HANNA-BRUNETTI
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CIVIL ENGINEERS • LAND SURVEYORS
CONSTRUCTION MANAGERS

Storm Water Drainage Calculations

For

16492 Los Gatos Blvd.
Los Gatos, CA 95032
APN: 532-07-085 & -086

By:

Hanna-Brunetti
7651 Eigleberry St.
Gilroy, CA 95020
November 2025

HB JN: 22101

Introduction – Drainage Analysis

This report has been prepared for:

16492 Los Gatos Blvd.
Los Gatos, CA 95032

Existing Drainage Conditions

The existing site is approximately 27,426-SF in size and has a general slope in a north westerly direction. The property is currently developed by a liquor store and parking lot with some vegetation. The existing impervious surface is about 16,327-SF.
The existing peak flow pre-development is 0.58 cfs.

Proposed Drainage Conditions

This project proposes to construct 10 new townhomes, a driveway, parking lot, and associated improvements. The new total impervious surface area is about 18,746-SF. The new post construction impervious area will increase by 2,419-SF and the total proposed peak flow post-development is 0.67 cfs. The post-development water runoff will be treated by (22) SC-800 Storm chambers and 3 Bioretention ponds along the frontage. The water will be conveyed through a series of storm drain pipes into the Chambers, and sheet flow into the Bioretention ponds.

Los Gatos' drainage requirements include matching the post-development 10-year storm with the pre-development 10-year storm runoff rate. A total of 4 outlet structures for each treatment facility is proposed to mitigate the increase in flow and allow the runoff to be released at/close to the pre-development rate. Outlet structure #1 has a 3.5-in orifice outlet, Outlet structure #2 has a 1-in orifice, Outlet structure #3 has a 0.65-in orifice, and Outlet structure #4 has a 0.95-in orifice. See Stormwater Control Plan for more details.

Storm Drain Analysis

See attached calculations for methods and assumptions.

Santa Clara County
Department of Planning and Development

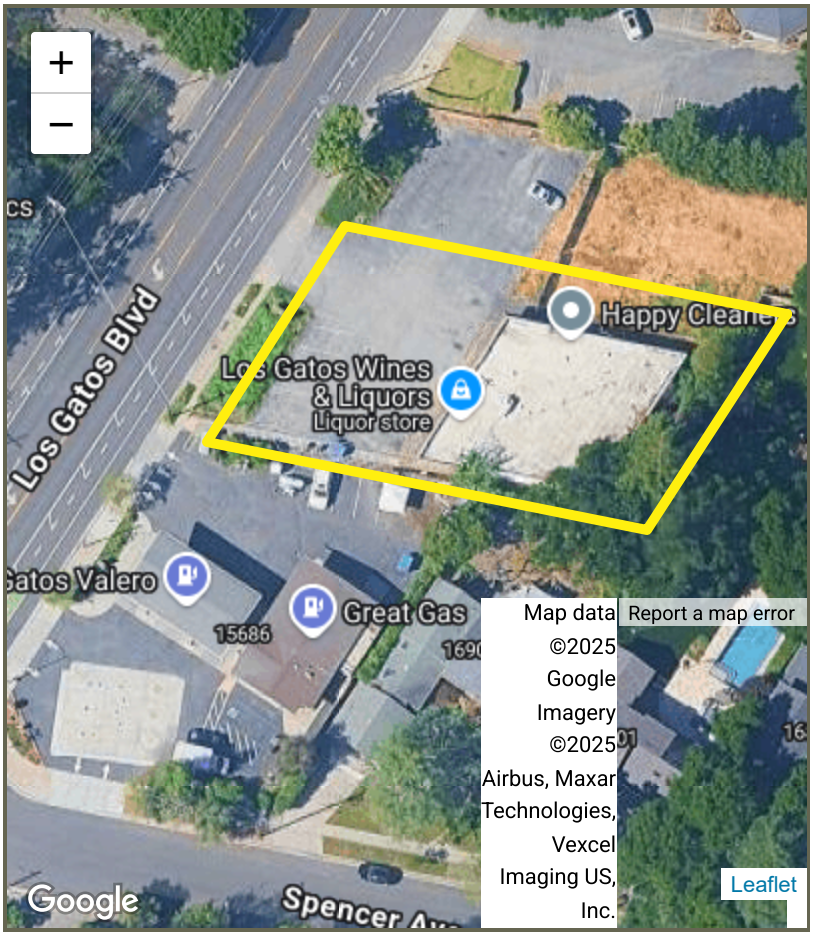
Online Property Profile

COUNTY OF SANTA CLARA PLANNING OFFICE
70 W. HEDDING ST., SAN JOSE, CA 95110
(408) 299-5770

June 23, 2025 12:05:38 PM. The GIS data used in this analysis was compiled from various sources. While deemed reliable, the Planning Office assumes no liability.

Property Location Information

APN: **532-07-085**
Site Address: **16492 LOS GATOS BL LOS GATOS CA 95032-5525**
Recorded Size (Assessor Database): **16,387 sq. ft. / 0.4 acres**
TRA: **03000**



Planning and Development Information

APN:53207085 is incorporated (LOS GATOS).

General Plan: **USA**
USA: **Los Gatos (100%)**
SOI: **Los Gatos**
Zoning: **INCORPORATED**
Supervisor District: **5**
Approved Building Site: **Research needed to evaluate parcel as a Building Site**

Special Area Policies and Information

- Los Gatos Hillside Specific Plan Area: **IN**
- Fire Responsibility Area: LRA (100%)
- Fire Protection District: Santa Clara County Central Fire Protection District
- Geohazard: County fault rupture hazard zone
- Historic Parcel: NO
- FEMA Flood Zone: X (100%)
- Sanitary District: West Valley Sanitation District
- Watershed: San Francisco Bay
- Rain isohyet: 27 inches
  Nearest named creek: ROSS CREEK (1074 feet)
  Nearest named lake: Vasona Reservoir (3709 feet)

