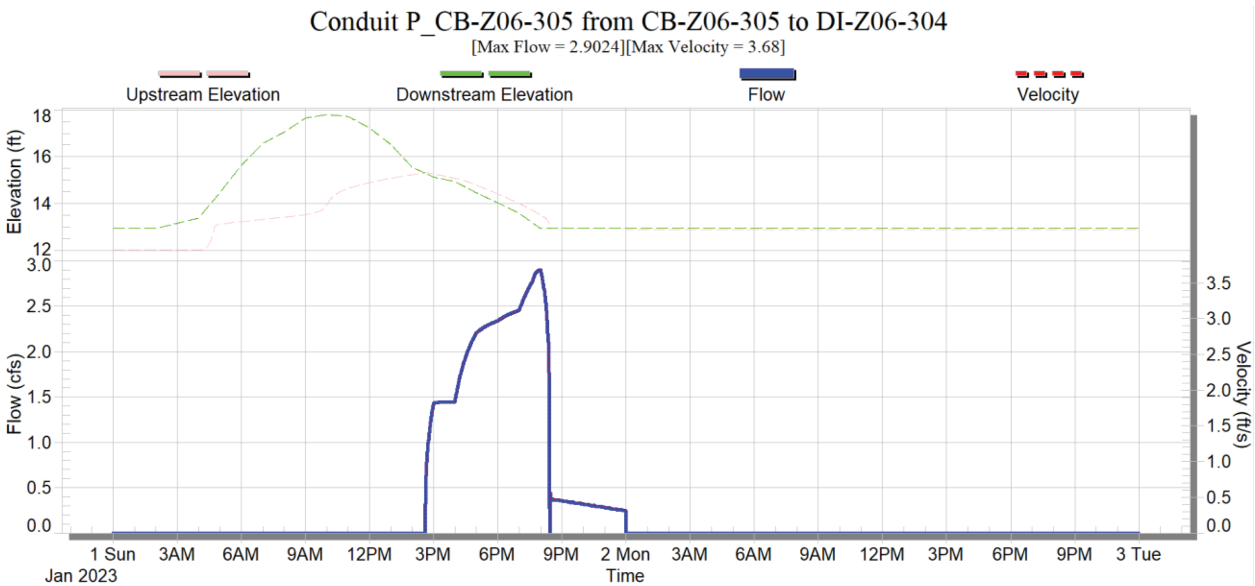
Outfall 17B



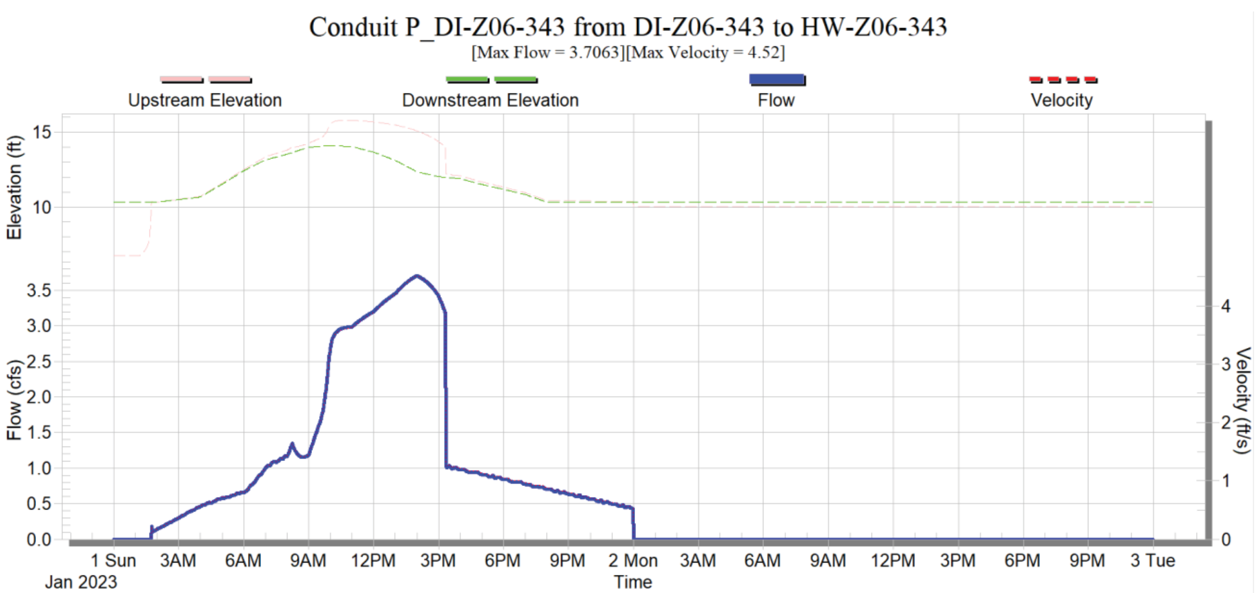
Outfall 26



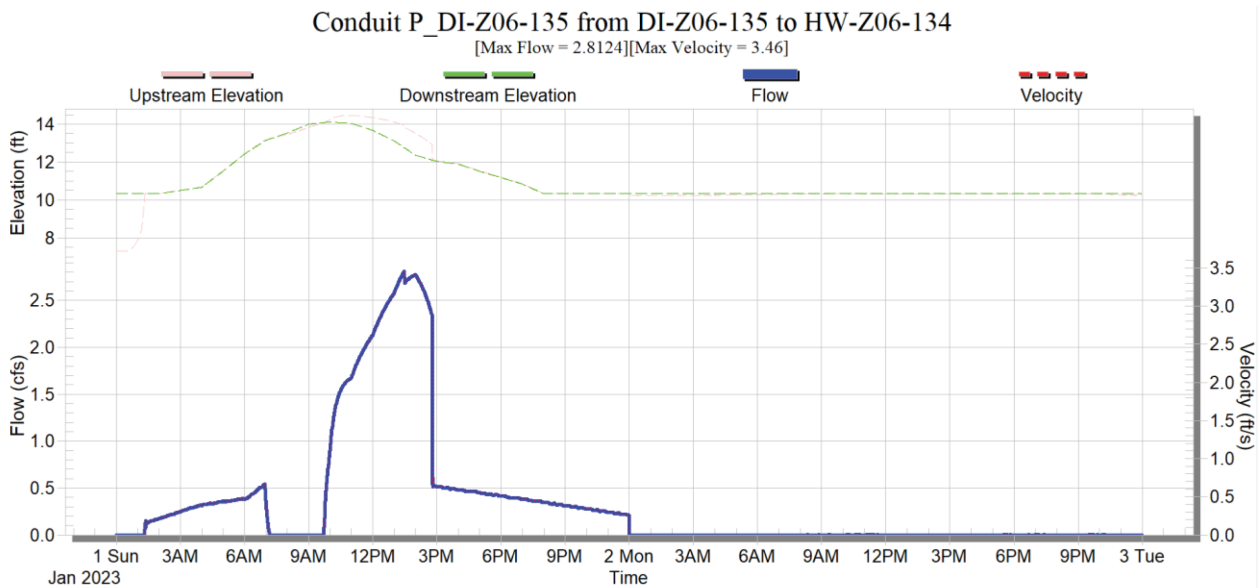
Outfall Northeast Corner



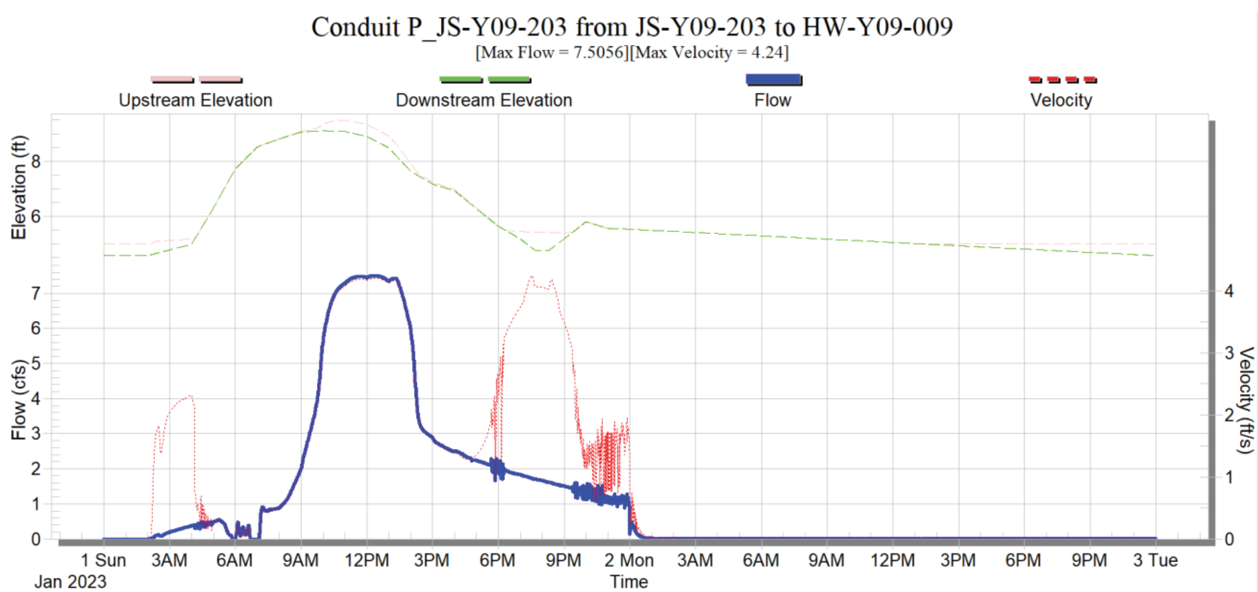
Outfall 495 Fairview – 1



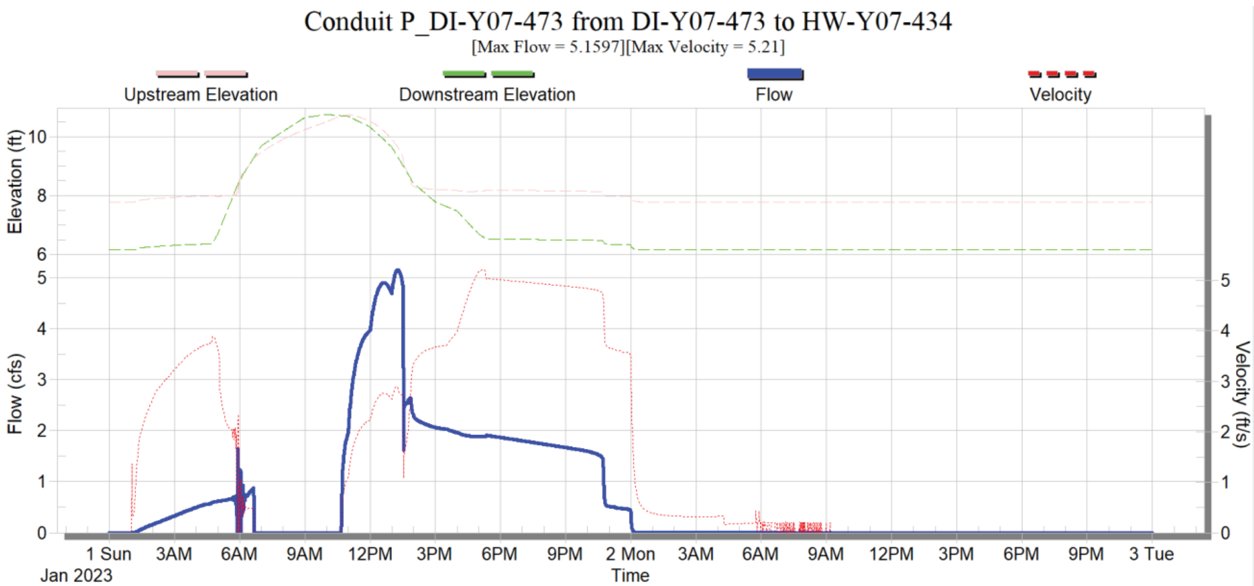
Outfall 495 Fairview – 2



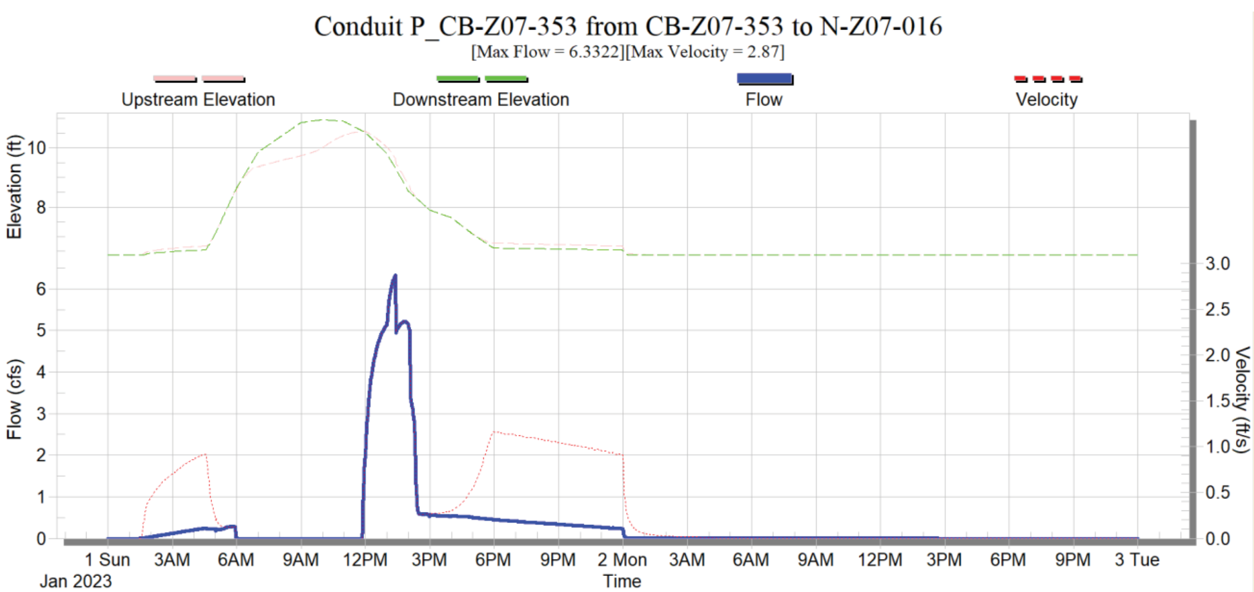
Outfall Parking A



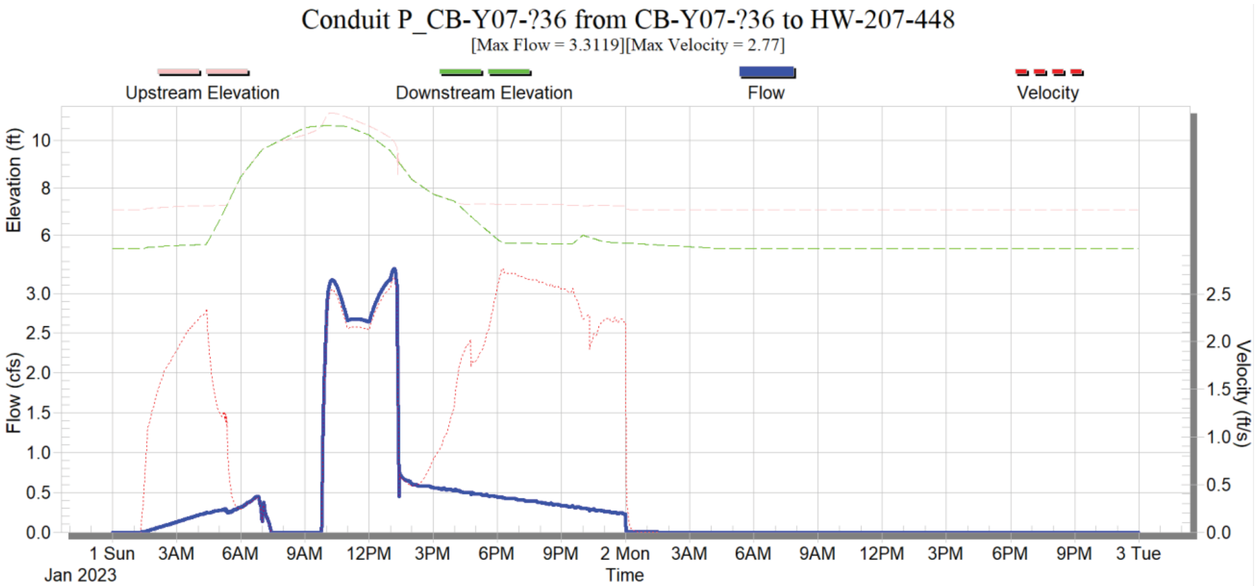
Outfall Parking B



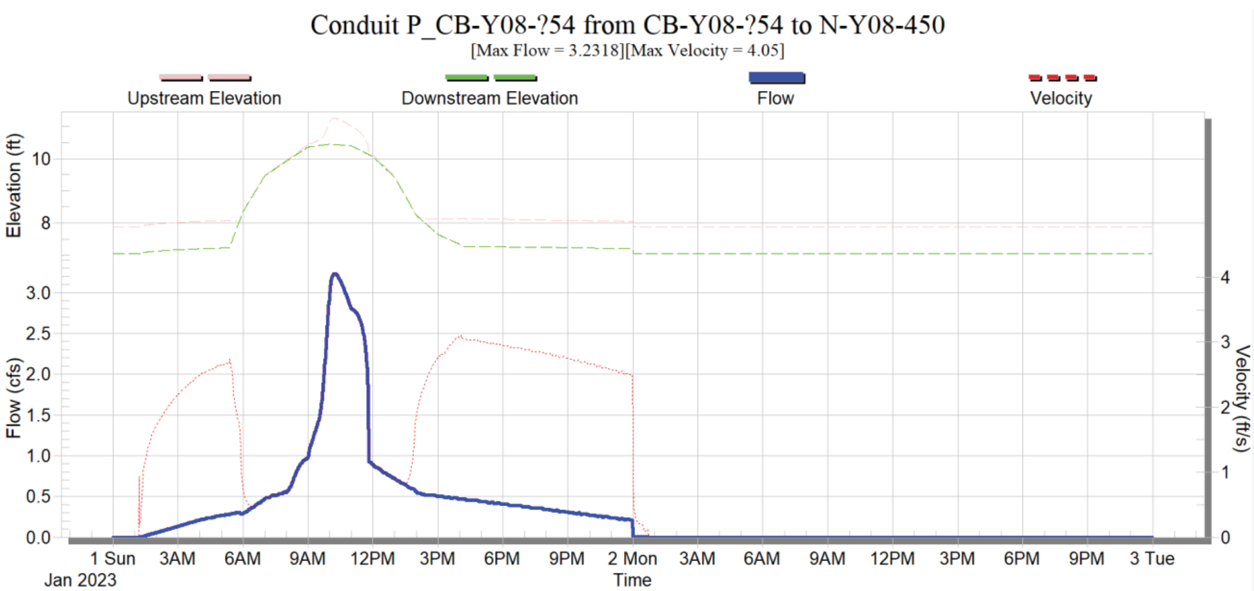
Outfall Parking C



Outfall Parking D



Outfall Parking E



Appendix I: Alternatives Prioritization Table

Drainage Master Plan Update
Alternative Prioritization Matrix

Prioritization Table						
Criteria	**Scoring Definition**					
	High		**Medium**		**Low**	
Maintains Airport Operability and Safety	Alternative definitively maintains reliable Airport operability and safety	10	Alternative acceptably maintains Airport operability and safety	5	Alternative does not adequately maintain Airport operability and safety	0
Alleviates Flooding and Known Drainage Concerns	Alternative alleviates a significant flooding concern or capacity deficiency	10	Alternative alleviates localized flooding or drainage concern	5	Alternative does not alleviate any known flooding or drainage concern	0
Incorporates Resiliency and Sustainability	Alternative incorporates progress toward resiliency and sustainability goals	8	Alternative is neutral towards resiliency and sustainability goals	4	Alternative hinders progress toward resiliency and sustainability goals	0
Considers Operations and Maintenance	Alternative reduces operations and maintenance load	6	Alternative has minor or no impact on operations and maintenance load	3	Alternative increases operations and maintenance load	0
Minimizes Capital Cost	Alternative provides no-additional-cost or relatively affordable drainage solution	6	Alternative provides a relatively moderate cost drainage solution	3	Alternative provides a relatively expensive drainage solution	0
Supports Regional Stewardship and Partnership	Alternative supports regional stewardship goals and partnerships	4	Alternative is neutral to regional stewardship goals and partnerships	2	Alternative is counter to regional stewardship goals and partnerships	0
Adheres with Master Plan Capital Plan	Alternative adheres with a short-term or intermediate project in the Master Plan	4	Alternative adheres with an intermediate-term project in the Master Plan	2	Alternative adheres with a long-term project or not associated with a Master Plan project	0
Streamlines Permitting	Alternative streamlines permitting requirements, or no permitting is required	2	Alternative requires permitting that is not considered a major risk actor	1	Alternative requires complex, multi-stakeholder permitting coordination; outcome uncertain	0
Aligns with the Climate Adaptation Plan Goals	Alternative aligns with and compliments the Climate Adaptation Plan	2	Alternative aligns with the Climate Adaptation Plan	1	Alternative does not align with the Climate Adaptation Plan recommendations	0

Appendix J: Alternatives Matrix

Outfall/ Drainage Area	Project No.	Project or Area of Interest (AOI)	Project List	Alternative No.	Alternative	Description	Maintains Airport Operability and Safety	Alleviates Flooding and Known Drainage Concerns	Incorporates Resiliency and Sustainability	Considers Operations and Maintenance	Minimizes Capital Cost	Supports Regional Stewardship and Partnership	Adheres with Master Plan Capital Plan	Streamlines Permitting	Aligns with the Climate Adaptation Plan Goals	Total Score
1	1	Ditch behind Lift Station 3	Flooding Area of Interest and Known Drainage Concern	1	Do nothing	Continue maintenance.	L	L	M	M	H	M	L	H	M	18
				2	Improvements associated with Taxiway B Extension	Assumes Taxiway B is extended. Includes regrading surface channel away from Taxiway B Extension and towards new inlet.	M	M	M	H	M	M	L	H	M	28
				3	**Local storm drain system upgrade**	**Independent of Taxiway B extension due to uncertainty of timing, construct combination pond area, upsize ditch area, upsize storm drain to 18''.**	**H**	**M**	**M**	**H**	**L**	**M**	**L**	**H**	**M**	**30**
1	2	Outfall 1 Improvements	Flooding Area of Interest and Known Drainage Concern	1	Do nothing	Leave as-is - new improvements would be costly and require complex permitting.	L	L	M	M	H	M	L	H	M	18
				2	Raise invert	Raise outfall invert - not helpful, because during a storm event water will be above outfall invert regardless.	L	L	H	M	M	M	L	M	H	19
				3	Upsize outfall	Increase from 24'' to 36''.	M	M	H	M	M	M	L	M	M	28
				4	Pump ponded water	Pump out ponded surface water and spillover from Carneros Creek to alleviate floodwater that the storm system is not designed for.	M	M	L	L	L	M	L	L	L	12
				5	**Creek maintenance**	Conduct maintenance to restore Carneros Creek to the 2006 as-built conditions. This includes removing sediment along channel bottom and that that has built up in Outfall 1.	**H**	**H**	**M**	**M**	**M**	**M**	**L**	**M**	**M**	**34**
				6	**Conduct further detailed study of detailed creek conveyance improvements**	**Independent of other projects for this area, conduct further study of downstream creek conveyance improvements such as channel widening to reduce WSE in the creek.**	**H**	**H**	**M**	**M**	**H**	**H**	**L**	**H**	**M**	**40**
				7	Distribute overflow water to Outfall 14 or 13	Piped conveyance under Runway 7/25 to Outfall 14 or 13. Analysis revealed there wasn't enough elevation fall for a pipe under the Runway to provide significant benefit.	M	L	M	M	L	M	M	H	M	19
				8	Distribute overflow water to Outfall 14 or 26	Piped and/or surface conveyance around Runway 7/25 to Outfall 26 or 14.	M	L	H	M	M	M	M	H	M	26
				9	Distribute overflow water to Outfall 26	Surface conveyance to Outfall 26.	M	M	H	M	M	M	M	H	M	31
1	3	Taxiway B Extension		[by others]	When Taxiway B extension occurs, new storm infrastructre that connects into Outfall 1 and grading to improve/increase surface storage and catch new direction of surface flow is recommended. An overland flow path that catches overtopping from Carneros Creek north of Taxiway B should be explored to carry flood water around Runway 7-25.											

Airport Projects and Flooding Areas of Interest							Scoring Criteria									
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1	4	Taxiway A3-C Connection	Flooding Area of Interest and Known Drainage Concern	**1**	**Rely on other Drainage Area 1 Improvements. (Project 1-2)**	**Assumes Taxiway B is not extended. Other improvements in Drainage Area 1 and 10 presumably would improve this ponding.**	**M**	**M**	**M**	**M**	**H**	**M**	**L**	**H**	**M**	**28**
				2	Taxiway B Extension Improvements	This is assuming Taxiway B is extended and this pavement is removed. Improvements associated with Taxiway B would improve this area.	M	M	M	M	M	M	L	H	M	25
				3	Infield grading	This is assuming Taxiway B is not extended. Provide additional temporary surface water storage (within FAA guidelines).	M	M	M	M	H	M	L	H	M	28
				4	Infield underground detention system	This is assuming Taxiway B is not extended. Provide underground storage	M	M	L	M	L	M	L	H	L	17
5	1	Taxiway B1	Flooding Area of Interest and Known Drainage Concern	1	Do nothing approach	Leave as-is.	L	L	M	M	H	M	L	H	M	18
				2	Underground Detention, possibly in conjunction with Drainage Area 6 projects	Provide underground detention system or surface grading in infield north of the Blast Pad.	M	M	L	M	L	M	H	H	L	21
