

Schaaf & Wheeler  
Consulting Civil Engineers

# Stone Valley Middle School Drainage Study

Project Manager:  
Daniel J. Schaaf, PE



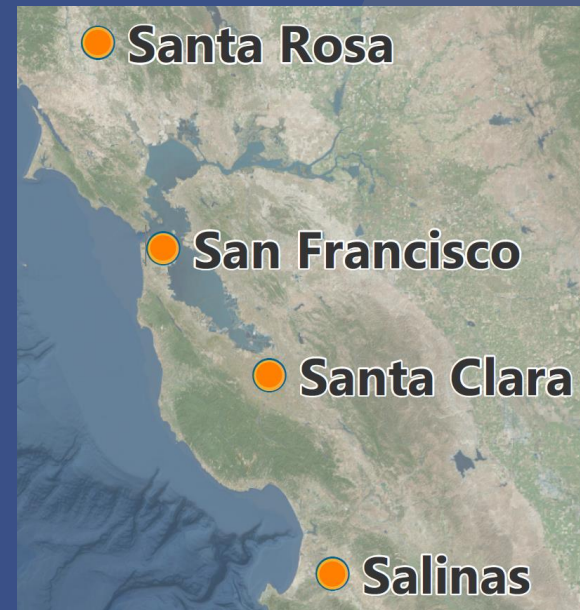
# Overview of Presentation

- History
- Understanding
- Results
- Improvements
- Questions & Answers



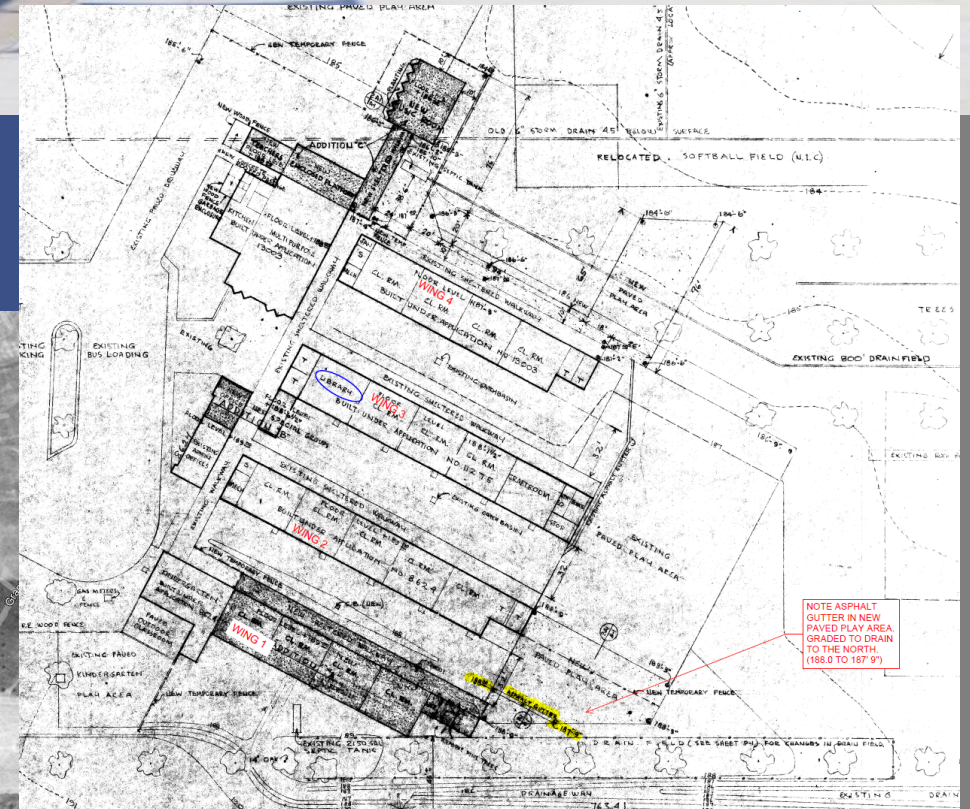
# Schaaf & Wheeler

- Dedicated to water resources
- Engineers who plan and design
- Lots of history in Bay Area
- Small firm, 40 employees
- Dan Schaaf, PE
  - 25-years of experience
  - Focus on urban stormwater