Santa Clara County
Department of Planning and Development

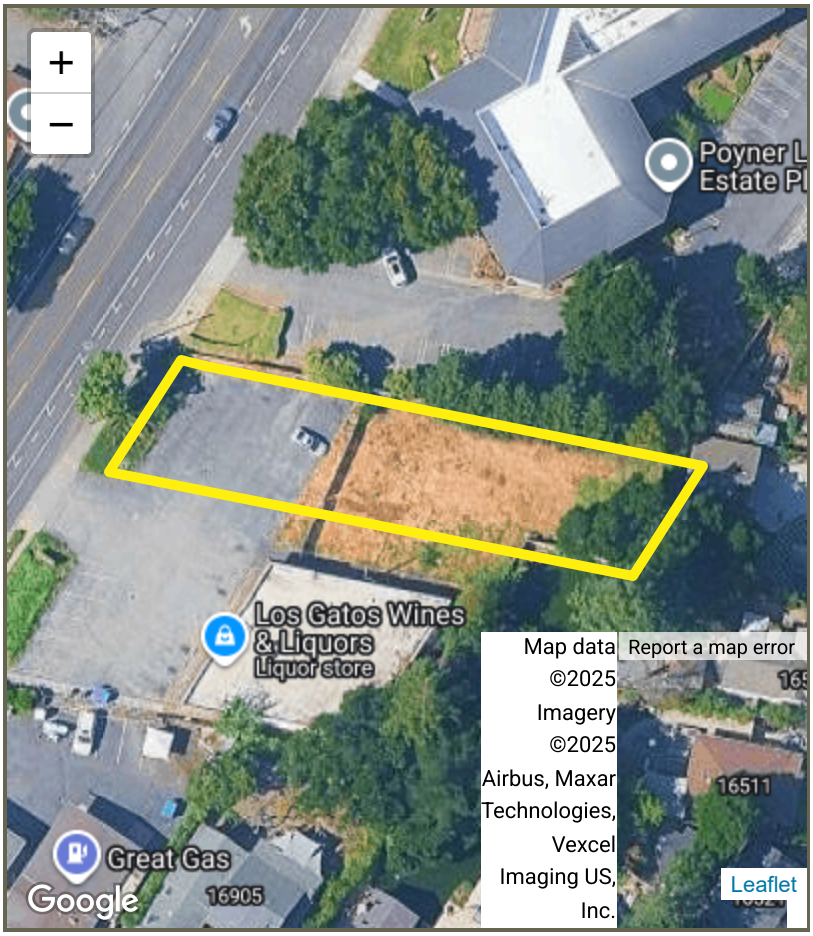
Online Property Profile

COUNTY OF SANTA CLARA PLANNING OFFICE
70 W. HEDDING ST., SAN JOSE, CA 95110
(408) 299-5770

November 20, 2025 09:04:37 AM. The GIS data used in this analysis was compiled from various sources. While deemed reliable, the Planning Office assumes no liability.

Property Location Information

APN: **532-07-086**
Site Address: **16492 LOS GATOS BL LOS GATOS CA 95032**
Recorded Size (Assessor Database): **9,902 sq. ft. / 0.2 acres**
TRA: **03000**



Planning and Development Information

APN:53207086 is incorporated (LOS GATOS).

General Plan: **USA**
USA: **Los Gatos (100%)**
SOI: **Los Gatos**
Zoning: **INCORPORATED**
Supervisor District: **5**
Approved Building Site: **Research needed to evaluate parcel as a Building Site**

Special Area Policies and Information

- Los Gatos Hillside Specific Plan Area: **IN**
- Fire Protection District: Santa Clara County Central Fire Protection District
- Geohazard: County fault rupture hazard zone
- Historic Parcel: NO
- FEMA Flood Zone: X (100%)
- Sanitary District: West Valley Sanitation District
- Watershed: San Francisco Bay
- Rain isohyet: 27 inches
  Nearest named creek: ROSS CREEK (1043 feet)
  Nearest named lake: Vasona Reservoir (3680 feet)

Santa Clara Valley
Urban Runoff
Pollution Prevention Program

Date Form Completed: _____

Completed by: _____

Provision C.3 Data Form

Which Projects Must Comply with Stormwater Requirements?

Effective July 1, 2023, the following projects must comply with Stormwater Requirements:

- **All development/redevelopment projects** (except single-family home projects) that create and/or replace **5,000 sq. ft.** or more of impervious surface on the project site must fill out this worksheet and submit it with the development project application.
- **All large single-family home projects** that create and/or replace **10,000 sq. ft.** or more of impervious surface on the project site must also fill out this worksheet.

These projects are called **Regulated Projects.** The Regulated Project area includes portions of the public right-of-way that are developed or redeveloped as part of the Regulated Project.

Excluded Projects - Interior remodeling projects, routine maintenance or repair projects such as re-roofing and re-surfacing, and smaller single-family homes that are not part of a larger plan of development are **NOT** required to complete this worksheet.

What is an Impervious Surface?

An impervious surface is a surface covering or pavement that prevents the land's natural ability to absorb and infiltrate rainfall/stormwater. Impervious surfaces include, but are not limited to rooftops, walkways, paved patios, driveways, parking lots, storage areas, impervious concrete and asphalt, gravel surfaces, and any other continuous watertight pavement or covering.

Pervious pavement, underlain with pervious soil and pervious storage material (e.g., drain rock), that infiltrates rainfall at a rate equal to or greater than surrounding unpaved areas OR that stores and infiltrates the water quality design volume specified in Provision C.3.d of the Municipal Regional Stormwater Permit (MRP), is not considered an impervious surface.

For More Information

The SCVURPPP C.3 Stormwater Handbook provides more information on selection of site design, source control, and treatment measures for a development project as well as guidance on preparing a stormwater control plan.

1. Project Information

Project Name: 16492 Los Gatos Blvd. **APN #** 532-07-085

Project Address: 16492 Los Gatos Blvd., Los Gatos 95032

Cross Streets: Spencer Ave.

Applicant/Developer Name: Nick Gera

Project Phase(s): _____ **of** _____ **Engineer:** Hanna-Brunetti

Project Type (Check all that apply): ☐ New Development ☐ Redevelopment

☐ Private ☐ Public ☐ Large Detached Single-Family Home

☑ Residential ☐ Commercial ☐ Industrial ☐ Mixed Use ☐ Institutional

☐ Other _____

Project Description: Construct 10 new town homes, a driveway, sidewalk and associated improvements.