				3	**Surface grading, possibly in conjunction with Project 6-3**	**Provide additional temporary surface water storage in infield north of the Blast Pad. Remove corner of Taxiway B1 not painted or used for aircraft ro prevent water from ponding on the pavement.**	**M**	**L**	**M**	**M**	**H**	**M**	**H**	**H**	**M**	**27**
				4	**Conduct further detailed study of San Pedro Creek conveyance improvements**	**Conduct further study of downstream creek conveyance improvements such as creek widening to reduce WSE in the creek.**	**M**	**H**	**H**	**M**	**H**	**M**	**L**	**H**	**M**	**37**
				5	Route water to Outfall 10	This is not recommended, as Drainage Area 10 experiences its own drainage issues.	L	L	L	M	M	M	H	H	M	15
5	2	Future Taxiway B2	Intermediate-term	1	Do nothing	This assumes new Taxiway B2 is built and no drainage improvements occur.	L	L	M	M	H	M	L	H	M	18
				2	**Infield grading and storm system improvements**	**To increase surface storage (within FAA guidelines). Line 670 LF of 24'' CMP pipe. Upsize pipe under future Taxiway B2 from 18'' ACP to 24'' RCP.**	**M**	**M**	**M**	**M**	**H**	**M**	**M**	**H**	**M**	**30**
				3	Route water to Outfall 10	This is not recommended, as Drainage Area 10 experiences its own drainage issues.	L	L	L	M	M	M	M	H	M	13
5	3	Taxiway F	Flooding Area of Interest and Known Drainage Concern	1	Do nothing - no development	Leave as-is.	L	L	M	M	H	M	L	H	M	18
				2	**Infield grading - independent of development**	**Provide additional temporary surface water storage (within FAA guidelines). FBO development is subject to funding, so an independent short-term alternative is preferred.**	**M**	**M**	**M**	**M**	**M**	**M**	**M**	**H**	**M**	**27**
				[by others]	Site improvements by developers (short-term)	Developer to provide appropriate stormwater management meeting the applicable regulations. Developer to maintain flow to Outfall 5.										

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5	4	Airfield Conveyance Swale Maintenance	Flooding Area of Interest and Known Drainage Concern	1	Do nothing	Continue maintenance as currently performed to reset riprap every 1-5 years.	M	L	M	M	H	M	L	H	M	23
				2	Replace riprap with other kind of erosion control	Replace riprap with other type of erosion control.	M	L	M	H	M	M	L	H	M	23
				3	Widen channel and upsize culverts	Allow high flows to pass without moving riprap. Not a capacity issue.	M	L	H	H	L	M	L	H	M	24
				4	**Grout riprap in place**	**Set riprap into place so high flows do not damage it.**	**M**	**M**	**M**	**H**	**M**	**M**	**L**	**H**	**M**	**28**
5	5	Future Fuel Farm	Intermediate-term	1	Do nothing	No new stormwater infrastructure.	L	L	M	M	H	M	L	H	M	18
				2	**Add inlet**	**Add inlet and other stormwater quality measures associated with new fuel area.**	**M**	**M**	**M**	**M**	**M**	**M**	**H**	**H**	**M**	**29**
5	6	Vertiport Site	Long-term	1	Do nothing	Leave as-is. Common blockage of outfall.	L	L	M	M	H	M	L	H	M	18
				2	Outfall improvements independent of development	Add headwall to outfall. Flood Control District maintenance often pushes sediment in front of outfall. Creek sediment builds up, blocking outfall.	M	M	M	H	M	M	L	M	M	27
				3	**Raise outfall invert and reconstruct outfall independent of development**	**(See above)**	**M**	**M**	**H**	**H**	**M**	**M**	**L**	**M**	**H**	**32**
				4	Vertiport site stormwater management	Combination of grading improvements, surface and/or subsurface detention, and outfall improvements.	H	M	M	L	L	M	L	M	M	23
6	1	Taxiway A1	Flooding Area of Interest and Known Drainage Concern	1	Do-nothing approach	Leave as-is.	L	L	M	M	H	M	L	H	M	18
				2	Raise Outfall 6 invert	Raise outfall invert - ineffective, because during a storm event water will be above outfall invert regardless.	L	L	H	M	M	M	L	M	H	19
				3	**Route water to Outfall 11 and Grading**	**With the removal of Taxiway E and Runway 15L/33R, and surface/pipe flow from Drainage Area 6 to Drainage Area 11.**	**M**	**M**	**H**	**M**	**M**	**M**	**M**	**H**	**M**	**31**
				4	Underground Detention (to serve 6-1 and 6-2)	Add detention system in infield east or west of Taxiway A1, allowing additional storage before water encroaches on Taxiway.	M	M	L	M	L	M	M	H	L	19
6	2	Future Taxiway A3	Intermediate-term	1	Do nothing	This assumes new Taxiway A3 is built and no drainage improvements occur.	L	L	M	M	H	M	L	H	M	18
				2	**Route water to Outfall 11 and Grading**	**This assumes new Taxiway A3 is built. Infield grading to provide additional temporary surface water storage (within FAA guidelines), in addition to routing water to Outfall 11.**	**M**	**L**	**H**	**M**	**M**	**M**	**H**	**H**	**M**	**28**
				3	Underground Detention (to serve 6-1 and 6-2)	Add detention system in infield east or west of Taxiway A1, allowing additional storage before water encroaches on Taxiway.	M	M	L	M	L	M	H	H	L	21
				4	Replace existing ACP pipe	New storm pipe will be required when new Taxiway A3 is built, as it will be above an inlet. Replace existing 15'' and 18'' ACP with 995 LF 18'' RCP.	M	L	M	M	M	M	H	H	M	24

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6	3	Runway 7-25 Blast Pad	Flooding Area of Interest and Known Drainage Concern	1	Do nothing approach	This assumes a portion of the Blast Pad is not removed.	L	L	M	M	H	M	L	H	M	18
				2	Porous pavement for Blast Pad	Replace portion of Blast Pad to remain with porous pavement. Includes infield grading improvements as appropriate.	L	M	H	M	M	M	M	H	M	26
				3	Underground detention	Provide underground detention system in infield north of the Blast Pad, whether pavement is removed or not.	M	M	L	M	L	M	M	H	L	19
				4	**Infield grading - associated with removal of Runway Blast Pad pavement**	**Provide additional surface water storage (within FAA guidelines) in area of removed Runway Blast Pad.**	**M**	**M**	**M**	**M**	**H**	**M**	**M**	**H**	**M**	**30**
				5	Pump water to San Pedro Creek	Pump out ponded surface water that cannot drain until creek water levels go down in San Pedro Creek.	M	M	L	L	L	M	L	L	L	12
6	4	Deposits and cracks in pipe (S1, M5)	Pipe/Other Maintenance Areas of Interest	1	Do nothing	Leave as-is with various deposits (M5) and cracks (S1)	L	L	M	M	H	M	L	H	M	18
				2	**Formally abandon**	**Clean up abandon job. Could be done with the construction of new Taxiway A3.**	**H**	**L**	**H**	**M**	**H**	**M**	**L**	**H**	**M**	**32**
				3	Line ACP	Independent of Taxiway A3, clean out pipe and line 241 LF 15'' and 328 LF 18'' existing ACP pipe.	H	L	H	M	M	M	L	H	M	29
6	5	Pipe surface damage reinforcement (S3)	Pipe/Other Maintenance Areas of Interest	1	Do nothing	Leave pipe as-is with multiple cracks (S3).	L	L	M	M	H	M	L	H	M	18
				2	**Replace**	**Replace entire 317' section of pipe with construction of Taxiway A3.**	**H**	**L**	**M**	**M**	**M**	**M**	**H**	**H**	**M**	**29**
				3	Line ACP	Independent of construction of Taxiway A3, line existing ACP pipe.	H	L	H	M	M	M	L	H	M	29
6	6	Deposits and cracks in pipe (S3, S4, M2)	Pipe/Other Maintenance Areas of Interest	1	Do nothing	Leave pipe as-is with multiple cracks (S3), deposits (M2) and surface damage (S4).	M	L	M	M	H	M	L	H	M	23
				2	Replace	Recommend this pipe be replaced with construction of new taxiway.	H	L	M	M	L	M	H	H	M	26
				3	**Line ACP**	**Clean and line 260 LF section of ACP associated with Taxiway A1 rehab.**	**H**	**L**	**H**	**M**	**M**	**M**	**H**	**H**	**M**	**33**