# History of School Site

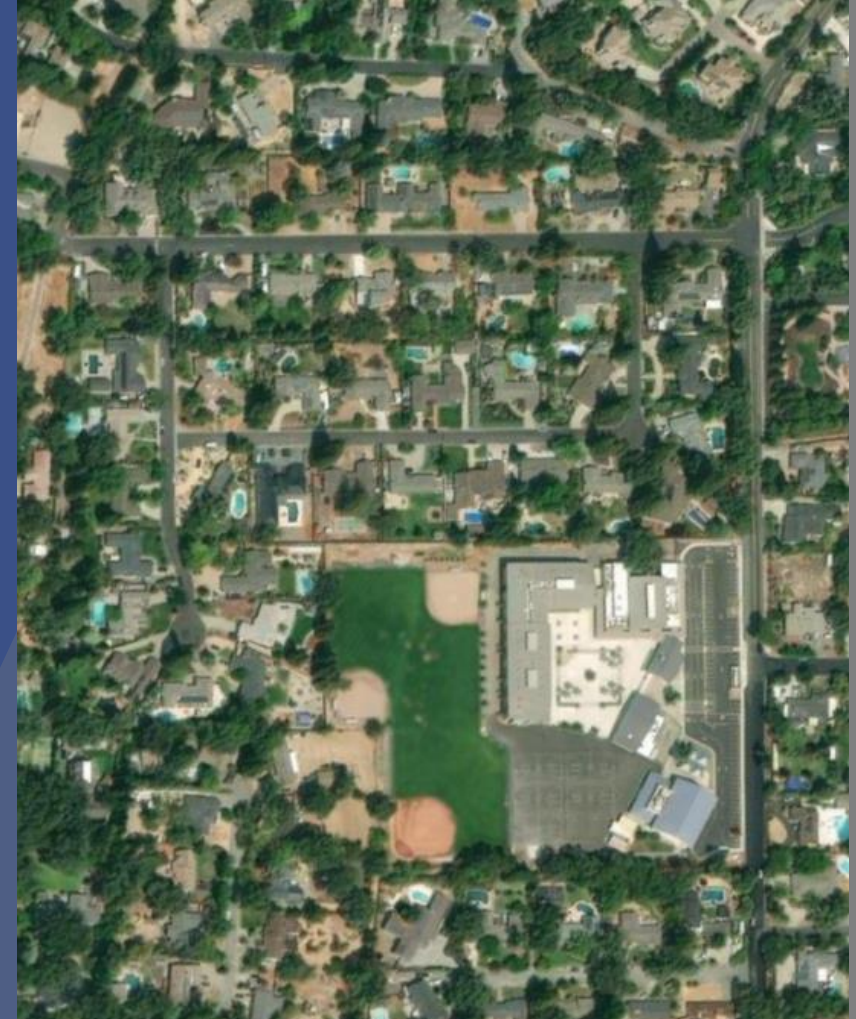
- Originally Built late 1950s
- Neighborhood Development late 1950s
- Additional Facilities at Various Times
- Major Renovation 2019