Project Watershed/Receiving Water (creek, river or bay): Los Gatos Creek

2. Project Size

a. Total Site Area: 27,426 (ft²)		b. Total Land Area Disturbed During Construction: 27,426 (ft²) (including clearing, grading, stockpiling, or excavating)			
Project Totals	**Total Existing (Pre-project) Area (ft²)**	**Existing Area Retained[1] (ft²)**	**Existing Area Replaced[2] (ft²)**	**New Area Created[2] (ft²)**	**Total Post-Project Area (ft²)**
Impervious Area (IA)					
c. Total on-site IA	16,327	0	16,327	2,419	18,746
d. Total off-site IA[3]	0			0	0
e. Total project IA	16,327	0	16,327	2,419	18,746
f. Total new and replaced IA			18,746		
Pervious Area (PA)[4]					
g. Total on-site PA	11,099				8,680
h. Total off-site PA[3]	0				0
i. Total project PA	11,099				8,680
j. **Total Project Area (2.e.+2.i.)**	27,426				27,426
k. Percent Replacement of IA in Redevelopment Projects: (Total Existing IA Replaced ÷ Total Existing IA) x 100% 100 %					

[1]"Retained" means to leave existing IA in place. An IA that receives surface treatment (e.g., pavement resurfacing/slurry seal/grind) only is considered "retained". This category does not apply to off-site areas.

[2] The "new" and "replaced" IA are based on the total project area and not specific locations within the project. Constructed IA on a project that does not exceed the total pre-project IA will be considered "replaced" IA. A project will have "new" IA only if the total post-project IA exceeds the total pre-project IA (total post-project IA – total pre-project IA = New IA).

[3] Off-site areas include sidewalks and other parts of the public right-of-way (e.g., roads, bike lanes, curbs, ramps, park strip) that are being reconstructed as part of the project footprint. Do not include frontage areas that are not being reconstructed as part of the project. Note that gravel is considered an impervious surface.

[4] Include bioretention areas, infiltration areas, green roofs, and pervious pavement in PA calculations.

3. State Construction General Permit Applicability:

a. Is #2.b. equal to 43,560 ft² (1 acre) or more?

☐ Yes, applicant must obtain coverage under the State Construction General Permit (see https://www.waterboards.ca.gov/water_issues/programs/stormwater/construction.html)

☑ No, applicant does not need coverage under the State Construction General Permit.

4. MRP Provision C.3 Applicability:

a. Is #2.f. equal to **5,000** ft² or more, or **10,000** ft² for single family homes?

☑ Yes, C.3. source control, site design and treatment requirements apply

☐ No, C.3. source control and site design requirements may apply – check with local agency

b. For redevelopment projects, is #2.k. equal to 50% or more?

☑ Yes, C.3. requirements (site design and source control, as appropriate, and stormwater treatment) apply to the entire on-site area

☐ No, C.3. requirements only apply to the impervious area created and/or replaced

5. Hydromodification Management (HM) Applicability:

a. Does the project create and/or replace one acre or more of impervious surface AND is the total post-project impervious area greater than the pre-project (existing) impervious area?

☐ Yes (continue) ☑ No – exempt from HM, go to page 3

b. Is the project located in an area of HM applicability (green area) on the HM Applicability Map?www.scvurppp.org/hmp-map

☐ Yes the project must implement HM requirements

☐ No, the project is exempt from HM requirements

6. Selection of Specific Stormwater Control Measures:

Site Design Measures

- ☑ Minimize land disturbed (e.g., protect trees and soil)
- ☐ Minimize impervious surfaces (e.g., reduction in post-project impervious surface)
- ☐ Minimum-impact street or parking lot design (e.g., parking on top of or under buildings)
- ☐ Cluster structures/ pavement
- ☐ Disconnected downspouts (direct runoff from roofs, sidewalks, patios to landscaped areas)
- ☐ Pervious pavement[5]
- ☐ Green roof
- ☐ Other self-treating[5] area (e.g., landscaped areas)
- ☐ Self-retaining[5] area
- ☐ Rainwater harvesting and use (e.g., rain barrel, cistern for designated use) [6]
- ☐ Preserved open space
- ☐ Protected riparian and wetland areas/buffers
- ☐ Other _____

Source Control Measures

- ☐ Wash area/racks, drain to sanitary sewer[7]
- ☐ Covered dumpster area, drain to sanitary sewer[7]
- ☐ Sanitary sewer connection or accessible cleanout for swimming pool/spa/fountain[7]
- ☐ Beneficial landscaping (minimize irrigation, runoff, pesticides and fertilizers; promotes treatment)
- ☐ Outdoor material storage protection
- ☐ Covers, drains for loading docks, maintenance bays, fueling areas
- ☐ Maintenance (pavement sweeping, catch basin cleaning, good housekeeping)
- ☑ Storm drain labeling
- ☐ Other _____

Treatment Measures

- ☐ None (all impervious surface drains to self-retaining areas)
- ☐ Alternative compliance (treatment offsite or in-lieu)

LID Treatment (onsite & offsite)

- ☑ Bioretention area
- ☐ Flow-through planter
- ☐ Tree Well Filter or Trench with bioretention soils
- ☐ Rainwater harvest/use (e.g., cistern for designated use, sized for C.3.d treatment)
- ☐ Pervious pavement, sized for C.3.d treatment
- ☐ Infiltration trench
- ☐ Infiltration well/dry well
- ☑ Subsurface Infiltration System (e.g. vault or large diameter conduit over drain rock)
- ☐ Other _____

Non-LID Treatment Methods

- ☐ Proprietary high flow rate tree box filter[8]
- ☐ Proprietary high flow media filter (sand, compost, or proprietary media)[8]
- ☐ Vegetated filter strip[9]
- ☐ Extended detention basin[9]
- ☐ Vegetated swale[9]
- ☐ Other _____

Flow Duration Controls for Hydromodification Management (HM)

- ☐ Extended Detention basin
- ☐ Underground tank or vault
- ☐ Bioretention with outlet control
- ☐ Other _____

[5] See SCVURPPP C.3 Stormwater Handbook for definitions. Pervious pavement areas should be sized per C.3.d treatment requirements.
[6] Optional site design measure; does not have to be sized to comply with Provision C.3.d treatment requirements.
[7] Subject to sanitary sewer authority requirements.
[8] These treatment measures are only allowed if the project qualifies as a "Special Project".
[9] These treatment measures are only allowed as part of a multi-step treatment process (i.e., for pretreatment).

7. Stormwater Treatment Measure (STM) Sizing for Projects with Treatment Requirements

Stormwater Treatment Measure (STM)	Hydraulic Sizing Criteria Used*
Subsurface infiltration system	1b
Bioretention unlined w/o underdrain	3
Choose from list	Choose from list
Choose from list	Choose from list

*Key: 1a: Volume – WEF Method
1b: Volume – CASQA BMP Handbook Method
2a: Flow – Factored Flood Flow Method
2b: Flow – CASQA BMP Handbook Method
2c: Flow – Uniform Intensity Method
3: Combination Flow and Volume Design Basis

8. Does the project install 3,000 sf or more of pervious pavement (not including private-use patios at residences)?

☐ Yes
☑ No

9. Additional Stormwater Treatment of Non-Regulated Areas - Is the project providing stormwater treatment for non-regulated impervious area that is not included in **Item 2 Project Size**? For example, stormwater treatment of right-of-way areas that are outside the project footprint, or treatment measures that are treating more right-of-way impervious area quantities than required.

