2550 Ventura Avenue
Santa Rosa, CA 95403

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Assistant Director

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Nathan Quarles
Engineering and Construction

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Code Enforcement

Genevieve Bertone
Communications

Steve Mosiurchak
Fire Marshal

John Mack
Natural Resources

Brian Keefer
Ombudsperson

April 24, 2025

To: Interested Agencies

The following application has been filed with the Sonoma County Permit and Resource Management Department.

File Number:	**PLP25-0006**
Applicant Name:	**Kelso G. Barnett**
Owner Name:	**PetroMart Retail Group Inc**
Site Address:	**21837 Geyserville Ave., Geyserville**
APN:	**140-180-035**
Zoning:	**R3 B6 20 DU, RC50/25 SR**

Project Description: Major Subdivision and Design Review with Hearing for a housing project on 5.11 acres to create 93 residential condominiums throughout 17 buildings. The proposed project includes 204 parking spaces, 100+ bicycle parking spaces, and associated site improvements.

We are submitting the above application for your review and recommendation. Additional information is on file in this office.

Responses to referrals should include a combination of any or all of the following details:

(1) Statement of any environmental concerns or uncertainties your agency may have with the project.
(2) Comments you wish to make regarding the merits of the project.
(3) Identification of any missing information or application submittals that will preclude you from providing conditions and mitigations for this project in the future.
(4) Your proposed conditions of approval and/or mitigations for this project.

After reviewing this application, please respond to the planner with your *marked* response below:

[ ] Conditions will be provided and no further information is necessary.
[ ] Conditions will be provided and additional information is necessary.
[ ] Comments and/or concerns.
[ ] No comments or conditions.

Responsible agencies under CEQA are requested to indicate whether permits will be required for this project.

Your comments will be appreciated by May 8, 2025, and should be sent to the attention of:

PLP25-0006, Alisa Rossetti (Alisa Rossetti@sonoma-county.org). The Project Planner can also be reached at (707) 565-2605. **If no response is received by May 8, 2025, it will be assumed that no comments or conditions will be provided.**

Please send a copy of your comments to the applicant(s) or their representatives as indicated on the attached Planning Application.

[X] Sanitation
[X] Building Inspection
[X] Fire Prevention
[X] Grading and Storm Water
[X] Health Specialist
[X] Management Group
[X] Natural Resources
[X] Road Naming
[X] Survey and Land Development
[X] SUSMP
[X] Ag Commissioner
[X] Assessor
[X] Community Development Commission
[X] Dist. 4 Director and Commissioners
[X] Economic Development Board
[X] Environmental Health
[X] LAFCO
[X] Regional Parks Dept
[X] SPI (DTPW), Land Development
[X] SPI (DTPW), Drainage
[X] Trans Authority/RCPA
[X] Transit/BPAC
[X] NW Information Center, S.S.U.
[X] Local Fire District – Northern Sonoma County FPD
[X] School District – Geyserville Unified
[X] Water District - Geyserville
[X] Recology Sonoma Marin (Disposal)
[X] Caltrans-State Dept of Transportation
[X] State Dept of Fish and Wildlife
[X] State Dept of Water Resources Control Board, Drinking Water
[X] State Parks and Recreation - Duncans Mills Office
[X] Regional Water QCB: North Coast
[X] Air Pollution Control: Northern Sonoma County AQM
[X] U.S. Army Corps of Engineers
[X] U.S. Fish and Wildlife
[X] Sonoma MOAG
[X] PG&E
[X] Milo Baker Chapter Conservation Committee
[X] Tribal Notification
[X] Alexander Valley Association
[X] Geyserville Planning Advisory Board
[X] Sonoma Marin Area Trail Transit (SMART)

Planning Application

PJR-001

Application Type(s):

File # _____

- ☐ Admin Cert. Compliance
- ☐ Ag. or Timber Preserve/Contract
- ☐ Conditional Cert. of Compliance
- ☐ Cert. of Modification
- ☐ Coastal Permit
- ☐ Zoning Permit for: _____
- ☐ Design Review Admin.
- ☐ Design Review Full
- ☐ General Plan Amendment
- ☐ Lot Line Adjustment
- ☒ Major Subdivision
- ☐ Minor Subdivision
- ☐ Voluntary Merger
- ☐ Ordinance Interpretation
- ☐ Second Unit Permit
- ☐ Specific/Area Plan Amendment
- ☐ Use Permit
- ☐ Variance
- ☐ Zone Change
- ☐ Other: _____

By placing my contact information (name, address, phone number, email address, etc.) on this application form and submitting it to Sonoma County PRMD, I understand and authorize PRMD to post this application to the internet for public information purposes, including my contact information.

PRINT CLEARLY

APPLICANT			**OWNER (IF OTHER THAN APPLICANT)**		
Name Kelso G. Barnett / City Ventures			Name Petromart Retail Group, Inc. / Mohammad A. Ahmadi		
Mailing Address 1185 Mason Street			Mailing Address 3669 Mount Diablo Boulevard		
City San Francisco	State CA	Zip 94123	City Lafayette	State CA	Zip 94549
Day Ph (707).758.3805	Email kbarnett@cityventures.com		Day Ph (925).979.0560	Email gabriel@gawfco.com	
Signature Kelso G. Barnett	Date 4/10/25		Signature (Signed Preliminary Application)	Date	

Billing Responsible Party (At-Cost Only) ☒ **Applicant** ☐ **Owner** ☐ **Other:** _____

OTHER PERSONS TO RECEIVE CORRESPONDENCE

Name/Title			Name/Title		
Mailing Address			Mailing Address		
City	State	Zip	City	State	Zip
Day Ph ( )	Email		Day Ph ( )	Email	

PROJECT INFORMATION

Address(es) 21837 Geyserville Avenue | City Geyserville

Assessor's Parcel Number(s) 140-180-035-000

Project Description The 5.11-acre project site represents Housing Opportunity Site GEY-1 in Sonoma County's 2023-31 Housing Element. The parcel is currently vacant and proposed for 93 for-sale solar all-electric townhome-style condominiums.

Acreage 5.11 | Number of new lots proposed 94 (93 condominium units, 1 common)

Site Served by Public Water? ☒ Yes ☐ No | Site Served by Public Sewer? ☒ Yes ☐ No

TO BE COMPLETED BY PRMD STAFF

Planning Area	Supervisorial District	☐ Critical Habitat ☐ Urban Service	Groundwater Availability	☐ 1 / 2 ☐ 3 / 4
Current Zoning		☐ NPDES ☐ Williamson Act		
		Specific/Area Plan	Subject to CEQA	☐ EX ☐ YES
General Plan Land Use		Parcel Specific Policy		
Application resolve planning violation? ☐ Yes ☐ No		Violation? ☐ Yes ☐ No	File No.	
Previous Files		Penalty application? ☐ Yes ☐ No		
Application accepted by		Date		
Approved by		Date		

Major Subdivision - Supplemental Information

PJR-079

Are any of the lots to be combined with existing parcels? Yes ___ No X Which? (APN) _____

Does the owner **now own**, or has the owner **formerly owned** or **held interest in**, adjacent land? No Where? (APN) _____

Note: Any approval by the County shall be automatically **voided** if the question on existing or former ownerships of adjacent properties is falsely or inaccurately answered.

Water Source: California American Water Sewage Disposal: Geyserville Sanitation Zone

Existing Site Characteristics:

Existing use of property: Vacant Acreage: 5.11

Proximity to creeks, waterways and impoundment areas: None

Vegetation on site: Minimal, grassland

General topography: Minimal, flat topography

Surrounding uses to North: Canyon Road/Single Family Home South: Single Family Home

East: Vineyards, Geyserville Inn West: Highway 101

Grading Required: Cut Max: 3,300 CY Fill Max: 4,500 CY

Fill Area: 1,200 CY Net Fill Approx. total yds: _____

Will more than one (1) acre be disturbed by construction of access roads, site preparation and clearing, fill or excavation, building removal, building construction, equipment staging and maintenance or other activities? If yes, indicate area of disturbance in acres: 4.9

Identify method of site drainage (sheet flow, storm drain, outflow to creek or ditch, detention area, etc.)
Outflow to existing drainage system

Will proposal required annexation to a district in order to obtain public services?

Yes ____ No X

Are there currently any hazardous materials(chemicals, oils, gasoline) etc. stored, used, or processed on this site?

Yes ____ No X

Were there any hazardous materials used, stored, or processed on this site anytime in the past?

Yes ____ No X

Will the use, storage, or processing of hazardous materials occur on this site in the future if this project is authorized?

Yes ____ No X

PROJECT TEAM

ARCHITECT
WILLIAM HEZMALHALCH ARCHITECTS, INC.
200 COMMERCE, SUITE 200
IRVINE, CA 92602
PHONE: (949) 250-0607 x8719
FAX: (949) 250-1529
CONTACT: Kimberly Hankins
WEB/EMAIL: KimH@WHAinc.com

OWNER
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1185 MASON STREET
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PHONE: 707) 758-3805
FAX: -
CONTACT: KELSO G. BARNETT
WEB/EMAIL: kbarnett@cityventures.com

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PHONE: 707) 541-2300
FAX: -
CONTACT: CASEY TALBOT P.E.
WEB/EMAIL: ctalbot@adobeinc.com

LANDSCAPE
C2 Collaborative
100 AVENIDA MIRAMAR
SAN CLEMENTE, CA 92672
PHONE: 949) 542-7703
FAX: -
CONTACT: Christopher Fortunato
WEB/EMAIL: cfortunato@c2collaborative.com

COLORS
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IRVINE, CA 92602
PHONE: (949) 250-0607
FAX: (949) 250-1529
CONTACT: Donna Aldrich, CID, LEED AP ID+C
WEB/EMAIL: donna@whainc.com

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VESTING TENTATIVE MAP SUBMITTAL

COVER SHEET - INDEX

21837 GEYSERVILLE AVE

SONOMA COUNTY, CA

CITY VENTURES
Building It Forward

A0.0

0 15 30 60

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2024269 | 2025-04-02

ARCHITECTS . PLANNERS . DESIGNERS
WHA.
ORANGE COUNTY . LOS ANGELES . BAY AREA . SACRAMENTO

PROJECT SUMMARY

City Ventures is delighted to submit our proposal for a housing development located at 21837 Geyserville Avenue in Geyserville, an unincorporated area of Sonoma County. We look forward to the opportunity to collaborate with Sonoma County and are pleased to submit an application that responds to the housing goals envisioned in Sonoma County's recently certified Housing Element.

The 5.11-acre project site represents the housing opportunity site "GEY-1" in Sonoma County's 2023-31 Housing Element. The land use designation for the project site is Urban Residential. The zoning is the High Density Residential District with a maximum density of 20 dwelling units an acre. The land, which is currently undeveloped, is proposed for 93 for-sale solar all-electric townhome-style condominiums, which at 18.1 units/acre is within the allowable density.

This housing development is designed with first-time homebuyers and young families in mind. The project is designed to be consistent with Sonoma County's Housing Element and the associated Environmental Impact Report which allowed for its approval. This proposed housing development is a Housing Development Project within the meaning of Government Code section 65589.5(h)(2) and has been designed to comply with applicable objective General Plan and subdivision standards and criteria as described in Government Code section 65589.5(j).

Per Sonoma County's Inclusionary Housing ordinance, an in-lieu fee may be paid in place of constructing affordable units on-site. This project currently proposes to satisfy the inclusionary housing requirements through the payment of the in-lieu fee. City Ventures reserves the right to alternatively satisfy the inclusionary housing requirement through providing at least 10 percent deed-restricted homes for households with low incomes, and 10 percent deed-restricted homes for households with moderate incomes, for a total of 20 percent deed-restricted homes, to become eligible for State Density Bonus Law (Gov. Code, §§ 65915-65918) benefits, including waivers and concessions.

We can't wait to bring this thoughtful project program to life and bring much needed housing to Geyserville. The 93-homes are comprised of 3 bedrooms, with some homes optioning up to 4 bedrooms, ranging in size from ± 1,480-sf to 1,912-sf. Each home has its own private garage accessed by an internal private street with the front doors accessed from gracious paseos. Each home will come standard with solar panels and will incorporate a specific focus on healthy, energy efficient living.

The proposed 93-homes would be distributed throughout 17-buildings, contemplated to have a modern agrarian aesthetic. The project proposes 204 parking spaces, comprised of 2-dedicated spaces within each home's garage, as well as 18 surface parking stalls.

The project will include over 100 bicycle parking spaces, with 93-long-term spaces located in each residential garage, and the remainder in onsite bicycle racks. The housing development will have extensive landscaping with new plantings chosen to complement the project design and setting.

City Ventures is respectfully requesting a Vesting Tentative Map permit from Sonoma County. City Ventures has previously submitted an application on January 2, 2025 for consideration under the State's SB330 Application.

City Ventures looks forward to working with Sonoma County to create a housing development just up the sculpture trail from Geyserville's charming downtown, so that more Sonoma County families can put down roots, just like the vineyards adjacent to the project site.

PROJECT INFORMATION

APN	140-180-035
Site Area	+/- 5.11 AC
Total Units	93 Du
Density	18.19 Du/Ac

UNITS

Unit Type	Bed / Bath	Sq. Ft.	#
P1	3 Bed / 2.5 Ba	± 1,480	5
P2	3 Bed (Opt 4 Bed)/ 2.5 Ba	± 1,746	31
P3	3 Bed (Opt 4 Bed) 2.5 Ba	± 1,812	26
P4	3 Bed (Opt 4 Bed)/ 2.5 Ba	± 1,912	31
Total			93

PARKING

Total Required Parking	187 Spaces
Total Provided Parking	204 Spaces
Bicycle Parking Provided	2.0/Unit

OPEN SPACE SUMMARY

Open Space Required

200SF/Unit	93 Units	18,600 SF

Private Open Space Provided

Unit Type	#	P.O.S.	Total
P1A	4	96 SF	384 SF
P1YA	1	96 SF	96 SF
P2A	26	148 SF	3,848 SF
P2B	5	148 SF	740 SF
P3	26	222 SF	5,772 SF
P4A	17	271 SF	4,607 SF
P4B	11	457 SF	5,027 SF
P4C	1	457 SF	457 SF
P4D	2	457 SF	914 SF
		21,845 SF X 50% =	10,923 SF

Common Open Space Provided	33,466 SF
Total Open Space Provided	44,392 SF

ZONING SUMMARY

Zoning	R3 B6 20 DU, RC50 SR
Land Use	UR 20

	Maximum	Provided
Max. Density	12-20 Du/Ac	18.19 Du/Ac
Max. Building Height	3 Stories (40ft Max.)	3 Stories (40ft Max.)

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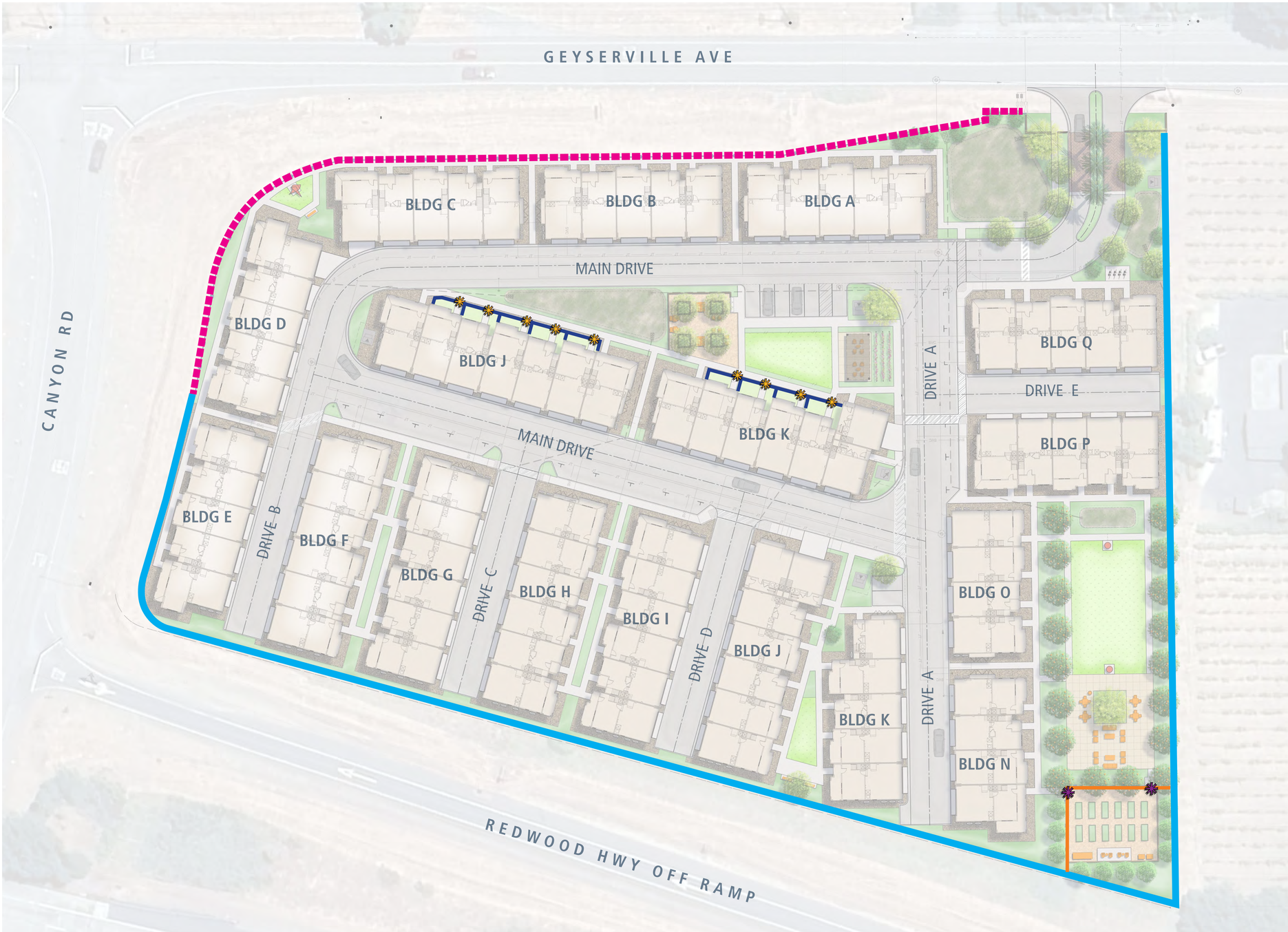

Notes:

1. Site plan is for conceptual purposes only.
2. Site plan must be reviewed by planning, building, and fire departments for code compliance.
3. Base information per civil engineer.
4. Civil engineer to verify all setbacks and grading information
5. Building Footprints might change due to the final design elevation style.
6. Open space area is subject to change due to the balcony design of the elevation.
7. Building setbacks are measured from property lines to building foundation lines.

CONCEPTUAL SITE PLAN

21837 GEYSERVILLE AVE

SONOMA COUNTY, CA

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A0.2

0 15 30 60

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Geyserville Ave.

Street Scene Elevation
Canyon Road

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SONOMA COUNTY, CA

Scale: 3/32"=1'-0"

0 4 8 16

A0.3

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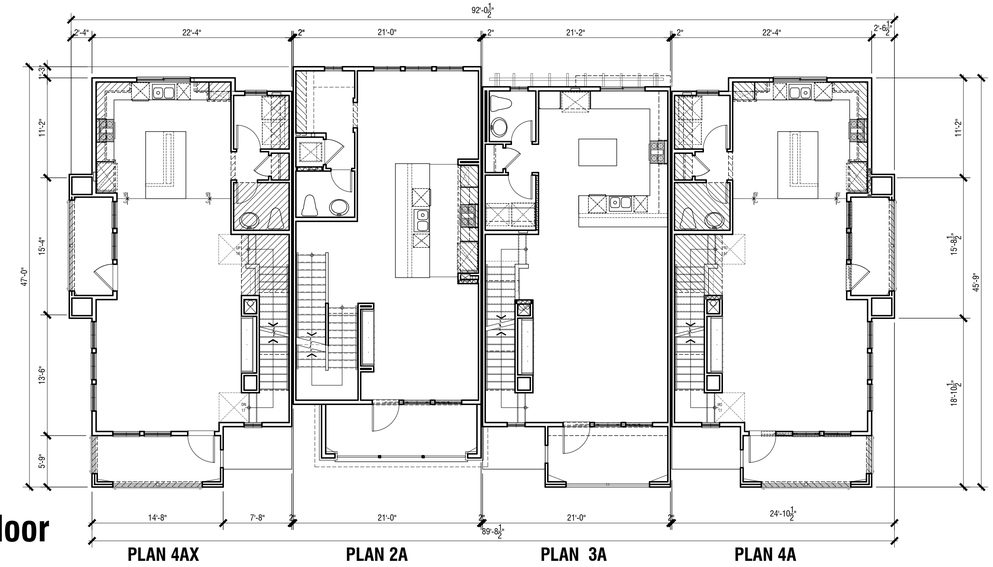
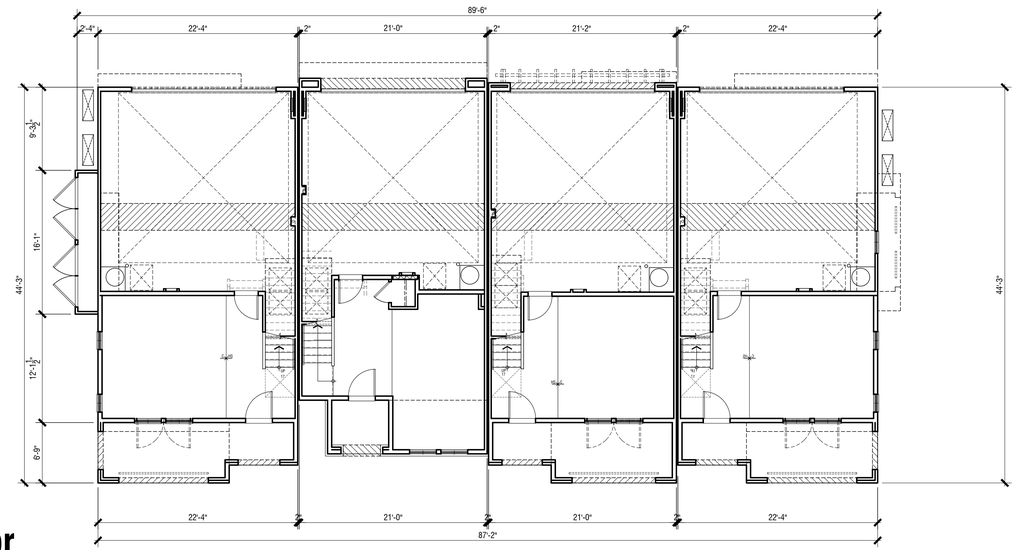