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9	1	Terminal Apron	Flooding Area of Interest and Known Drainage Concern	**1**	**Do nothing**	**Leave as-is.**	**L**	**L**	**M**	**M**	**H**	**M**	**L**	**H**	**M**	**18**
				2	Upsize storm drain system	Available pipe grades limit pipe capacity, and upsizing with existing slopes has little benefit. Project is scored as a stand-alone project; however, could be in conjunction with Runway 15L/3R Closure.	L	L	M	M	M	M	L	H	M	15
				3	Underground detention	Add underground detention system in infield west of apron, allowing additional capacity for water coming off the apron. Could be in conjunction with Runway closure.	M	M	L	M	L	M	L	H	M	18
9	2	Parking Garage	Long-term	[by others]		When developed, this area will require stormwater management for volume and flow control. [by developer]										
9	3	Concrete Conveyance Channel Maintenance	Flooding Area of Interest and Known Drainage Concern	1	Do nothing	Continue maintenance as currently performed.	L	L	M	M	H	M	L	H	M	18
				2	Widen channel and upsize cuvlerts	Widen channel and upsize cuvlerts.	M	M	H	H	L	M	L	H	M	29
				3	Increase maintenance of landscaping	Increase maintenance of landscaping.	M	M	L	M	H	M	L	H	M	24
				4	**Inlet improvements**	**Increase inlet capacity and/or provide clog resistant grates/screens to block debris from entering channel.**	**M**	**M**	**H**	**H**	**M**	**M**	**L**	**H**	**M**	**32**
9	4	Angular Pipe Joint	Pipe/Other Maintenance Areas of Interest	**1**	**Do nothing**	**Leave pipe as-is with angular pipe joint (S3).**	**M**	**L**	**M**	**M**	**H**	**M**	**L**	**H**	**M**	**23**
				2	Reroute flow west.	Add new pipe to carry water west, abandoning old pipe.	M	L	M	M	M	M	L	H	M	20
9	5	Southfield Redevelopment	Other	[by others]		Project is currently under design. Pervious pavement is being considered.										
10	1	Infiltration Runner in Pipe (M4)	Pipe/Other Maintenance Areas of Interest	1	Do nothing	Leave as-is. RCP Pipe has an infiltration runner (M4).	L	L	M	M	H	M	L	H	M	18
				2	Monitor	Continue to monitor runway pavement condition to determine if pipe needs to be lined/replaced.	L	L	M	L	H	M	L	H	M	15
				3	**Pipe lining**	**While doing Runway pavement rehab, line 570 LF of 36'' RCP pipe.**	**H**	**L**	**H**	**M**	**M**	**M**	**L**	**H**	**M**	**29**
				4	Replace pipe	While doing Runway pavement rehab, replace 570 LF of 36'' pipe.	H	L	M	M	L	M	L	H	M	22
10	2	Pipe surface damage reinforcement (S4), obstruction through pipe wall (M5)	Pipe/Other Maintenance Areas of Interest	1	Do nothing	Leave pipe as-is whether Taxiway A3 removal occurs or not. RCP Pipe has surface damage (S4) and obstruction intruding through wall (M5).	L	L	M	M	H	M	L	H	M	18
				2	Replace pipe	Independent of Taxiway A3 removal, replace 345 LF of 36'' RCP from edge of shoulder to junction.	H	L	M	M	L	M	L	H	M	22
				3	**Replace pipe**	**When Taxiway A3 removal occurs, replace 345 LF of 36'' RCP from edge of shoulder to junction**	**H**	**L**	**M**	**M**	**L**	**M**	**H**	**H**	**M**	**26**
10	3	Outfall 10 Channel Maintenance	Flooding Area of Interest and Known Drainage Concern	1	Do nothing	Leave channel as-is.	L	L	L	M	H	M	L	H	M	14
				2	**Restore channel to 2010 design**	**Recommend looking into maintenance project to restore channel to its 2010 design.**	**H**	**M**	**M**	**M**	**M**	**M**	**L**	**M**	**M**	**29**

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10	4	Northern Portion of Taxiway E	Flooding Area of Interest and Known Drainage Concern	1	Do nothing	This is assuming Taxiway E removal does not occur, and no specific project is done. Downstream/upstream projects in Drainage Area 10 could alleviate this issue.	L	L	M	M	H	M	L	H	M	18
				2	Infield grading - independent project	Independent of Taxiway E removal, provide grading for additional temporary surface water storage (within FAA guidelines) in that large infield area.	M	M	M	M	H	M	L	H	M	28
				3	**Infield grading associated with Taxiway E relocation project**	**This is assuming Taxiway E relocation does occur. Create surface detention pond in infield for additional temporary surface water storage (within FAA guidelines), including area where Taxiway E was removed.**	**M**	**M**	**M**	**M**	**H**	**M**	**H**	**H**	**M**	**32**
				4	Underground detention system - independent project	Independent of Taxiway E removal, provide underground detention system.	M	M	L	M	L	M	L	H	L	17
				5	Underground detention System associated with Taxiway E relocation project	This is assuming Taxiway E relocation does occur. Create underground detention system in infield (within FAA guidelines), including area where Taxiway E was removed.	M	M	L	M	L	M	H	H	L	21
10	5	NW GA Apron	Flooding Area of Interest and Known Drainage Concern	**1**	**Do nothing until development occurs**	**Wait for redevelopment for this project.**	**M**	**L**	**H**	**M**	**H**	**M**	**L**	**H**	**M**	**27**
				2	Inlet capacity	Add additional inlets/increase inlet to capture more water.	M	M	M	M	M	M	L	H	M	25
				3	Pipe capacity	Upsize pipe connecting to system.	M	M	M	M	M	M	L	H	M	25
				4	Underground detention system	Add underground detention system in infield south of apron, allowing additional capacity for water coming off the apron.	M	M	L	M	L	M	L	H	L	17
				[by others]	When developed, this area will require stormwater management for volume and flow control. [by developer]											N/A
10	6	NE Hangar Development	Intermediate-term	[by others]	When developed, this area will require stormwater management for volume and flow control. [by developer]											N/A

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10	7	Distribute Flow away from Drainage Area 10	Flooding Area of Interest and Known Drainage Concern	1	Do nothing	Leave as-is.	L	L	M	M	H	M	L	H	M	18
				2	Convey water under Runway to Drainage Areas 17 or 11	During Runway Rehab project, reroute water with new pipe connection under Runway 7-25 to connect some of Drainage System 10 to 17 or 11. Analysis revealed that due to limited elevation falls and pipe slopes, rerouting flow to 17 or 11 does not provide significant benefit to the upper areas of Drainage Area 10, as pipe capacity is limited by slope.	M	L	H	M	M	M	L	H	M	24
				3	**Maintain Drainage Area 10 system, and add connection under Runway to Drainage Area 11**	**During Runway Rehab project, add pipe connection to Drainage Area 11 under Runway 7-25 and leave existing connection to Drainage Area 10 to allow flow in either direction.**	**M**	**M**	**H**	**M**	**M**	**M**	**L**	**H**	**M**	**29**
				4	Convey water around Runway Distribute portion flow to Drainage Areas 1 or 5	If Drainage Area 1 or 5 receive capacity upgrades, reconfigure parts of Drainage System 10 to connect to Drainage Area 1 or 5. This is not recommended until improvements there occur.	L	L	M	M	M	M	H	H	M	19
				5	Upsize Outfall 10 and Drainage Area 10 pipe system	Pipe capacity is limited by elevation fall, upsizing the pipe system would provide little benefit at the existing grades.	L	M	H	M	L	M	L	H	M	21
10	8	Existing Taxiway A3 Removal	Short-term	1	Keep high-point with no drainage change	With Taxiway A3 removal, keep high point at the same location.	L	L	M	M	L	M	H	H	M	16
				2	**Keep high-point and change draingae**	**With Taxiway A3 removal, regrade infield to eliminated need for DI-X07-035 by connection to Drainage Area 12 to alleviate flow from Drainage Area 10.**	**L**	**M**	**M**	**M**	**L**	**M**	**H**	**H**	**M**	**21**
11	1	Taxiway E Relocation/Runway 15L-33R Closure	Intermediate-term	1	Do nothing approach	This assumes that the trunk line is not moved with relocated Taxiway E, but new inlets are added to connect to the existing trunk line.	M	M	L	M	H	M	M	H	M	26
				2	**Reconstruct trunk line**	**This assumes that the trunk line is moved with relocated Taxiway E. Upsize from 15'' and 12'' ACP to 18'' RCP. Modifications could also consider minor flooding shown in model on Terminal Apron.**	**H**	**M**	**M**	**M**	**M**	**M**	**M**	**H**	**M**	**32**
11	2	Pipe with hole and joint offset (S5)	Pipe/Other Maintenance Areas of Interest	1	Do nothing	Leave ACP pipe as-is with a hole (S5) and joint offset (S3).	L	L	M	M	H	M	L	H	M	18
				2	Replace	This assumes Taxiway E is not relocated. Replace 420 LF of 15'' ACP.	H	L	M	M	M	M	L	H	M	25
				3	**Realignment**	**Solution will be accomplished with realignment and reconstruction of storm infrastructure associated with relocation of Taxiway E.**	**H**	**L**	**M**	**M**	**M**	**M**	**M**	**H**	**M**	**27**

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12	1	Outfall 12 Improvements	Flooding Area of Interest and Known Drainage Concern	1	Do nothing	Leave leaky check valve as-is.	L	L	L	M	H	M	L	H	M	14
				2	**Replace check valve**	Replace leaky check valve	**M**	**L**	**H**	**M**	**M**	**M**	**L**	**H**	**H**	**25**
12	2	Pipe with surface damage (S3)	Pipe/Other Maintenance Areas of Interest	1	Do nothing	Leave CMP pipe as-is. Surface damage for 144 LF (S3).	L	L	M	M	H	M	L	H	M	18
				2	**Line entire CMP section**	**Line 334 LF 24'' CMP pipe from Outfall 12 to RCP transition at edge of Taxiway A.**	**H**	**L**	**H**	**M**	**M**	**M**	**L**	**H**	**M**	**29**
				3	Replace CMP section	Replace 167 LF 24'' CMP pipe with new CMP.	H	L	M	M	L	M	L	H	M	22
13	1	Runway 7-25 Run-up Pad	Flooding Area of Interest and Known Drainage Concern	1	Do nothing	This assumes no project occurs.	M	L	M	M	H	M	L	H	M	23
				2	**Infield grading**	**While doing shoulder removal, redefine infield grading within FAA guidelines for additional temporary surface water storage away from pavement.**	**H**	**M**	**M**	**M**	**H**	**M**	**H**	**H**	**M**	**37**
13	2	Cracks (S3), deposits (M2), infiltration dripper (M3) in pipe	Pipe/Other Maintenance Areas of Interest	1	Do nothing	Leave pipe as-is. ACP Pipe had multiple cracks (S3), infiltration dripper (M3), a joint offset (S3), and deposits (M2).	M	L	M	M	H	M	L	H	M	23
				2	**Pipe lining**	**While doing shoulder removal, line entire stretch of 260 LF 24'' ACP pipe.**	**H**	**L**	**H**	**M**	**M**	**M**	**H**	**H**	**M**	**33**
				3	Replace pipe	While doing shoulder removal, replace entire stretch of 260 LF 24'' ACP pipe. Pipe is under Taxiway A.	H	L	M	M	L	M	H	H	M	26
				4	Monitor condition of entire Drainage Area 13 pipe system	Drainage Area 13 pipe system is entirely ACP. Monitor performance and condition of additional 900 LF of 15'' ACP as a possible pipe replacement location when work is done in this area.	M	L	M	M	H	M	L	H	M	23
14	1	Taxiway A5	Flooding Area of Interest and Known Drainage Concern	1	Do nothing	This is assuming Taxiway A5 is not modified and no project occurs.	L	L	M	M	H	M	L	H	M	18
				3	**Rely on Taxiway A5 rehab project**	**Encroachment fixed with taxiway addition as new pavement elevation is assumed to be higher than existing infield. Included in Taxiway A5 rehab project would be new inlets/pipe connections and new surface grading to direct flow off and around new pavement.**	**M**	**M**	**M**	**M**	**M**	**M**	**H**	**H**	**M**	**29**
				2	Infield grading independent of Taxiway A5 improvements	Infield grading for additional temporary surface water storage within FAA guidelines.	M	M	M	M	H	M	L	H	M	28
14	2	Crack in RCP pipe (S3)	Pipe/Other Maintenance Areas of Interest	1	Do nothing	Leave pipe as-is. No stand-alone project. RCP pipe has multiple cracks (S3).	M	L	M	M	H	M	L	H	M	23
				2	**Replace section of pipe**	**While doing shoulder removal on Taxiway A5, replace only the section of 24'' RCP pipe with crack.**	**M**	**L**	**M**	**M**	**M**	**M**	**H**	**H**	**M**	**24**
				3	Replace entire pipe	While doing shoulder removal on Taxiway A5, replace 345 LF of 24'' RCP under Taxiway A5.	M	L	M	M	L	M	H	H	M	21

Airport Projects and Flooding Areas of Interest							Scoring Criteria									
Outfall/ Drainage Area	Project No.	Project or Area of Interest (AOI)	Project List	Alternative No.	Alternative	Description	Maintains Airport Operability and Safety	Alleviates Flooding and Known Drainage Concerns	Incorporates Resiliency and Sustainability	Considers Operations and Maintenance	Minimizes Capital Cost	Supports Regional Stewardship and Partnership	Adheres with Master Plan Capital Plan	Streamlines Permitting	Aligns with the Climate Adaptation Plan Goals	Total Score
26	1	Outfall 26 Improvements	Flooding Area of Interest and Known Drainage Concern	1	Do nothing	Leave pipe as-is.	M	L	M	M	H	M	L	H	M	23
				2	**Reconstruct outfall pipe**	**Existing pipe has a negative slope per 2022 survey, and standing water was present in airside inlet.**	**M**	**M**	**M**	**M**	**M**	**M**	**L**	**M**	**M**	**24**
F	1	495 Fairview Hangars	Flooding Area of Interest and Known Drainage Concern	**1**	**Do nothing**	**Leave as-is. Area is low priority.**	**L**	**L**	**M**	**M**	**H**	**M**	**L**	**H**	**M**	**18**
				2	Raise outfall invert	Raise outfall invert - not too effective because during a storm event, water will be above outfall invert regardless.	L	L	H	M	L	M	L	M	H	16
				3	Reroute flows via pipe to Outfall 5	Reroute flows via pipe to Outfall 5, however Outfall 5 capacity is already limited.	L	L	M	M	L	M	L	H	M	12
				4	Underground detention	This area is low priority. When a new project is done, add an underground detention system to store water until it can drain into San Pedro.	M	M	L	M	L	M	L	H	L	17
P	1	Long Term Parking Lot	Flooding Area of Interest and Known Drainage Concern	1	Do nothing	Leave as-is.	L	L	M	M	H	M	L	H	M	18
				2	**Pervious Concrete Pavement**	**If and when any future project occurs in this parking lot, change pavement to pervious concrete pavement.**	**M**	**M**	**H**	**L**	**M**	**M**	**L**	**H**	**M**	**26**
				3	Underground Detention	Add underground detention system to hold flows until creek levels go down.	M	M	L	M	L	M	L	H	M	18
P	2	East Cell Phone Lot	Flooding Area of Interest and Known Drainage Concern	1	Do nothing	Leave as-is.	L	L	M	M	H	M	L	H	M	18
				2	**Pervious Concrete Pavement**	**If and when any future project occurs in this parking lot, change pavement to pervious concrete pavement.**	**M**	**M**	**H**	**L**	**M**	**M**	**L**	**H**	**M**	**26**
				3	Underground Detention	Add underground detention system to hold flows until creek levels go down.	M	M	L	M	L	M	L	H	M	18
P	3	Terminal Parking Lot	Flooding Area of Interest and Known Drainage Concern	1	Do nothing	Leave as-is.	L	L	M	M	H	M	L	H	M	18
				2	**Pervious Concrete Pavement**	**If and when any future project occurs in this parking lot, change pavement to pervious concrete pavement.**	**M**	**M**	**H**	**L**	**M**	**M**	**L**	**H**	**M**	**26**
				3	Underground Detention	Add underground detention system to hold flows until creek levels go down.	M	M	L	M	L	M	L	H	M	18
				4	Additional inlet capacity	Additional streetside inlet would reduce clogging potential of street drop inlet and reduce potential flooding.	M	M	M	H	M	M	L	H	M	28