☐ Yes, complete the table below
☑ No

Additional Stormwater Treatment of Non-Regulated Areas

Non-Regulated Area Draining to Treatment Measure			Treatment Measures	Hydraulic Sizing Criteria
Impervious Area Treated (ft^2)	Pervious Area Treated (ft^2)	Total Area Treated (ft^2)		
			Choose from list	Choose from list
			Choose from list	Choose from list
			Choose from list	Choose from list
			Choose from list	Choose from list
			Choose from list	Choose from list
			Choose from list	Choose from list
			Choose from list	Choose from list
			Choose from list	Choose from list
			Choose from list	Choose from list

10. Alternative Certification: Was the treatment system sizing and design reviewed by a qualified third-party professional that is not a member of the project team or agency staff?

☐ Yes ☑ No Name of Third-party Reviewer_____

11. Alternative Compliance: Is the Regulated Project using alternative compliance (AC) for stormwater treatment, i.e., is stormwater treatment provided at an off-site location?

☐ Yes. Complete the table below. ☑ No

Offsite Project Name and Address	
Offsite Project Description	
Offsite Project Reference # (if applicable)	
Offsite Project Watershed	
Offsite Project Construction Status	
Offsite Project Owner	
Total Regulated Project Impervious Area Requiring AC *(ft^2)*	
Impervious Area Treated at Offsite Project for AC *(ft^2)*	
Treatment Measure Used at Offsite Project to Provide AC	Choose from list
Hydraulic Sizing Criteria for Treatment Measure at Offsite Project	Choose from list
O&M Responsibility Mechanism for Offsite Project	

12. Operation & Maintenance Information

A. Property Owner's Name: Nick Gera

B. Responsible Party for Stormwater Treatment/Hydromodification Control O&M:

a. Name: Nick Gera

b. Address: 19341 Monte Vista Dr.

c. Phone/E-mail: 408-391-9081 / ngera@comcast.net

This section to be completed by Municipal staff.

O&M Responsibility Mechanism

Indicate how responsibility for O&M is assured. Check all that apply:

☐ O&M Agreement

☐ Other mechanism that assigns responsibility (describe below):

_____

This section to be completed by Municipal staff (Note: This is an optional section that agencies should modify per their internal review and tracking process.)

Reviewed:

Community Development Department

☐ **Planning Division**

☐ **Building Division**

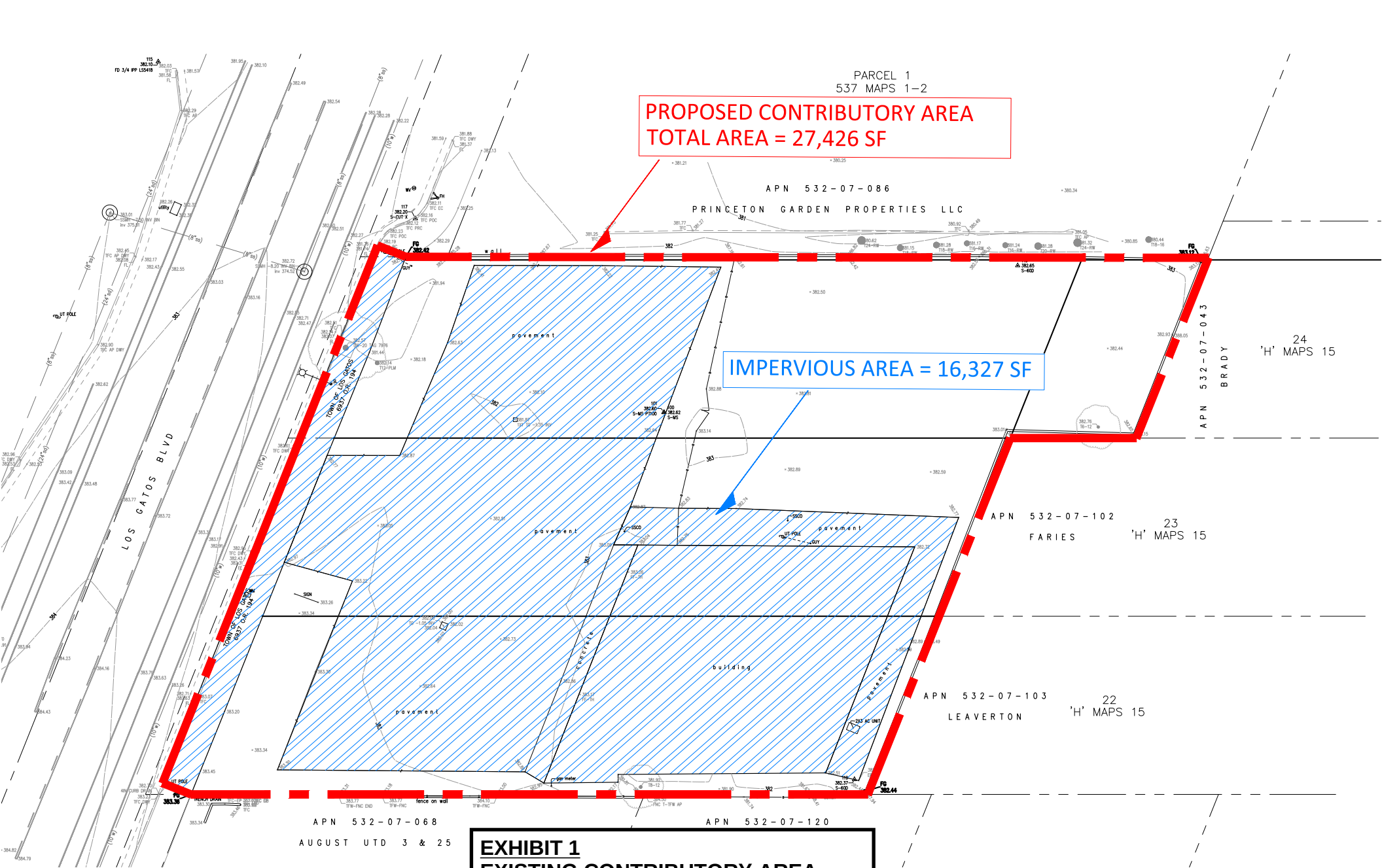
Public Works Department

☐ **Engineering**

☐ **Other (Specify)**

Return form to: _____

Data entry performed by: _____


PARCEL 1
537 MAPS 1–2
PROPOSED CONTRIBUTORY AREA
TOTAL AREA = 27,426 SF
APN 532-07-086
PRINCETON GARDEN PROPERTIES LLC
IMPERVIOUS AREA = 16,327 SF
APN 532-07-043
BRADY
24
'H' MAPS 15
APN 532-07-102
FARIES
23
'H' MAPS 15
APN 532-07-103
LEAVERTON
22
'H' MAPS 15
APN 532-07-068
AUGUST UTD 3 & 25
APN 532-07-120
LOS GATOS BLVD
pavement
building
concrete
fence on wall
TOWN OF LOS GATOS
EXHIBIT 1
EXISTING CONTRIBUTORY AREA