Second Floor

PLAN 4AX **PLAN 2A** **PLAN 3A** **PLAN 4A**



First Floor

Floor Plans
Building 200 - 4Plex

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A2.1

Scale: 1/8"=1'-0" 0 4 8 16

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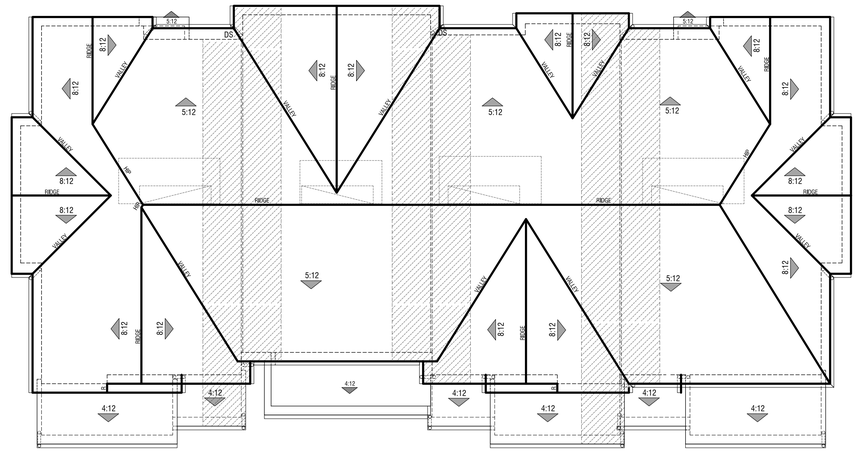
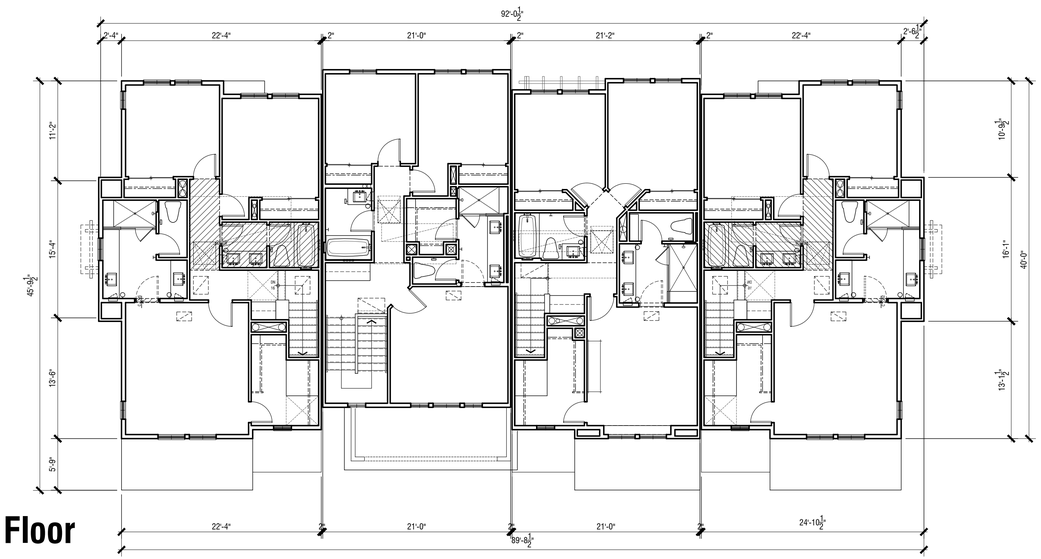


Roof Plan

PLAN 4AX PLAN 2A PLAN 3A PLAN 4C



Third Floor

Floor Plans
Building 200 - 4Plex

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SONOMA COUNTY, CA

Scale: 1/8"=1'-0" 0 4 8 16

A2.2

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COLOR LEGEND

B1	BODY 1 (STUCCO)
B2	BODY 2 (STUCCO)
B3	BODY 3 (SIDING)
AB	ACCENT BODY
T	TRIM

Right

Rear

Left

Front

COLOR LEGEND

B1	BODY 1 (STUCCO)
B2	BODY 2 (STUCCO)
B3	BODY 3 (SIDING)
AB	ACCENT BODY
T	TRIM

Building 200 - 4Plex

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Scale: 1/8"=1'-0" 0 4 8 16

A2.3

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Typical Bldg. Section
Building 200

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Scale: 3/16"=1'-0" 0 4 8 16

A2.4

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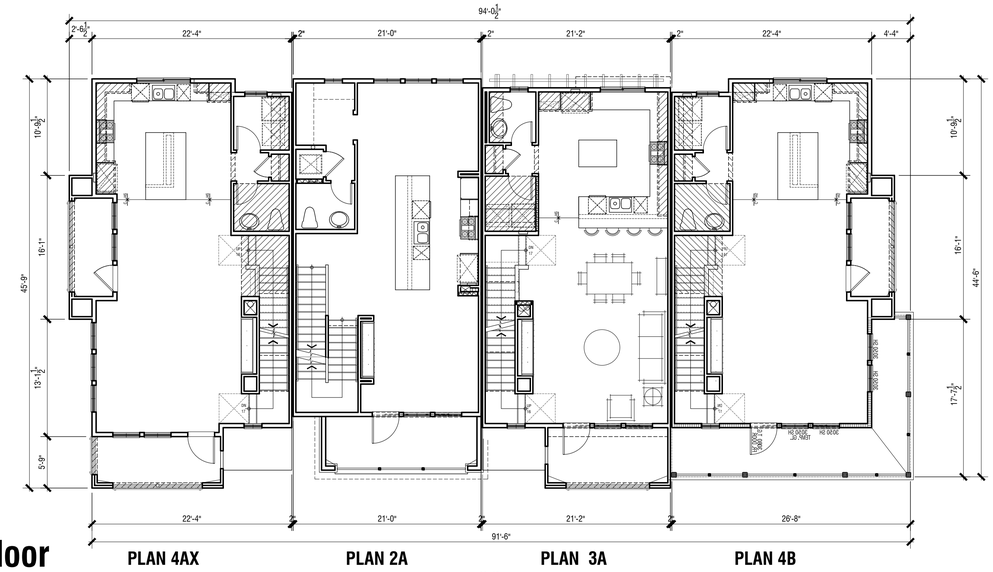
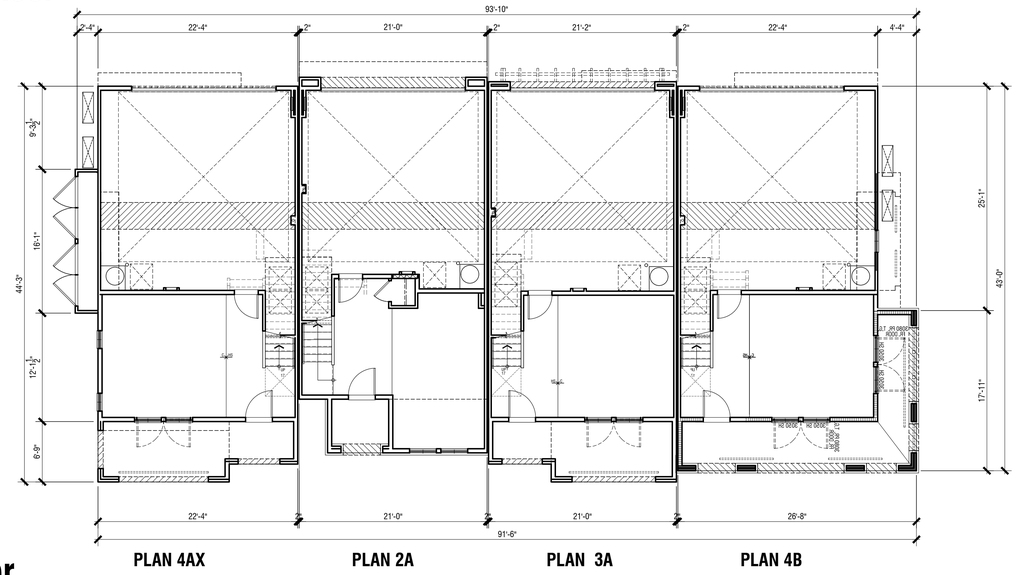


Second Floor



First Floor

Floor Plans
Building 201 - 4Plex

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21837 GEYSERVILLE AVE

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A2.5

Scale: 1/8"=1'-0" 0 4 8 16

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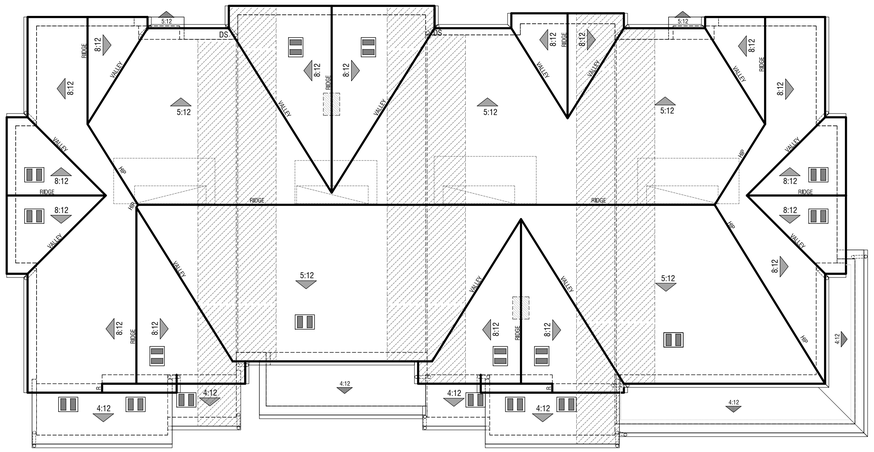
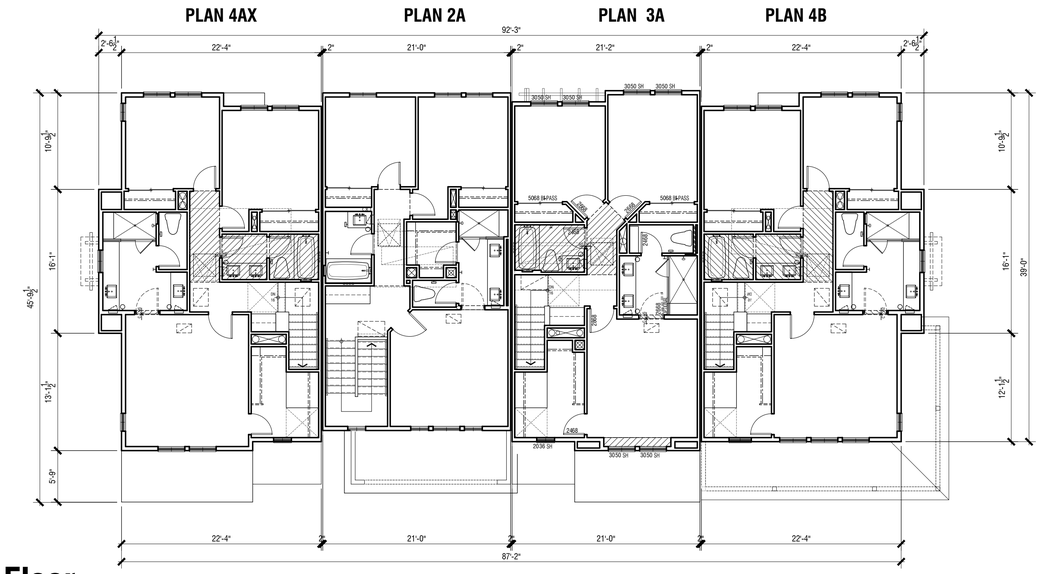


Roof Plan

BUILDING 201 - ROOF



Third Floor

Floor Plans
Building 201 - 4Plex

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21837 GEYSERVILLE AVE

SONOMA COUNTY, CA

A2.6

Scale: 1/8"=1'-0" 0 4 8 16

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COLOR LEGEND

B1	BODY 1 (STUCCO)
B2	BODY 2 (STUCCO)
B3	BODY 3 (SIDING)
AB	ACCENT BODY
T	TRIM

Right

Rear

Left

COLOR LEGEND

B1	BODY 1 (STUCCO)
B2	BODY 2 (STUCCO)
B3	BODY 3 (SIDING)
AB	ACCENT BODY
T	TRIM

Front

Building 201 - 4Plex

CITY VENTURES
Building It Forward

21837 GEYSERVILLE AVE

SONOMA COUNTY, CA

Scale: 1/8"=1'-0" 0 4 8 16

A2.7

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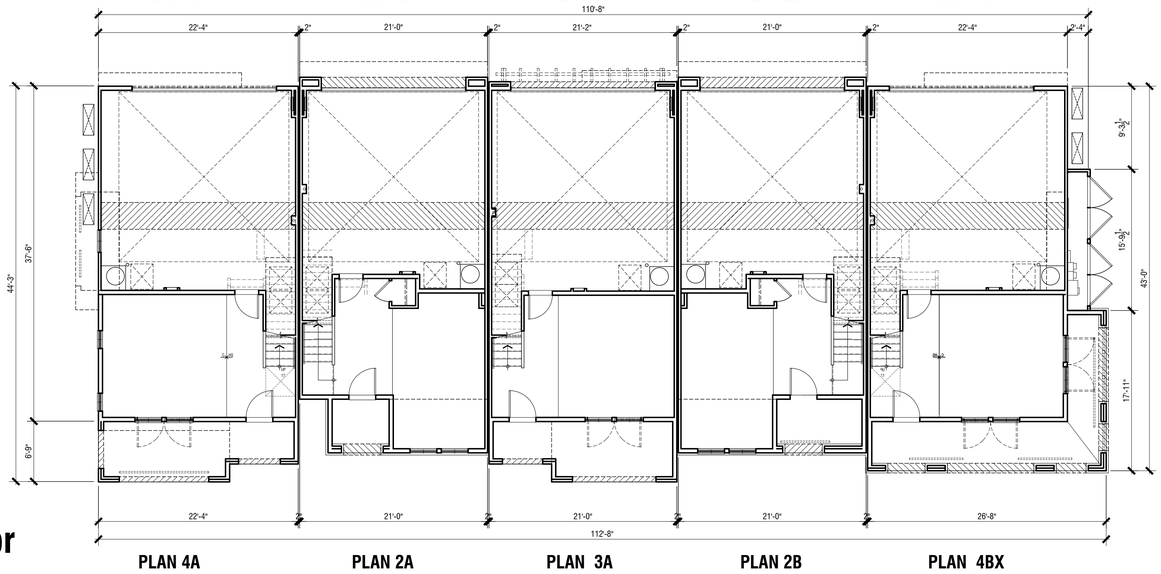
Second Floor



First Floor

Floor Plans
Building 300 - 5Plex

CITY VENTURES
Building It Forward

21837 GEYSERVILLE AVE

SONOMA COUNTY, CA

Scale: 1/8"=1'-0" 0 4 8 16

A3.1

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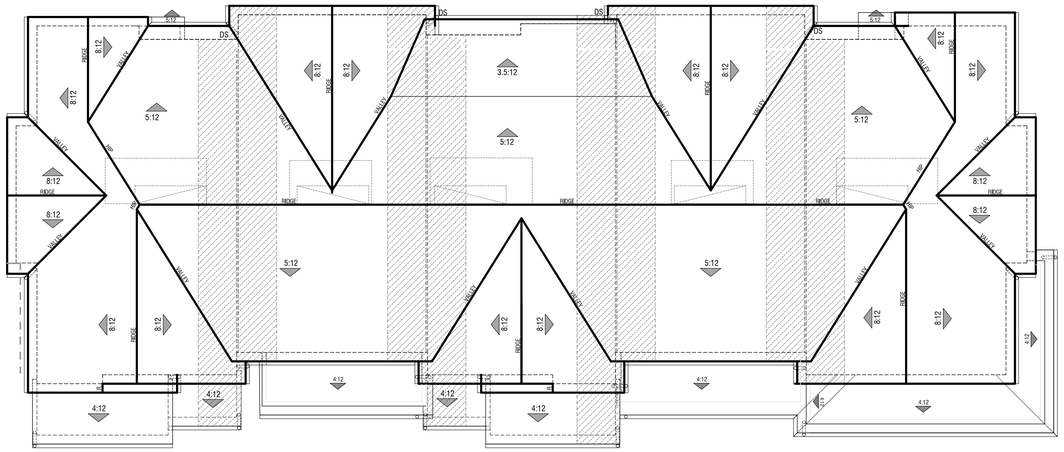
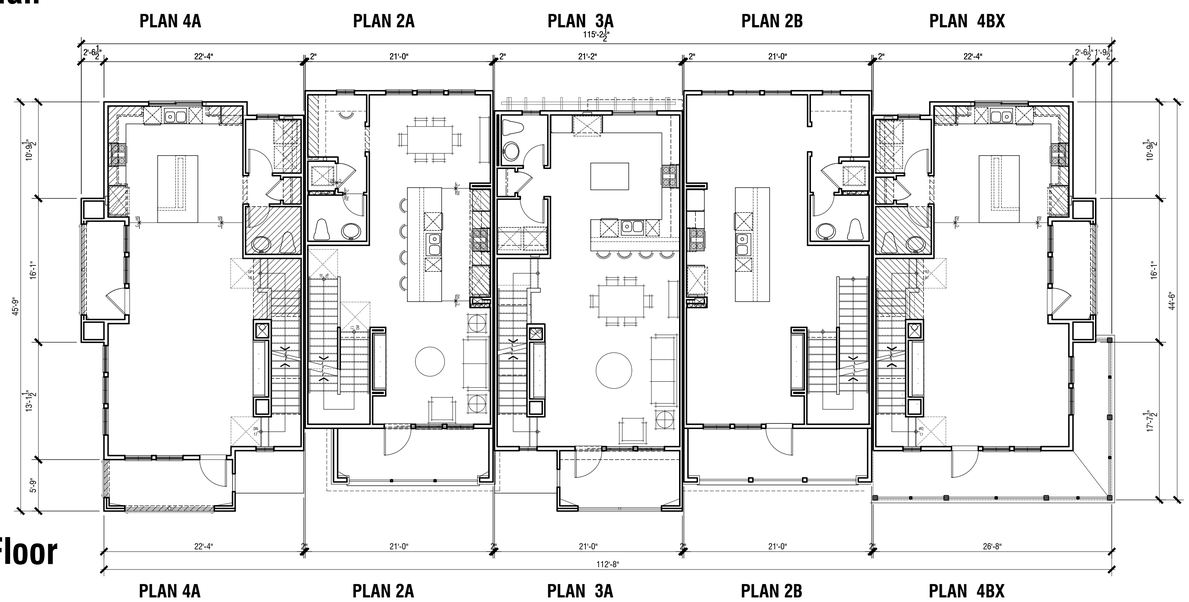


Roof Plan



Third Floor

Floor Plans
Building 300 - 5Plex

CITY VENTURES
Building It Forward

21837 GEYSERVILLE AVE

SONOMA COUNTY, CA

Scale: 1/8"=1'-0" 0 4 8 16

A3.2

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COLOR LEGEND

B1	BODY 1 (STUCCO)
B2	BODY 2 (STUCCO)
B3	BODY 3 (SIDING)
AB	ACCENT BODY
T	TRIM

Right

Rear

Left

Front

COLOR LEGEND

B1	BODY 1 (STUCCO)
B2	BODY 2 (STUCCO)
B3	BODY 3 (SIDING)
AB	ACCENT BODY
T	TRIM

Building 300 - 5Plex

CITY VENTURES
Building It Forward

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SONOMA COUNTY, CA

A3.3

Scale: 1/8"=1'-0" 0 4 8 16

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Right

Rear

Left

Front

Building 300 - 5Plex

CITY VENTURES
Building It Forward

Note: Artist's conception; colors, materials and application may vary.

21837 GEYSERVILLE AVE

SONOMA COUNTY, CA

Scale: 1/8"=1'-0"

0 4 8 16

A3.3a

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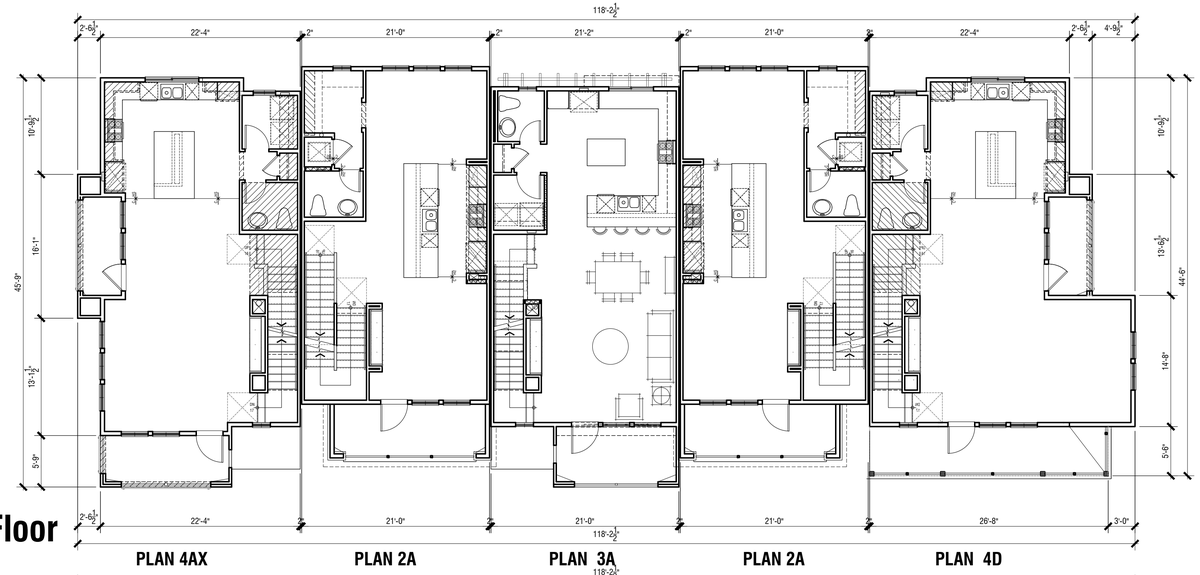
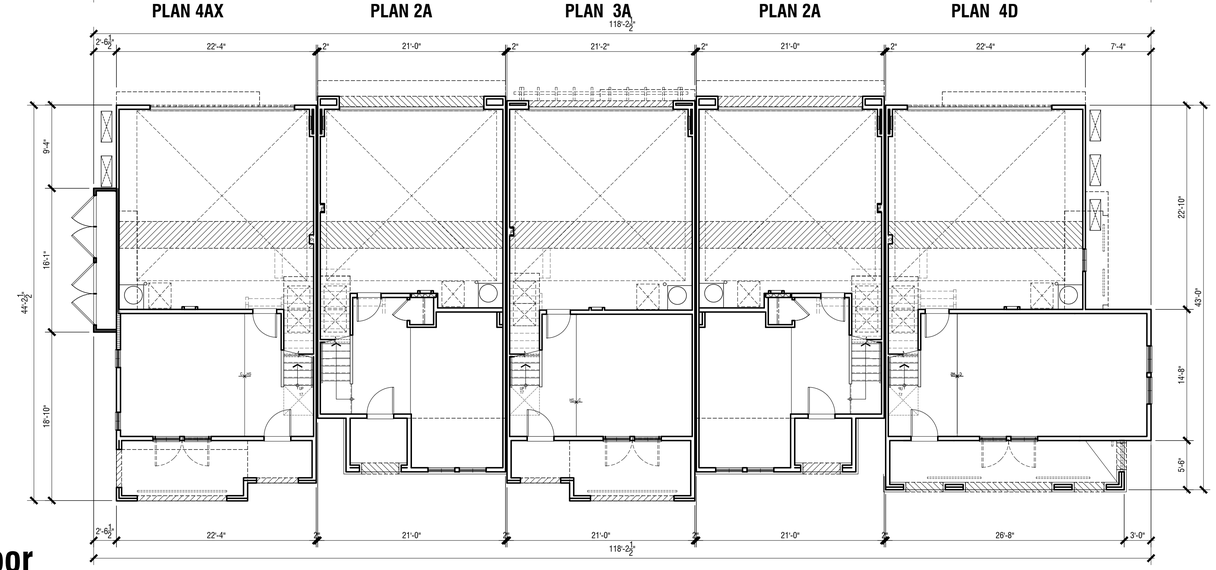