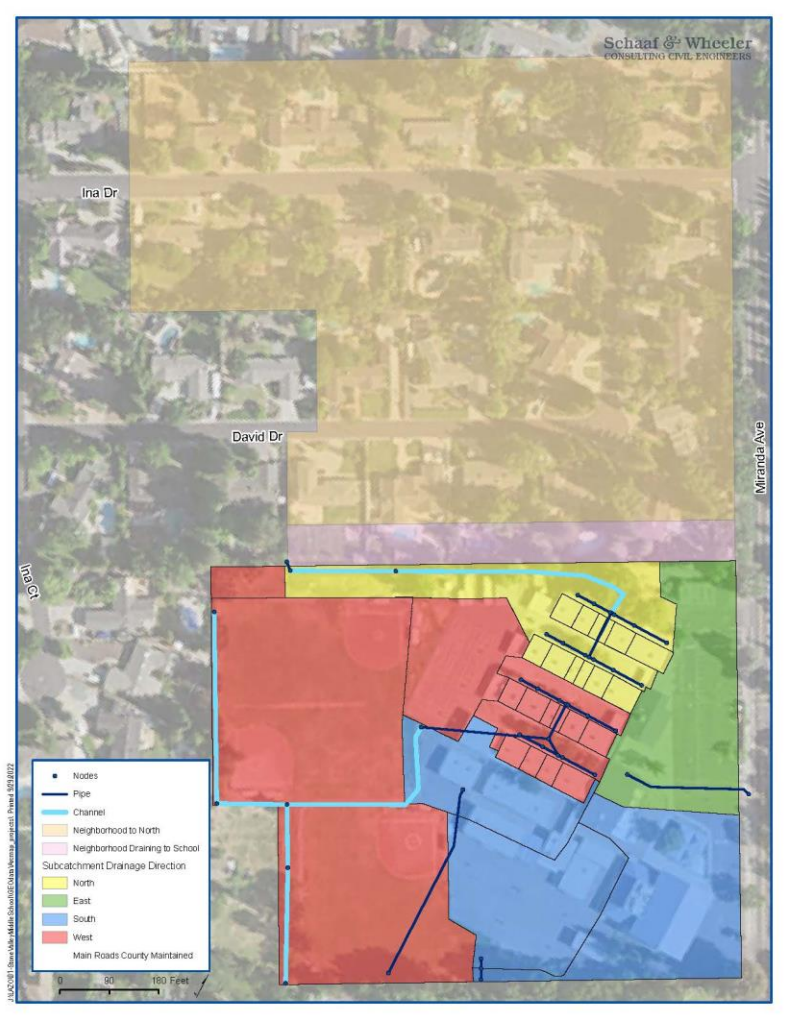
# Pre-Construction



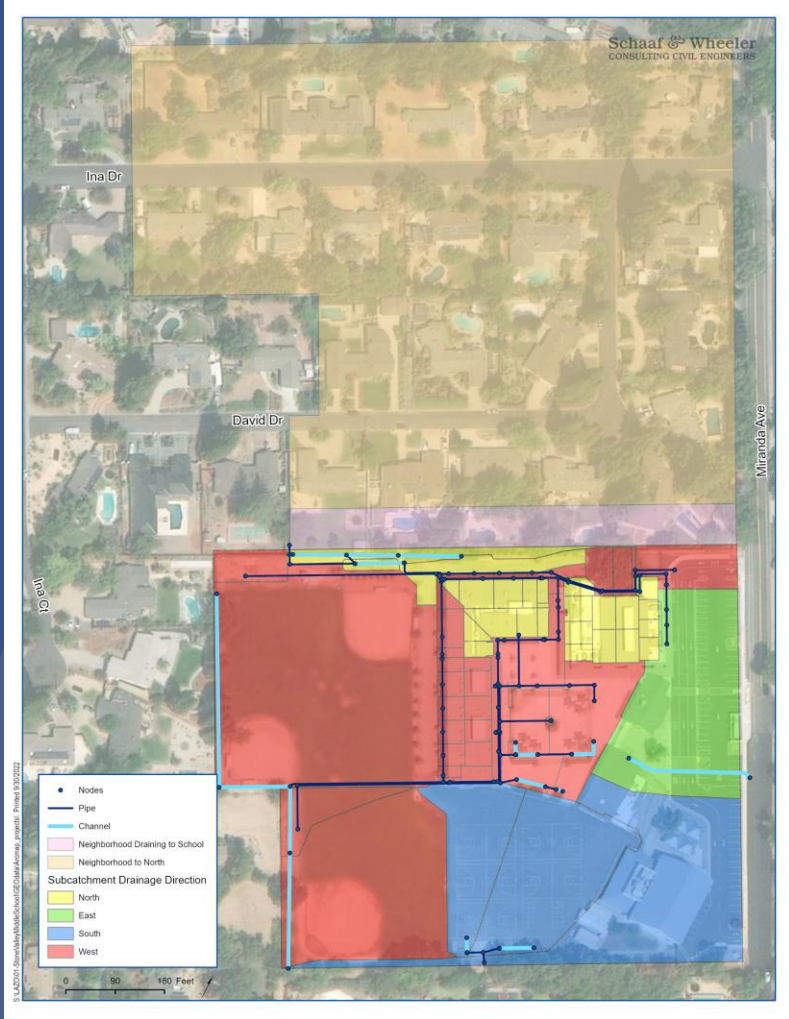
# Post-Construction



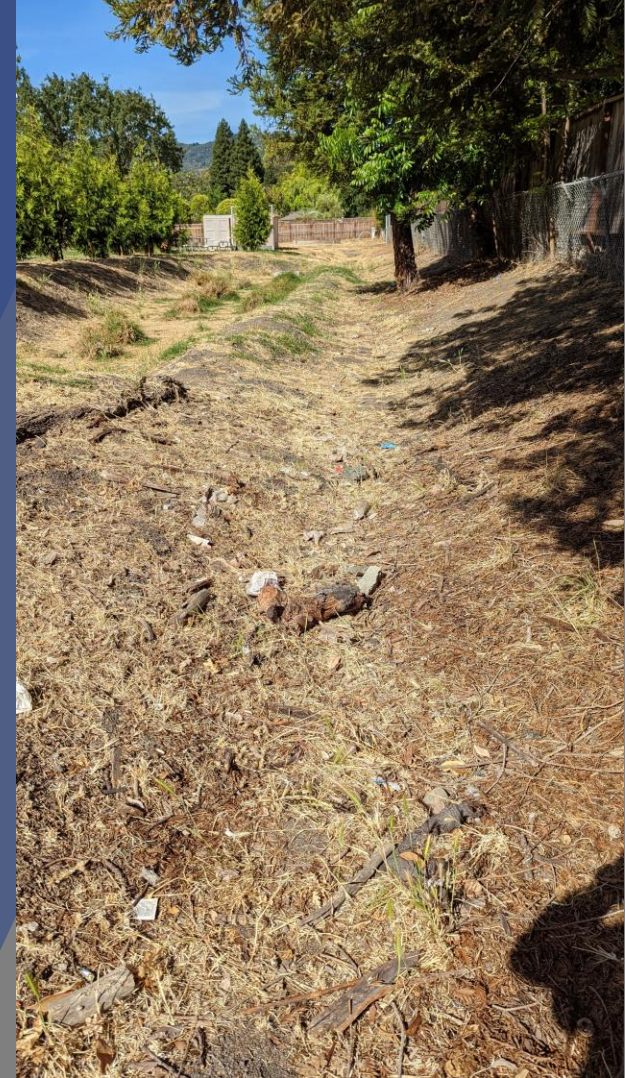