Appendix K: Alternatives Model Parameters

Model: Preferred Alternatives

Conveyance Links										Results		
										Free Discharge Conditions	5-Year Water Level Time Series	10-Year Water Level Time Series
Name	Drainage Area	Length (feet)	Shape	Diameter (Height) ft	Roughness	Upstream Invert Elevation (feet)	Downstream Invert Elevation (feet)	Conduit Slope	Design Full Flow (cfs)	Max Flow (cfs)	Max Flow (cfs)	Max Flow (cfs)
Drainage Area 1												
P_DI-W07-001	1	343	Circular	1.5	0.013	5.617	5.274	0.1	3.322	7.9	6.979	6.979
P_DI-W07-002	1	498	Circular	1.5	0.013	4.918	4.42	0.1	3.084	7.411	4.874	5.126
P_DI-W07-003	1	102	Circular	2	0.013	4.42	4.228	0.188	9.815	20.831	13.835	15.608
P_DI-W07-024	1	295	Circular	2	0.013	4.95	4.421	0.179	9.58	14.669	12.84	13.222
P_DI-X07-027	1	581	Circular	1.5	0.013	6.86	5.84	0.176	4.401	5.405	5.229	5.159
P_DI-X07-028	1	179	Circular	1.25	0.013	7.35	6.86	0.274	3.38	3.166	3.037	3.095
P_DI-X07-029	1	122	Circular	1.5	0.013	7.43	7.25	0.148	4.035	4.566	4.561	4.566
P_DI-X07-28.5	1	265	Circular	1.5	0.013	7.25	6.86	0.147	4.03	4.566	4.562	4.567
P_W07-506	1	307	Circular	1.5	0.013	5.274	4.95	0.106	3.412	3.772	1.933	0.633
P_X07-025	1	498	Circular	1.5	0.013	5.17	4.95	0.044	2.208	5.102	2.259	1.2
P_X07-026	1	496	Circular	1.5	0.013	5.84	5.17	0.135	3.861	4.088	1.959	1.818
Drainage Area 2												
P_HW-X06-509	2	50	Circular	1	0.013	9.99	9.8	0.38	0.22	0.723	0.706	0.706
P_HW-X06	2	47	Circular	2	0.013	8.23	8	0.489	15.825	6.204	6.156	7.373
P_HW-X06-502	2	50	Circular	1	0.013	8.98	8.7	0.56	2.666	6.209	5.061	5.846
Drainage Area 5												
P_313-1	5	373	Circular	2	0.013	9.65	7	0	19.068	7.574	9.66	10.879
P_313-2	5	373	Circular	2	0.013	9.65	7	0.71	19.068	7.574	9.66	10.879
P_CB-Y06-100	5	67	Circular	0.67	0.01	11.95	10.54	2.104	2.309	0.831	0.847	0.953
P_DI-Y06-060	5	405	Circular	1.5	0.013	8.64	7.96	0.168	3.997	4.491	-3.6	-4.063
P_DI-Y06-104	5	291	Circular	2.5	0.013	7.85	7	0	22.168	9.516	7.467	8.108
P_DI-Y06-105	5	54	Circular	1.5	0.013	7.96	7.92	0.074	2.859	5.465	3.148	-3.796
P_DI-Y06-121	5	174	Circular	1.5	0.013	9.98	8.64	0.77	9.218	7.322	7.22	7.249
P_DI-Y06-313-1	5	143	Circular	2	0.013	9.65	7.96	1.182	22.836	9.58	9.66	10.879
P_DI-Y06-314	5	223	Circular	0.67	0.01	12.45	11.95	0.224	0.754	0.84	0.852	0.957
P_DI-Y06-739	5	119	Circular	1.5	0.013	7.89	7.85	0.034	1.926	5.743	3.254	4.452
P_DI-Y07-?71	5	306	Circular	2.5	0.013	8.848	5.41	1.124	43.477	3.825	3.933	4.77
P_DI-Y07-059	5	350	Circular	1.75	0.013	6.54	5.956	0.167	6.472	4.896	5.33	-4.491
P_DI-Y07-096	5	534	Circular	2	0.013	5.885	5.692	0.036	4.301	6.393	6.724	8.629
P_DI-Y07-097.1	5	454	Circular	2	0.013	5.692	5.11	0.128	8.1	7.614	6.261	4.698
P_DI-Y07-101	5	326	Circular	2.5	0.013	6.04	5.42	0.19	17.888	30.474	18.492	21.721
P_DI-Y07-102.1	5	331	Circular	2.5	0.013	6.31	6.04	0.082	11.715	23.625	11.68	11.131
P_DI-Z06-408	5	193	Circular	0.67	0.01	11.55	10.54	0.523	1.152	1.259	1.153	1.135
P_DI-Z07-098	5	396	Circular	1.9	0.013	5.11	6.35	-0.313	11.041	9.998	10.392	-10.473
P_DI-Z07-100	5	246	Circular	2.5	0.013	5.42	5.41	0.004	2.615	31.438	17.749	17.218
P_DI-Z07-453	5	274	Circular	1.9	0.013	6.35	5.41	0.343	11.556	11.134	10.582	8.832
P_HW-Y06-023	5	35	Circular	1.5	0.013	11.22	10.56	1.886	14.425	4.022	0	0
P_HW-Y06-419	5	42.5	Circular	2	0.013	11.31	10.96	0.824	20.529	17.589	17.587	22.198
P_HW-Z06-462	5	154	Circular	2.5	0.013	5.41	2.64	0	55.01	47.444	17.752	20.993
P_N-Y06-594	5	71	Circular	2.5	0.013	7	6.96	0	9.736	23.382	22.194	24.169
P_N-Y06-598	5	177	Circular	1.5	0.013	7.92	7.89	0.034	1.368	5.45	3.141	-3.614
P_N-Y06-600	5	325	Circular	2	0.013	8.5	7.38	0.345	13.28	6.763	6.682	6.693
P_N-Z06-336	5	475	Circular	1	0.013	14.21	11.22	0.629	2.827	2.783	2.726	2.848
P_Y07-095	5	452	Circular	2	0.013	6.54	5.827	0.158	8.985	-4.224	-4.395	-5.013

Conveyance Links										Results		
										Free Discharge Conditions	5-Year Water Level Time Series	10-Year Water Level Time Series
Name	Drainage Area	Length (feet)	Shape	Diameter (Height) ft	Roughness	Upstream Invert Elevation (feet)	Downstream Invert Elevation (feet)	Conduit Slope	Design Full Flow (cfs)	Max Flow (cfs)	Max Flow (cfs)	Max Flow (cfs)
P_Y07-103	5	350	Circular	2.5	0.013	6.96	6.31	0.186	17.676	18.029	13.675	12.368
Drainage Area 6												
560.1	6	300	Circular	1.75	0.013	5.24	4.98	0.087	4.665	11.274	10.916	10.978
P_DI-Y07-087	6	328	Circular	1.5	0.013	7.56	6.6	0.293	5.683	2.726	2.728	3.285
P_DI-Y07-088-2	6	200	Circular	1.5	0.013	8.42	8.02	0.2	4.698	3.487	-5.417	-7.847
P_DI-Y07-089	6	401	Circular	1.75	0.013	5.728	5.483	0.037	3.917	6.984	8.253	8.15
P_DI-Y07-091	6	255	Circular	1.5	0.013	5.91	5.49	0.165	4.263	3.938	2.583	2.521
P_DI-Y07-092A	6	53	Circular	1.5	0.013	5.483	5.483	0	0.332	3.933	3.521	3.859
P_DI-Z07-093	6	334	Circular	2.5	0.013	4.98	5.19	-0.063	10.285	14.547	26.828	30.091
P_DI-Z07-094	6	192	Circular	2.5	0.013	4.9	2.41	1.297	46.71	22.556	27.243	30.578
P_JS-Y07-090	6	300	Circular	1.75	0.013	5.483	5.24	0.081	4.51	8.595	8.83	8.98
Drainage Area 9												
Link324	9B	245	Circular	0.5	0.013	6.662	6.624	0.016	0.07	-0.184	6.029	7.208
Link325	9B	245	Circular	0.5	0.013	6.945	6.662	0.116	0.191	0.091	2.207	3.384
P_DI-Y07-012	9B	125	Circular	0.75	0.013	6	5.2	0.64	1.323	3.111	2.091	1.768
P_DI-Y07-615	9B	78.6	Circular	1.5	0.012	5.88	4.93	1.209	12.511	2.17	2.207	3.384
P_DI-Y07-616	9B	65	Circular	1.5	0.012	5.562	4.6	1.48	13.844	5.059	6.029	7.208
P_DI-Y08-?65	9B	253	Circular	1.33	0.012	7.5	5.325	0.86	7.656	0.726	0.768	0.923
P_DI-Y08-?67	9B	182	Circular	1.25	0.013	7	6.3	0.549	4.006	3.513	3.513	3.768
P_DI-Y08-?71	9B	33	Circular	2	0.013	6.1	6.03	0.212	10.419	7.164	3.986	-10.874
P_DI-Y08-075	9B	293	Circular	2	0.013	6.03	5.96	0.024	3.497	8.465	4.56	6.47
P_DI-Y08-076.1	9B	350	Circular	2	0.013	5.96	5.49	0	8.29	12.777	6.236	6.797
P_DI-Y08-079	9B	300	Circular	2.5	0.013	5.49	5.2	0.097	12.753	14.584	8.497	8.075
P_DI-Y08-082	9B	650	Circular	2.5	0.013	5.2	2.979	0.342	23.976	20.414	11.209	10.982
P_DIY08-618	9B	62	Circular	1.5	0.012	5.276	4.49	1.268	12.813	9.58	8.458	7.85
P_DI-Y08-618-2	9B	220	Circular	0.5	0.013	6.624	6.441	0	0.162	0.28	8.458	7.85
P_DI-Y08-620	9B	68	Circular	1.5	0.012	5.325	4.12	1.772	15.149	9.711	8.852	8.312
P_DI-Y08-620-2	9B	220	Circular	0.5	0.013	6.355	6.13	0	0.179	0.416	8.852	8.312
P_JS-Y08-069	9B	271	Circular	1.25	0.013	6.3	5.853	0.165	2.624	3.509	3.508	3.764
P_DI-Y07-?32	9C	176.2	Circular	2	0.012	8.02	7	0.579	18.647	6.549	0	0
P_DI-Y07-065	9c	173.5	Circular	2.5	0.012	6.97	4.93	1.176	48.183	6.573	5.842	7.822
P_DI-Y07-066	9C	80	Circular	1.33	0.012	7.05	4.93	2.65	13.442	3.265	-4.246	-4.672
P_DI-Y07-068	9C	77	Circular	1.33	0.012	6.63	4.49	2.627	13.765	6.556	-4.791	5.495
P_DI-Y07-617	9C	81	Circular	1.33	0.012	7.05	4.6	3.025	14.36	-2.643	-4.328	-4.736
P_DI-Y08-073	9C	71	Circular	1.33	0.012	6.66	4.12	3.577	15.618	7.134	5.208	5.934
P_DI-Y08-074	9C	63	Circular	1.33	0.012	6.44	4.18	3.587	15.639	1.993	5.619	7.294
P_DI-Y08-077	9C	70	Circular	1.33	0.012	6.55	4.22	3.329	15.064	7.567	2.965	-3.969
P_DI-Y08-080	9C	59	Circular	1.33	0.012	5.89	4.05	0	14.582	2.084	4.33	5.225
P_DI-Y08-081	9C	50	Circular	1.33	0.012	5.64	3.89	3.5	15.448	5.005	6.822	8.8
P_JS-Y07-?2	9C	143	Circular	2	0.012	7	6.97	0.021	3.55	6.581	5.245	7.143
P_JS-Y09-203	9C	33	Circular	1.5	0.013	5	4.42	1.758	13.926	7.268	6.795	7.506
P_JS-Y07-617	9C	214	Circular	2.5	0.012	4.6	4.49	0.051	10.074	10.616	10.382	12.425
P_MH-Y07-066	9C	217	Circular	2.5	0.012	4.93	4.6	0.152	17.328	7.532	8.128	10.25
P_MH-Y07-068	9C	350	Circular	2.67	0.012	4.49	4.12	0.106	17.218	15.587	12.727	15.764
P_MH-Y08-073	9C	361	Circular	2.67	0.012	4.12	4.18	-0.017	6.827	22.188	16.584	19.536
P_MH-Y08-074	9C	289	Circular	2.67	0.012	4.18	4.22	-0.013	6.23	23.515	18.917	22.29
P_MH-Y08-077	9C	350	Circular	3	0.012	4.22	4.05	0.049	15.925	28.543	20.054	24.607

Conveyance Links										Results		
										Free Discharge Conditions	5-Year Water Level Time Series	10-Year Water Level Time Series
Name	Drainage Area	Length (feet)	Shape	Diameter (Height) ft	Roughness	Upstream Invert Elevation (feet)	Downstream Invert Elevation (feet)	Conduit Slope	Design Full Flow (cfs)	Max Flow (cfs)	Max Flow (cfs)	Max Flow (cfs)
P_MH-Y08-080	9C	301	Circular	3	0.012	4.05	3.89	0.053	16.659	29.954	20.848	24.553
P_MH-Y08-081	9C	657	Circular	3.5	0.012	3.89	2.979	0.139	40.586	34.304	26.749	32.78
Drainage Area 10												
505.1	10	393	Circular	2.5	0.013	5.21	5.17	0.01	4.138	14.283	13.273	12.971
618.1	10	363	Circular	1.5	0.013	13.02	12.09	0.256	5.317	6.043	6.027	5.928
alt 10-7	10	485	Circular	1.5	0.013	8.638	7.862	0.16	4.201	-3.226	8.877	11.311
P_DI-X07-035	10	173	Circular	1.25	0.013	5.42	4.04	0.798	5.769	4.33	27.461	29.882
P_DI-X07-041	10	571	Circular	3	0.013	4.59	4.04	0.096	20.7	34.634	27.458	29.878
P_DI-X07-045	10	148	Circular	1.5	0.013	6.98	5.99	0.669	8.591	7.455	6.331	5.548
P_DI-X07-046	10	217	Circular	1.5	0.013	5.99	4.92	0.493	7.376	6.425	4.557	4.379
P_DI-X07-046A	10	361	Circular	1.25	0.013	6.381	5.99	0.108	2.126	2.207	1.272	1.071
P_DI-X07-201	10	135	Circular	3.83	0.013	3.707	3.164	0.402	81.138	35.761	27.63	30.077
P_DI-Y06-048	10	311	Circular	2.5	0.013	5.47	5.21	0.084	11.86	13.84	12.956	12.817
P_DI-Y06-049	10	201	Circular	2.5	0.013	5.46	5.47	-0.005	2.893	13.279	12.241	11.88
P_DI-Y06-301	10	254	Circular	1.5	0.013	11.18	9.94	0.488	7.339	9.603	9.579	9.96
P_DI-Y06-318	10	197	Circular	1.5	0.013	7.32	7.1	0	3.51	6.828	6.803	7.389
P_DI-Y06-319	10	300	Circular	1.5	0.013	8.04	7.32	0.24	5.146	5.74	5.649	5.641
P_DI-Y06-330	10	110	Circular	2	0.024	8.88	8.5	0.345	7.202	6.765	6.685	6.694
P_DI-Y06-331	10	156	Circular	1.5	0.024	9.94	8.88	0.679	4.69	6.767	6.686	6.694
P_DI-Y06-610.1	10	205	Circular	1	0.024	7.51	5.48	0.99	1.92	2.388	1.769	1.695
P_DI-Y07-?30	10	411	Circular	2	0.013	5.941	5.914	0.007	1.834	7.356	7.793	10.569
P_DI-Y07-?31	10	292	Circular	2	0.013	5.887	5.6	0.098	7.092	7.566	7.94	10.617
P_DI-Y07-044S	10	374	Circular	3	0.013	5.17	5.13	0.011	6.898	22.242	22.375	23.697
P_DI-Y07-054.1	10	435	Circular	1.25	0.013	7.01	5.6	0.324	3.678	1.651	1.146	1.161
P_DI-Y07-055	10	374	Circular	2.5	0.013	5.6	5.17	0.115	13.908	9.424	8.877	11.311
P_HW-Y06-612	10	33	Circular	1.5	0.013	11.7	11.5	0.606	8.178	4.711	4.711	5.977
P_N-X07-454	10	344	Circular	3	0.013	4.04	3.774	0.077	18.547	34.635	27.461	29.882
P_X07-042	10	384	Circular	3	0.013	4.92	4.59	0	19.553	28	24.467	26.347
P_Y06-050	10	300	Circular	2	0.013	5.88	5.46	0.14	8.465	8.492	8.628	8.71
P_Y06-051	10	300	Circular	2	0.013	6.28	5.88	0.133	8.261	7.792	6.657	6.613
P_Y06-053	10	121	Circular	1.5	0.013	7.94	7.49	0.372	6.406	5.903	5.462	5.223
P_Y06-145	10	150	Circular	1.5	0.013	7.1	6.74	0.24	5.146	3.795	3.803	3.816
P_Y06-211-1	10	138	Circular	1	0.024	9.03	7.94	0.79	1.715	1.401	1.291	1.249
P_Y06-211-2	10	138	Circular	1	0.024	9.03	7.94	0.79	1.715	1.401	1.291	1.249
P_Y07-043	10	301	Circular	3	0.013	5.13	4.92	0.07	17.617	22.676	22.77	24.189
P_Y07-058	10	321	Circular	1.5	0.013	6.74	5.942	0.249	5.237	6.946	7.751	8.012
Drainage Area 11												
P_DI-Y07-005	11	150	Circular	1.5	0.013	7.2	7.05	0.1	3.322	3.124	3.149	3.887
P_DI-Y07-006	11	150	Circular	1.5	0.013	7.2	7.05	0.1	3.322	2.661	2.689	3.334
P_DI-Y07-007	11	150	Circular	1.5	0.013	6.81	6.66	0.1	3.322	6.354	4.458	3.79
P_DI-Y07-008	11	150	Circular	1.5	0.013	6.7	6.55	0.1	3.322	6.063	5.091	4.601
P_DI-Y07-061	11	420	Circular	1.5	0.013	7.862	7.19	0.16	4.202	2.554	2.553	2.756
P_DI-Y07-131A	11	208	Circular	1.5	0.024	4.84	4.22	0.298	3.106	7.079	5.805	6.048
P_DI-Y07-131B	11	388	Circular	1.25	0.013	5.069	4.84	0.059	1.457	2.315	2.182	2.148
P_DI-Y08-008	11	150	Circular	1.5	0.013	5.673	5.64	0.1	1.558	1.781	5.596	5.792
P_DI-Y08-130	11	504	Circular	1.5	0.013	6.29	5.88	0.081	2.997	2.087	2.174	2.41
P_DI-Y08-132	11	496	Circular	1.5	0.024	6.08	5.546	0.108	1.868	2.365	2.933	3.144