Second Floor

PLAN 4AX | PLAN 2A | PLAN 3A | PLAN 2A | PLAN 4D



First Floor

PLAN 4AX | PLAN 2A | PLAN 3A | PLAN 2A | PLAN 4D

Floor Plans
Building 301 - 5Plex

CITY VENTURES
Building It Forward

21837 GEYSERVILLE AVE

SONOMA COUNTY, CA

A3.5

Scale: 1/8"=1'-0" 0 4 8 16

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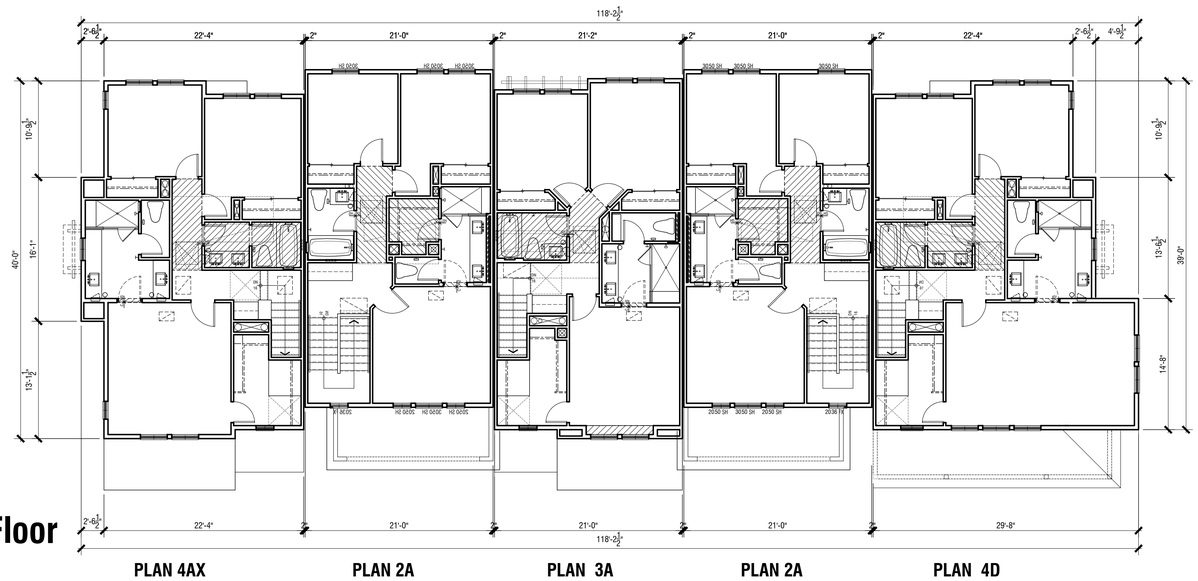

Third Floor

Floor Plans
Building 301 - 5Plex

CITY VENTURES
Building It Forward

21837 GEYSERVILLE AVE

SONOMA COUNTY, CA

A3.6

Scale: 1/8"=1'-0" 0 4 8 16

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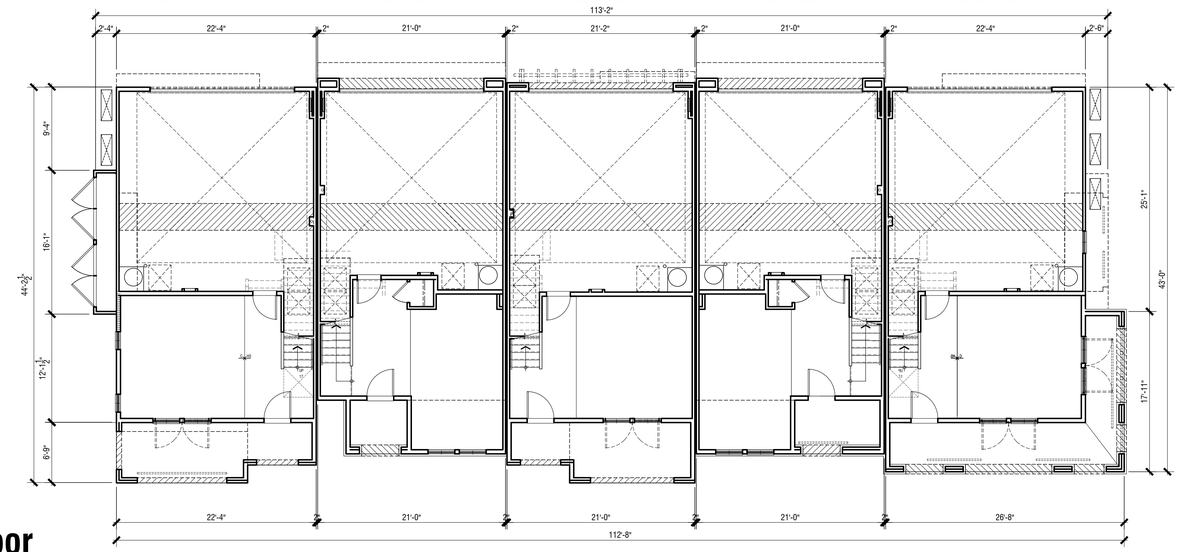
Second Floor

PLAN 4AX | PLAN 2A | PLAN 3A | PLAN 2B | PLAN 4B



First Floor

PLAN 4AX | PLAN 2A | PLAN 3A | PLAN 2B | PLAN 4B

Floor Plans
Building 302 - 5Plex

CITY VENTURES
Building It Forward

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SONOMA COUNTY, CA

A3.8

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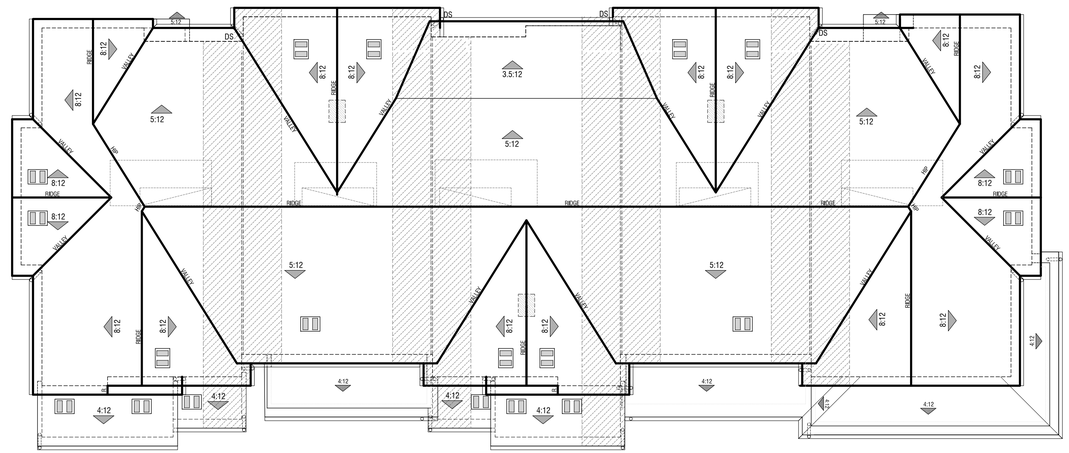
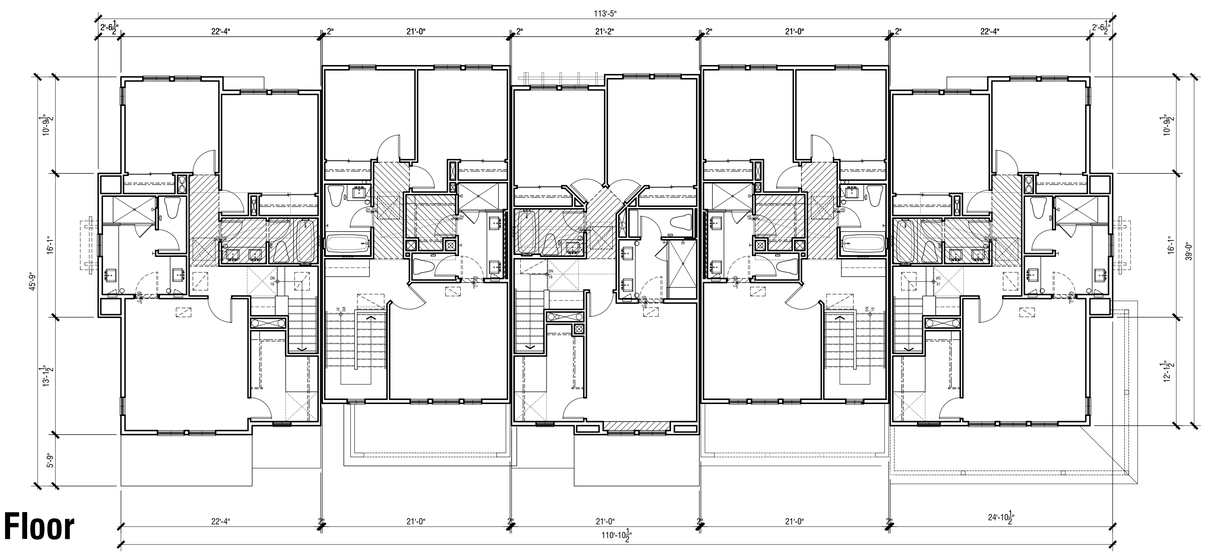


Roof Plan

PLAN 4AX | PLAN 2A | PLAN 3A | PLAN 2B | PLAN 4B



Third Floor

Floor Plans
Building 302 - 5Plex

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Building It Forward

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SONOMA COUNTY, CA

A3.9

Scale: 1/8"=1'-0" 0 4 8 16

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BUILDING 300 - BUILDING SECTION

Typical Bldg. Section
Building 300

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Building It Forward

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SONOMA COUNTY, CA

A3.4

Scale: 3/16"=1'-0" 0 4 8 16

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COLOR LEGEND

B1	BODY 1 (STUCCO)
B2	BODY 2 (STUCCO)
B3	BODY 3 (SIDING)
AB	ACCENT BODY
T	TRIM

Right

Rear

Left

COLOR LEGEND

B1	BODY 1 (STUCCO)
B2	BODY 2 (STUCCO)
B3	BODY 3 (SIDING)
AB	ACCENT BODY
T	TRIM

Front

Building 302 - 5Plex

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Scale: 1/8"=1'-0" 0 4 8 16

A3.10

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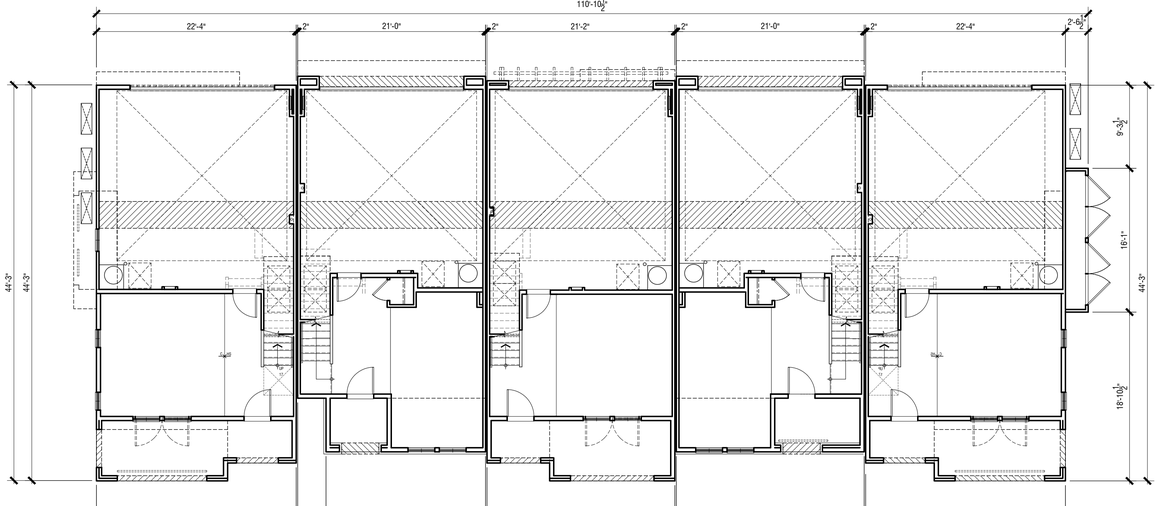
Second Floor

PLAN 4A | PLAN 2A | PLAN 3A | PLAN 2B | PLAN 4AX



First Floor

PLAN 4A | PLAN 2A | PLAN 3A | PLAN 2B | PLAN 4AX

Floor Plans
Building 303 - 5Plex

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Scale: 1/8"=1'-0" 0 4 8 16

A3.12

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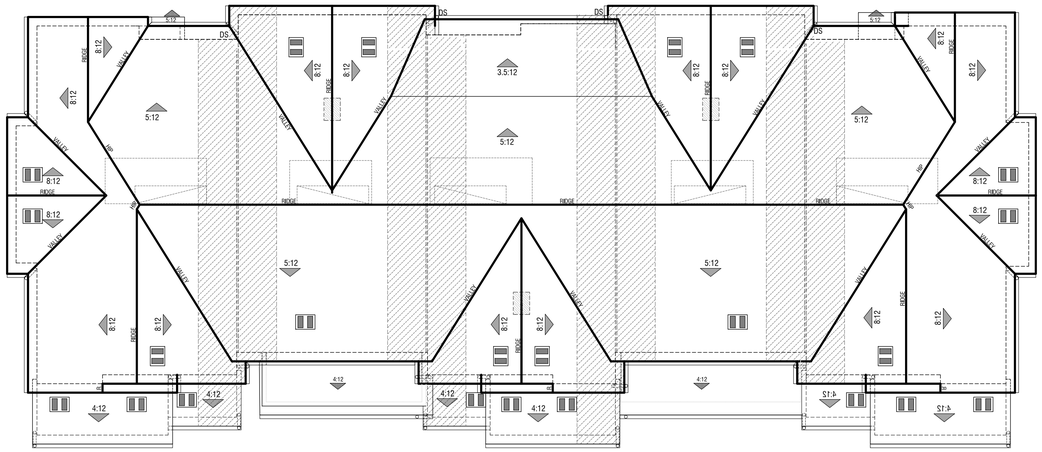
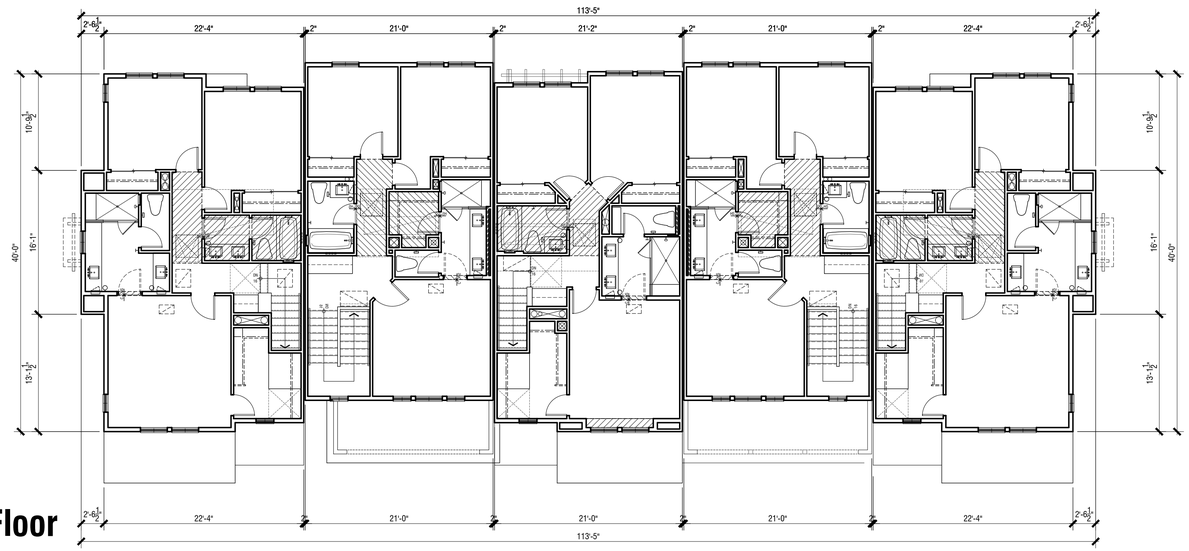


Roof Plan

PLAN 4A | PLAN 2A | PLAN 3A | PLAN 2B | PLAN 4AX



Third Floor

Floor Plans
Building 303 - 5Plex

CITY VENTURES
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SONOMA COUNTY, CA

Scale: 1/8"=1'-0" 0 4 8 16

A3.13

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COLOR LEGEND

B1	BODY 1 (STUCCO)
B2	BODY 2 (STUCCO)
B3	BODY 3 (SIDING)
AB	ACCENT BODY
T	TRIM

Right

Rear

Left

Front

COLOR LEGEND

B1	BODY 1 (STUCCO)
B2	BODY 2 (STUCCO)
B3	BODY 3 (SIDING)
AB	ACCENT BODY
T	TRIM

Building 303 - 5Plex

CITY VENTURES
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SONOMA COUNTY, CA

Scale: 1/8"=1'-0" 0 4 8 16

A3.14

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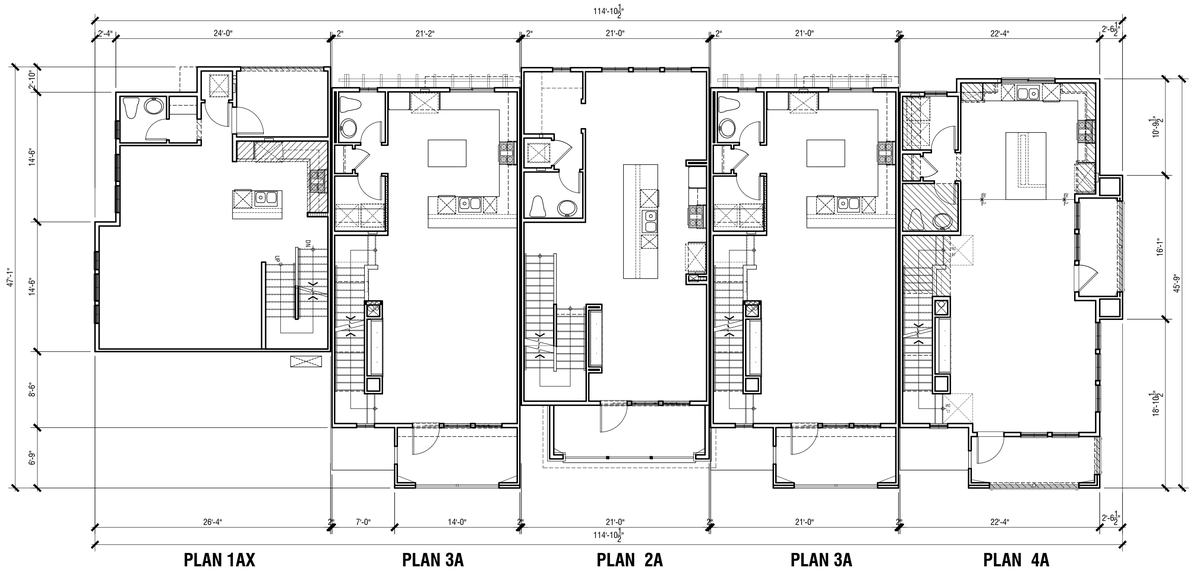
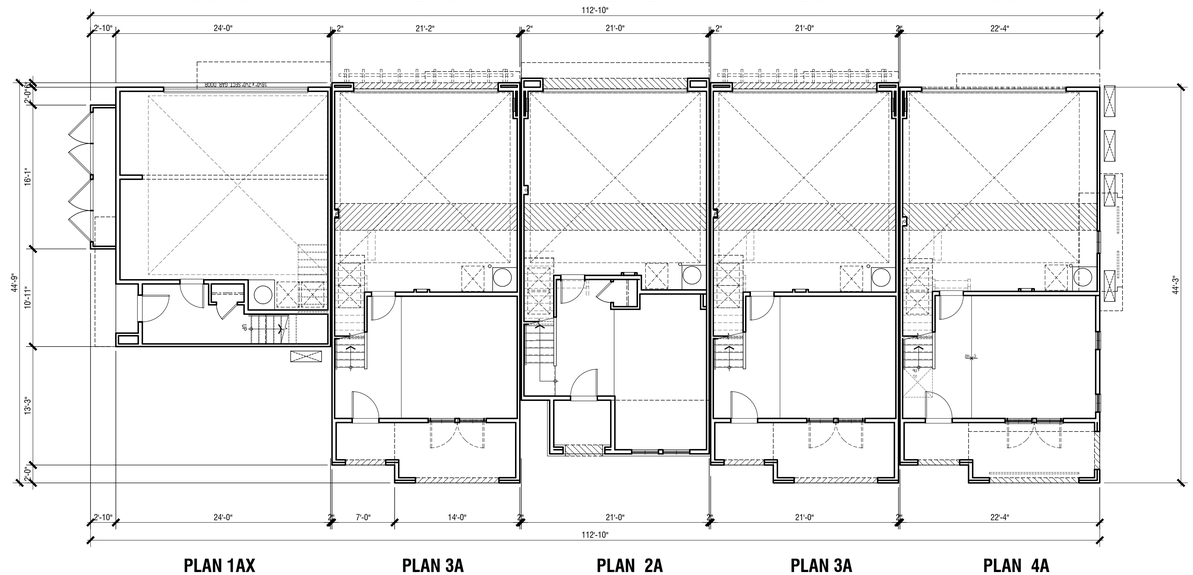
Second Floor



First Floor



Floor Plans
Building 304 - 5Plex

CITY VENTURES
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SONOMA COUNTY, CA

Scale: 1/8"=1'-0" 0 4 8 16

A3.16

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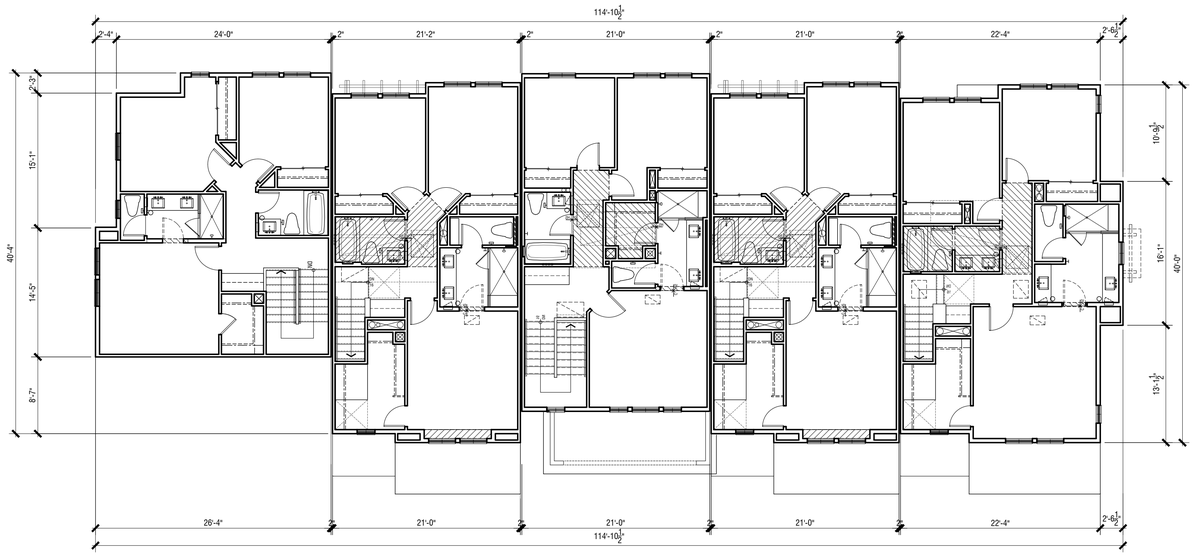
PLAN 1AX | PLAN 3A | PLAN 2A | PLAN 3A | PLAN 4A