# Pre-Construction



# Post-Construction



# North Swale and Bioretention Basin

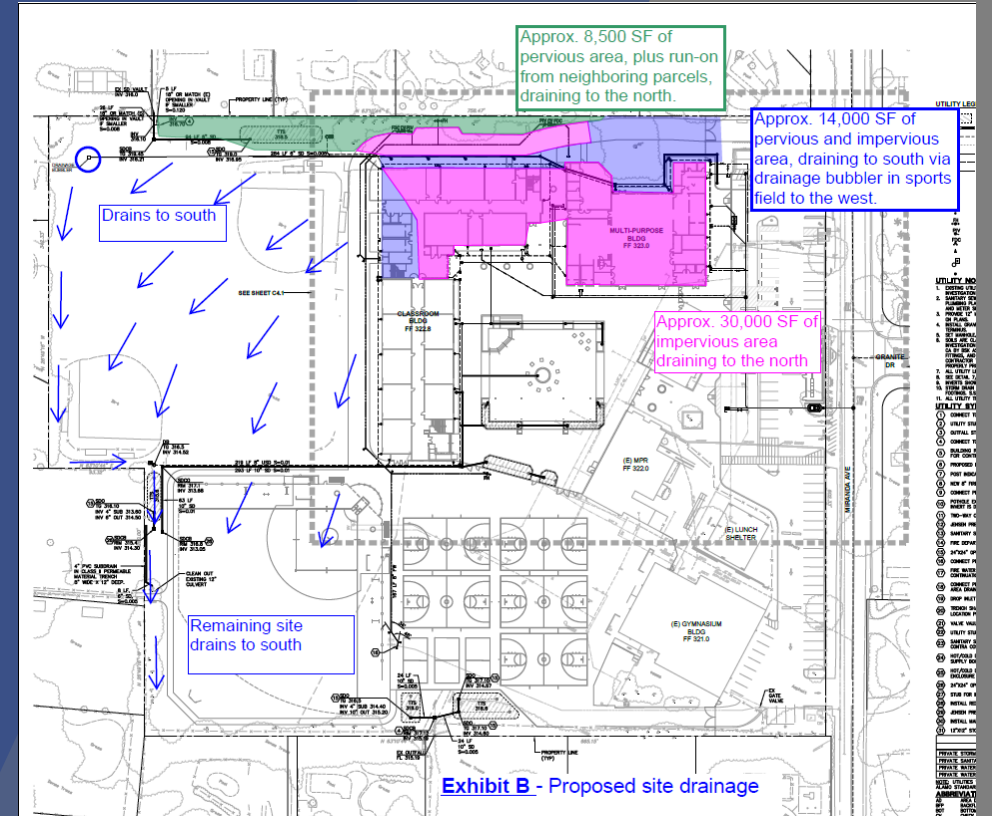
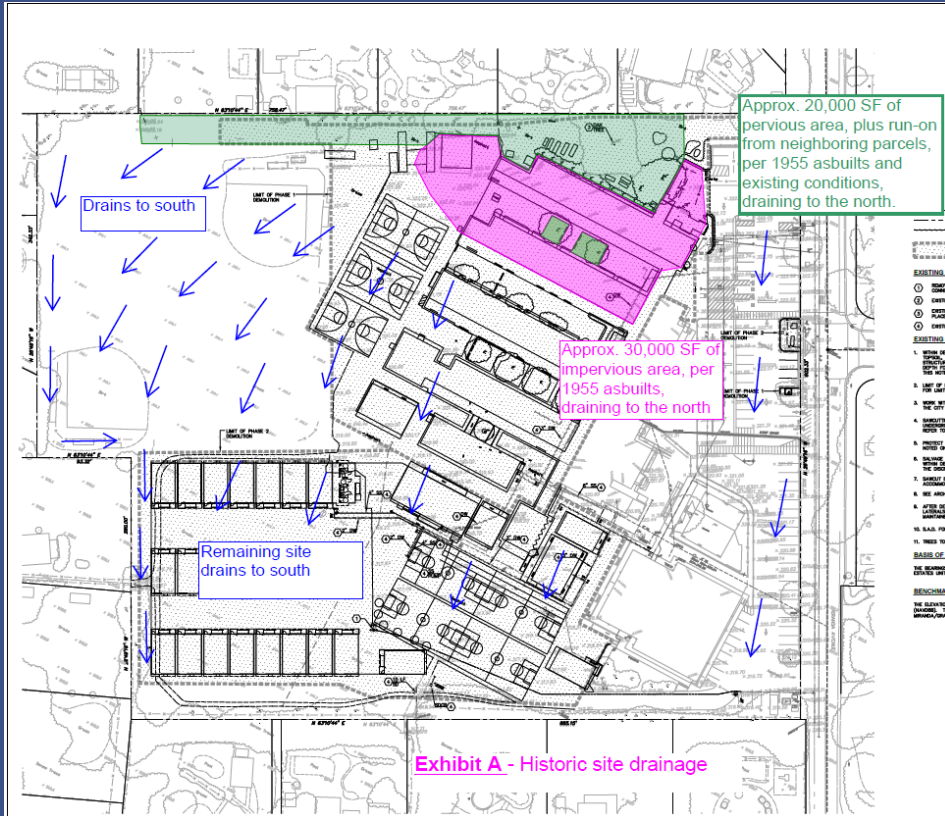