Conveyance Links										Results		
										Free Discharge Conditions	5-Year Water Level Time Series	10-Year Water Level Time Series
Name	Drainage Area	Length (feet)	Shape	Diameter (Height) ft	Roughness	Upstream Invert Elevation (feet)	Downstream Invert Elevation (feet)	Conduit Slope	Design Full Flow (cfs)	Max Flow (cfs)	Max Flow (cfs)	Max Flow (cfs)
P_Y07-063	11	244	Circular	1.5	0.013	7.19	6.8	0.16	4.202	5.206	5.088	5.416
P_Y08-132	11	450	Circular	1.5	0.013	6.8	6.08	0.16	4.202	2.731	2.525	2.478
Drainage Area 12												
P_DI-X07-037	12	447	Circular	2	0.024	4.57	4.25	0.072	3.279	8.205	7.618	8.826
P_DI-X07-040	12	167	Circular	2	0.024	4.25	3.892	0.214	5.674	15.512	12.037	12.73
P_DI-Y07-039	12	470	Circular	1.25	0.013	6.86	6.07	0.168	2.648	3.344	3.325	3.302
P_X07-036	12	316	Circular	1.25	0.013	6.05	4.57	0	4.421	4.374	4.385	4.964
P_Y07-038	12	289	Circular	1.25	0.013	6.07	4.57	0.519	4.321	4.707	3.264	3.596
Drainage Area 13												
P_DI-X07-032	13	262	Circular	2	0.013	4.9	4.33	0.218	9.798	14.162	11.362	11.998
P_DI-X07-202	13	122	Circular	2	0.013	4.33	4.017	0.257	10.64	17.253	11.773	12.428
P_X07-031	13	300	Circular	1.25	0.013	5.8	4.9	0.3	3.285	4.363	2.999	3.245
P_X07-033	13	300	Circular	1.25	0.013	5.33	4.9	0.143	2.271	4.096	2.838	2.905
P_X07-034	13	300	Circular	1.25	0.013	6.13	5.33	0.267	3.098	3.264	2.647	2.072
Drainage Area 14												
P_DI-W07-?2	14	509	Circular	2	0.013	5.652	5.331	0.063	5.681	11.526	4.513	6.982
P_DI-W07-504A	14	400	Circular	1.25	0.013	5.944	5.421	0.131	2.336	1.906	2.04	1.898
P_DI-W07-504A(2)	14	203	Circular	1.5	0.013	5.392	5.415	-0.011	1.118	3.003	2.85	2.682
P_DI-W07-504B	14	300	Circular	1.5	0.013	5.407	5.308	0.033	1.908	3.716	3.598	3.598
P_DI-W07-511	14	259	Circular	2	0.013	5.298	4.223	0.415	14.574	18.762	7.667	10.986
P_DI-X.1	14	264	Circular	1.25	0.013	5.879	5.69	0.072	1.728	5.208	1.433	3.25
P_W07-510	14	294	Circular	1.5	0.013	5.588	5.308	0.095	3.242	3.201	4.594	5.487
Drainage Area 17												
P_DI-Y07-131E	17	228	Circular	1.5	0.013	5.821	5.727	0.041	2.133	4.255	-4.981	-5.113
P_DI-Y07-131F	17	212	Circular	1.5	0.013	5.726	5.54	0.088	2.889	4.934	4.562	4.883
P_DI-Y07-416	17	671	Circular	2	0.024	5.47	4.17	0.194	5.394	7.98	5.093	5.442
P_HW-Y08-415	17	190	Circular	2	0.013	6.83	4.01	1.484	25.592	7.698	7.705	10.176
P_Y07-131C	17	200	Circular	1.25	0.013	6.061	5.873	0.094	1.839	2.426	2.522	1.638
P_Y07-131D	17	300	Circular	1.25	0.013	5.845	5.826	0.006	0.514	3.216	3.075	3.286
Drainage Area 26												
P_DI-W07-?1	26	165	Circular	1.5	0.013	5.29	4.966	0.196	4.655	1.695	5.355	5.518
P_DI-W07-507	26	89	Circular	2	0.013	4.966	4.8	0.187	9.77	15.494	14.261	16.934
P_W07-509	26	300	Circular	1.25	0.013	6.4	5.67	0.243	3.187	3.683	2.698	2.169
P_WO7-508	26	300	Circular	1.5	0.013	5.641	4.966	0.225	4.983	7.427	4.251	3.505
495 Fairview Hangars												
P_DI-Z06-134	495 FAIRVIEW	58	Circular	1	0.013	7.33	7.3	0.052	0.81	5.162	2.402	2.77
P_DI-Z06-135	495 FAIRVIEW	170	Circular	1	0.013	7.3	7.22	0.047	0.773	5.162	2.167	2.812
P_DI-Z06-343	495 FAIRVIEW	241	Circular	1	0.013	6.74	6.62	0.05	0.795	6.031	3.282	3.707
Northeast Corner												
P_CB-Z06-305	NE CORNER	56	Circular	1	0.013	12.489	12.4	0.159	1.42	0.539	1.221	1.936
Parking Areas												
P_DI-Y07-010	PARKING A	100	Circular	1.5	0.013	9.5	9.37	0.394	3.787	11.841	11.842	12.657
P_DI-Y08-481	PARKING A	36	Circular	1	0.024	9.37	9.14	0.639	1.543	4.711	4.705	4.905
P_HW-Y08-483	PARKING A	33	Circular	1.5	0.013	9.25	9.16	0	5.486	4.711	4.703	4.87
P_HW-Y08-485	PARKING A	33	Circular	1.5	0.013	8.86	8.65	0.636	8.38	4.709	4.679	4.657
P_HW-Y08-487	PARKING A	33	Circular	1.5	0.013	8.26	8.14	0.364	6.334	4.708	4.497	4.478
P_HW-Y08-489	PARKING A	331	Circular	1.5	0.013	6.7	5	0.514	7.528	4.704	4.524	5.233

Conveyance Links										Results		
										Free Discharge Conditions	5-Year Water Level Time Series	10-Year Water Level Time Series
Name	Drainage Area	Length (feet)	Shape	Diameter (Height) ft	Roughness	Upstream Invert Elevation (feet)	Downstream Invert Elevation (feet)	Conduit Slope	Design Full Flow (cfs)	Max Flow (cfs)	Max Flow (cfs)	Max Flow (cfs)
P_CB-Y07-439	PARKING B	280	Circular	1	0.024	8.37	7.78	0.211	0.886	0.678	2.019	2.272
P_DI-Y07-473	PARKING B	80	Circular	1.5	0.013	7.78	6.16	2.025	14.948	0.678	2.019	2.272
P_CB-Z07-353	PARKING C	98	Circular	1.67	0.013	6.37	6.37	0	0.442	2.399	3.651	3.689
P_DI-Z07-428	PARKING C	89	Circular	1	0.013	8.24	6.82	1.596	4.5	2.399	3.637	3.673
P_CB-Y07-?36	PARKING D	190	Circular	1.25	0.013	7.08	5.439	0.864	6.003	2.777	3.629	3.522
P_CB-Y08-?54	PARKING E	70	Circular	1	0.013	7.88	7.04	1.2	3.903	2.862	3.589	3.729

Model: Preferred Alternatives

Structure Nodes					Results		
					Free Discharge Conditions	5-Year Water Level Time Series	10-Year Water Level Time Series
Name	Drainage Area	Subcatchment	Area (acres)	Impervious Percentage %	Max Water Elevation (feet)	Max Water Elevation (feet)	Max Water Elevation (feet)
Drainage Area 1							
DI-W07-001	1	1	6.623	3	10.088	10.156	10.346
DI-W07-001	1	2	1.459	100		0	0
DI-W07-002	1	1	7.686	8	9.785	10.184	10.308
DI-W07-002	1	2	3.192	100		0	0
DI-W07-024	1	1	2.948	0	8.42	9.154	9.366
DI-W07-024	1	2	1.504	100		0	0
DI-W07-506	1	1	1.455	0	8.422	9.154	9.366
DI-W07-506	1	2	1.453	100		0	0
DI-X07-025	1	1	3.051	0	8.437	9.154	9.366
DI-X07-025	1	2	1.744	100		0	0
DI-X07-026	1	1	2.314	0	8.657	9.155	9.367
DI-X07-026	1	2	2.003	100		0	0
DI-X07-027	1	1	2.037	0	10.108	10.111	10.157
DI-X07-027	1	2	1.752	100		0	0
DI-X07-028	1	1	2.982	0	10.47	10.477	10.519
DI-X07-028	1	2	2.347	100		0	0
DI-X07-029	1	1	3.947	7	10.827	10.828	10.876
DI-X07-029	1	2	3.33	100		0	0
Drainage Area 2							
HW-X06-502	2	1	6.097	38	11.026	11.643	12.015
HW-X06-509	2	1	4.022	61	12.598	12.6	12.62
Drainage Area 5							
DI-Y06-003	5	1	0.383	57	0	0	0
DI-Y06-060	5	1	1.772	0	11.155	11.164	11.389
DI-Y06-060	5	2	0.836	100		0	0

Structure Nodes					Results		
					Free Discharge Conditions	5-Year Water Level Time Series	10-Year Water Level Time Series
Name	Drainage Area	Subcatchment	Area (acres)	Impervious Percentage %	Max Water Elevation (feet)	Max Water Elevation (feet)	Max Water Elevation (feet)
DI-Y06-103	5	1	1.264	5	11.335	11.67	11.954
DI-Y06-104	5	1	0.757	27	11.682	11.813	12.104
DI-Y06-105	5	1	3.159	21	11.609	11.666	11.87
DI-Y06-121	5	1	7.889	100	11.974	11.974	11.996
DI-Y06-313	5	1	3.286	92	11.953	12.038	12.332
DI-Y06-314	5	1	0.485	45	13.404	13.464	13.678
DI-Y06-739	5	1	0.799	20	11.665	11.771	12.031
DI-Y07-?71	5	1	0.543	0	9.349	10.919	10.992
DI-Y07-?71	5	2	1.026	100		0	0
DI-Y07-059	5	1	5.452	20	9.495	9.986	10.292
DI-Y07-095	5	1	2.553	0	9.552	9.976	10.287
DI-Y07-095	5	2	1.697	100		0	0
DI-Y07-096	5	1	2.978	0	9.473	9.981	10.292
DI-Y07-096	5	2	3.286	100		12.038	12.332
DI-Y07-097	5	1	2.322	100	9.087	10.099	10.298
DI-Y07-097	5	2	0.751	0		0	0
DI-Y07-101	5	1	5.273	25	10.535	11.632	11.93
DI-Y07-102	5	1	7.155	19	10.895	11.642	11.937
DI-Y07-X	5	1	4.676	84	12.251	12.333	12.591
DI-Z06-408	5	1	2.265	24	13.172	13.182	13.423
DI-Z07-098	5	1	6.783	0	8.803	10.101	10.298
DI-Z07-098	5	2	1.561	100		9.659	9.937
DI-Z07-099	5	1	1.404	0	7.202	10.919	10.986
DI-Z07-099	5	2	0.558	100		0	0
DI-Z07-100	5	1	3.285	16	8.749	10.98	11.03
DI-Z07-453	5	1	1.512	0	7.981	10.588	10.717
DI-Z07-453	5	2	0.528	100		0	0
HW-Y06-024	5	1	3.206	92	0	0	0

Structure Nodes					Results		
					Free Discharge Conditions	5-Year Water Level Time Series	10-Year Water Level Time Series
Name	Drainage Area	Subcatchment	Area (acres)	Impervious Percentage %	Max Water Elevation (feet)	Max Water Elevation (feet)	Max Water Elevation (feet)
HW-Y06-410	5	1	1.846	24	12.306	12.378	12.72
HW-Y06-414	5	1	1.537	31	12.366	12.432	12.795
HW-Y06-419	5	1	14.803	58	12.668	12.701	13.046
N-Z06-336	5	1	2.356	83	15.051	15.052	15.448
Drainage Area 6							
DI-Y07-087	6	1	0.945	100	9.472	9.526	9.95
DI-Y07-089	6	1	2.988	0	9.291	9.874	9.955
DI-Y07-089	6	2	5.559	100		0	0
DI-Y07-091	6	1	1.433	98	9.726	9.877	9.958
DI-Y07-092	6	1	1.621	0	8.555	10.089	10.285
DI-Y07-092	6	2	0.554	100		0	0
DI-Y07-092A	6	1	2.877	96	9.392	9.878	9.959
DI-Z07-093	6	1	1.399	0	7.062	10.095	10.292
DI-Z07-093	6	2	0.828	100		0	0
DI-Z07-094	6	1	2.536	0	6.381	10.145	10.29
DI-Z07-094	6	2	1.784	100		0	0
JS-Y07-090	6	1	2.877	96	9.323	9.878	9.959
Drainage Area 9							
DI-Y07-088	9B	1	1.799	0	9.36	9.525	9.949
DI-Y07-088	9B	2	2.025	100		0	0
DI-Y07-615	9B	1	0.736	98	8.824	9.193	9.398
DI-Y07-616	9B	1	2.017	99	8.876	9.346	9.61
DI-Y08-?65	9B	1	0.266	100	8.988	9.437	9.629
DI-Y08-?67	9B	1	1.23	97	10.038	10.428	10.912
DI-Y08-?71	9B	1	0.805	98	8.819	9.305	9.597
DI-Y08-012	9B	1	2.949	100	10.5	10.5	10.5
DI-Y08-075	9B	1	0.967	94	8.802	9.302	9.595
DI-Y08-076	9B	1	2.313	90	8.551	9.234	9.54

Structure Nodes					Results		
					Free Discharge Conditions	5-Year Water Level Time Series	10-Year Water Level Time Series
Name	**Drainage Area**	**Subcatchment**	**Area (acres)**	**Impervious Percentage %**	**Max Water Elevation (feet)**	**Max Water Elevation (feet)**	**Max Water Elevation (feet)**
DI-Y08-079	9B	1	0.899	79	7.543	9.09	9.528
DI-Y08-082	9B	1	1.315	82	7.141	9.013	9.462
DI-Y08-618	9B	1	5.146	94	8.988	9.429	9.621
DI-Y08-620	9B	1	2.085	93	8.975	9.421	9.617
DI-Y07-?32	9C	1	1.499	0	9.035	9.272	9.488
DI-Y07-?32	9C	2	0.679	100		0	0
DI-Y07-066	9C	1	1.121	0	8.764	9.091	9.354
DI-Y07-066	9C	2	0.659	100		0	0
DI-Y07-068	9C	1	0.705	0	8.643	9.089	9.353
DI-Y07-068	9C	2	0.068	100		0	0
DI-Y07-617	9C	1	0.537	0	8.712	9.09	9.353
DI-Y07-617	9C	2	0.047	100		0	0
DI-Y08-073	9C	1	1.381	0	8.642	9.088	9.353
DI-Y08-073	9C	2	0.115	100		0	0
DI-Y08-074	9C	1	0.791	0	8.071	9.087	9.353
DI-Y08-074	9C	2	0.248	100		0	0
DI-Y08-077	9C	1	0.959	0	8.027	8.671	9.114
DI-Y08-077	9C	2	0.301	100		0	0
DI-Y08-080	9C	1	0.9	0	7.112	8.669	9.114
DI-Y08-080	9C	2	0.321	100		0	0
DI-Y08-081	9C	1	1.021	0	6.626	8.668	9.114
DI-Y08-081	9C	2	0.62	100		0	0
JS-Y09-203	9C	1	6.774	26	6.116	8.758	9.491
Drainage Area 10							
DI-X07-041	10	1	2.621	0	9.26	9.826	10.066
DI-X07-041	10	2	1.363	100		0	0
DI-X07-042	10	1	2.535	0	9.449	9.838	10.071
DI-X07-042	10	2	1.328	100		0	0

Structure Nodes					Results		
					Free Discharge Conditions	5-Year Water Level Time Series	10-Year Water Level Time Series
Name	Drainage Area	Subcatchment	Area (acres)	Impervious Percentage %	Max Water Elevation (feet)	Max Water Elevation (feet)	Max Water Elevation (feet)
DI-X07-045	10	1	10.79	89	10.52	10.531	10.585
DI-X07-046	10	1	0.337	0	10.096	10.255	10.382
DI-X07-046	10	2	0.687	100		0	0
DI-X07-046A	10	1	0.476	0	10.117	10.275	10.418
DI-X07-046A	10	2	1.204	100		0	0
DI-X07-201	10	1	0.692	11	5.943	9.11	9.442
DI-X07-201	10	2	0.453	100		0	0
DI-Y06-048	10	1	0.431	0	10.045	10.258	10.523
DI-Y06-048	10	2	0.293	100		0	0
DI-Y06-049	10	1	2.452	10	10.209	10.349	10.545
DI-Y06-050	10	1	3.545	0	10.21	10.35	10.546
DI-Y06-050	10	2	0.203	100		0	0
DI-Y06-051	10	1	6.874	25	10.212	10.352	10.546
DI-Y06-053	10	1	2.2	98	10.793	10.789	10.81
DI-Y06-145	10	1	1.494	0	9.719	10.03	10.29
DI-Y06-145	10	2	0.345	100		0	0
DI-Y06-211	10	1	6.075	98	10.822	10.817	10.844
DI-Y06-303	10	1	10.068	64	15.393	15.393	15.501
DI-Y06-318	10	1	2.532	0	10.188	10.418	10.684
DI-Y06-318	10	2	0.083	100		0	0
DI-Y06-319	10	1	1.031	0	11.052	11.155	11.387
DI-Y06-319	10	2	0.475	100		0	0
DI-Y06-610	10	1	7.818	79	10.937	10.937	10.965
DI-Y07-?30	10	1	2.932	0	9.671	9.98	10.275
DI-Y07-?30	10	2	1.71	100		0	0
DI-Y07-?31	10	1	0.678	0	9.6	9.973	10.283
DI-Y07-?31	10	2	1.493	100		0	0
DI-Y07-043	10	1	1.983	0	9.498	9.841	10.072