Third Floor

Floor Plans
Building 304 - 5Plex

CITY VENTURES
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21837 GEYSERVILLE AVE

SONOMA COUNTY, CA

Scale: 1/8"=1'-0" 0 4 8 16

A3.17

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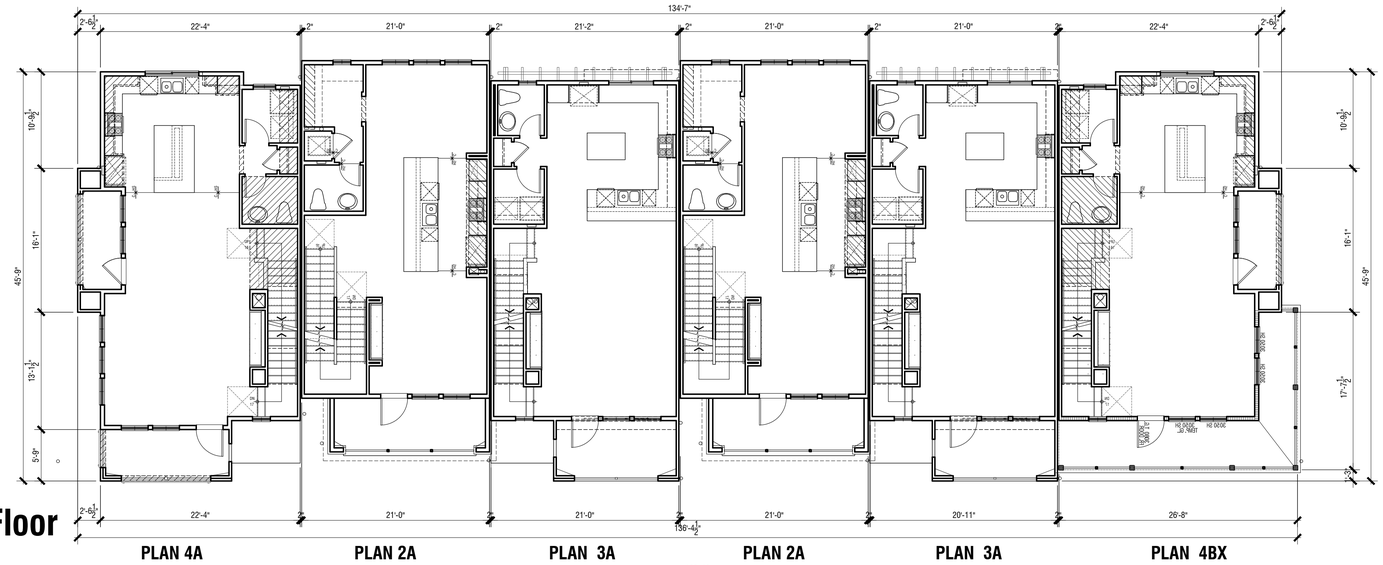
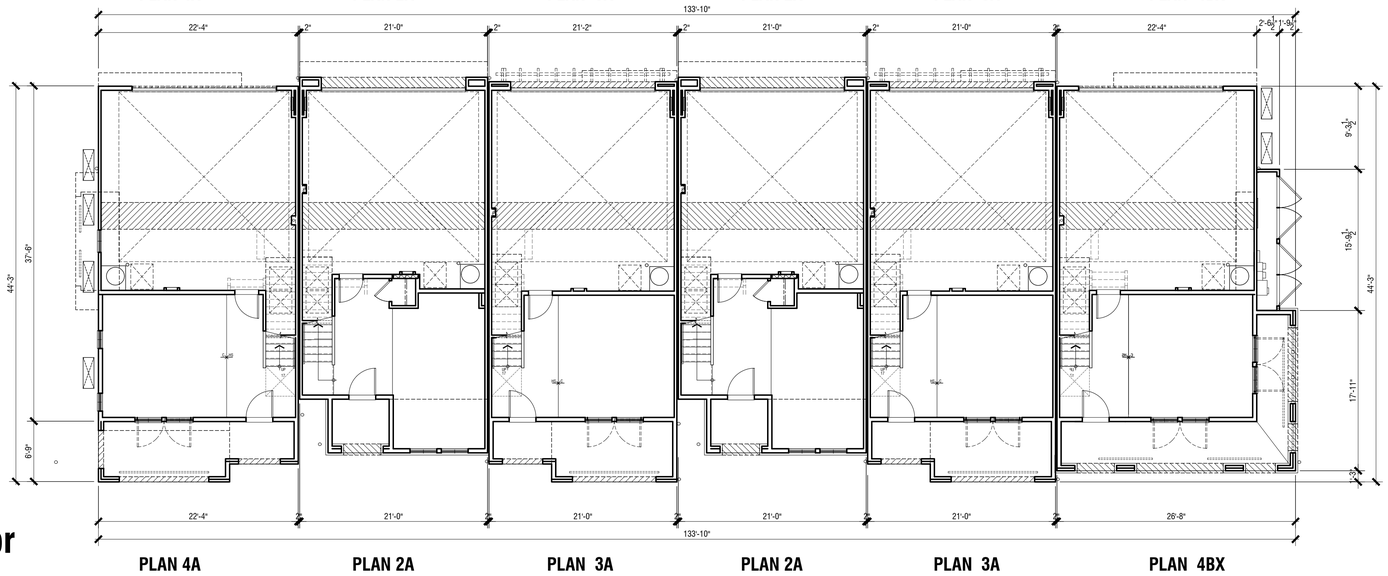


Second Floor



First Floor

Floor Plans
Building 400 - 6Plex

CITY VENTURES
Building It Forward

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SONOMA COUNTY, CA

Scale: 1/8"=1'-0" 0 4 8 16

A4.1

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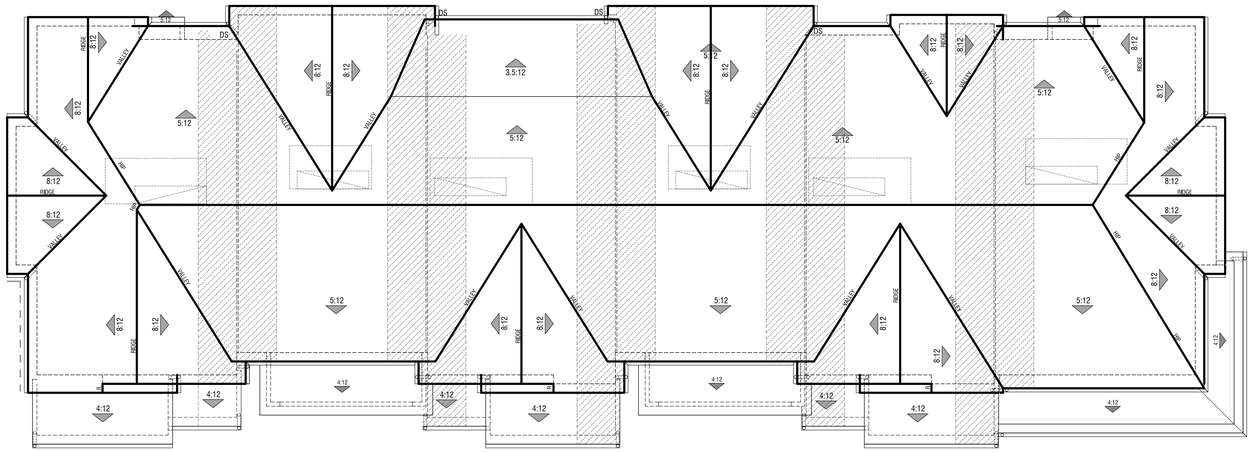
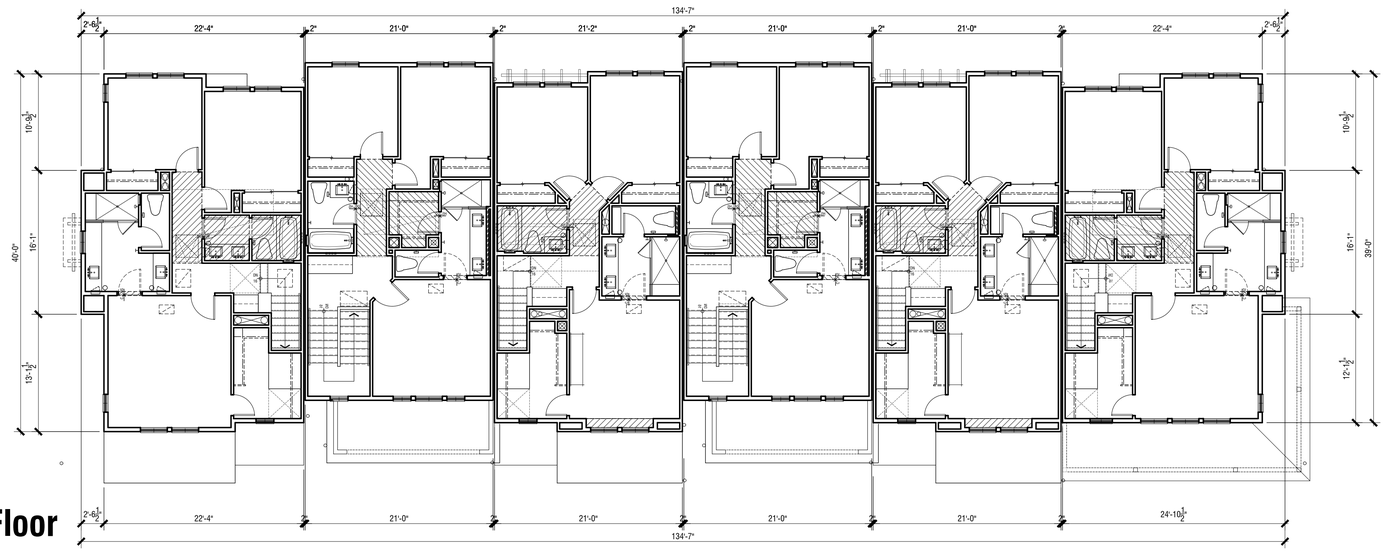


Roof Plan



Third Floor

PLAN 4A | PLAN 2A | PLAN 3A | PLAN 2A | PLAN 3A | PLAN 4BX

Floor Plans
Building 400 - 6Plex

CITY VENTURES
Building It Forward

21837 GEYSERVILLE AVE

SONOMA COUNTY, CA

Scale: 1/8"=1'-0" 0 4 8 16

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WHA.
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COLOR LEGEND

B1	BODY 1 (STUCCO)
B2	BODY 2 (STUCCO)
B3	BODY 3 (SIDING)
AB	ACCENT BODY
T	TRIM

Right

Rear

Left

Front

COLOR LEGEND

B1	BODY 1 (STUCCO)
B2	BODY 2 (STUCCO)
B3	BODY 3 (SIDING)
AB	ACCENT BODY
T	TRIM

Building 400 - 6Plex

CITY VENTURES
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SONOMA COUNTY, CA

Scale: 1/8"=1'-0" 0 4 8 16

A4.3

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Right

Rear

Left

Front

Building 400 - 6Plex

CITY VENTURES
Building It Forward

21837 GEYSERVILLE AVE

SONOMA COUNTY, CA

Note: Artist's conception; colors, materials and application may vary.

Scale: 1/8"=1'-0"

0 4 8 16

A4.3a

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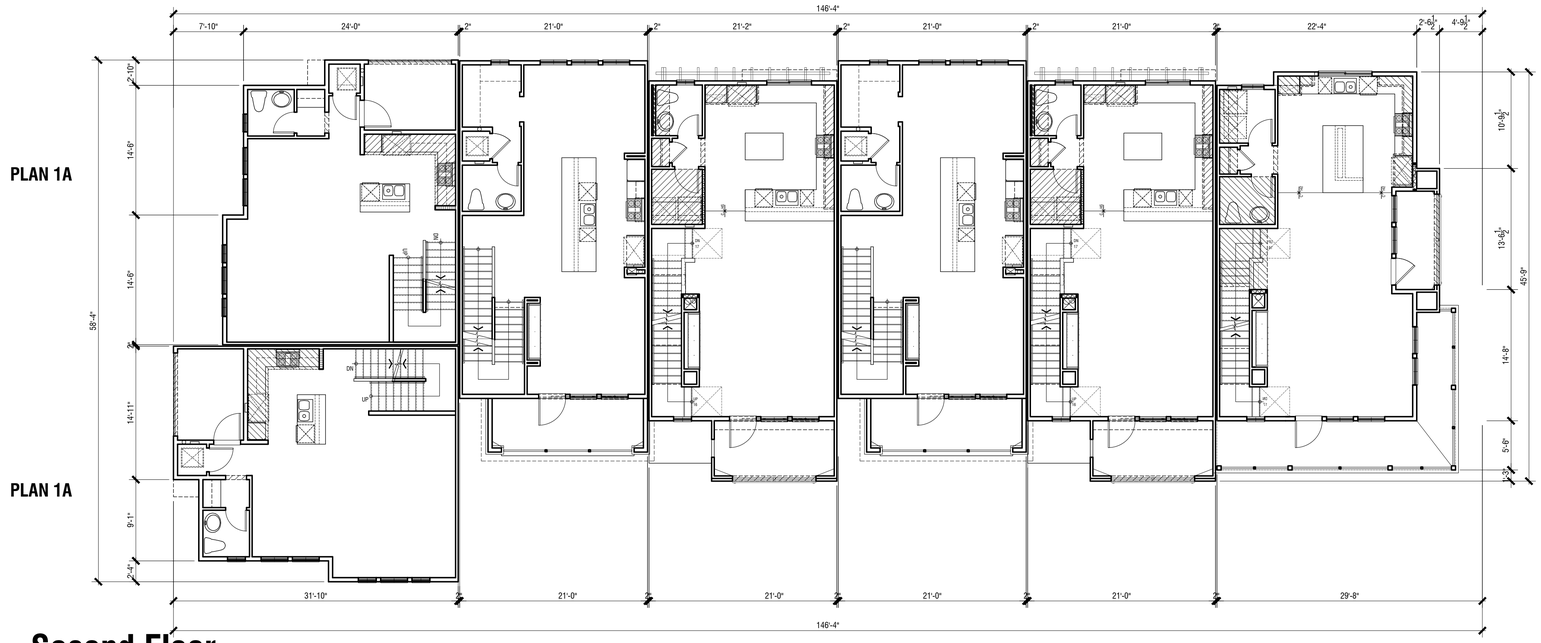
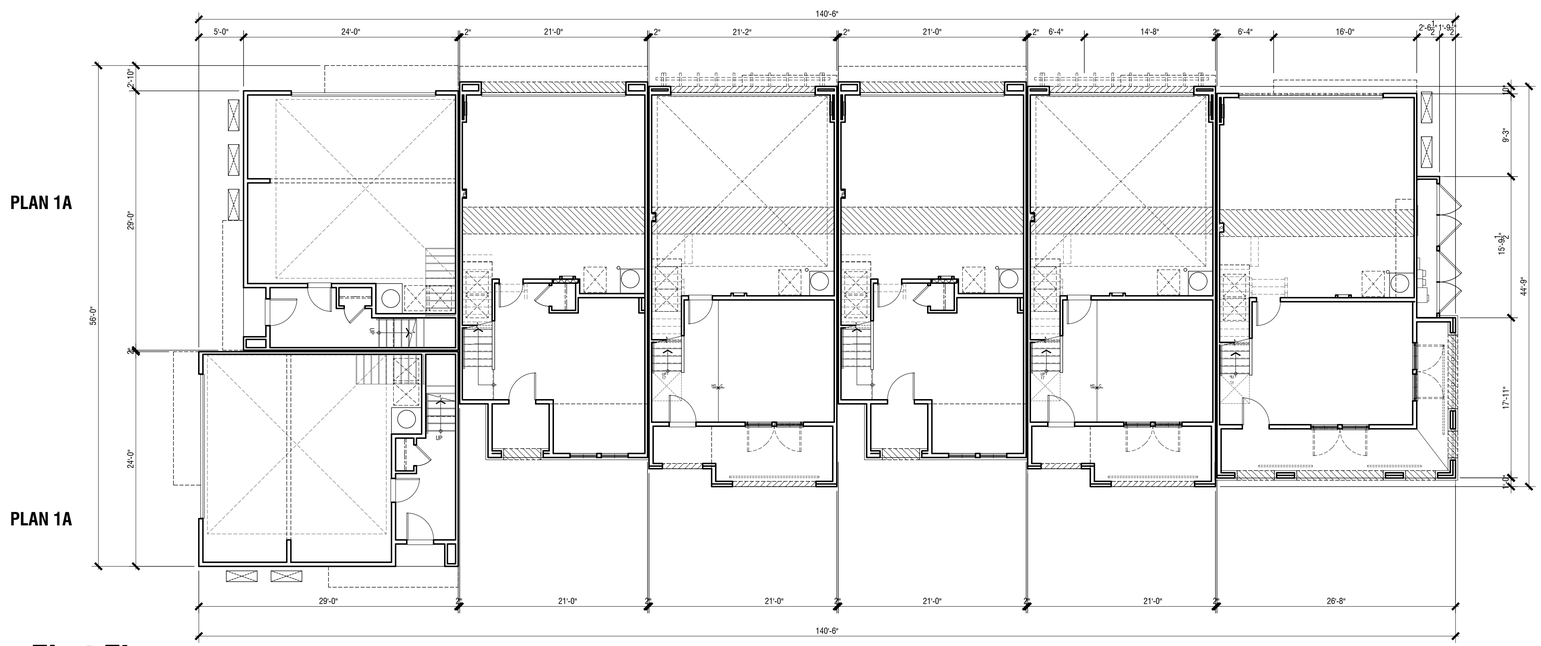


Second Floor

PLAN 2A | PLAN 3A | PLAN 2A | PLAN 3A | PLAN 4BX



First Floor

Floor Plans
Building 500 - 7Plex

21837 GEYSERVILLE AVE

SONOMA COUNTY, CA

A5.1

Scale: 1/8"=1'-0" 0 4 8 16

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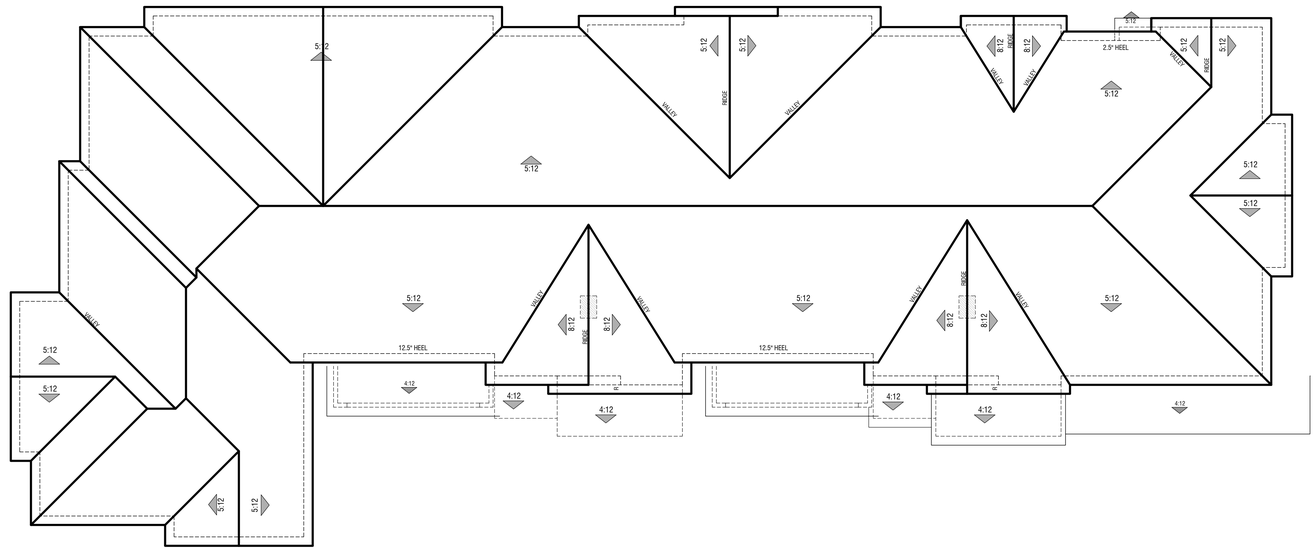

Roof Plan

Third Floor

Floor Plans
Building 500 - 7Plex

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CITY VENTURES
Building It Forward

Scale: 1/8"=1'-0" 0 4 8 16

A5.2

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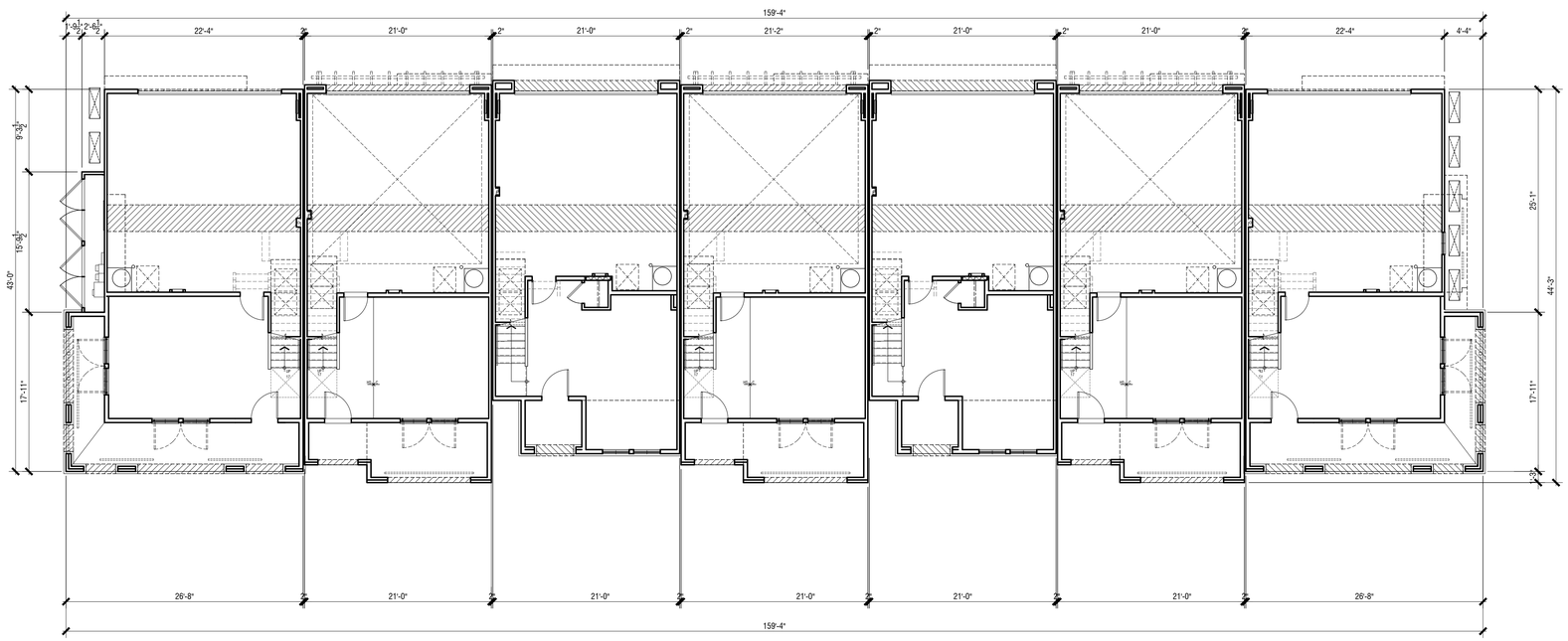
Second Floor