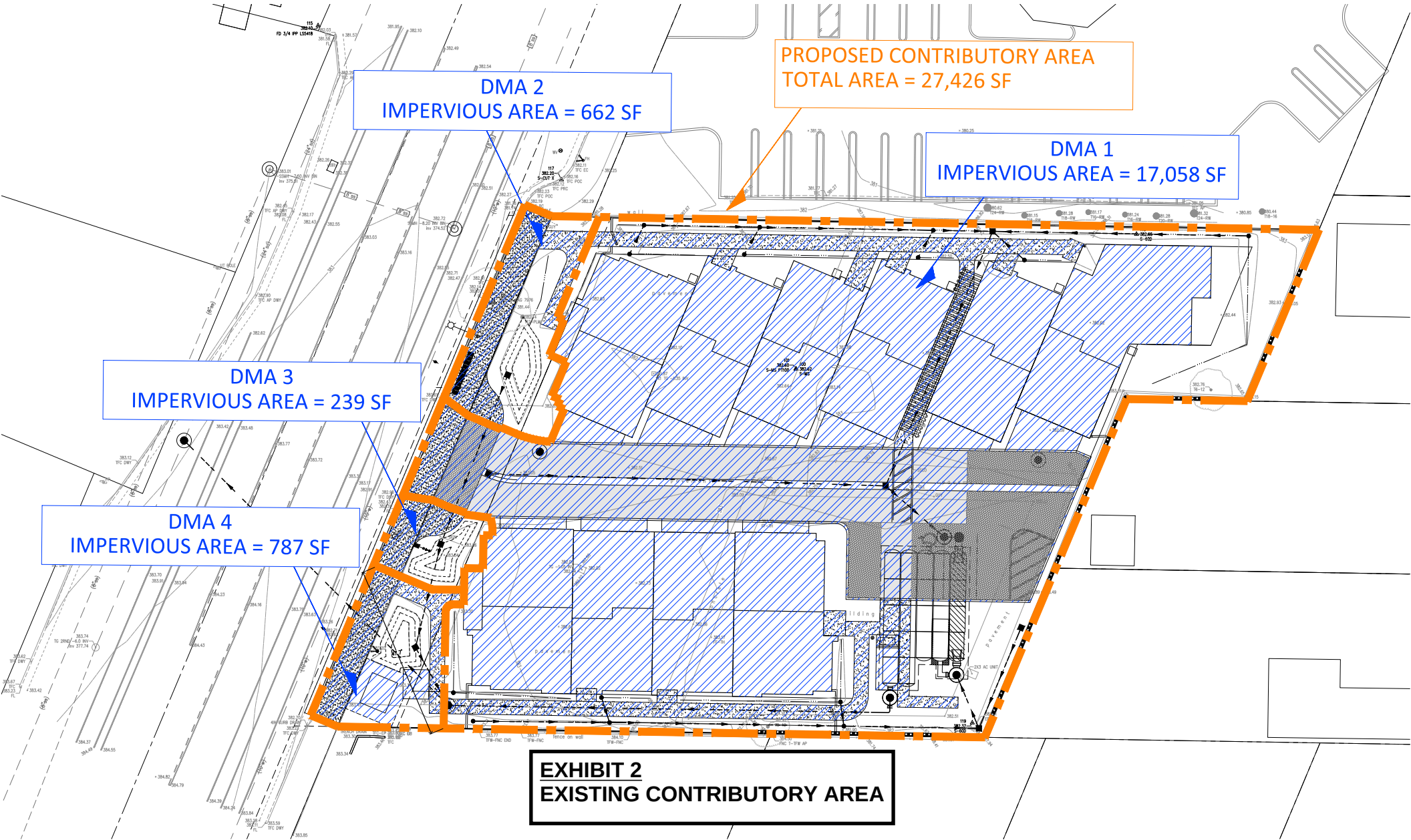


EXHIBIT 2
EXISTING CONTRIBUTORY AREA

Project: 16492 Los Gatos Blvd
JN: 22101

Date: 11/18/2025

DMA 1

1) Drainage Analysis - 2-year storm

Total Area	=	0.56	AC
Existing Impervious Area	=	0.35	AC
Replaced Impervious Area	=	0.35	AC
New Impervious Area	=	0.04	AC
Length of Travel (L)	=	275	LF
Difference in Elevation (H)	=	0.52	FT
Effective Slope Line	=	0.0019	FT/FT

$Tc = 0.0078*(L^2/S)^{0.385} + 10$ = 16.6 min

MAP = 27.0 "

2) Rainfall Intensity

Note: 2-yr storm from Drainage Manual Table B-1.

T (min)	A	B
15	0.2948	0.0047
16.6	0.3025	0.0050
30	0.3679	0.0079

Depth = A+B(MAP)

x = 0.4388 in at 16.6 min

Intensity: I = x/D = 1.5870 in/hr

3) Rate of Runoff

Note: C-Values from Drainage Manual Table 3-1.

	Pre-Development			Post-Development		Note:
	acres	c-value		acres	c-value	Hardscape Post Dev:
Hardscape	0.35	0.9		0.39	0.9	New + Reaplaced
Grass	0.20	0.10		0.16	0.10	Impervious Area
Weighted C-Value		**0.61**			**0.66**	
	$Q_2 = C\ I\ A$					
	Q_{2pre} = 0.53 cfs			Q_{2post} = 0.59 cfs		

4) Restrictor Size for Q_{2pre} Outflow

Outlet 1 $D = 2*(Q_{2pre}/(Pi*Cd*(2gH)^{0.5}))^{0.5}$

Q_{2pre}	=	0.53	cfs
Cd	=	0.65	
h1	=	378.35	Base Stone Elev.
h2	=	380.60	top of water surface
		27.0	in.
H (head)	=	2.25	ft. (H2-H1)
Max Diameter	=	3.54	in.
	use	3.50	in.