Structure Nodes					Results		
					Free Discharge Conditions	5-Year Water Level Time Series	10-Year Water Level Time Series
Name	Drainage Area	Subcatchment	Area (acres)	Impervious Percentage %	Max Water Elevation (feet)	Max Water Elevation (feet)	Max Water Elevation (feet)
DI-Y07-043	10	2	1.49	100		0	0
DI-Y07-044S	10	1	1.224	0	9.621	9.91	10.209
DI-Y07-044S	10	2	1.916	100		0	0
DI-Y07-047	10	1	1.639	0	9.839	10.112	10.487
DI-Y07-047	10	2	1.006	100		0	0
DI-Y07-054	10	1	1.581	0	9.861	9.965	10.254
DI-Y07-054	10	2	1.538	100		0	0
DI-Y07-055	10	1	2.078	0	9.658	9.924	10.23
DI-Y07-055	10	2	1.457	100		0	0
DI-Y07-058	10	1	6.818	0	9.719	10.03	10.29
DI-Y07-058	10	2	0.327	100		0	0
HW-Y06-612	10	1	2.02	50	12.517	12.517	12.649
Drainage Area 11							
DI-Y07-005	11	1	0.668	0	8.857	9.116	9.356
DI-Y07-005	11	2	0.819	100		0	0
DI-Y07-006	11	1	0.335	0	8.754	9.093	9.355
DI-Y07-006	11	2	0.771	100		0	0
DI-Y07-007	11	1	0.821	0	8.854	9.153	9.363
DI-Y07-007	11	2	1.883	100		0	0
DI-Y07-008	11	1	1.1	0	8.476	8.947	9.125
DI-Y07-008	11	2	1.789	100		0	0
DI-Y07-061	11	1	2.089	0	10.195	10.215	10.419
DI-Y07-061	11	2	1.148	100		0	0
DI-Y07-063	11	1	0.629	0	10.016	10.041	10.255
DI-Y07-063	11	2	0.77	100		0	0
DI-Y07-064	11	1	0.921	0	9.553	9.829	10.094
DI-Y07-064	11	2	0.608	100		0	0
DI-Y07-131A	11	1	5.169	4	9.137	9.571	10.004

Structure Nodes					Results		
					Free Discharge Conditions	5-Year Water Level Time Series	10-Year Water Level Time Series
Name	Drainage Area	Subcatchment	Area (acres)	Impervious Percentage %	Max Water Elevation (feet)	Max Water Elevation (feet)	Max Water Elevation (feet)
DI-Y07-131A	11	2	2.176	0		0	0
DI-Y07-131B	11	1	3.496	5	9.408	9.729	10.129
DI-Y07-131B	11	2	1.468	100		0	0
DI-Y08-009	11	1	0.204	0	6.687	8.669	9.118
DI-Y08-009	11	2	0.529	100		0	0
DI-Y08-130	11	1	3.857	0	9.457	9.683	9.963
DI-Y08-130	11	2	2.303	100		0	0
DI-Y08-132	11	1	2.497	0	9.553	9.829	10.092
DI-Y08-132	11	2	1.254	100		0	0
Drainage Area 12							
DI-X07-035	12	1	1.931	0	9.502	9.685	9.872
DI-X07-035	12	2	1.106	100		0	0
DI-X07-036	12	1	2.831	0	9.501	9.684	9.872
DI-X07-036	12	2	1.418	100		0	0
DI-X07-037	12	1	0.437	0	9.497	9.684	9.872
DI-X07-037	12	2	0.818	100		0	0
DI-X07-040	12	1	12.265	2	8.916	9.433	9.649
DI-X07-040	12	2	0.963	100		0	0
DI-Y07-038	12	1	2.773	0	9.912	9.776	9.873
DI-Y07-038	12	2	2.375	93		0	0
DI-Y07-039A	12	1	1.247	0	10.829	10.838	10.916
DI-Y07-039A	12	2	1.78	100		0	0
Drainage Area 13							
DI-X07-031	13	1	1.638	0	8.81	9.228	9.46
DI-X07-031	13	2	2.386	100		0	0
DI-X07-032	13	1	2.674	0	8.346	9.228	9.46
DI-X07-032	13	2	1.672	100		0	0
DI-X07-033	13	1	0.964	0	8.641	9.229	9.461

Structure Nodes					Results		
					Free Discharge Conditions	5-Year Water Level Time Series	10-Year Water Level Time Series
Name	Drainage Area	Subcatchment	Area (acres)	Impervious Percentage %	Max Water Elevation (feet)	Max Water Elevation (feet)	Max Water Elevation (feet)
DI-X07-033	13	2	0.53	100		0	0
DI-X07-034	13	1	3.821	0	8.903	9.23	9.461
DI-X07-034	13	2	2.064	100		0	0
DI-X07-202	13	1	2.44	88	7.201	9.173	9.477
Drainage Area 14							
DI-W07-?2	14	1	1.749	0	9.453	9.797	9.941
DI-W07-?2	14	2	2.234	100		0	0
DI-W07-504A	14	1	1.087	54	9.414	10.388	10.468
DI-W07-504A(2)	14	1	0.458	59	9.075	10.143	10.291
DI-W07-504B	14	1	0.274	59	8.911	9.997	10.163
DI-W07-510	14	1	1.073	0	8.709	9.611	9.861
DI-W07-510	14	2	0.779	100		0	0
DI-W07-511	14	1	1.208	6	8.551	9.679	9.857
DI-W07-511	14	2	0.853	100		0	0
DI-X	14	1	1.694	0	9.493	9.799	9.941
DI-X	14	2	1.694	100		0	0
Drainage Area 17							
DI-Y07-131C	17	1	1.098	0	9.103	9.357	9.688
DI-Y07-131C	17	2	1.098	100		9.357	9.688
DI-Y07-131D	17	1	1.326	0	9.103	9.357	9.688
DI-Y07-131D	17	2	0.734	100		0	0
DI-Y07-131E	17	1	1.427	0	9.102	9.357	9.688
DI-Y07-131E	17	2	0.542	100		0	0
DI-Y07-131F	17	1	1.712	0	9.156	9.611	9.999
DI-Y07-131F	17	2	1.083	100		0	0
DI-Y07-416	17	1	3.734	0	9.1	9.704	10.396
DI-Y07-416	17	2	0.632	100		0	0
HW-Y08-415	17	1	5.28	0	7.663	8.887	9.706

Structure Nodes					Results		
					Free Discharge Conditions	5-Year Water Level Time Series	10-Year Water Level Time Series
Name	**Drainage Area**	**Subcatchment**	**Area (acres)**	**Impervious Percentage %**	**Max Water Elevation (feet)**	**Max Water Elevation (feet)**	**Max Water Elevation (feet)**
HW-Y08-415	17	2	0.877	100		0	0
Drainage Area 26							
DI-W07-?1	26	1	1.762	3	7.584	9.62	9.87
DI-W07-507	26	1	4.623	8	7.55	9.611	9.861
DI-W07-508	26	1	6.973	3	8.889	9.614	9.863
DI-W07-509	26	1	4.614	5	9.028	9.615	9.864
495 Fairview Hangars							
DI-Z06-134	495 FAIRVIEW	1	3.025	99	13.473	14.298	14.588
DI-Z06-343	495 FAIRVIEW	1	6.229	85	14.98	15.478	15.801
Northeast Corner							
CB-Z06-305	NE CORNER	1	3.728	20	12.948	13.192	13.568
Parking Areas							
DI-Y08-010	PARKING A	1	4.32	83	12.845	12.844	13.154
DI-Y08-481	PARKING A	1	2.253	74	12.089	12.085	12.344
CB-Y07-439	PARKING B	1	6.337	88	9.061	9.113	9.233
DI-Z07-428	PARKING C	1	3.298	80	8.867	9.53	9.756
CB-Y07-?36	PARKING D	1	3.298	80	7.729	9.53	9.756
CB-Y08-?54	PARKING E	1	3.001	83	8.656	9.69	10.088

Appendix L: Project Data Sheets

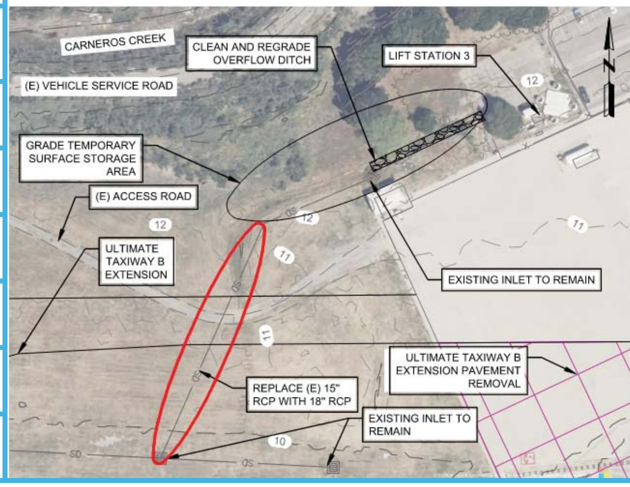
PREFERRED ALTERNATIVE No. 1 - Drainage Area 1 Local Storm Drain Upgrades

Flooding Area of Interest

Associated Area of Interest	1-1	
Associated Master Plan Projects	None	
Project Type	Airside	
Mitigation Type	Flooding Mitigation	
Project Footprint (SF)	15,000	
Total Cost	**$310,580.00**	
Federal Share	90.66%	$281,580.00
Local Share	9.34%	$29,010.00

Project Map

Not to scale. Existing contours shown.



Narrative

Replace the existing 15-inch RCP storm drain with an 18-inch RCP, clean and increase the size of the ditch to inlet DI-X07-029, and grade a temporary surface storage area to temporarily store runoff until WSE at Outfall 1 recede.

Cost Estimate

FAA Spec	Item Description	Unit	Quantity	Unit Cost or %	Cost
C-105	Mobilization	LS	1	10%	$18,300.00
C-102	Erosion and Sediment Control	LS	1	10%	$18,300.00
P-101	Remove 15" RCP	LF	387	$60.00	$23,220.00
P-151	Clear and Grubbing	AC	0.02	$67,020.00	$1,350.00
P-152	Excavation	CY	523	$60.00	$31,380.00
D-701	Install 18" RCP	LF	387	$310.00	$119,970.00
D-752	Connect to Existing Inlet	EA	2	$3,030.00	$6,060.00
T-901	Seeding	AC	0.02	$6,050.00	$130.00
Construction Total					**$218,710.00**
Design				15%	$32,810.00
Environmental Clearances				25%	$54,680.00
Adminstration				2%	$4,380.00
Project Total					**$310,580.00**

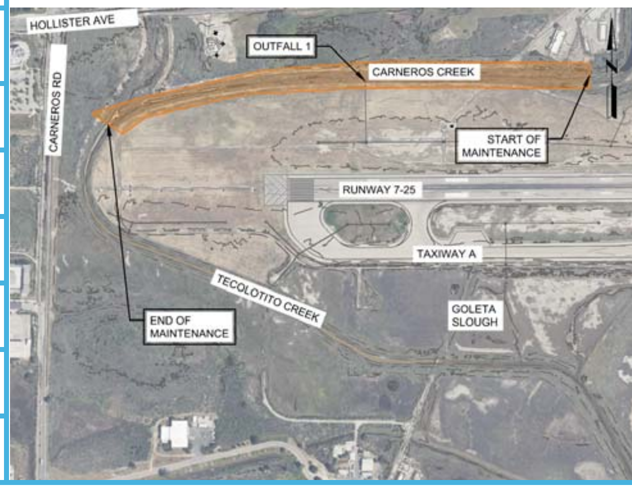
PREFERRED ALTERNATIVE No. 2a - Outfall 1 Improvements

Flooding Area of Interest

Associated Area of Interest	1-2a	
Associated Master Plan Projects	None	
Project Type	Maintenance	
Mitigation Type	Flooding mitigation	
Project Footprint (SF)	N/A	
Total Cost	**$750,000.00**	
Federal Share	90.66%	$679,950.00
Local Share	9.34%	$70,050.00

Project Map

Not to scale. Existing contours shown.



Narrative

Conduct routine maintenance in Carneros Creek to remove built-up sediment in the channel and decrease the likelihood of creek overtopping.

Cost Estimate

FAA Spec	Item Description	Unit	Quantity	Unit Cost or %	Cost
C-105	Mobilization	LS	1	$200,000.00	$200,000.00
C-102	Erosion Control	LS	1	$100,000.00	$100,000.00
P-152	Excavation	LS	1	$200,000.00	$200,000.00
M-105	Dewatering	LS	1	$100,000.00	$100,000.00
Construction Total					**$600,000.00**
Contingency				$150,000.00	$150,000.00
Project Total					**$750,000.00**

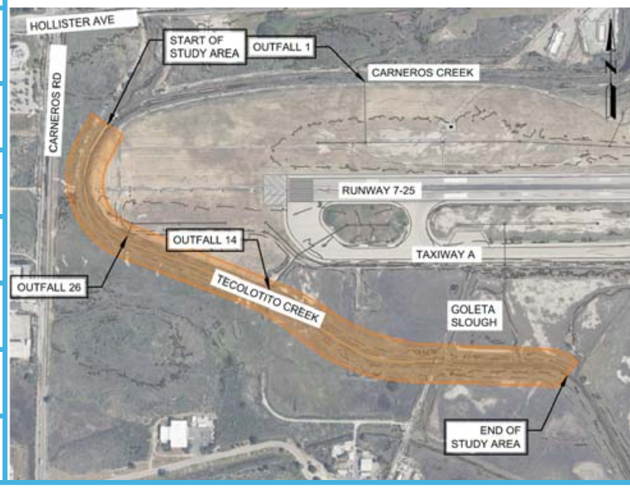
PREFERRED ALTERNATIVE No. 2b - Outfall 1 Improvements

Flooding Area of Interest

Associated Area of Interest	1-2b	
Associated Master Plan Projects	None	
Project Type	Study	
Mitigation Type	Flooding mitigation	
Project Footprint (SF)	N/A	
Total Cost	**$204,000.00**	
Federal Share	90.66%	$184,950.00
Local Share	9.34%	$19,060.00

Project Map

Not to scale. Existing contours shown.



Narrative

Perform a drainage study of Tecolotito Creek from its confluence with Carneros Creek to the interface with Goleta Slough, approximately 4,000 linear feet downstream. The study will investigate alternatives for providing additional capacity of Tecolotito Creek and improving the conveyance of the 10- and 25-year floods. The impact of alternatives on the 100-year flood will be documented. As Tecolotito Creek has been realigned since the most recent FEMA floodplain study, the effective FEMA hydraulic model cannot be used to investigate alternatives. A new hydraulic model will be required. The model will use publicly available LiDAR to define overbank elevations in the model. Field survey will be conducted along the creek to define channel elevations not included in the LiDAR dataset. Surface roughness in the model will be defined based on field observations. The study will include an alternatives analysis for recommended improvements. Results of the alternatives analysis will be documented in a project report.

Cost Estimate

FAA Spec	Item Description	Unit	Quantity	Unit Cost or %	Cost
N/A	Study	LS	1	$200,000.00	$200,000.00
Construction Total					**$200,000.00**
Adminstration				2%	$4,000.00
Project Total					**$204,000.00**

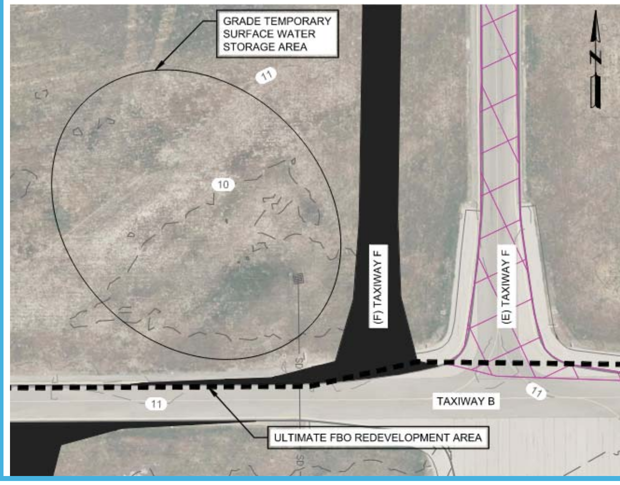
PREFERRED ALTERNATIVE No. 3 - Taxiway F Surface Storage

Short-term

Associated Area of Interest	5-3	
Associated Master Plan Projects	Taxiway F Relocation	
Project Type	Airside	
Mitigation Type	Flooding Mitigation	
Project Footprint (SF)	3,100	
Total Cost	**$253,374.00**	
Federal Share	90.66%	$229,710.00
Local Share	9.34%	$23,670.00

Project Map

Not to scale. Existing contours shown.



Narrative

Regrade infield to provide additional temporary surface water storage.