PLAN 4BX | PLAN 3A | PLAN 2A | PLAN 3A | PLAN 2A | PLAN 3A | PLAN 4B



First Floor

Floor Plans
Building 501 - 7Plex

21837 GEYSERVILLE AVE

SONOMA COUNTY, CA

Scale: 1/8"=1'-0" 0 4 8 16

A5.5

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CITY VENTURES
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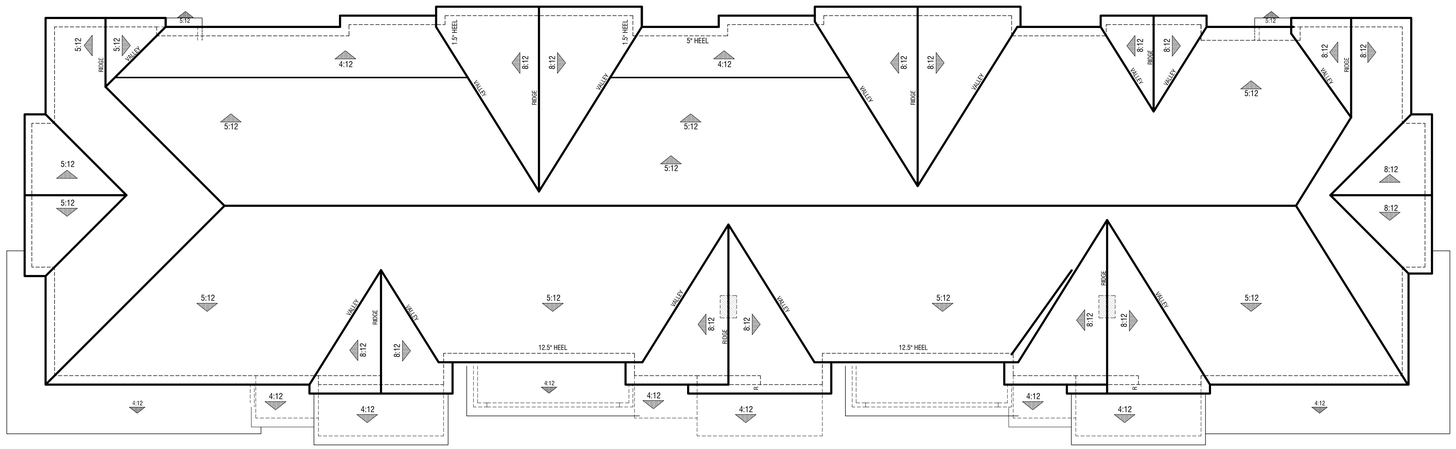

Roof Plan

Third Floor

Floor Plans
Building 501 - 7Plex

21837 GEYSERVILLE AVE

SONOMA COUNTY, CA

Scale: 1/8"=1'-0" 0 4 8 16

A5.6

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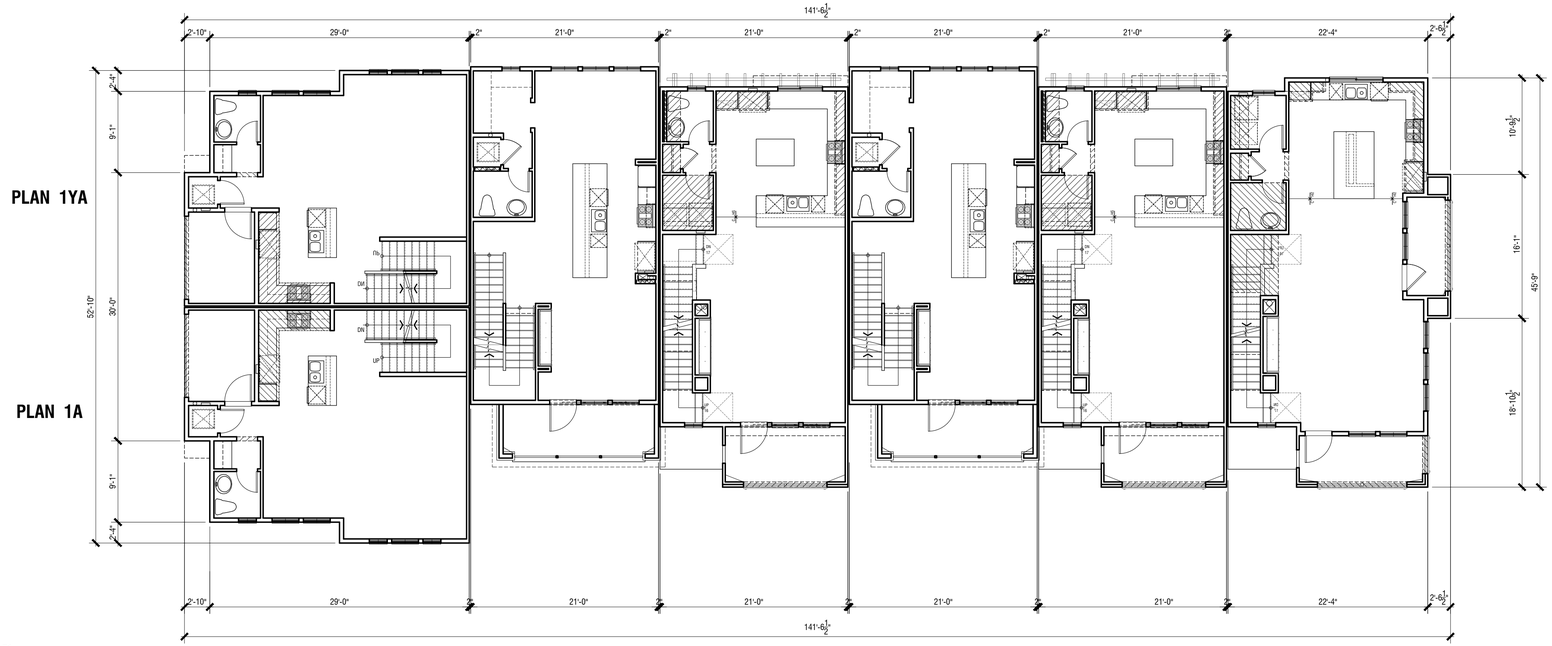
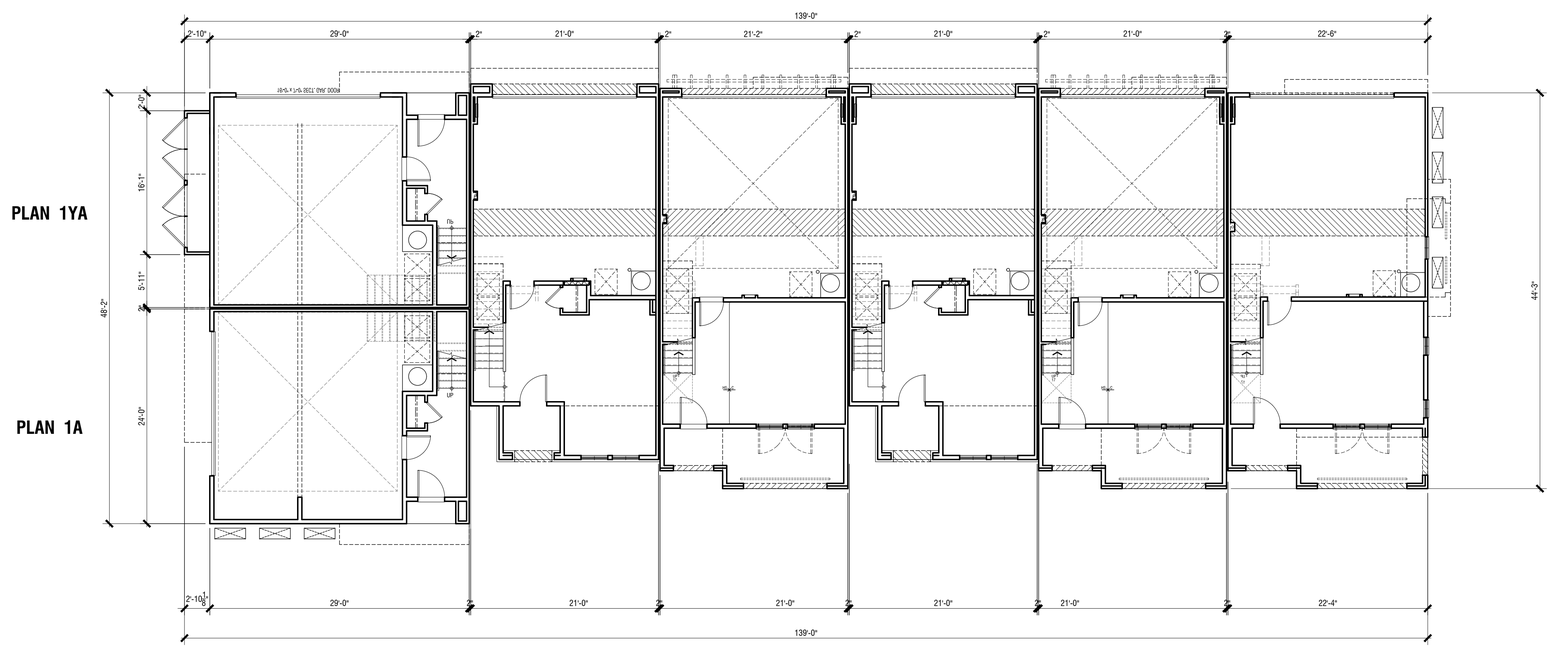


Second Floor



First Floor

Floor Plans
Building 502 - 7Plex

21837 GEYSERVILLE AVE

SONOMA COUNTY, CA

Scale: 1/8"=1'-0" 0 4 8 16

A5.9

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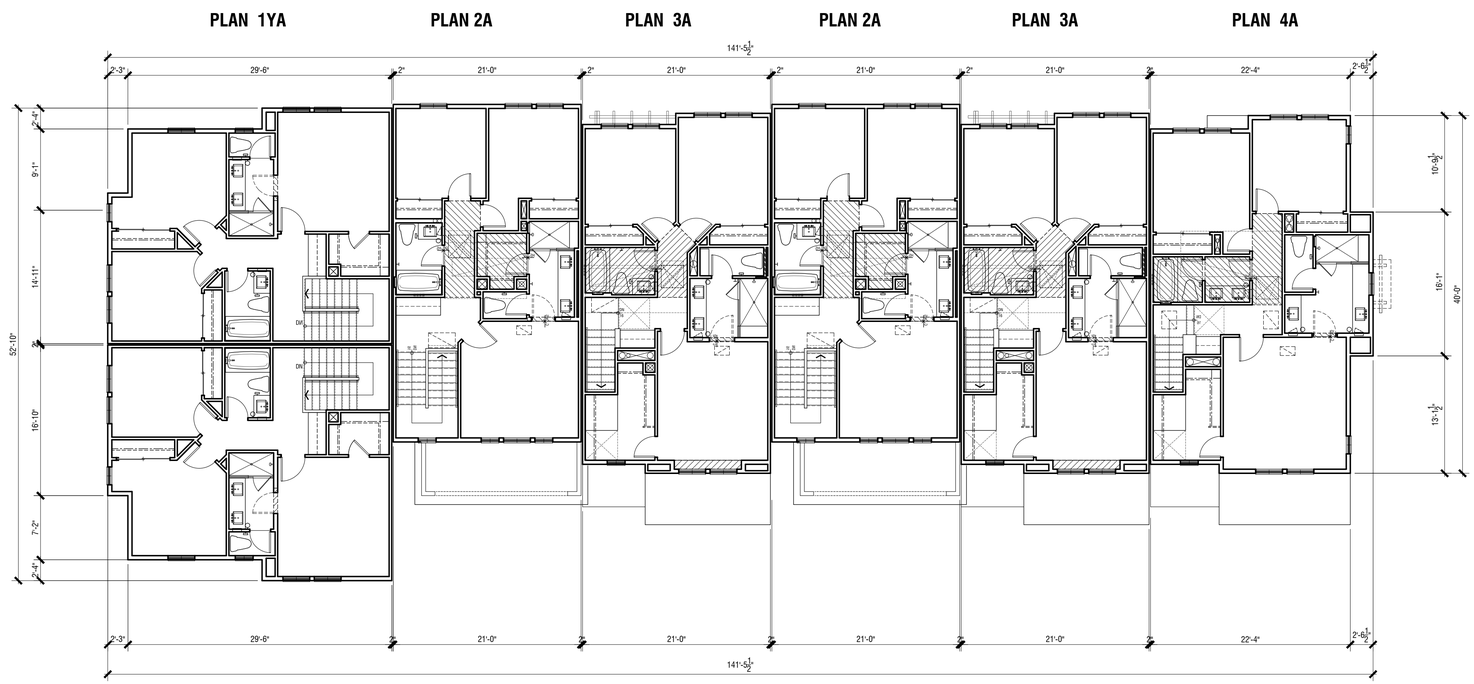

Third Floor

Floor Plans
Building 502 - 7Plex

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SONOMA COUNTY, CA

Scale: 1/8"=1'-0" 0 4 8 16

A5.10

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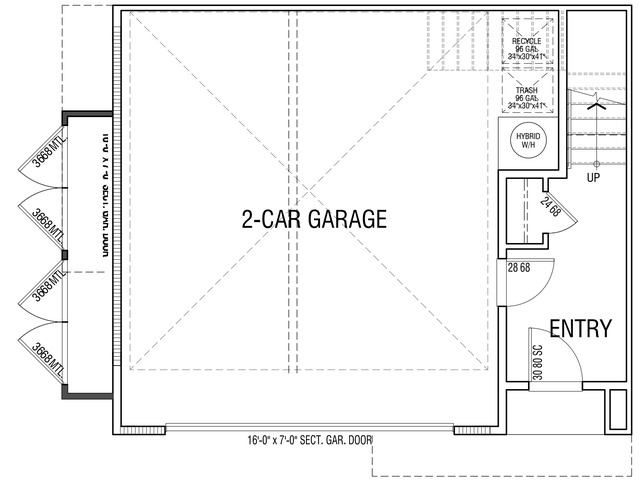
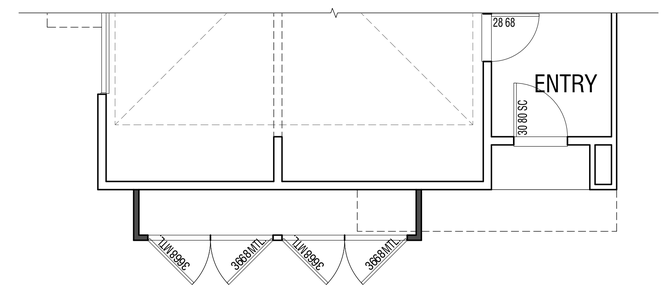
DWELLING PLAN SUMMARY - PLAN 1A, 1AX AND 1AY	
ROOM TYPE	QUANTITY
BEDROOM(S)	3
BATH(S)	2.5
FLOOR AREA TABLE	PLAN 1A
FIRST LEVEL	133 SQ. FT.
SECOND LEVEL	690 SQ. FT.
THIRD LEVEL	710 SQ. FT.
TOTAL	1533 SQ. FT.
2-BAY GARAGE	549 SQ. FT.
COVERED ENTRY	14 SQ. FT.
DECK	82 SQ. FT.

NOTE: SQUARE FOOTAGE MAY VARY DUE TO METHOD OF CALCULATION



1AY FIRST FLOOR



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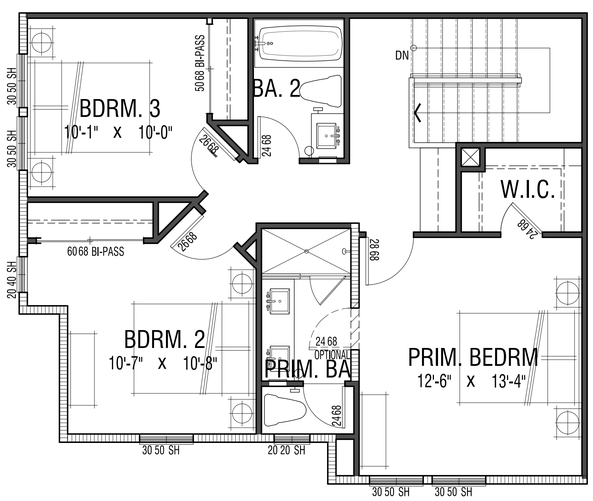

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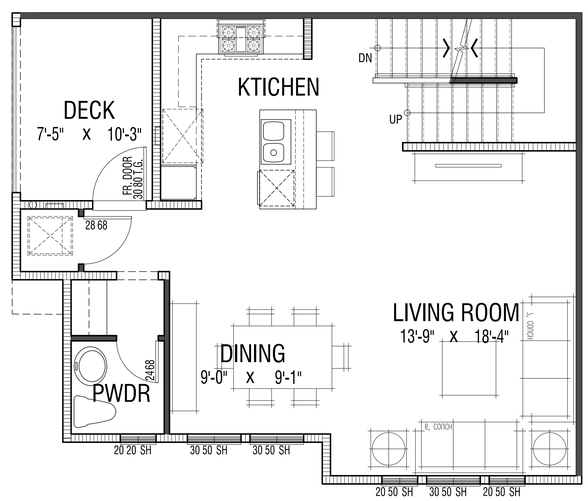

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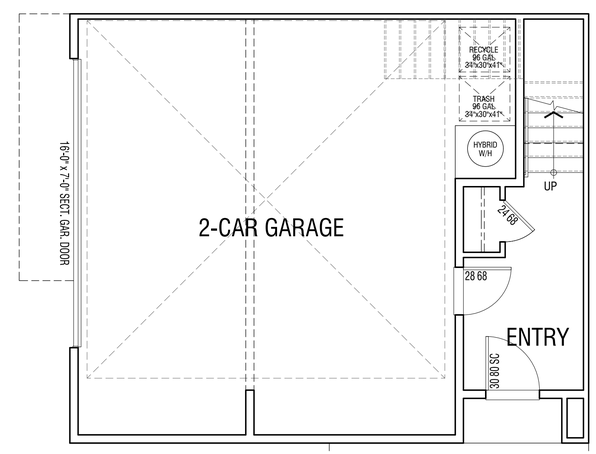

1A FIRST FLOOR

UNIT PLAN 1A, 1AX AND 1AY

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A6.1

Scale: 1/4"=1'-0" 0 4 8 16

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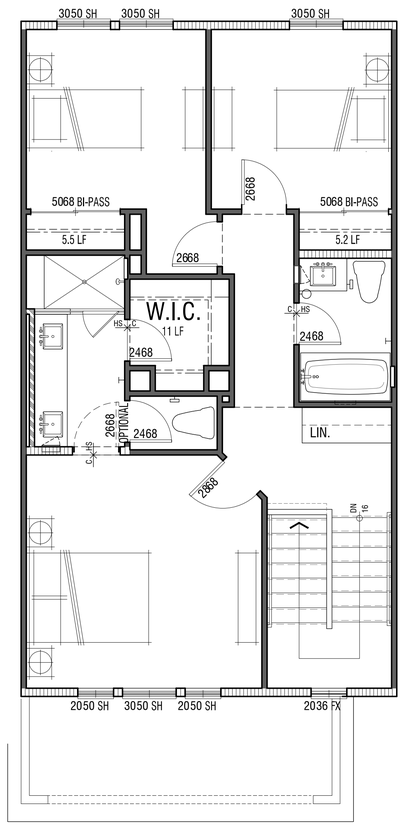

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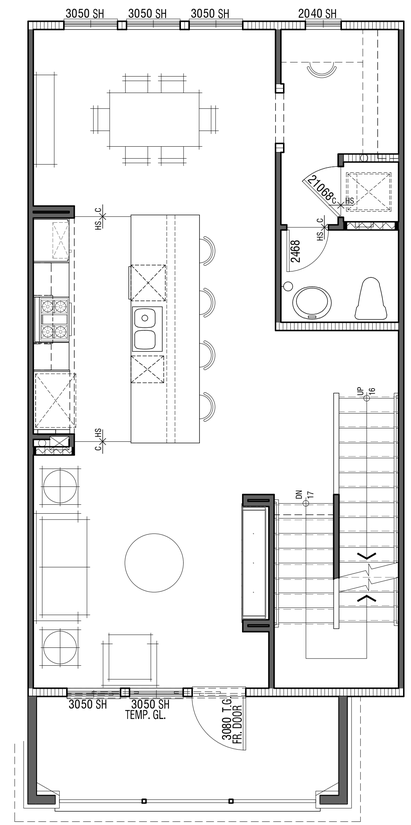

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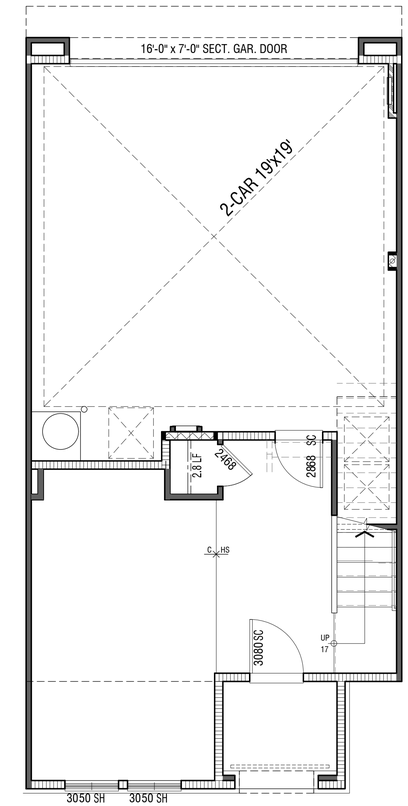

FIRST FLOOR

DWELLING PLAN SUMMARY - PLAN 2A&2B	
ROOM TYPE	QUANTITY
BEDROOM(S)	3 (Opt. 4)
BATH(S)	2.5
FLOOR AREA TABLE	PLAN 2A
FIRST LEVEL	321 SQ. FT.
SECOND LEVEL	793 SQ. FT.
THIRD LEVEL	719 SQ. FT.
TOTAL	1833 SQ. FT.
2-BAY GARAGE	479 SQ. FT.
COVERED ENTRY	41 SQ. FT.
DECK	107 SQ. FT.