$Q_{out} = Cd * A * (2gh)^{.5}$

Q_{out} = 0.52 cfs

Project: 16492 Los Gatos Blvd
JN: 22101

Date: 11/18/2025

10-year Storm: Volume Calculations

Area =	0.56	acre
Orifice Outflow =	0.52	cfs
MAP =	27	inch

Infiltration

Area =	890	sf
Infiltration Rate =	37.83	in/hr
Factor of Safety =	2	
0 ltration Rate =	A * I * 1/12 (ft/in) * 1/ 60 (min/hr) /FS	
Basin Infiltration Rate =	23.38	ft^3/min

T	MAP =27"		10 yr Depth	Volume In	Volume Out	Volume Infiltrated	Storage
	A	B	(in)	(ft^3)	(ft^3)	(ft^3)	(ft^3)
5 min	0.201876	0.002063	0.257577	422.9929	156.76	116.91	149.32
10 min	0.258682	0.003569	0.355045	583.0549	313.53	233.81	35.72
15 min	0.294808	0.00471	0.421978	692.9723	470.29	350.72	-128.03
30 min	0.367861	0.007879	0.580594	953.4515	940.58	701.43	-688.56
1 hr	0.427723	0.014802	0.827377	1358.719	1881.16	1402.86	-1925.30
2 hr	0.522608	0.027457	1.263947	2075.654	3762.32	2805.73	-4492.39
3 hr	0.59166	0.038944	1.643148	2698.378	5643.47	4208.59	-7153.68
6 hr	0.625054	0.070715	2.534359	4161.924	11286.95	8417.18	-15542.20
12 hr	0.641638	0.11166	3.656458	6004.635	22573.90	16834.35	-33403.61
						Max Storage	**149**

Project: 16492 Los Gatos Blvd Date: 11/18/2025
JN: 22101

Modified Rational Method - Detention Calculation

Existing Tc in Contributory Area

Length	275	ft	see Drainage Site Plan
High Elev	383.64	ft	
Low Elev	383.12		
Slope	0.0019		

Tc per Santa Clara Co 3.4.1 Natural Watershed

t_c = 16.6 min

MAP =	27	inches
C_{pre} =	0.53	
C_{post} =	0.59	
Area =	0.56	acres
Storage Volume Req. =	**149**	**CF**

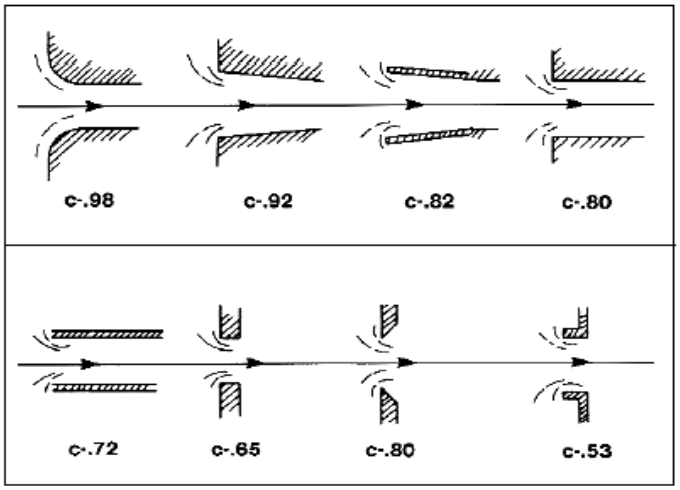
Orifice Calculation

Sized for 10-year storm

$D = 2*(Q_{pre10}/(Pi*Co*(2gH)^{0.5}))^{0.5}$

Q_{pre10}	=	0.535	cfs
Co	=	0.65	
H (head)	=	2.25	ft. (to provide req'd storage)
Max Diameter	=	3.54	in.

Use: **3.5** **inch hole in outlet weir**



Project: 16492 Los Gatos Blvd
JN: 22101

Date: 11/20/2025

DMA 2

1) Drainage Analysis - 2-year storm

Total Area	=	0.03	AC
Existing Impervious Area	=	0.01	AC
Replaced Impervious Area	=	0.01	AC
New Impervious Area	=	0.00	AC
Length of Travel (L)	=	65	LF
Difference in Elevation (H)	=	0.67	FT
Effective Slope Line	=	0.0103	FT/FT
$Tc = 0.0078*(L^2/S)^{0.385} + 10$	=	11.1	min
MAP	=	27.0	"

2) Rainfall Intensity

Note: 2-yr storm from Drainage Manual Table B-1.

T (min)	A	B
10	0.2587	0.0036
11.1	0.2668	0.0038
15	0.2948	0.0047

Depth = A+B(MAP)

x = 0.3702 in at 11.1 min

Intensity: I = x/D = 1.9956 in/hr

3) Rate of Runoff

Note: C-Values from Drainage Manual Table 3-1.

	Pre-Development		Post-Development	
	acres	c-value	acres	c-value
Hardscape	0.01	0.9	0.02	0.9
Grass	0.02	0.10	0.02	0.10
Weighted C-Value		**0.37**		**0.47**
$Q_2 = C\ I\ A$				
Q_{2pre} =	0.02 cfs		Q_{2post} =	0.03 cfs

Note:
Hardscape Post Dev:
New + Replaced
Impervious Area

4) Restrictor Size for Q_{2pre} Outflow

Outlet 1 $D = 2*(Q_{2pre}/(Pi*Cd*(2gH)^{0.5}))^{0.5}$

Q_{2pre}	=	0.02	cfs	
Cd	=	0.65		
h1	=	381.00		Bottom pond elev.
h2	=	381.54		top of water surface
		6.5	in.	Depth of ponding
H (head)	=	0.54	ft. (H2-H1)	
Max Diameter	=	1.07	in.	
	use	1.00	in.	