# North Bubbler and West Ditch





# BKF Report – Rational Method ( $Q = CiA$ )



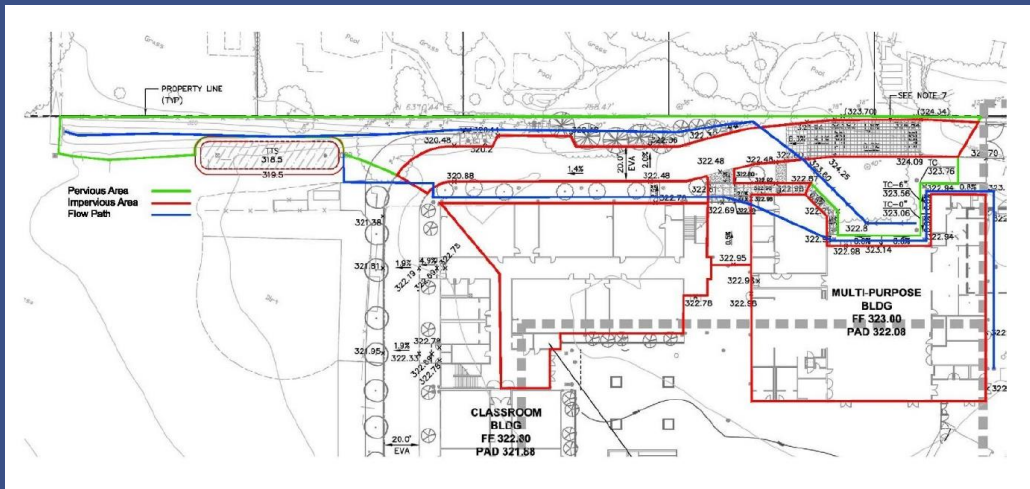
EXISTING STORM DRAIN TABLE (10-YEAR STORM)								
SITE WATERSHED	TOTAL SITE AREA (SF)	A		C		TIME OF CONCENTRATION (MIN)	RAIN INTENSITY (10-YEAR STORM) (IN/HR)	RUNOFF (CFS)
		TOTAL SITE AREA (AC)	IMPERVIOUS AREA (SF)	PERVIOUS AREA (SF)	WEIGHTED RUNOFF COEFFICIENT			
NORTH	50,000	1.15	30,000	20,000	0.66	10	2.1	1.59
EAST	46,228	1.06	39,728	6,500	0.82	10	2.1	1.82
SOUTH	336,360	7.72	180,000	156,360	0.62	15	1.7	8.15
<b>TOTAL:</b>	<b>432,588</b>	<b>9.93</b>	<b>249,728</b>	<b>182,860</b>				<b>11.56</b>

PROPOSED STORM DRAIN TABLE (10-YEAR STORM)								
SITE WATERSHED	TOTAL SITE AREA (SF)	A		C		TIME OF CONCENTRATION (MIN)	RAIN INTENSITY (10-YEAR STORM) (IN/HR)	RUNOFF (CFS)
		TOTAL SITE AREA (AC)	IMPERVIOUS AREA (SF)	PERVIOUS AREA (SF)	WEIGHTED RUNOFF COEFFICIENT			
NORTH	38,500	0.88	30,000	8,500	0.77	10	2.1	1.42
EAST	46,228	1.06	39,728	6,500	0.82	10	2.1	1.82
SOUTH	347,860	7.99	179,000	168,860	0.61	15	1.7	8.26
<b>TOTAL:</b>	<b>432,588</b>	<b>9.93</b>	<b>248,728</b>	<b>183,860</b>				<b>11.51</b>

# Balance Report – Rational Method ( $Q = CiA$ )



	Area (sf)			Area (acres)	C Value	Flow Path (feet)			Slope (ft/ft)	Velocity (ft/sec)	Tc (min)	Intensity (in/hr)	Q10 (cfs)
	Pervious	Impervious	Total			Length	High	Low					
North Pre	20,100	8,400	28,500	0.654	0.48	540	323.2	318	0.0096	1.20	12.5	1.82	0.57



	Area (sf)			Area (acres)	C Value	Flow Path (feet)			Slope (ft/ft)	Velocity (ft/sec)	Tc (min)	Intensity (in/hr)	Q10 (cfs)
	Pervious	Impervious	Total			Length	High	Low					
Post Swale	10,700	8,500	19,200	0.441	0.57	520	322.9	318	0.0094	1.09	13.0	1.76	0.44
Post Bio	0	26,600	26,600	0.611	0.90	540	321.5	318.5	0.0056	2.80	8.2	2.34	1.28
Total Post	10,700	35,100	45,800	1.051	---	---	---	---	---	---	---	---	1.72