NOTE: SQUARE FOOTAGE MAY VARY DUE TO METHOD OF CALCULATION

UNIT PLAN 2A

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SONOMA COUNTY, CA

Scale: 1/4"=1'-0" 0 4 8 16

A6.2

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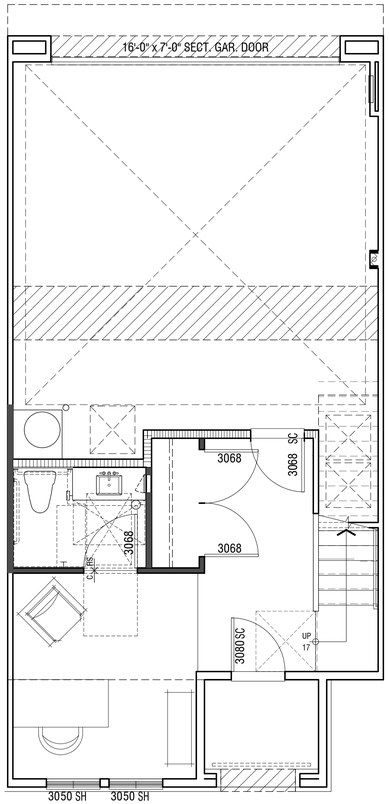
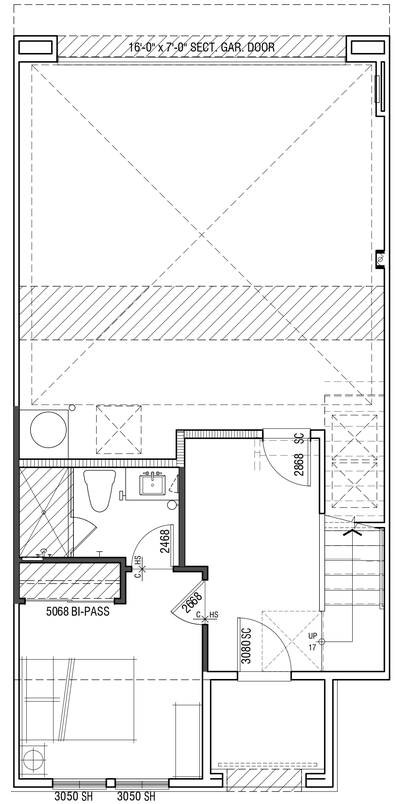
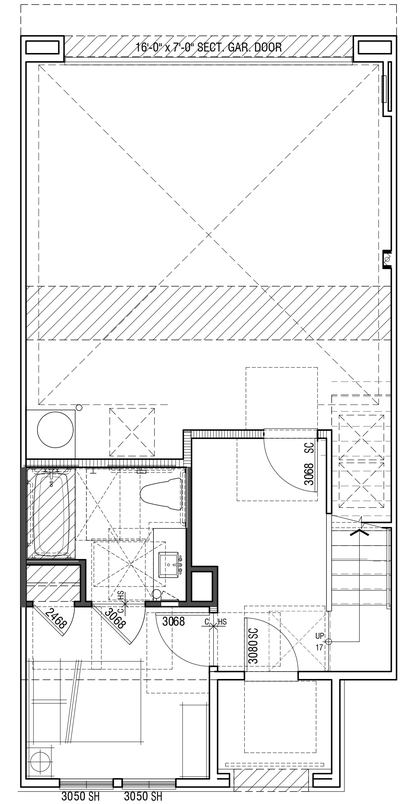


FIRST FLOOR ADAPTABLE DEN / OFFICE



FIRST FLOOR OPTIONAL BEDROOM



FIRST FLOOR ADAPTABLE OPT. BEDRM.

UNIT PLAN 2A

CITY VENTURES
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A6.2a

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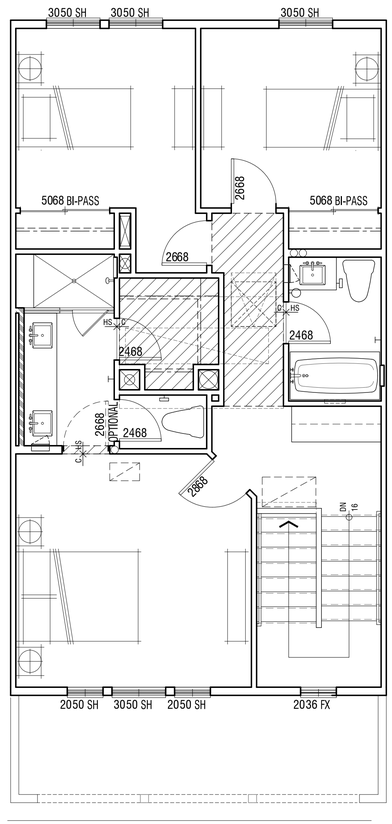
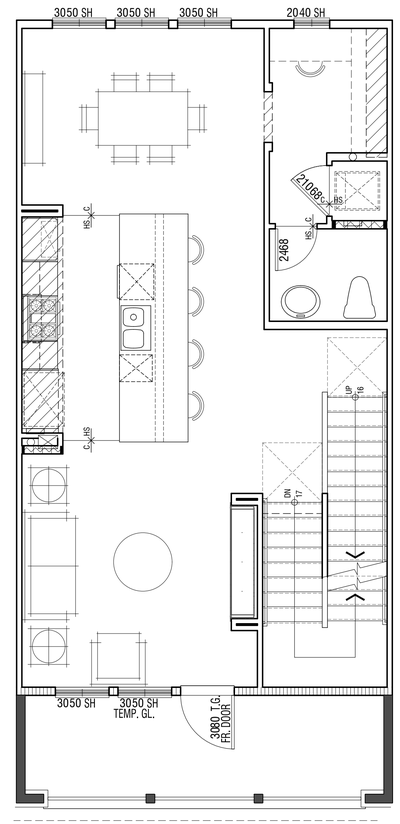
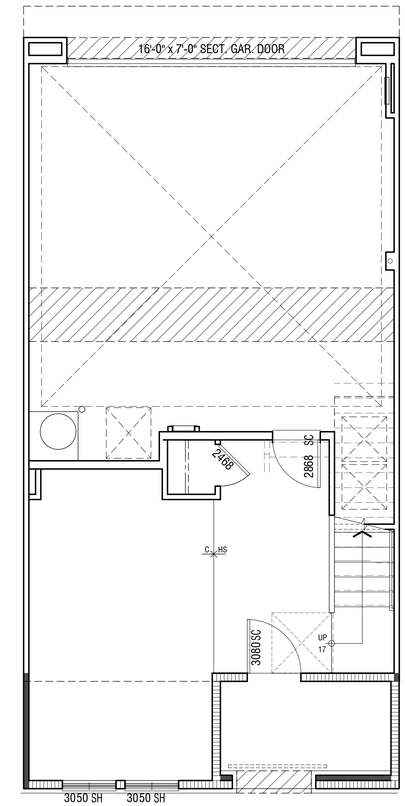


THIRD FLOOR



SECOND FLOOR



FIRST FLOOR

UNIT PLAN 2B

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Scale: 1/4"=1'-0" 0 4 8 16

A6.2b

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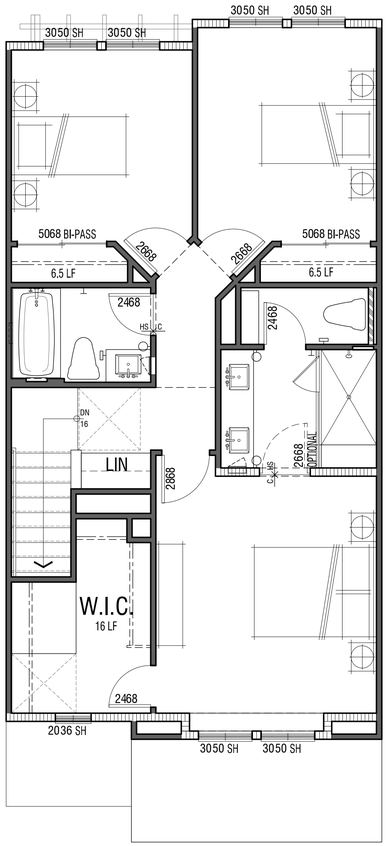

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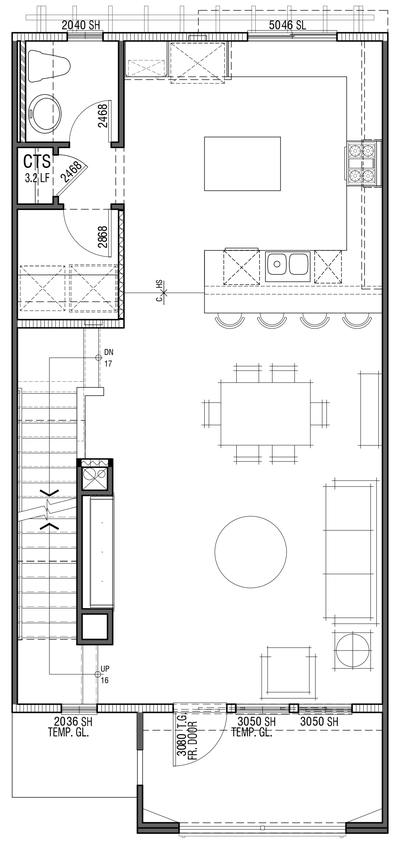

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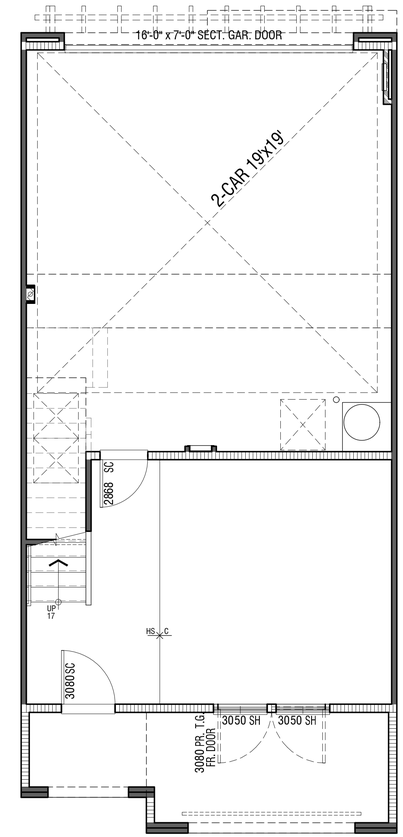

FIRST FLOOR

DWELLING PLAN SUMMARY - PLAN 3A	
ROOM TYPE	QUANTITY
BEDROOM(S)	3 (Opt. 4)
BATH(S)	2.5
FLOOR AREA TABLE	PLAN 3A
FIRST LEVEL	288 SQ. FT.
SECOND LEVEL	798 SQ. FT.
THIRD LEVEL	780 SQ. FT.
TOTAL	1866 SQ. FT.
2-BAY GARAGE	499 SQ. FT.
COVERED ENTRY	128 SQ. FT.
DECK	94 SQ. FT.

NOTE: SQUARE FOOTAGE MAY VARY DUE TO METHOD OF CALCULATION

UNIT PLAN 3A

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A6.3

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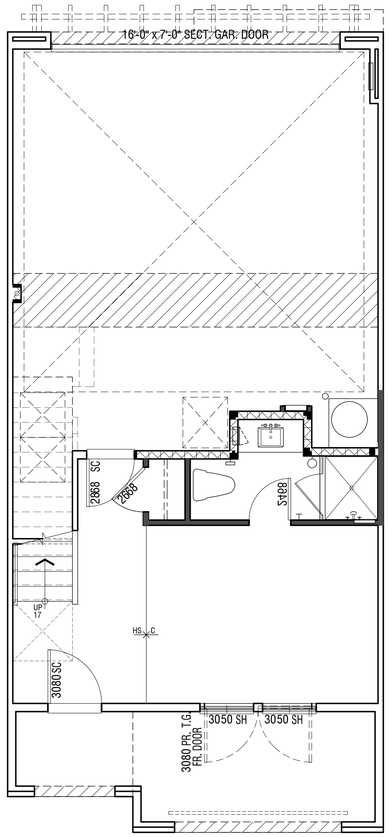
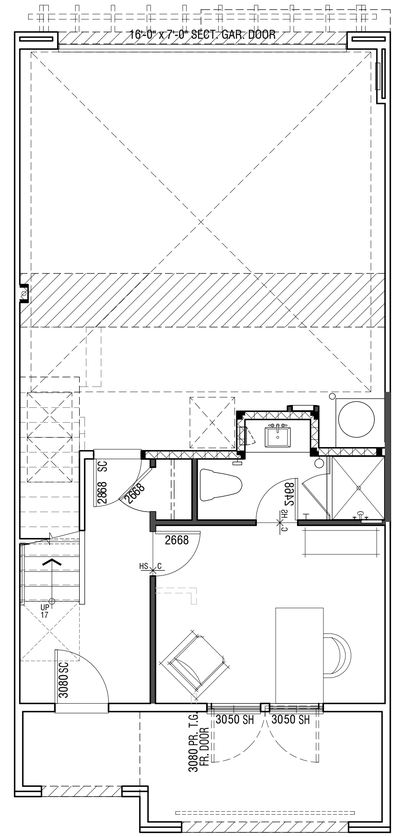
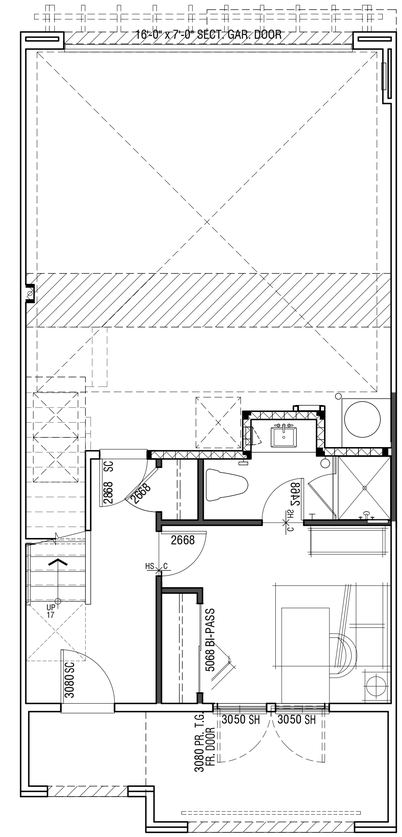


FIRST FLOOR OPTIONAL BATH ROOM



FIRST FLOOR OPTIONAL DEN / OFFICE



FIRST FLOOR OPTIONAL BED ROOM

UNIT PLAN 3A OPTIONS

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Scale: 1/4"=1'-0" 0 4 8 16

A6.3a

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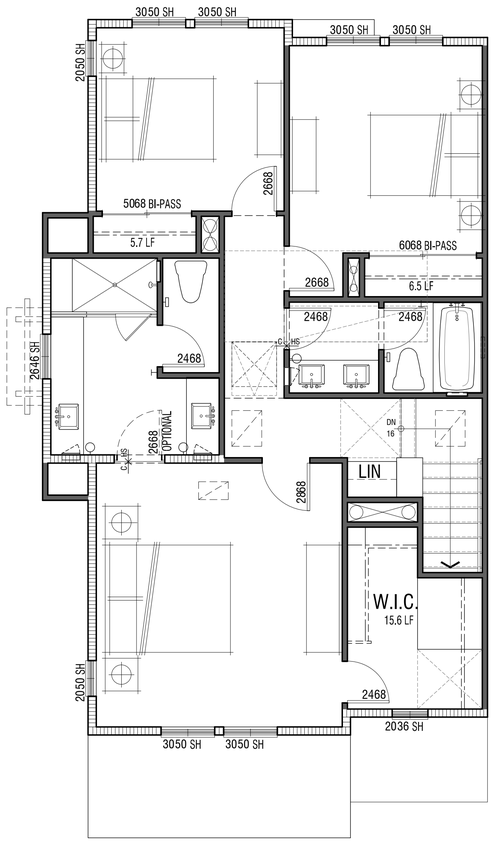
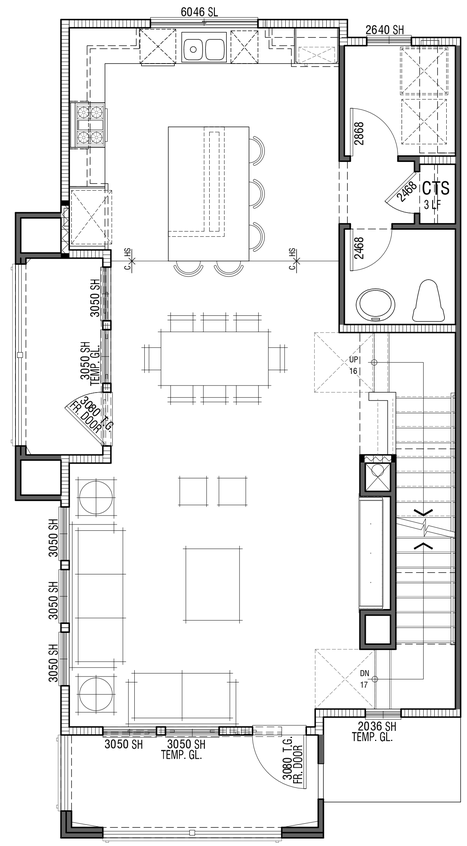


THIRD FLOOR



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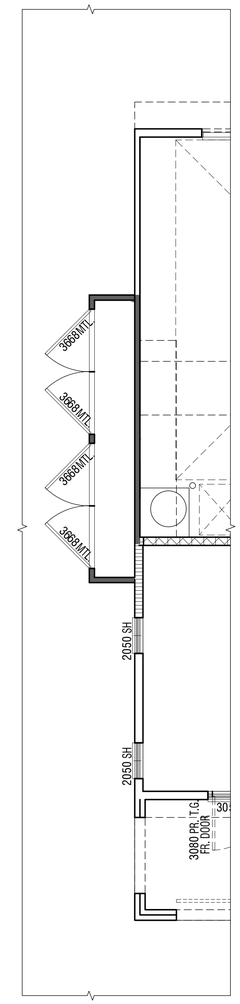
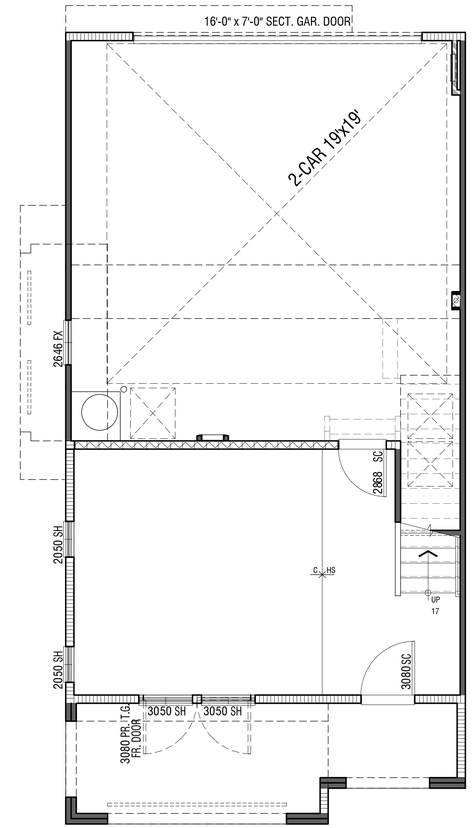


4AX



FIRST FLOOR

DWELLING PLAN SUMMARY - PLAN 4A & 4AX	
ROOM TYPE	QUANTITY
BEDROOM(S)	3 (Opt. 4)
BATH(S)	2.5
FLOOR AREA TABLE	PLAN 4A & 4AX
FIRST LEVEL	298 SQ. FT.
SECOND LEVEL	850 SQ. FT.
THIRD LEVEL	897 SQ. FT.
TOTAL	2045 SQ. FT.
2-BAY GARAGE	531 SQ. FT.
COVERED ENTRY	135 SQ. FT.
DECK 1	84 SQ. FT.
DECK 2	52 SQ. FT.

NOTE: SQUARE FOOTAGE MAY VARY DUE TO METHOD OF CALCULATION

UNIT PLAN 4A & 4AX

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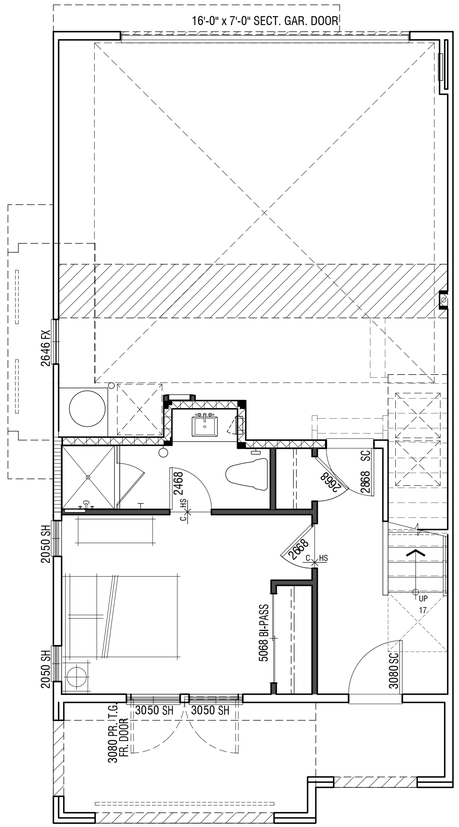

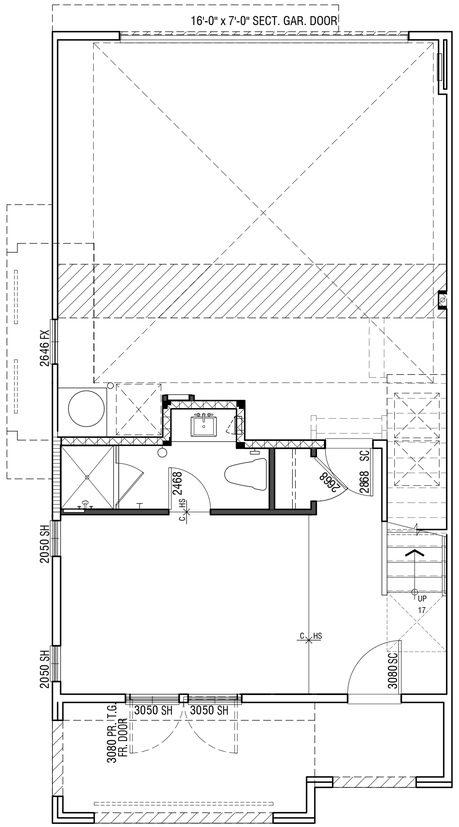

FIRST FLOOR OPTION BED ROOM

FIRST FLOOR OPTION BATH ROOM

UNIT PLAN 4A OPTIONS

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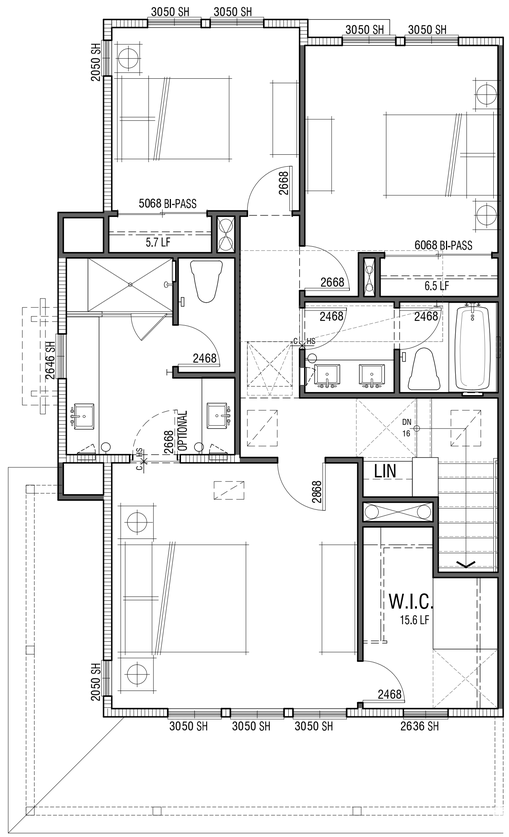
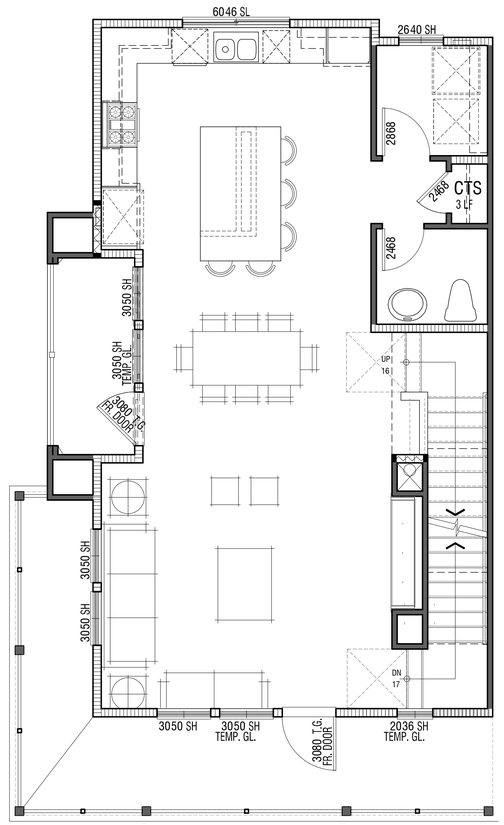
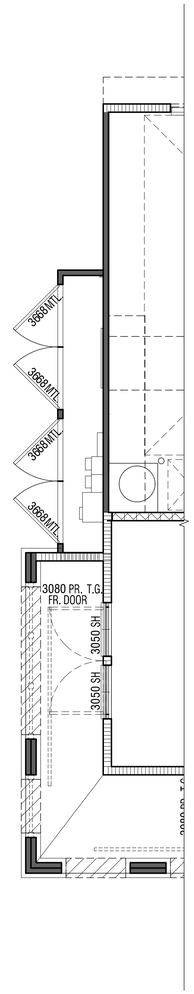
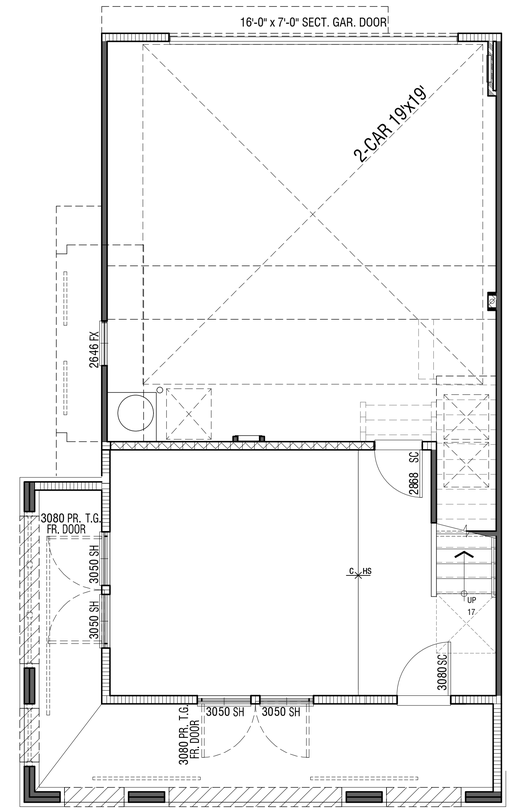