Cost Estimate

FAA Spec	Item Description	Unit	Quantity	Unit Cost or %	Cost
C-105	Mobilization	LS	1	10%	$16,000.00
C-102	Erosion and Sediment Control	LS	1	10%	$16,000.00
P-152	Unclassified Excavation	CY	3064	$52.00	$159,344.00
T-901	Seeding	AC	0.1	$6,050.00	$605.00
Construction Total					**$191,949.00**
Design				15%	$28,793.00
Environmental Clearances				15%	$28,793.00
Adminstration				2%	$3,839.00
Project Total					**$253,374.00**

PREFERRED ALTERNATIVE No. 4 - Airfield Conveyance Swale Maintenance

Maintenance area of interest

Associated Area of Interest	5-4	
Associated Master Plan Projects	None	
Project Type	Airside	
Mitigation Type	Swale Maintenance	
Project Footprint (SF)	10	
Total Cost	**$12,370.00**	
Federal Share	90.66%	$11,220.00
Local Share	9.34%	$1,160.00

Project Map

Not to scale. Existing contours shown.

Narrative

Grout existing riprap into place.

Cost Estimate

FAA Spec	Item Description	Unit	Quantity	Unit Cost or %	Cost
C-105	Mobilization	LS	1	$7,500.00	$7,500.00
N/A	Grout Riprap	CY	11	$170.00	$1,870.00
Construction Total					**$9,370.00**
Design				15%	$1,406.00
Environmental Clearances				15%	$1,406.00
Adminstration				2%	$188.00
Project Total					**$12,370.00**

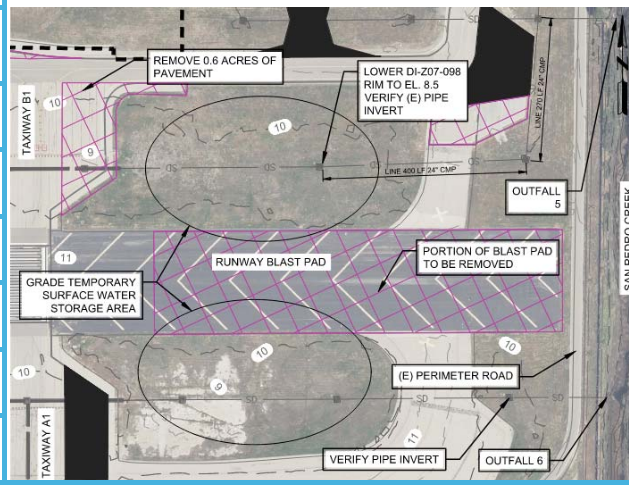
PREFERRED ALTERNATIVE No. 5a - Drainage Area 5 and 6 Surface Storage

Flooding Area of Interest

Associated Area of Interest	6-3, 5-1	
Associated Master Plan Projects	Runway Blast Pad Removal	
Project Type	Airside	
Mitigation Type	Flood Mitigation	
Project Footprint (SF)	200,000	
Total Cost	**$687,000.00**	
Federal Share	90.66%	$622,840.00
Local Share	9.34%	$64,170.00

Project Map

Not to scale. Existing contours shown.



Narrative

Associated with the Runway 7-25 Blast Pad removal, regrade the infield to provide additional temporary surface water storage including the removed east corner of unused Taxiway B1, lower the rim on inlet DI-Z07-098 to create more surface storage area, and line 670 linear feet of 24-inch CMP pipe to increase pipe longevity and capacity.

Cost Estimate

FAA Spec	Item Description	Unit	Quantity	Unit Cost or %	Cost
C-105	Mobilization	LS	1	10%	$47,320.00
C-102	Erosion and Sediment Control	LS	1	10%	$43,020.00
P-152	Unclassified Excavation	CY	5600	$60.00	$336,000.00
D-701	Clean and Line 24" CMP	LF	670	$90.00	$60,300.00
D-751	Adjust Rim Elevation	EA	1	$3,560.00	$3,560.00
T-901	Seeding	AC	5	$6,050.00	$30,250.00
Construction Total					**$520,450.00**
Design				15%	$78,070.00
Environmental Clearances				15%	$78,070.00
Adminstration				2%	$10,410.00
Project Total					**$687,000.00**

PREFERRED ALTERNATIVE No. 5b - Drainage Area 5 and 6 Improvements

Flooding Area of Interest

Associated Area of Interest	1-2b	
Associated Master Plan Projects	None	
Project Type	Study	
Mitigation Type	Flooding mitigation	
Project Footprint (SF)	N/A	
Total Cost	**$153,000.00**	
Federal Share	90.66%	$138,710.00
Local Share	9.34%	$14,300.00

Project Map

Not to scale. Existing contours shown.

Narrative

Perform a drainage study of San Pedro Creek from Hollister Ave to James Fowler Road. The study will investigate alternatives for providing additional capacity of San Pedro Creek and improving the conveyance of the 10- and 25-year floods. The impact of alternatives on the 100-year flood will be documented. The published FEMA hydraulic model will be used. The study will include an alternatives analysis for recommended improvements. Results of the alternatives analysis will be documented in a project report.

Cost Estimate

FAA Spec	Item Description	Unit	Quantity	Unit Cost or %	Cost
N/A	Study	LS	1	$150,000.00	$150,000.00
Construction Total					**$150,000.00**
Adminstration				2%	$3,000.00
Project Total					**$153,000.00**

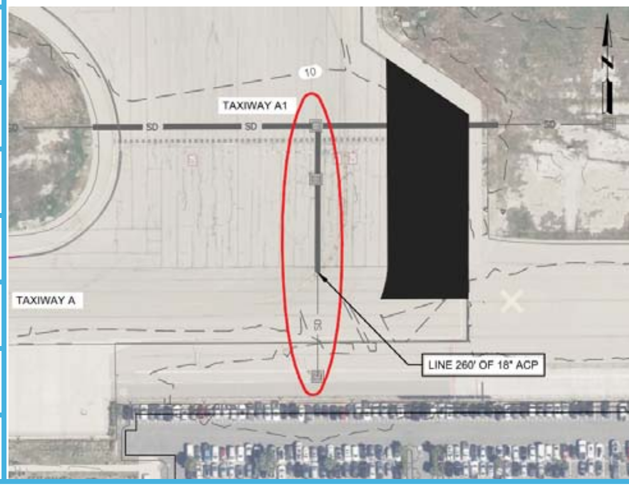
PREFERRED ALTERNATIVE No. 6 - Taxiway A1 Pipe Maintenance

Flooding Area of Interest

Associated Area of Interest	6-6	
Associated Master Plan Projects	Taxiway A1 Rehab	
Project Type	Airside	
Mitigation Type	Pipe Maintenance	
Project Footprint (SF)	1,300	
Total Cost	**$37,752.00**	
Federal Share	90.66%	$34,230.00
Local Share	9.34%	$3,530.00

Project Map

Not to scale. Existing contours shown.



Narrative

Clean and line 260 linear feet of 18-inch ACP.

Cost Estimate

FAA Spec	Item Description	Unit	Quantity	Unit Cost or %	Cost
C-105	Mobilization	LS	1	10%	$2,600.00
D-701	Line 18" ACP	LF	260	$100.00	$26,000.00
Construction Total					**$28,600.00**
Design				15%	$4,290.00
Environmental Clearances				15%	$4,290.00
Adminstration				2%	$572.00
Project Total					**$37,752.00**

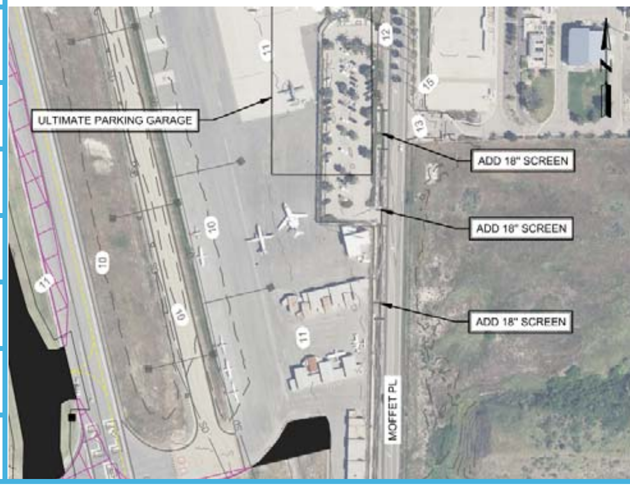
PREFERRED ALTERNATIVE No. 7 - Concrete Channel Conveyance

Maintenance area of interest

Associated Area of Interest	9-3	
Associated Master Plan Projects	None	
Project Type	Landside	
Mitigation Type	Maintenance	
Project Footprint (SF)		
Total Cost	**$8,784.00**	
Federal Share	90.66%	$7,970.00
Local Share	9.34%	$830.00

Project Map

Not to scale. Existing contours shown.



Narrative

Install screens and grates on all inlets to block debris from entering the channel.

Cost Estimate

FAA Spec	Item Description	Unit	Quantity	Unit Cost or %	Cost
C-105	Mobilization	LS	1	10%	$600.00
C-102	Erosion and Sediment Control	LS	1	10%	$600.00
D-701	18'' ACP Culvert Screen	EA	3	$2,000.00	$6,000.00
Construction Total					**$7,200.00**
Design*				20%	$1,440.00
Environmental Clearances*				0%	$0.00
Adminstration				2%	$144.00
Project Total					**$8,784.00**

*no enviromnetal clearances anticipated and design costs are higher due to small scale of project

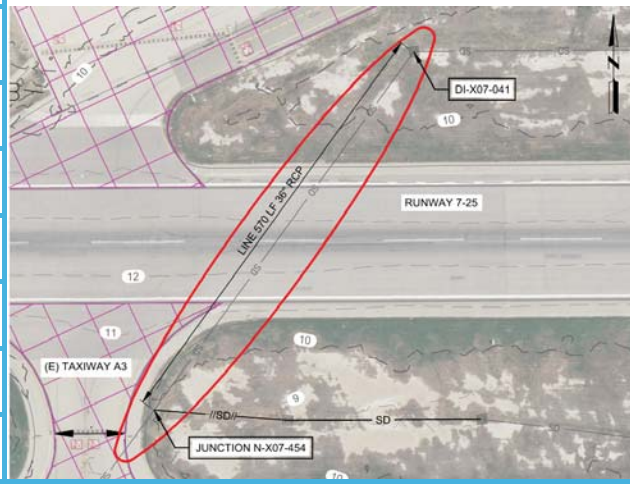
PREFERRED ALTERNATIVE No. 8 - Runway 7-25 Pipe Maintenance

Flooding Area of Interest

Associated Area of Interest	10-1	
Associated Master Plan Projects	Runway 7-25 Rehab	
Project Type	Airside	
Mitigation Type	Pipe Maintenance	
Project Footprint (SF)	2,850	
Total Cost	**$82,780.00**	
Federal Share	90.66%	$75,050.00
Local Share	9.34%	$7,740.00

Project Map

Not to scale. Existing contours shown.



Narrative

Associated with Runway 7-25 Rehab project, clean and line 570 linear feet of 36-inch RCP pipe from Junction N-X07-454 to Inlet DI-X07-041.

Cost Estimate

FAA Spec	Item Description	Unit	Quantity	Unit Cost or %	Cost
C-105	Mobilization	LS	1	10%	$5,700.00
D-701	Clean and Line 36" RCP	LF	570	$100.00	$57,000.00
Construction Total					**$62,700.00**
Design				15%	$9,410.00
Environmental Clearances				15%	$9,410.00
Adminstration				2%	$1,260.00
Project Total					**$82,780.00**

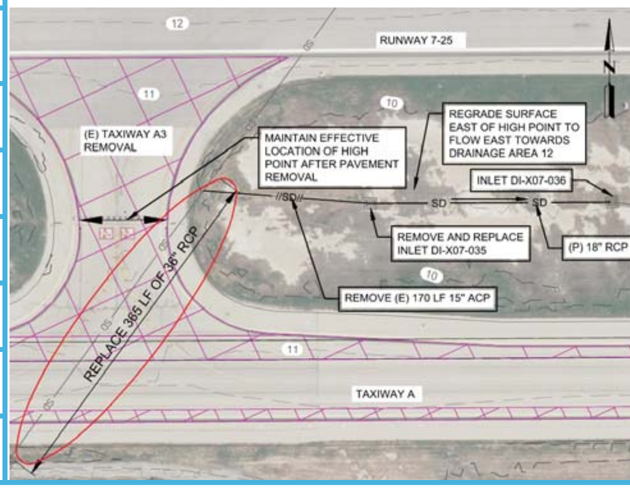
PREFERRED ALTERNATIVE No. 9 - Taxiway A3 Removal Improvements

Pipe area of inerest, short-term project

Associated Area of Interest	10-2, 10-8	
Associated Master Plan Projects	Taxiway A3 Removal, Taxiway A Shoulder Removal	
Project Type	Airside	
Mitigation Type	Pipe Maintenance, Capacity Improvements	
Project Footprint (SF)	2,975	
Total Cost	**$384,420.00**	
Federal Share	90.66%	$348,520.00
Local Share	9.34%	$35,910.00

Project Map

Not to scale. Existing contours shown.



Narrative

Associated with Taxiway A3 removal, replace 365 linear feet of 36-inch RCP. Retain the high point location between Drainage Areas 13 and 12 and connect existing inlet DI-X07-035 east to DI-X07-036 through new 18-inch RCP and remove the existing 15-inch ACP at the 36-inch RCP. A similar option is to upsize the existing 15-inch ACP, which is proposed to be removed, and connect downstream to the Drainage Area 12 system with 18-inch RCP.

Cost Estimate

FAA Spec	Item Description	Unit	Quantity	Unit Cost or %	Cost
C-105	Mobilization	LS	1	10%	$24,270.00
C-102	Erosion and Sediment Control	LS	1	10%	$24,270.00
P-101	Remove 15" ACP Pipe	LF	173	$60.00	$10,380.00
P-101	Remove 36" RCP	LF	345	$60.00	$20,700.00
D-701	Install 18" RCP	LF	250	$310.00	$77,500.00
D-701	Install 36" RCP	LF	345	$370.00	$127,650.00
D-701	Connect to Existing Pipe	EA	1	$2,990.00	$2,990.00
D-751	Connect to Existing Structure	EA	1	$3,030.00	$3,030.00
T-901	Seeding	AC	0.07	$6,050.00	$420.00
Construction Total					**$291,210.00**
Design				15%	$43,690.00
Environmental Clearances				15%	$43,690.00
Adminstration				2%	$5,830.00
Project Total					**$384,420.00**

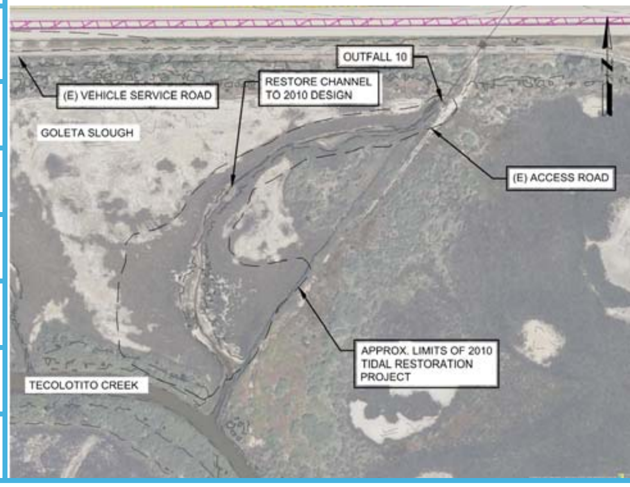
PREFERRED ALTERNATIVE No. 10 - Outfall 10 Channel Improvements

Known drainage concern

Associated Area of Interest	10-3	
Associated Master Plan Projects	None	
Project Type	Landside (access via airfield)	
Mitigation Type	Channel Maintenance	
Project Footprint (SF)		
Total Cost	**$404,770.00**	
Federal Share	90.66%	$366,970.00
Local Share	9.34%	$37,810.00

Project Map

Not to scale. Existing contours shown.



Narrative

Restore the channel through Goleta Slough from Outfall 10 to Tecolotito Creek to its 2010 Tidal Restoration Project design.

Cost Estimate

FAA Spec	Item Description	Unit	Quantity	Unit Cost or %	Cost
C-105	Mobilization	LS	1	10%	$25,920.00
P-151	Clearing and Grubbing	AC	0.7	$67,100.00	$46,970.00
P-152	Sediment Removal	CY	300	$20.00	$6,000.00
M-105	Dewatering	LS	1	$110,000.00	$110,000.00
N/A	Temporary Access Road	LF	8500	$10.00	$85,000.00
T-901	Planting/Restoration	LS	1	$11,150.00	$11,150.00
Construction Total					**$285,040.00**
Design				15%	$42,760.00
Environmental Clearances*				25%	$71,260.00
Adminstration				2%	$5,710.00
Project Total					**$404,770.00**

*environmental clearances percentage increased due to site location within Goleta Slough

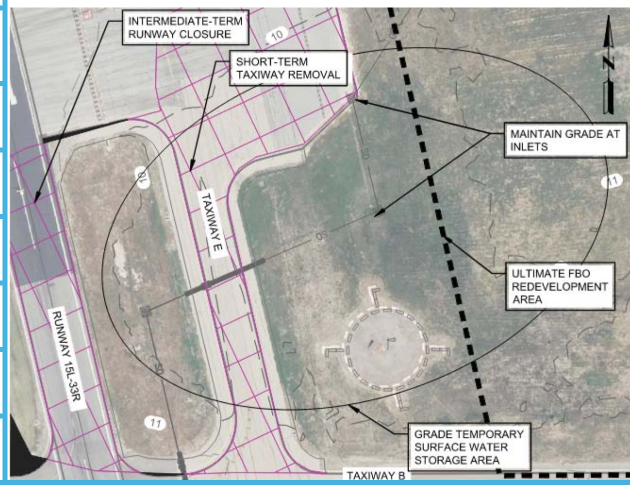
PREFERRED ALTERNATIVE No. 11 - Drainage Area 10 Surface Storage

Flooding Area of Interest

Associated Area of Interest	10-4	
Associated Master Plan Projects	Taxiway E Removal	
Project Type	Airside	
Mitigation Type	Flooding Mitigation	
Project Footprint (SF)	230,000	
Total Cost	**$667,630.00**	
Federal Share	90.66%	$605,280.00
Local Share	9.34%	$62,360.00

Project Map

Not to scale. Existing contours shown.