# New Analysis Results

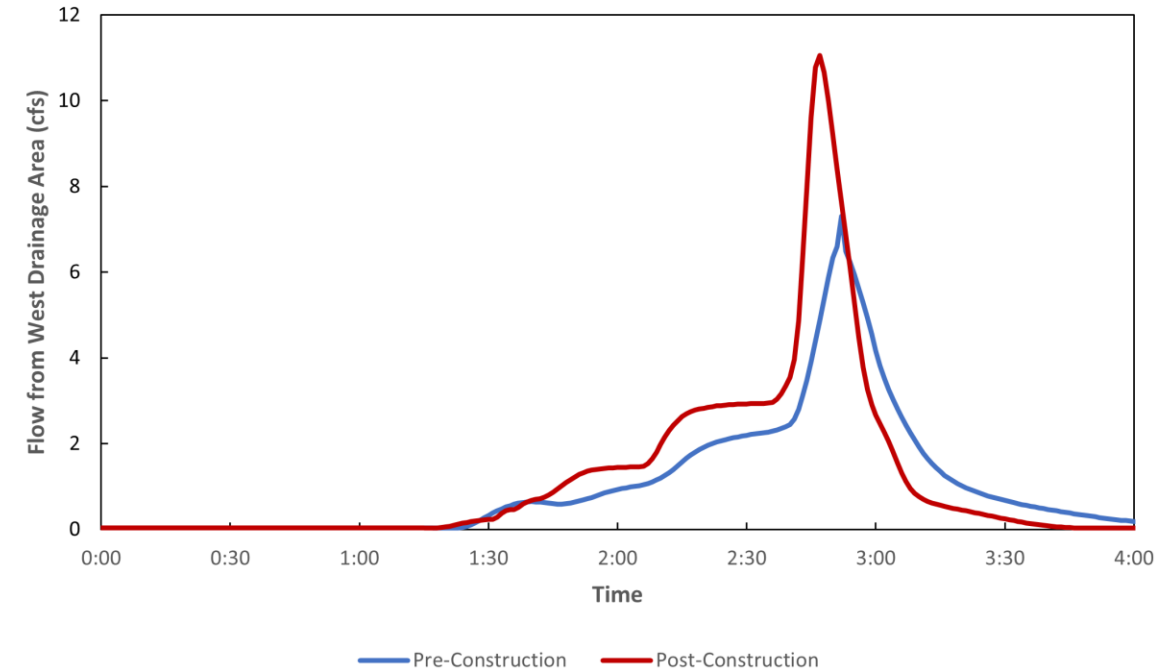
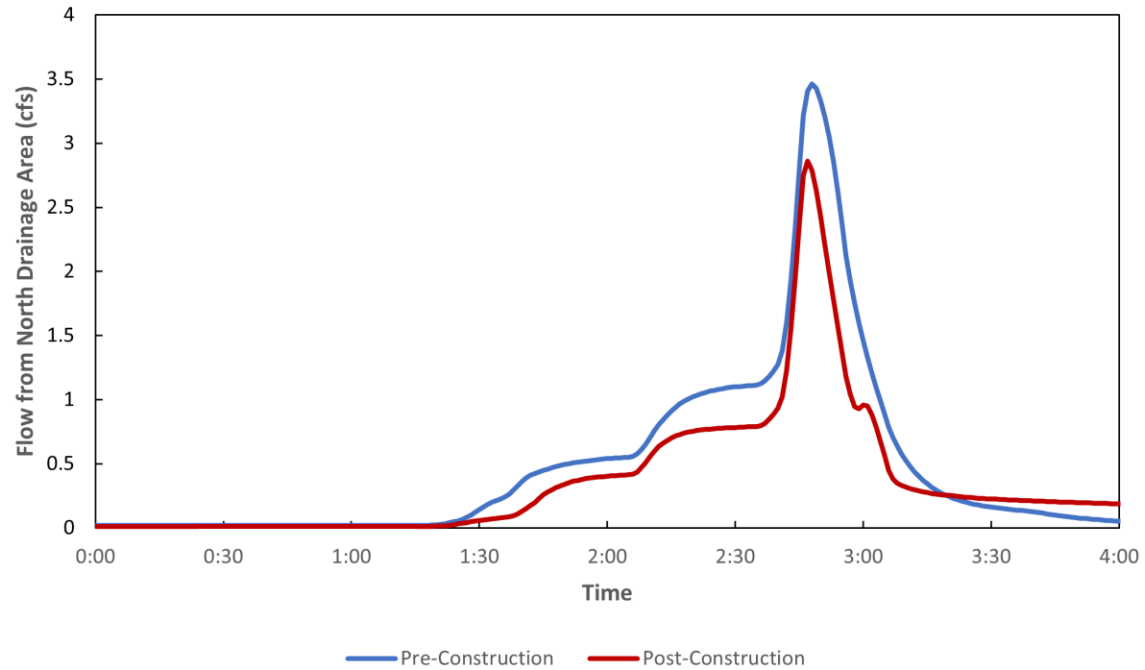
System	Pre-Construction (cfs)	Post-Construction (cfs)
Neighborhood	22.8	22.8
North*	3.5	2.9
East	1.9	2.6
South	3.6	7.3
West	7.3	11.0
West – at backstop (see Fig. 6)	2.6	5.7

\*North peak flows include runoff from portions of adjacent neighborhood that are assumed to flow onto the school.