THIRD FLOOR



SECOND FLOOR





FIRST FLOOR

4BX

DWELLING PLAN SUMMARY - PLAN 4B & 4BX	
ROOM TYPE	QUANTITY
BEDROOM(S)	3 (Opt. 4)
BATH(S)	2.5
FLOOR AREA TABLE	PLAN 4B & 4BX
FIRST LEVEL	309 SQ. FT.
SECOND LEVEL	835 SQ. FT.
THIRD LEVEL	843 SQ. FT.
TOTAL	1988 SQ. FT.
2-BAY GARAGE	528 SQ. FT.
COVERED ENTRY	202 SQ. FT.
DECK 1	202 SQ. FT.
DECK 2	53 SQ. FT.

UNIT PLAN 4B

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A6.4B

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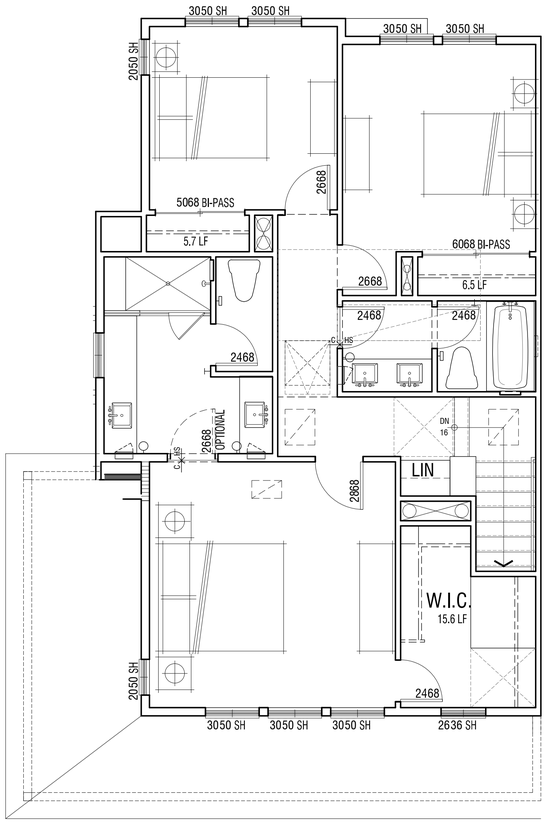
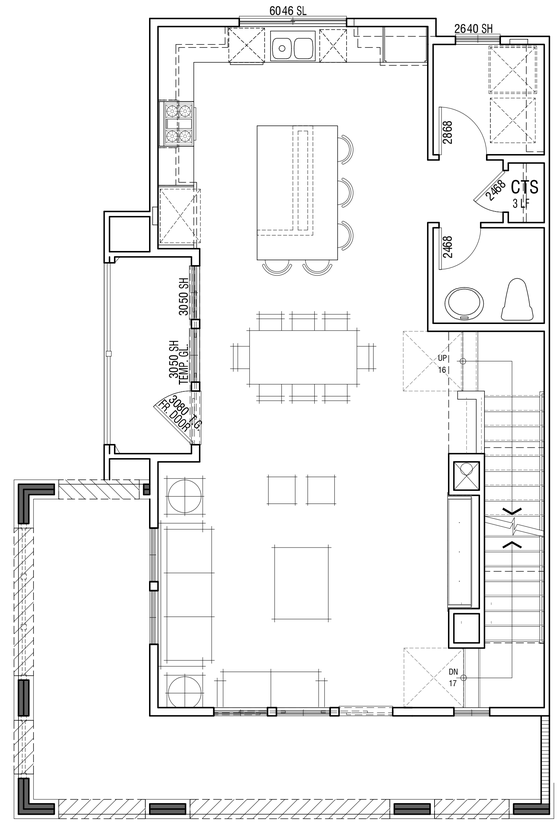


THIRD FLOOR



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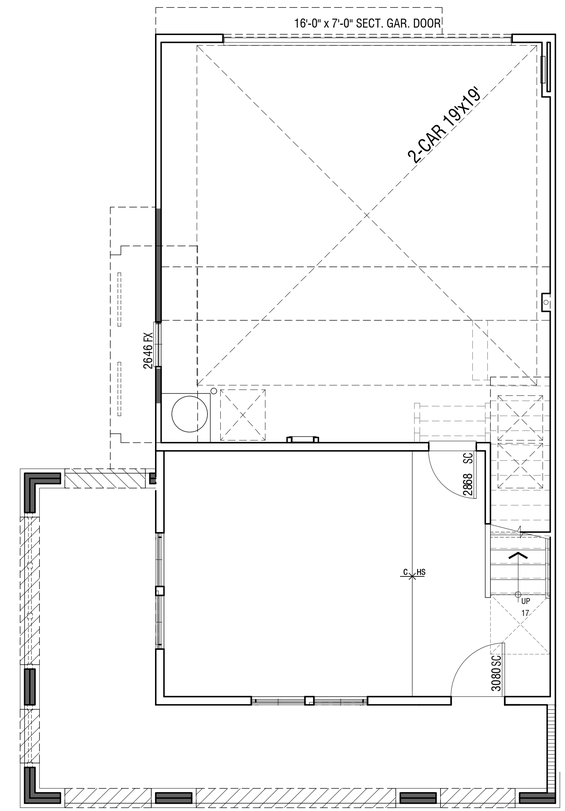

FIRST FLOOR

DWELLING PLAN SUMMARY - PLAN 4C	
ROOM TYPE	QUANTITY
BEDROOM(S)	3 (Opt. 4)
BATH(S)	2.5
FLOOR AREA TABLE	PLAN 4C
FIRST LEVEL	309 SQ. FT.
SECOND LEVEL	835 SQ. FT.
THIRD LEVEL	843 SQ. FT.
TOTAL	1988 SQ. FT.
2-BAY GARAGE	528 SQ. FT.
COVERED ENTRY	202 SQ. FT.
DECK 1	202 SQ. FT.
DECK 2	53 SQ. FT.

UNIT PLAN 4C

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Scale: 1/4"=1'-0" 0 4 8 16

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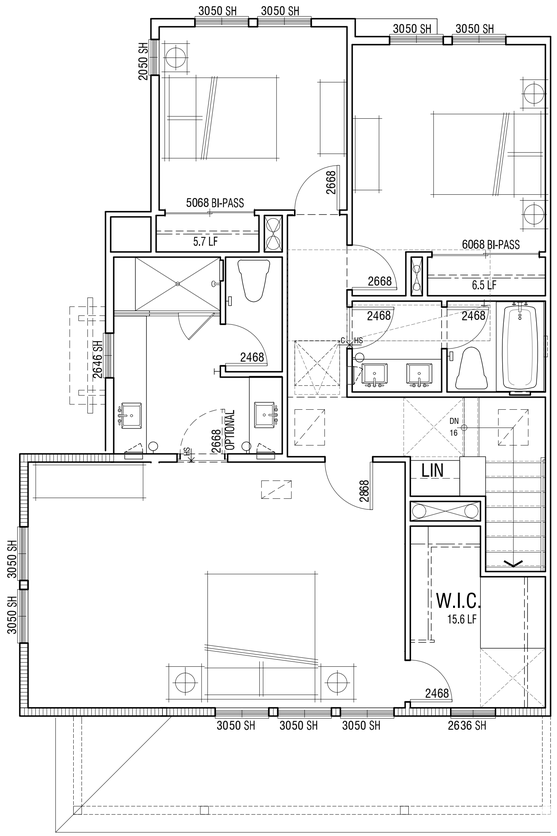
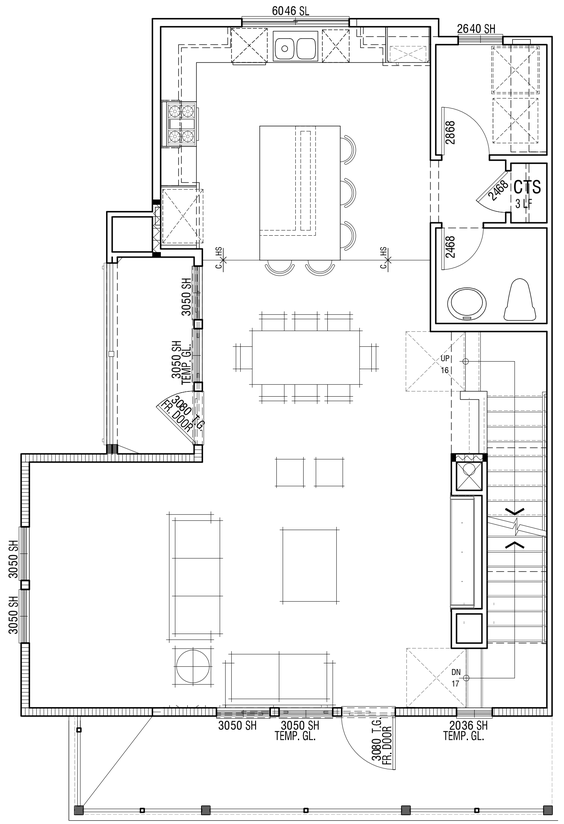
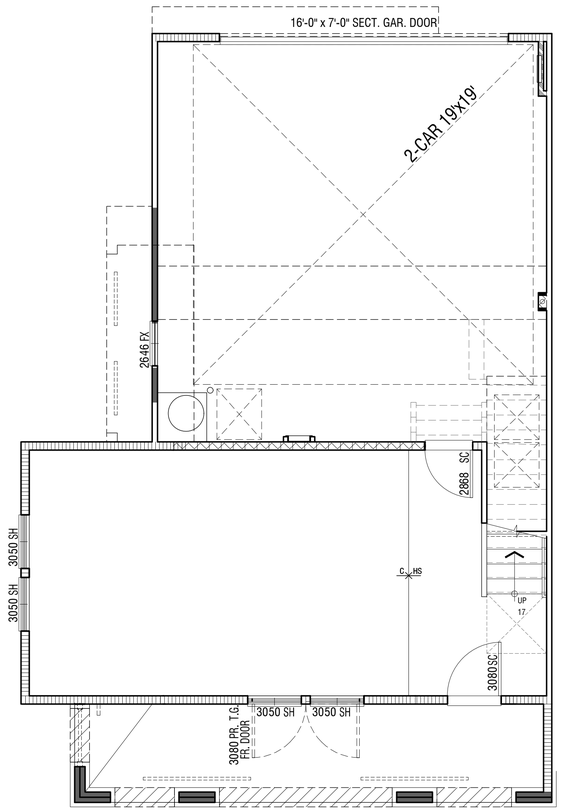


THIRD FLOOR



SECOND FLOOR



FIRST FLOOR

DWELLING PLAN SUMMARY - PLAN 4D	
ROOM TYPE	QUANTITY
BEDROOM(S)	3 (Opt. 4)
BATH(S)	2.5
FLOOR AREA TABLE	PLAN 4D
FIRST LEVEL	309 SQ. FT.
SECOND LEVEL	835 SQ. FT.
THIRD LEVEL	843 SQ. FT.
TOTAL	1988 SQ. FT.
2-BAY GARAGE	528 SQ. FT.
COVERED ENTRY	202 SQ. FT.
DECK 1	202 SQ. FT.
DECK 2	53 SQ. FT.

UNIT PLAN 4D

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SONOMA COUNTY, CA

Scale: 1/4"=1'-0" 0 4 8 16

A6.4D

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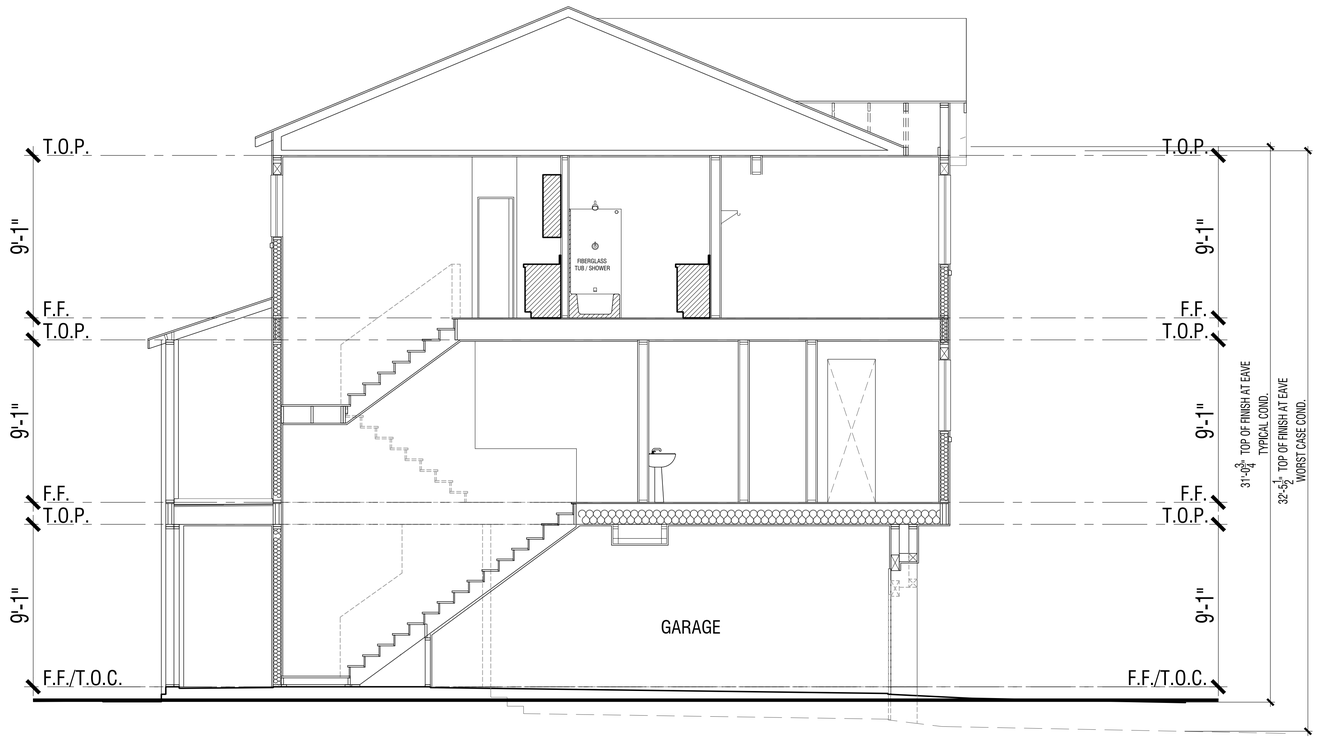

Typical Unit Section
Plan 2A

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SONOMA COUNTY, CA

A7.1

Scale: 1/4"=1'-0" 0 4 8 16

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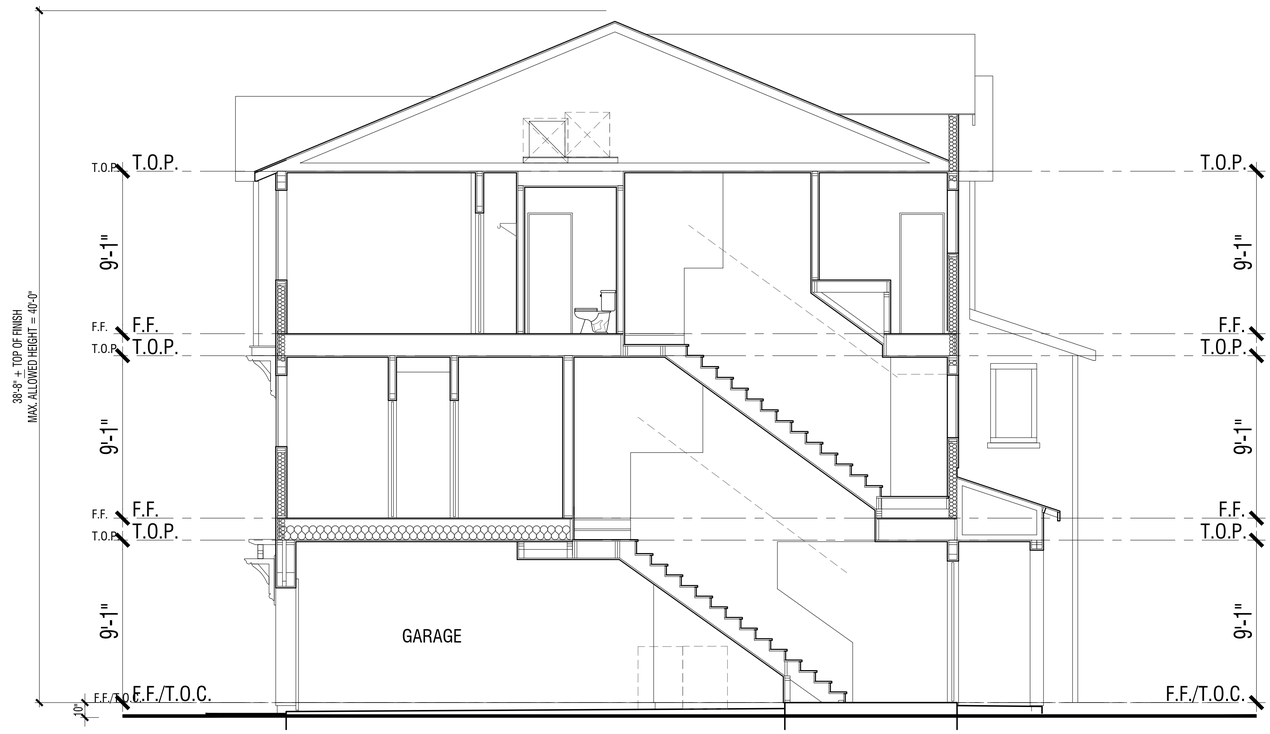

Typical Unit Section
Plan 3A

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SONOMA COUNTY, CA

Scale: 1/4"=1'-0" 0 4 8 16

A7.2

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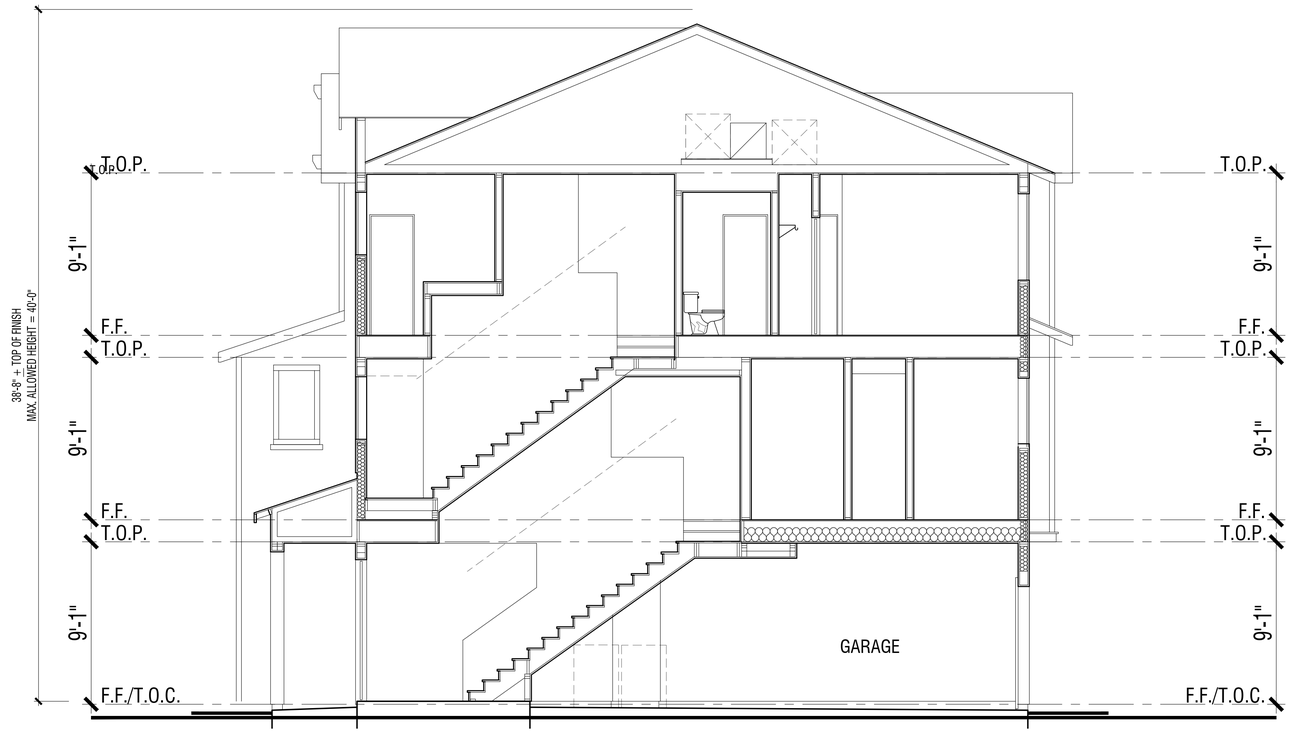