$Q_{out} = Cd * A * (2gh)^{.5}$

Q_{out} = 0.02 cfs

Project: 16492 Los Gatos Blvd
JN: 22101

Date: 11/20/2025

10-year Storm: Volume Calculations

Area =	0.03	acre
Orifice Outflow =	0.02	cfs
MAP =	27	inch

Infiltration

Area =	40	sf
Infiltration Rate =	37.83	in/hr
Factor of Safety =	1	
0 ltration Rate =	A * I * 1/12 (ft/in) * 1/ 60 (min/hr) /FS	
Basin Infiltration Rate =	2.10	ft^3/min

T	MAP =27"		10 yr Depth	Volume In	Volume Out	Volume Infiltrated	Storage
	A	B	(in)	(ft^3)	(ft^3)	(ft^3)	(ft^3)
5 min	0.201876	0.002063	0.257577	19.04138	6.28	10.51	2.25
10 min	0.258682	0.003569	0.355045	26.2467	12.56	21.02	-7.33
15 min	0.294808	0.00471	0.421978	31.19472	18.84	31.53	-19.17
30 min	0.367861	0.007879	0.580594	42.92041	37.67	63.05	-57.80
1 hr	0.427723	0.014802	0.827377	61.16384	75.35	126.10	-140.28
2 hr	0.522608	0.027457	1.263947	93.43728	150.69	252.20	-309.46
3 hr	0.59166	0.038944	1.643148	121.4697	226.04	378.30	-482.87
6 hr	0.625054	0.070715	2.534359	187.3525	452.08	756.60	-1021.33
12 hr	0.641638	0.11166	3.656458	270.3037	904.16	1513.20	-2147.06
						Max Storage	**2**

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Modified Rational Method - Detention Calculation

Existing Tc in Contributory Area

Length	65	ft	see Drainage Site Plan
High Elev	382.88	ft	
Low Elev	382.21		
Slope	0.0103		

Tc per Santa Clara Co 3.4.1 Natural Watershed

t_c = 11.1 min

MAP =	27	inches
C_{pre} =	0.02	
C_{post} =	0.03	
Area =	0.03	acres
Storage Volume Req. =	**2**	**CF**

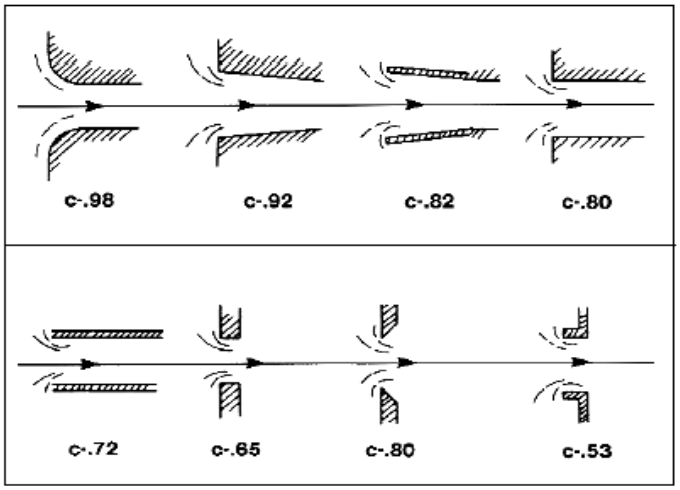
Orifice Calculation

Sized for 10-year storm

$D = 2*(Q_{pre10}/(Pi*Co*(2gH)^{0.5}))^{0.5}$

Q_{pre10}	=	0.024	cfs
Co	=	0.65	
H (head)	=	0.54	ft. (to provide req'd storage)
Max Diameter	=	1.07	in.

Use: **1.0** **inch hole in outlet weir**



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DMA 3

1) Drainage Analysis - 2-year storm

Total Area	=	0.013	AC
Existing Impervious Area	=	0.004	AC
Replaced Impervious Area	=	0.004	AC
New Impervious Area	=	0.001	AC
Length of Travel (L)	=	31	LF
Difference in Elevation (H)	=	0.43	FT
Effective Slope Line	=	0.0139	FT/FT

$Tc = 0.0078*(L^2/S)^{0.385} + 10$ = 10.6 min

MAP = 27.0 "

2) Rainfall Intensity

Note: 2-yr storm from Drainage Manual Table B-1.

T (min)	A	B
10	0.2587	0.0036
10.6	0.2628	0.0037
15	0.2948	0.0047

Depth = A+B(MAP)

x = 0.3627 in at 10.6 min

Intensity: I = x/D = 2.0587 in/hr

3) Rate of Runoff

Note: C-Values from Drainage Manual Table 3-1.

	Pre-Development			Post-Development		Note:
	acres	c-value		acres	c-value	Hardscape Post Dev:
Hardscape	0.004	0.9		0.005	0.9	New + Replaced
Grass	0.01	0.10		0.007	0.10	Impervious Area
Weighted C-Value		**0.35**			**0.44**	
	$Q_2 = C\ I\ A$					
	Q_{2pre} = 0.01 cfs			Q_{2post} = 0.01 cfs		

4) Restrictor Size for Q_{2pre} Outflow

Outlet 1 $D = 2*(Q_{2pre}/(Pi*Cd*(2gH)^{0.5}))^{0.5}$

Q_{2pre}	=	0.01	cfs	
Cd	=	0.65		
h1	=	381.00		Bottom pond elev.
h2	=	381.58		top of water surface
		7.0	in.	Depth of ponding
H (head)	=	0.58	ft. (H2-H1)	
Max Diameter	=	0.65	in.	
	use	0.65	in.	$Q_{out} = Cd * A * (2gh)^{.5}$
				Q_{out} = 0.01 cfs

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10-year Storm: Volume Calculations

Area =	0.01	acre
Orifice Outflow =	0.01	cfs
MAP =	27	inch

Infiltration

Area =	15 sf
Infiltration Rate =	37.83 in/hr
Factor of Safety =	1
0 ltration Rate =	A * I * 1/12 (ft/in) * 1/ 60 (min/hr) /FS
Basin Infiltration Rate =	0.79 ft^3/min

T	MAP =27"		10 yr Depth	Volume In	Volume Out	Volume Infiltrated	Storage
	A	B	(in)	(ft^3)	(ft^3)	(ft^3)	(ft^3)
5 min	0.201876	0.002063	0.257577	7.098393	2.76	3.94	0.39
10 min	0.258682	0.003569	0.355045	9.784448	5.53	7.88	-3.63
15 min	0.294808	0.00471	0.421978	11.62901	8.29	11.82	-8.49
30 min	0.367861	0.007879	0.580594	16.0002	16.59	23.64	-24.23
1 hr	0.427723	0.014802	0.827377	22.80113	33.18	47.29	-57.66
2 hr	0.522608	0.027457	1.263947	34.83227	66.35	94.58	-126.10
3 hr	0.59166	0.038944	1.643148	45.28242	99.53	141.86	-196.11
6 hr	0.625054	0.070715	2.534359	69.84271	199.06	283.73	-412.94
12 hr	0.641638	0.11166	3.656458	100.7659	398.12	567.45	-864.81
						Max Storage	**0.4**