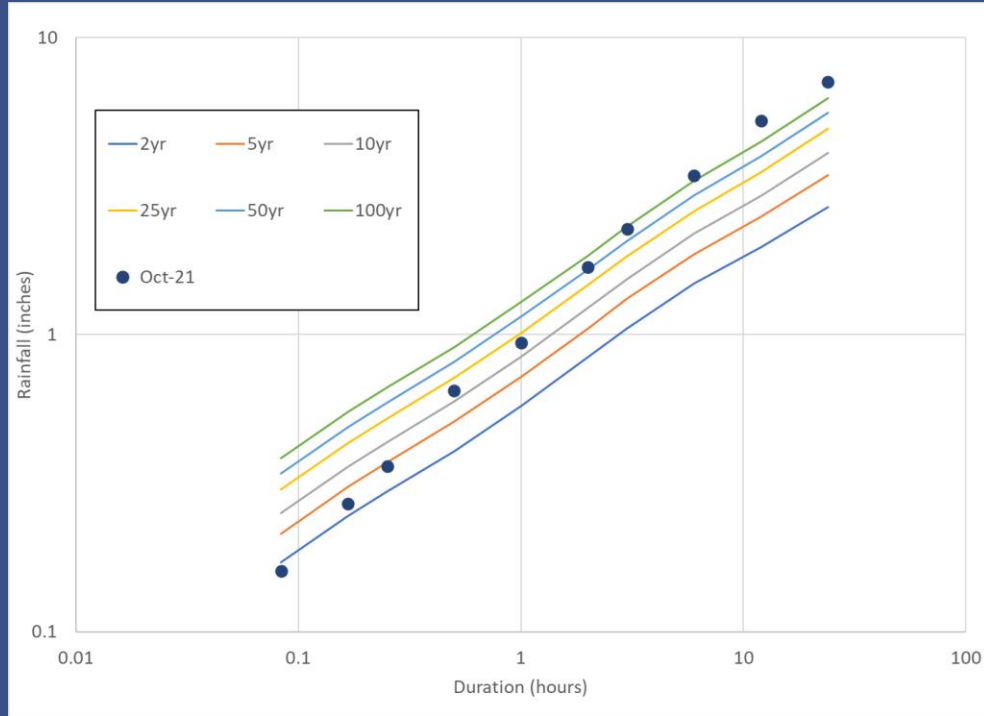
System	Pre-Construction (cubic feet)	Post-Construction (cubic feet)
Neighborhood	42,000	42,000
North*	8,600	7,000
East	5,700	4,700
South	14,000	12,000
West	24,000	20,000
West – at backstop	6,300	11,000

\* North flow volumes include runoff from portions of adjacent neighborhood that are assumed to flow onto the school.

# New Analysis Results

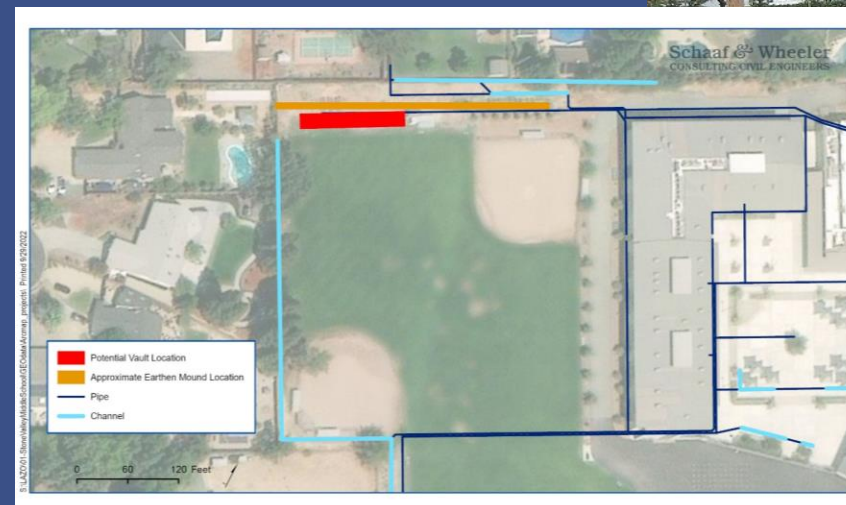


# October 24, 2021 Storm



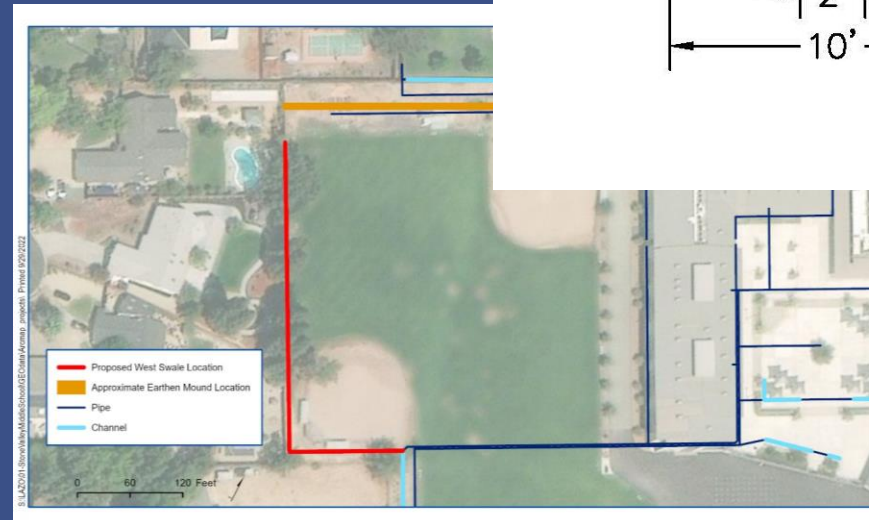
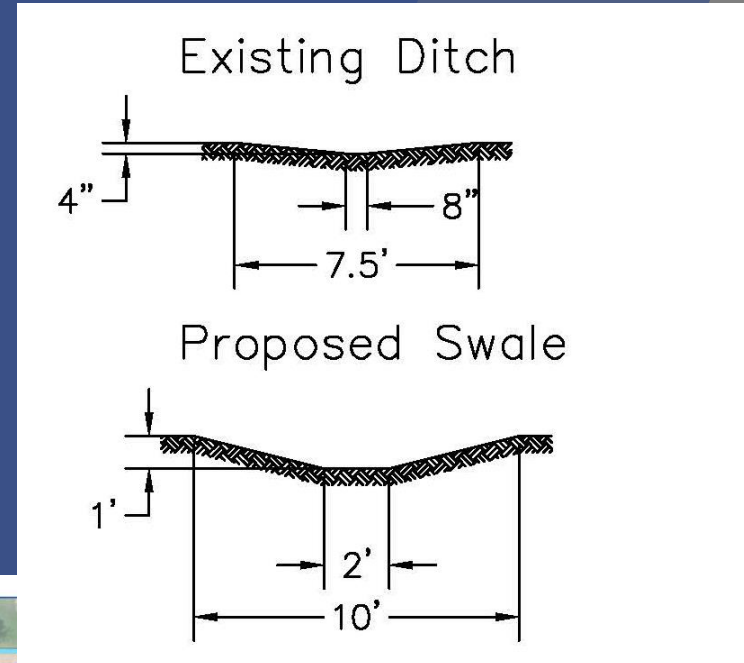
# Storage and Infiltration Alternative