Narrative

Associated with Taxiway E relocation, grade the infield to provide additional temporary surface water storage while maintaining the rim elevations of the existing inlets for adequate pipe cover.

Cost Estimate

FAA Spec	Item Description	Unit	Quantity	Unit Cost or %	Cost
C-105	Mobilization	LS	1	10%	$42,150.00
C-102	Erosion and Sediment Control	LS	1	10%	$42,150.00
P-152	Unclassified Excavation	CY	6480	$60.00	$388,800.00
T-901	Seeding	AC	5.4	$6,050.00	$32,670.00
Construction Total					**$505,770.00**
Design				15%	$75,870.00
Environmental Clearances				15%	$75,870.00
Adminstration				2%	$10,120.00
Project Total					**$667,630.00**

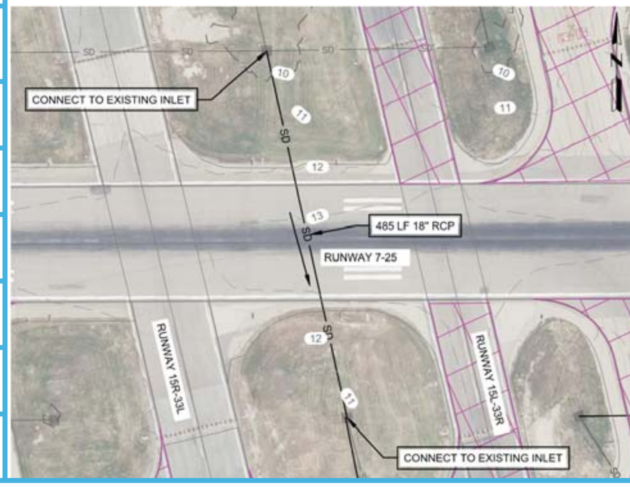
PREFERRED ALTERNATIVE No. 12 - Drainage Area 10 Capacity

Flooding Area of Interest

Associated Area of Interest	10-7	
Associated Master Plan Projects	Runway 7-25 Rehab	
Project Type	Airside	
Mitigation Type	Flooding Mitigation	
Project Footprint (SF)	2,425	
Total Cost	**$227,130.00**	
Federal Share	90.66%	$205,920.00
Local Share	9.34%	$21,220.00

Project Map

Not to scale. Existing contours shown.



Narrative

Connect a new storm drain pipe to existing inlets and route under Runway 7-25 to connect to Drainage Area 11.

Cost Estimate

FAA Spec	Item Description	Unit	Quantity	Unit Cost or %	Cost
C-105	Mobilization	LS	1	10%	$15,650.00
D-701	Install 18" RCP	LF	485	$310.00	$150,350.00
D-752	Connect to Existing Inlet	EA	2	$3,030.00	$6,060.00
Construction Total					**$172,060.00**
Design				15%	$25,810.00
Environmental Clearances				15%	$25,810.00
Adminstration				2%	$3,450.00
Project Total					**$227,130.00**

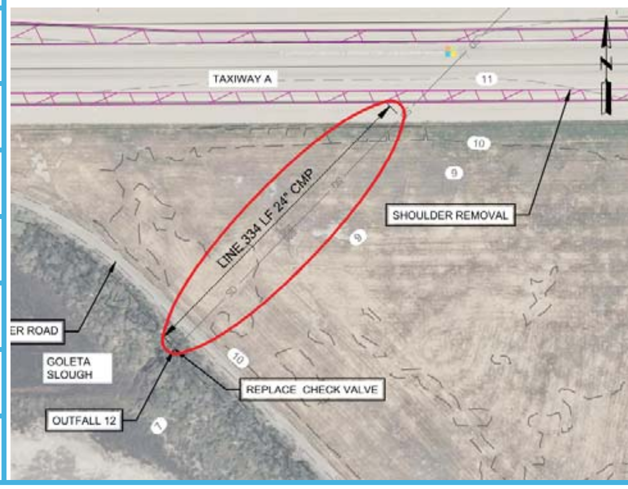
PREFERRED ALTERNATIVE No. 13 - Outfall 12 Improvements

Known drainage concern, pipe area of interest

Associated Area of Interest	12-1, 12-2	
Associated Master Plan Projects	None; possibly Taxiway A Shoulder Removal	
Project Type	Airside	
Mitigation Type	Pipe and Outfall Maintenance	
Project Footprint (SF)	1,670	
Total Cost	**$75,780.00**	
Federal Share	90.66%	$68,710.00
Local Share	9.34%	$7,080.00

Project Map

Not to scale. Existing contours shown.



Narrative

Associated with Taxiway A shoulder removal, replace the ineffective check valve on the 24-inch outlet pipe and clean and line 334 linear feet of 24-inch CMP pipe from Outfall 12 upstream to the transition to 24-inch RCP at the edge of Taxiway A.

Cost Estimate

FAA Spec	Item Description	Unit	Quantity	Unit Cost or %	Cost
C-105	Mobilization	LS	1	10%	$4,450.00
C-102	Erosion Control and Sediment Control	LS	1	10%	$4,450.00
P-101	Remove Existing 24" Check Valve	EA	1	$2,200.00	$2,200.00
M-105	Dewatering	LA	1	$10,000.00	$10,000.00
D-701	Clean and Line 24'' CMP	LF	334	$90.00	$30,060.00
D-751	Install 24" Check Valve	EA	1	$2,200.00	$2,200.00
Construction Total					**$53,360.00**
Design				15%	$8,010.00
Environmental Clearances*				25%	$13,340.00
Adminstration				2%	$1,070.00
Project Total					**$75,780.00**

*environmental clearances percentage increased due to site location within Goleta Slough

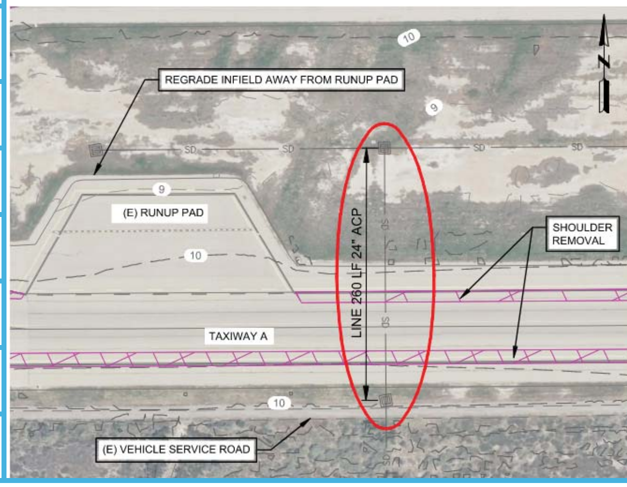
PREFERRED ALTERNATIVE No. 14 - Drainage Area 13 Improvements

Flooding Area of Interest, pipe maintenance

Associated Area of Interest	13-1, 13-2	
Associated Master Plan Projects	Taxiway A Shoulder Removal	
Project Type	Airside	
Mitigation Type	Flooding mitigation, maintenance	
Project Footprint (SF)	1,300	
Total Cost	**$37,760.00**	
Federal Share	90.66%	$34,240.00
Local Share	9.34%	$3,530.00

Project Map

Not to scale. Existing contours shown.



Narrative

Associated with Taxiway A shoulder removal, regrade the infield to provide additional temporary surface water storage away from the pavement and clean and line 260 linear feet of existing 24-inch ACP outfall pipe. A similar option is to upsize the existing 15-inch ACP in the infield to 18-inch RCP.

Cost Estimate

FAA Spec	Item Description	Unit	Quantity	Unit Cost or %	Cost
C-105	Mobilization	LS	1	10%	$2,600.00
D-701	Clean and Line 24" ACP	LF	260	$100.00	$26,000.00
Construction Total					**$28,600.00**
Design				15%	$4,290.00
Environmental Clearances				15%	$4,290.00
Adminstration				2%	$580.00
Project Total					**$37,760.00**

*infield grading costs assumed to be included with pavement work

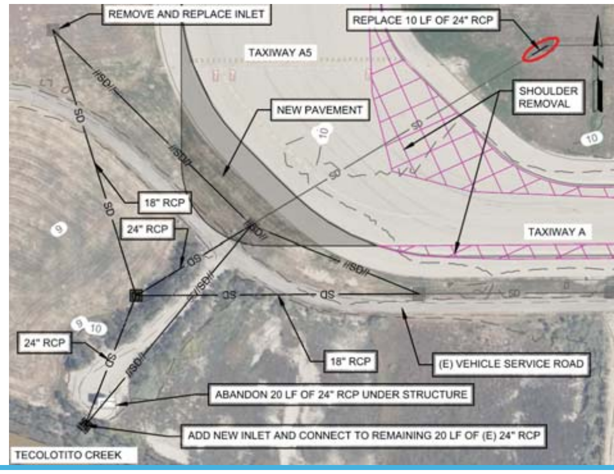
PREFERRED ALTERNATIVE No. 15 - Taxiway A5 Storm Drain Upgrades

Shoert-term project, pipe maintenance

Associated Area of Interest	14-1, 14-2	
Associated Master Plan Projects	Taxiway A5 Improvements, Taxiway A Shoulder Removal	
Project Type	Airside	
Mitigation Type	Pipe Maintenance	
Project Footprint (SF)	9,000	
Total Cost	**$660,490.00**	
Federal Share	90.66%	$598,810.00
Local Share	9.34%	$61,690.00

Project Map

Not to scale. Existing contours shown.



Narrative

Associated with the taxiway upgrades, remove an existing inlet and install a new inlet and piping. Upsize pipe segments that are 15-inch in diameter to 18-inch. Remove and replace 20 linear feet of 24-inch RCP connected to Inlet DI-W07-?2 [sic] in the infield between Runway 7-25 and Taxiway A.

Cost Estimate

FAA Spec	Item Description	Unit	Quantity	Unit Cost or %	Cost
C-105	Mobilization	LS	1	10%	$41,700.00
C-102	Erosion and Sediment Control	LS	1	10%	$41,700.00
P-101	Abandon 24" RCP	LF	20	$1,870.00	$37,400.00
P-101	Remove Structure	EA	1	$2,530.00	$2,530.00
P-101	Remove 15" RCP	LF	486	$60.00	$29,160.00
P-101	Remove 24" RCP	LF	265	$60.00	$15,900.00
P-151	Clearing and Grubbing	AC	0.21	$67,100.00	$14,100.00
P-151	Gravel Road Restoration	AC	0.17	$10,570.00	$1,820.00
D-701	Install 18" RCP	LF	600	$310.00	$186,000.00
D-701	Install 24" RCP	LF	290	$340.00	$98,600.00
D-701	Connect to Existing Structure	EA	1	$3,030.00	$3,030.00
D-751	Install Drop Inlet	EA	3	$8,050.00	$24,150.00
D-751	Connect to Existing Pipe	EA	1	$2,990.00	$2,990.00
T-901	Seeding	AC	0.21	$6,050.00	$1,280.00
Construction Total					**$500,360.00**
Design				15%	$75,060.00
Environmental Clearances				15%	$75,060.00
Adminstration				2%	$10,010.00
Project Total					**$660,490.00**

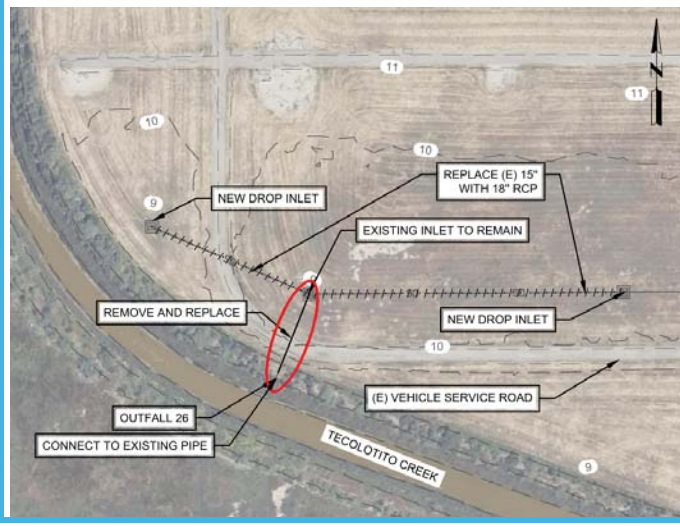
PREFERRED ALTERNATIVE No. 16 - Outfall 26 Improvements

Known Drainage Concern

Associated Area of Interest	26-1	
Associated Master Plan Projects	None	
Project Type	Airside	
Mitigation Type	Maintenance	
Project Footprint (SF)	5,000	
Total Cost	**$579,856.00**	
Federal Share	90.66%	$525,700.00
Local Share	9.34%	$54,160.00

Project Map

Not to scale. Existing contours shown.



Narrative

Replace the 24-inch RCP outfall pipe to slope towards Tecolotito Creek, remove and replace 15-inch pipe with 18-inch RCP and new inlets.

Cost Estimate

FAA Spec	Item Description	Unit	Quantity	Unit Cost or %	Cost
C-105	Mobilization	LS	1	10%	$36,610.00
C-102	Erosion and Sediment Control	LS	1	10%	$36,610.00
P-101	Remove 15'' ACP	LF	463	$60.00	$27,780.00
P-101	Remove 24'' RCP	LF	86	$60.00	$5,160.00
P-101	Remove Structure	EA	3	$2,530.00	$7,590.00
P-151	Gravel Road Restoration	AC	0.004	$10,570.00	$40.00
P-152	Clearing and Grubbing	AC	0.2	$67,100.00	$13,420.00
D-701	Install 18'' RCP	LF	463	$310.00	$143,530.00
D-701	Install 24'' RCP	LF	86	$1,630.00	$140,180.00
D-701	Connect Existing Pipe	EA	1	$2,990.00	$2,990.00
D-751	Install Drop Inlet	EA	3	$8,050.00	$24,150.00
T-901	Seeding	AC	0.2	$6,050.00	$1,210.00
Construction Total					**$439,270.00**
Design				15%	$65,900.00
Environmental Clearances				15%	$65,900.00
Adminstration				2%	$8,786.00
Project Total					**$579,856.00**

PREFERRED ALTERNATIVE No. 17 - Long Term Parking Lot and East Cell Phone Lot

Flooding area of interest

Associated Area of Interest	P-1, P-2	
Associated Master Plan Projects	None	
Project Type	Landside	
Mitigation Type	Flooding mitigation	
Project Footprint (SF)	7,400	
Total Cost	**$2,637,360.00**	
Federal Share	90.66%	$2,391,040.00
Local Share	9.34%	$246,330.00

Project Map

Not to scale. Existing contours shown.

Narrative

Associated with a project in the East Cell Phone Lot or Long-Term Parking Lot, upgrade the existing pavement to pervious concrete within the drive aisles and parking spaces.

Cost Estimate

FAA Spec	Item Description	Unit	Quantity	Unit Cost or %	Cost
C-105	Mobilization	LS	1	10%	$148,000.00
C-102	Erosion and Sediment Control	LS	1	10%	$148,000.00
P-101	Pavement Removal	SY	7400	$30.00	$222,000.00
P-501	Pervious Concrete	SY	7400	$200.00	$1,480,000.00
Construction Total					**$1,998,000.00**
Design				15%	$299,700.00
Environmental Clearances				15%	$299,700.00
Adminstration				2%	$39,960.00
Project Total					**$2,637,360.00**

PREFERRED ALTERNATIVE No. 18 - Terminal Parking Lot

Flooding area of interest

Associated Area of Interest	P-3	
Associated Master Plan Projects	None	
Project Type	Landside	
Mitigation Type	Flooding mitigation	
Project Footprint (SF)	1,740	
Total Cost	**$620,136.00**	
Federal Share	90.66%	$562,220.00
Local Share	9.34%	$57,930.00

Project Map

Not to scale. Existing contours shown.

Narrative

Associated with a project in the Terminal Parking Lot, upgrade the existing pavement to pervious concrete within the drive aisles and parking spaces.

Cost Estimate

FAA Spec	Item Description	Unit	Quantity	Unit Cost or %	Cost
C-105	Mobilization	LS	1	10%	$34,800.00
C-102	Erosion and Sediment Control	LS	1	10%	$34,800.00
P-101	Pavement Removal	SY	1740	$30.00	$52,200.00
P-501	Pervious Concrete	SY	1740	$200.00	$348,000.00
Construction Total					**$469,800.00**
Design				15%	$70,470.00
Environmental Clearances				15%	$70,470.00
Adminstration				2%	$9,396.00
Project Total					**$620,136.00**

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