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Modified Rational Method - Detention Calculation

Existing Tc in Contributory Area

Length	31	ft	see Drainage Site Plan
High Elev	383.28	ft	
Low Elev	382.85		
Slope	0.0139		

Tc per Santa Clara Co 3.4.1 Natural Watershed

t_c = 10.6 min

MAP =	27	inches
C_{pre} =	0.01	
C_{post} =	0.01	
Area =	0.01	acres
Storage Volume Req. =	**0.4**	**CF**

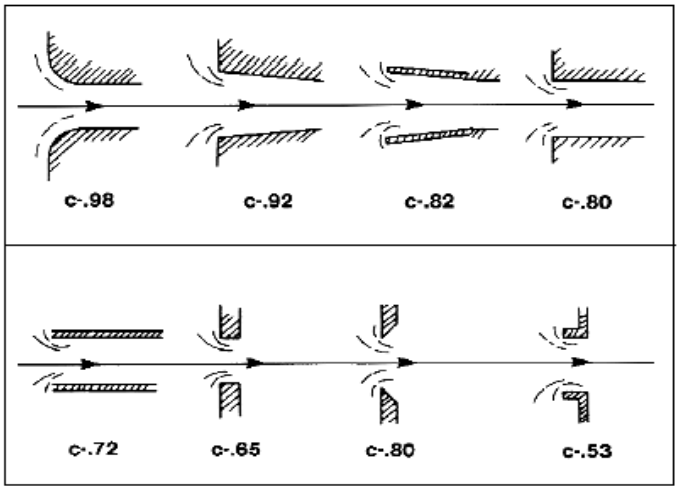
Orifice Calculation

Sized for 10-year storm

$D = 2*(Q_{pre10}/(Pi*Co*(2gH)^{0.5}))^{0.5}$

Q_{pre10}	=	0.009	cfs
Co	=	0.65	
H (head)	=	0.58	ft. (to provide req'd storage)
Max Diameter	=	0.65	in.

Use: **0.65** **inch hole in outlet weir**



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DMA 4

1) Drainage Analysis - 2-year storm

Total Area	=	0.027	AC
Existing Impervious Area	=	0.008	AC
Replaced Impervious Area	=	0.008	AC
New Impervious Area	=	0.010	AC
Length of Travel (L)	=	48	LF
Difference in Elevation (H)	=	0.81	FT
Effective Slope Line	=	0.0169	FT/FT

$Tc = 0.0078*(L^2/S)^{0.385} + 10$ = 10.7 min

MAP = 27.0 "

2) Rainfall Intensity

Note: 2-yr storm from Drainage Manual Table B-1.

T (min)	A	B
10	0.2587	0.0036
10.7	0.2640	0.0037
15	0.2948	0.0047

Depth = A+B(MAP)

x = 0.3649 in at 10.7 min

Intensity: I = x/D = 2.0388 in/hr

3) Rate of Runoff

Note: C-Values from Drainage Manual Table 3-1.

	Pre-Development			Post-Development		Note:
	acres	c-value		acres	c-value	Hardscape Post Dev:
Hardscape	0.008	0.9		0.018	0.9	New + Replaced
Grass	0.019	0.10		0.009	0.10	Impervious Area
Weighted C-Value		**0.34**			**0.63**	
	$Q_2 = C\ I\ A$					
	Q_{2pre} = 0.02 cfs			Q_{2post} = 0.04 cfs		

4) Restrictor Size for Q_{2pre} Outflow

Outlet 1 $D = 2*(Q_{2pre}/(Pi*Cd*(2gH)^{0.5}))^{0.5}$

Q_{2pre}	=	0.02	cfs	
Cd	=	0.65		
h1	=	381.00		Bottom pond elev.
h2	=	381.55		top of water surface
		6.6	in.	Depth of ponding
H (head)	=	0.55	ft. (H2-H1)	
Max Diameter	=	0.95	in.	
	use	0.95	in.	$Q_{out} = Cd * A * (2gh)^{.5}$
				Q_{out} = 0.02 cfs

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10-year Storm: Volume Calculations

Area =	0.03	acre
Orifice Outflow =	0.02	cfs
MAP =	27	inch

Infiltration

Area =	36	sf
Infiltration Rate =	37.83	in/hr
Factor of Safety =	1	
0 ltration Rate =	A * I * 1/12 (ft/in) * 1/ 60 (min/hr) /FS	
Basin Infiltration Rate =	1.89	ft^3/min

T	MAP =27"		10 yr Depth	Volume In	Volume Out	Volume Infiltrated	Storage
	A	B	(in)	(ft^3)	(ft^3)	(ft^3)	(ft^3)
5 min	0.201876	0.002063	0.257577	19.93753	5.70	9.46	4.78
10 min	0.258682	0.003569	0.355045	27.48196	11.40	18.92	-2.84
15 min	0.294808	0.00471	0.421978	32.66286	17.11	28.37	-12.82
30 min	0.367861	0.007879	0.580594	44.94039	34.21	56.75	-46.02
1 hr	0.427723	0.014802	0.827377	64.04243	68.43	113.49	-117.87
2 hr	0.522608	0.027457	1.263947	97.83476	136.85	226.98	-266.00
3 hr	0.59166	0.038944	1.643148	127.1865	205.28	340.47	-418.56
6 hr	0.625054	0.070715	2.534359	196.1699	410.55	680.94	-895.32
12 hr	0.641638	0.11166	3.656458	283.0251	821.11	1361.88	-1899.96
						Max Storage	**5**

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Modified Rational Method - Detention Calculation

Existing Tc in Contributory Area

Length	48	ft	see Drainage Site Plan
High Elev	383.64	ft	
Low Elev	382.83		
Slope	0.0169		

Tc per Santa Clara Co 3.4.1 Natural Watershed

t_c = 10.7 min

MAP =	27	inches
C_{pre} =	0.02	
C_{post} =	0.04	
Area =	0.03	acres
Storage Volume Req. =	**5**	**CF**

Orifice Calculation

Sized for 10-year storm

$D = 2*(Q_{pre10}/(Pi*Co*(2gH)^{0.5}))^{0.5}$

Q_{pre10}	=	0.019	cfs
Co	=	0.65	
H (head)	=	0.55	ft. (to provide req'd storage)
Max Diameter	=	0.95	in.

Use: **0.95** **inch hole in outlet weir**