- Increase Storage with Basin
- Infiltrate in Soils
- Flexible Land Use
- Reported High Water Table
- Reported Clay Soils



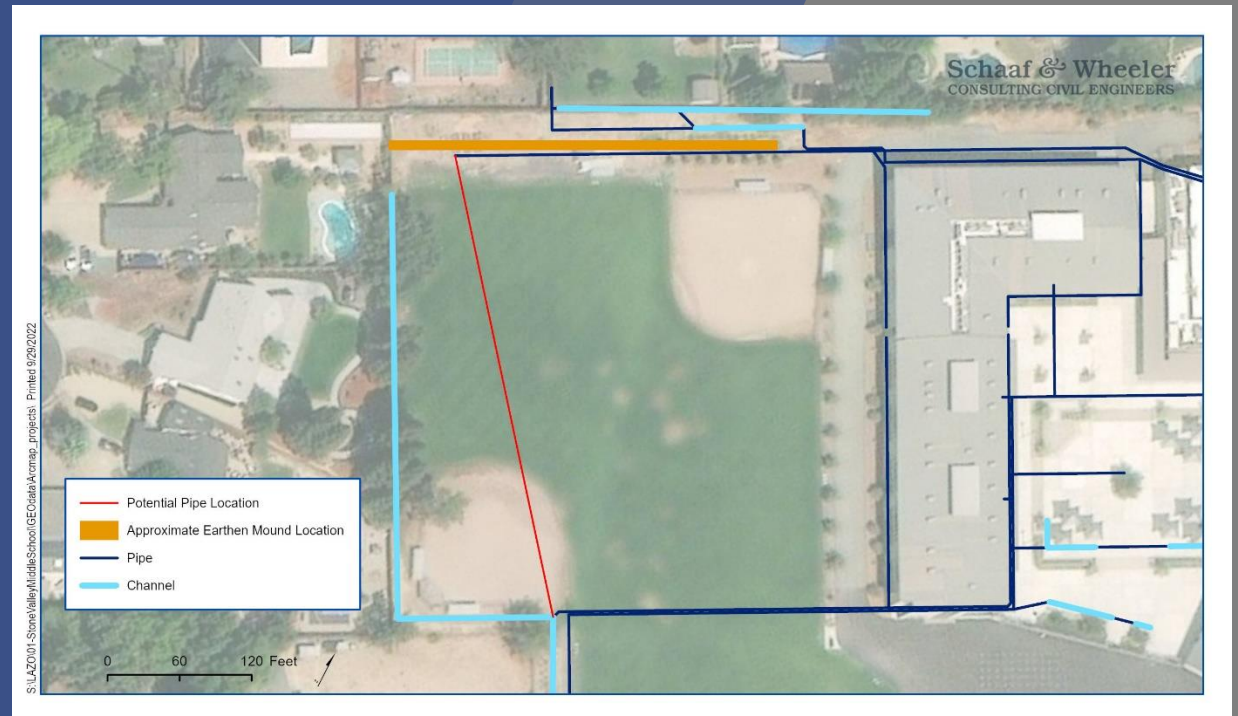
# Conveyance – West Ditch Improvement

- Keeps Historic Drainage Patterns
- Increases Conveyance
- Cost Effective
- Shallow Slope
- No Storage
- Raise East/West Berm



# Conveyance – Bypass Pipe

- Route pipe from bubbler directly to larger ditch
- Raise East/West Berm





# Estimated Project Costs

<b>ALTERNATIVE</b>	<b>DESCRIPTION</b>	<b>TOTAL</b>
1a	INFILTRATION VAULT	\$145,000
1b	ABOVE GROUND BASIN	\$42,000
2	WEST DITCH IMPROVEMENT	\$80,000
3	BYPASS PIPE	\$115,000
4	EARTHEN BERM	\$21,600

# Questions?