Typical Unit Section
Plan 4A

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Scale: 3/16"=1'-0" 0 4 8 16

A7.3

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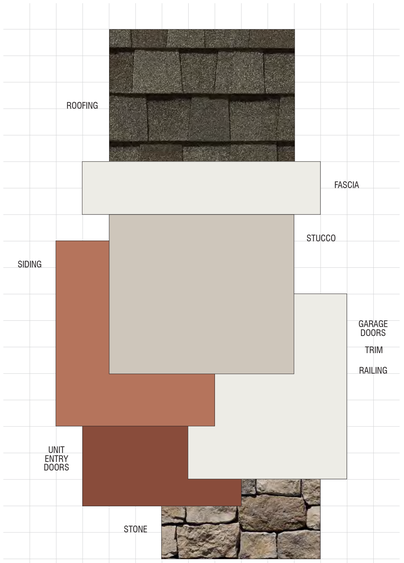

21837 GEYSERVILLE AVE

Sonoma, California
CITY VENTURES
March 28, 2025 | 2024269

SCHEME 1

All Buildings

For exact color refer to manufacturers' actual samples.
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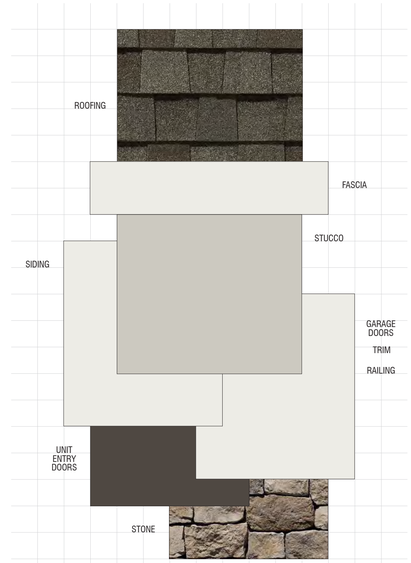

21837 GEYSERVILLE AVE

Sonoma, California
CITY VENUTRES
March 28, 2025 | 2024269

SCHEME 2

All Buildings

For exact color refer to manufacturers' actual samples.
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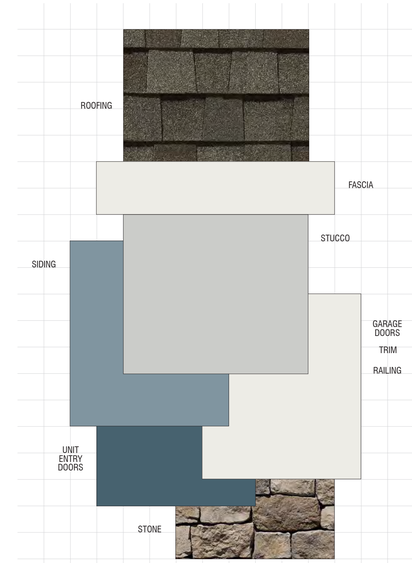

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Sonoma, California
CITY VENUTRES
March 28, 2025 | 2024269

SCHEME 3

All Buildings

For exact color refer to manufacturers' actual samples.
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Sonoma, California
CITY VENUTRES
March 28, 2025 | 2024269
PAGE 1 OF 3

Exterior Color & Materials

SCHEME 1 — ALL BUILDINGS

Material	Color	Manufacturer
Roofing: Ashpalt Shingles	Weathered Wood Landmark Solaris Ref: .20 Emi: .91 A.SRI: 20 CRRC: 0668-0119	Certainteed
Gutters & Downspouts *(factory finish)*	Match Adjacent Color	TBD
Vinyl Windows *(factory finish)*	White	Milgard
Manufactured Stone *(standard raked joints)*	Moonlight Roughcut	Eldorado / Westlake
Grout at Manufactured Stone	Misty Cove	Orco
Stucco Color *(16/20 sand finish)*	SW 7043 Worldly Gray	Sherwin Williams
Siding Color *(applied to):* Corner Boards, Lap Siding	Match Dunn Edwards DE 5187 Weathered Saddle	Sherwin Williams
Trim Color *(applied to):* Barge Boards, Braces, Eaves, Fascia, French Doors, Gable Trusses, Garage Doors, Posts, Railing, Trim, Utility Doors	SW 7005 Pure White	Sherwin Williams
Accent Color *(applied to):* Unit Entry Doors	Match Dunn Edwards DEA 156 Cherry Cola	Sherwin Williams
Garage Door Weatherstrip *(factory finish)*	Match Garage Door Color	TBD

NOTE: Notify WHA if any variation occurs between these schemes and the construction documents prior to purchase. Contact Donna Aldrich (949) 250-0607.

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Sonoma, California
CITY VENUTRES
March 28, 2025 | 2024269
PAGE 2 OF 3

Exterior Color & Materials

SCHEME 2 — ALL BUILDINGS

Material	Color	Manufacturer
Roofing: Ashpalt Shingles	Weathered Wood Landmark Solaris Ref: .20 Emi: .91 A.SRI: 20 CRRC: 0668-0119	Certainteed
Gutters & Downspouts *(factory finish)*	Match Adjacent Color	TBD
Vinyl Windows *(factory finish)*	White	Milgard
Manufactured Stone *(standard raked joints)*	Moonlight Roughcut	Eldorado / Westlake
Grout at Manufactured Stone	Misty Cove	Orco
Stucco Color *(16/20 sand finish)*	SW 7015 Repose Gray	Sherwin Williams
Siding Color *(applied to):* Barge Boards, Braces, Corner Boards, Eaves, Fascia, French Doors, Gable Trusses, Garage Doors, Lap Siding, Posts, Railing, Trim, Utility Doors	SW 7005 Pure White	Sherwin Williams
Accent Color *(applied to):* Unit Entry Doors	SW 7020 Black Fox	Sherwin Williams
Garage Door Weatherstrip *(factory finish)*	Match Garage Door Color	TBD

NOTE: Notify WHA if any variation occurs between these schemes and the construction documents prior to purchase. Contact Donna Aldrich (949) 250-0607.

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Sonoma, California
CITY VENUTRES
March 28, 2025 | 2024269
PAGE 3 OF 3

Exterior Color & Materials

SCHEME 3 — ALL BUILDINGS

Material	Color	Manufacturer
Roofing: Ashpalt Shingles	Weathered Wood Landmark Solaris Ref: .20 Emi: .91 A.SRI: 20 CRRC: 0668-0119	Certainteed
Gutters & Downspouts *(factory finish)*	Match Adjacent Color	TBD
Vinyl Windows *(factory finish)*	White	Milgard
Manufactured Stone *(standard raked joints)*	Moonlight Roughcut	Eldorado / Westlake
Grout at Manufactured Stone	Misty Cove	Orco
Stucco Color *(16/20 sand finish)*	SW 7064 Passive	Sherwin Williams
Siding Color *(applied to):* Corner Boards, Lap Siding	SW 7603 Poolhouse	Sherwin Williams
Trim Color *(applied to):* Barge Boards, Braces, Eaves, Fascia, French Doors, Gable Trusses, Garage Doors, Posts, Railing, Trim, Utility Doors	SW 7005 Pure White	Sherwin Williams
Accent Color *(applied to):* Unit Entry Doors	SW 0048 Bunglehouse Blue	Sherwin Williams
Garage Door Weatherstrip *(factory finish)*	Match Garage Door Color	TBD

NOTE: Notify WHA if any variation occurs between these schemes and the construction documents prior to purchase. Contact Donna Aldrich (949) 250-0607.

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Color Schemes & Exterior Color & Materials

Note:
All Colors & Materials Are Conceptual And
Shall Be Finalized During Building Permits.

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21837 GEYSERVILLE AVE

SONOMA COUNTY, CA

Scale: 3/32"=1'-0"

C&M

0 4 8 16

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2024269 | 2025-03-19

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LEGEND

1. Project Entry with Signage
2. Vehicular Pavers
3. Sidewalk
4. Central Open Space
   - Shade Structure
   - BBQ Grill
   - Picnic Table
   - Turf Area
   - Vineyard
5. Social Area
   - Event Lawn
   - Sculpture
   - Seating
6. Community Garden
   - Planter Plot
   - Seating Area
   - Work Bench
7. Pocket Park A
   - Art Piece
   - Turf Area
   - Bench
8. Pocket Park B
   - Turf Area
   - Bench
9. Bike Rack
10. Mailbox
11. Private Patio
12. Bio-Retention Basin per Civil Engineer
13. Transformer
14. Rock Mulch within 5' "0 Zone"
15. Shrub Plating
16. Specimen Tree
17. Shade Tree

CITY VENTURES
Building It Forward

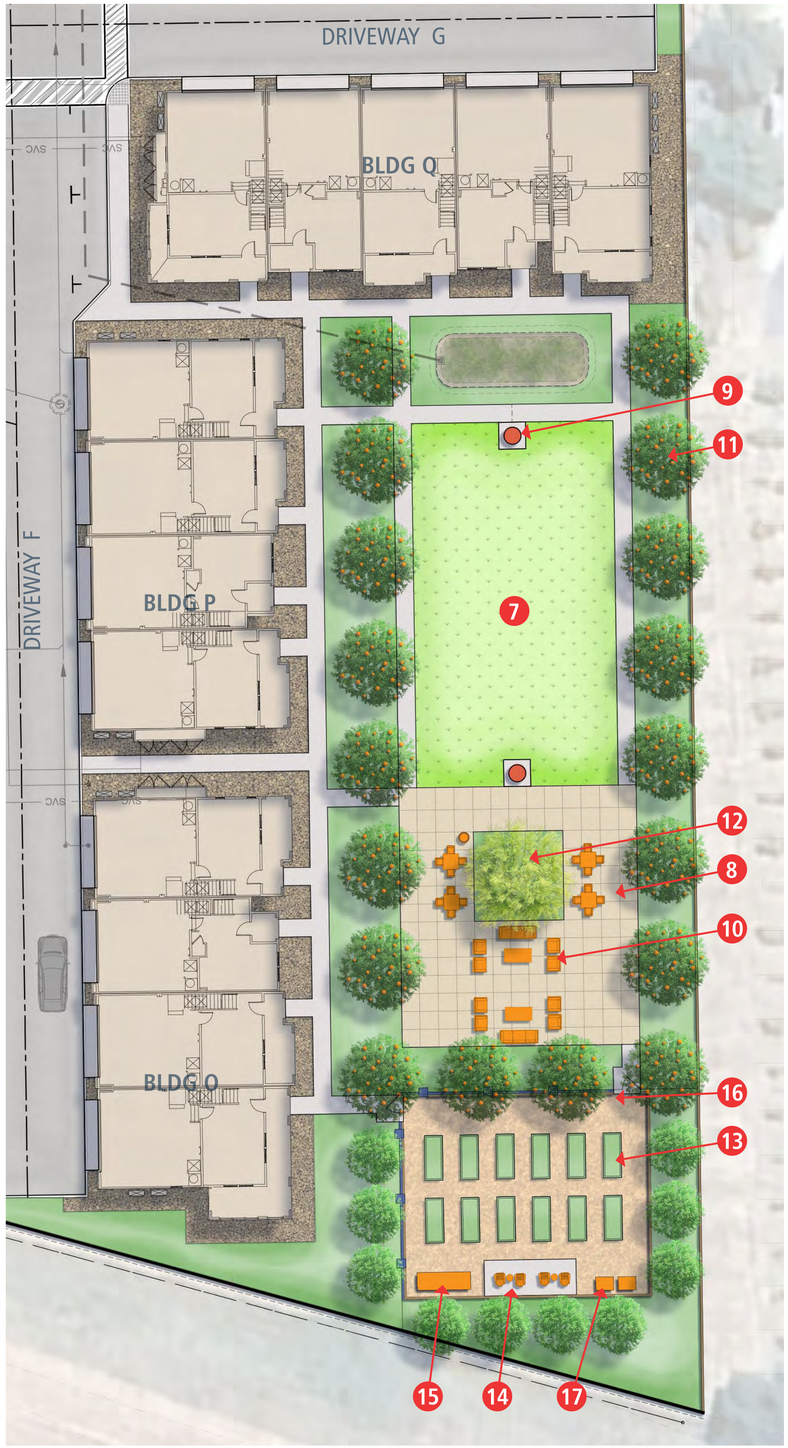
21837 GEYSERVILLE AVE - CONCEPTUAL LANDSCAPE SITE PLAN
SONOMA COUNTY, CA

0 15' 30' 60'
Scale: 1" = 30'-0"

03.26.25

L-1

C2 Collaborative



B SOCIAL OPEN SPACE AND COMMUNIATY GARDEN
SCALE: 1/16"=1'-0"

A CENTRAL OPEN SPACE
SCALE: 1"=10'-0"

LEGEND

Central Open Space

1. Shade Structure
2. BBQ Grill
3. Picnic Table
4. Turf Area
5. Planter Pot
6. Vineyard

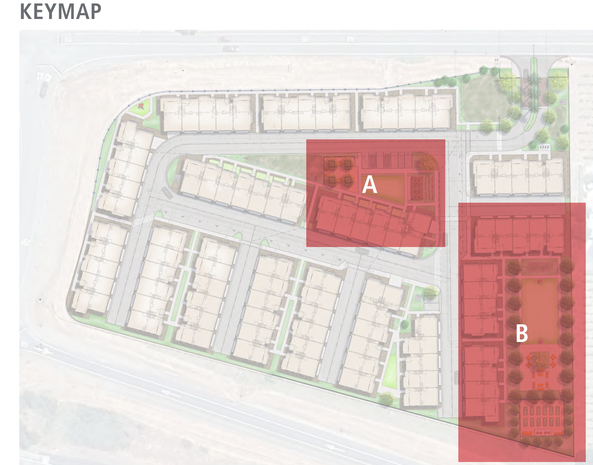
Social Area

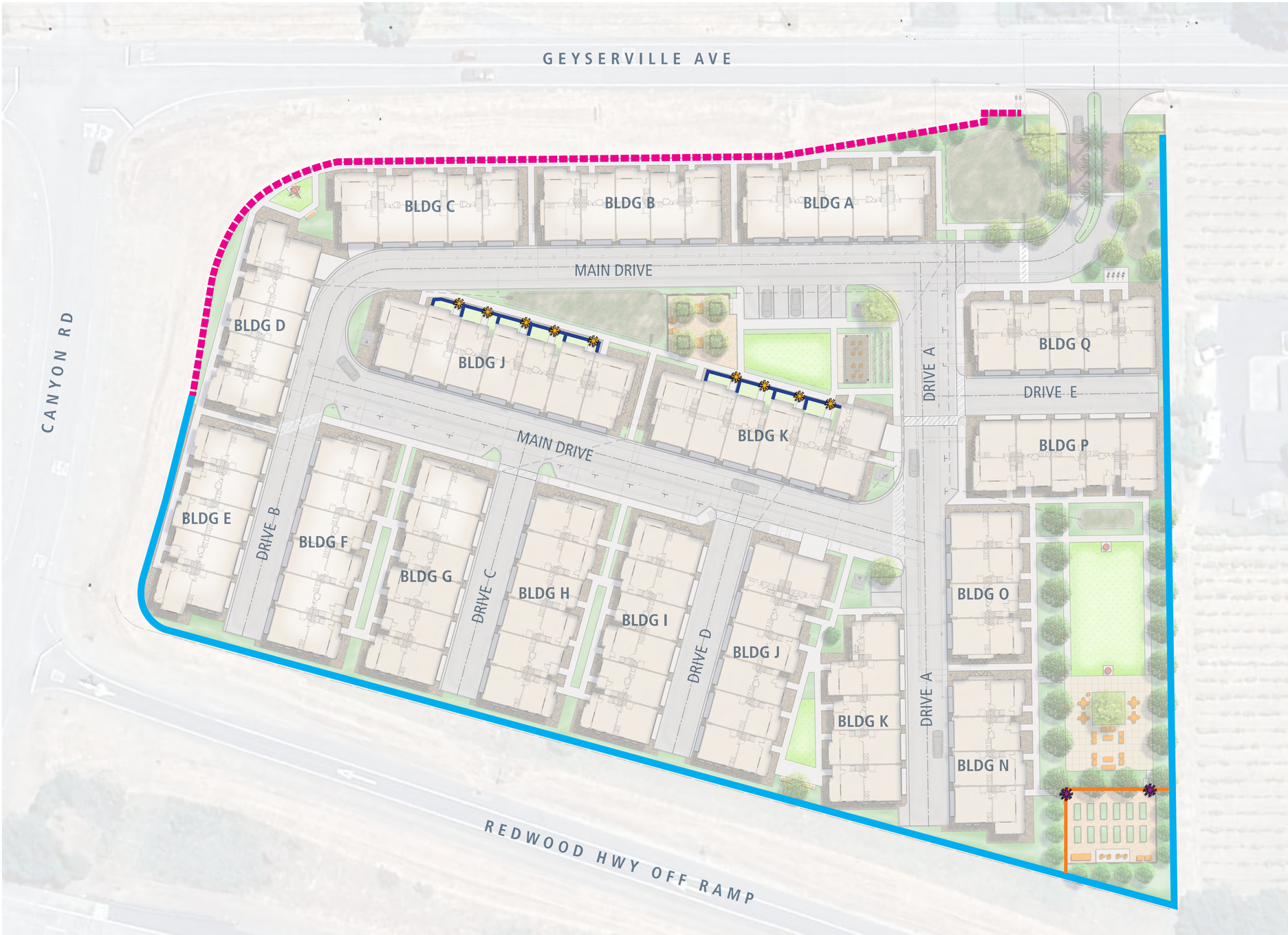
7. Event Lawn
8. Concrete Paving
9. Accent Sculpture
10. Seating
11. Fruit Tree
12. Specimen Tree

Community Garden

13. Planter Plot
14. Seating Area
15. Work Bench
16. Enclosure Fence
17. Compost

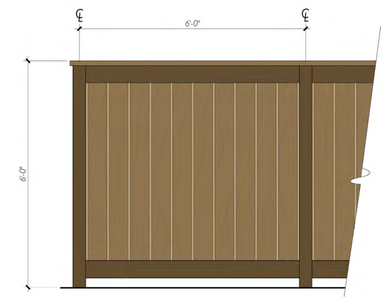
KEYMAP





LEGEND

- Vinyl Perimeter Fence - 6'ht.
- Tubular Steel View Fence - 6'ht.
- Tubular Steel Patio Fence - 3.5'ht.
- Tubular Stee Patio Gate - 3.5'ht.
- Tubular Steel Community Garden Enclosure Fence - 3.5'ht.
- Tubular Steel Community Garden Enclosure Gate - 3.5'ht.

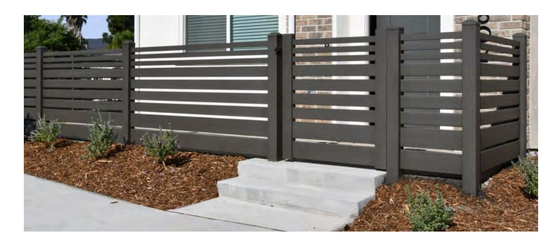


Color to Match Architure

Vinyl Perimeter Fence

Paint Color: SW7048 Urbane Bronze or Equal

Tubular Steel View Fence



Paint Color: SW7048 Urbane Bronze or Equal

Tubular Steel Patio Fence and Gate

Community Garden Enclosure Fence and Gate

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21837 GEYSERVILLE AVE - CONCEPTUAL WALL AND FENCE PLAN AND DETAILS

SONOMA COUNTY, CA

0 15' 30' 60'
Scale: 1" = 30'-0"

03.26.25

L-4

C2 Collaborative

LEGEND

- Very Low Water Use
- Medium Water Use
- High Water Use

Project Name: CTV217- Sonoma - Geyserville A

Date: March 25, 2025

WATER EFFICIENT WORK SHEET

Maximum Applied Water Allowance (MAWA)

Total MAWA = (Eto x 0.50 x LA in Sq.ft. x 0.62)+(Eto x 1.0 x SLA in Sq.ft. x 0.62)= Gallons per year for LA + SLA

Hydrozone:	Eto:	KL	LA Sq. Ft.	Conversion	SLA Sq. Ft.	MAWA
Landscaped Area	**43.9**	**0.55**	**53,616**	**0.62**	**NA**	**802,626**

MAWA= Maximum Applied Water Allowance (gallons per year)
Eto= Reference Evapotranspiration from Appendix C (inches per year)
0.50= Evapotrasspiration Adjustment Factor (ETAF)
1.0= ETAF for Sprcial Landscaped Area
LA= Landscaped Area includes Special Landscape Area (square feet)
0.62= Conversion Factor (to gallons per square foot)
0.3= the additional ET adjustment Factor for Special Landscape Area (1.0- 0.7= 0.3)
SLA= Speical Landscape Area (square feet)

Applicant to fill in boxes below:

Eto (Reference Evapotranspiration from Appendix C inches per year)	**43.9**
Landscaped Area includes Special Landscape Area (square feet)	**53,616**
Speical Landscape Area (square feet)	**0**

Estimated Annual Water Use:

Total EAWU = (Eto x KL x LA in Sq.ft. / IE)= Gallons per Year

Hydrozone:	Eto:	KL	Sq. Ft.	Conversion	IE	EAWU
Very Low Water Use	**43.9**	**0.1**	**17,086**	**0.62**	**0.81**	**57,413**
Low Water Use	**43.9**	**0.2**	**-**	**0.62**	**0.81**	**-**
Medium Water Use S	**43.9**	**0.5**	**30,230**	**0.62**	**0.81**	**507,901**
High Water Use	**43.9**	**0.8**	**6,300**	**0.62**	**0.73**	**187,916**
Total EAWU:			**53,616**			**753,231**

EAWU= Estimated Applied Water Use (gallons per year)
Eto= Reference Evapotranspiration from Appendix C (inches per year)
Kl= Landscape Coefficient
LA= Landscaped Area (square feet)
0.62= Conversion Factor (to gallons per square foot)
IE = Irrigation Efficiency= IME X DU (See defination in Appendix E for exmapine IE percentages)
IME= Irrigation Management Efficiency (90%)
DU= Distribution Uniformity of Irrigation Head
Kl= Ks x Kc x Kmc
Ks= species factor (range 1.0- 0.9) (see WUCOLS list for values)
Kd= density factor (range 0.5- 1.3) (see WUCOLS list for density value)
Kmc= microclimatic factor (range 0.5- 1.4) (see WUCOLS)

Table A- PF (Plant Factor)

Cool Season Turf= 0.8
Warm Season Turf= 0.7
High Water Use Plants= 0.7 (can be between 0.7-0.9)
Moderate Water Use Plants= 0.5 (can be between 0.4-0.6)
Low Water Use Plants= 0.2 (can be between 0.1-0.3)
Very Low Water Use Plants= 0.1

IE (Irrigation Efficiency)- Appendix E

Pop-up Stream Rotor= 0.73
Rotor Head= 0.76
Microspray= 0.76
Bubbler= 0.77
Drip Emitters= 0.81
Subsurface Irrigation= 0.81

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21837 GEYSERVILLE AVE - PRELIMINARY IRRIGATION CALCULATION

SONOMA COUNTY, CA

0 15' 30' 60'
Scale: 1" = 30'-0"

03.26.25

L-5

C2 Collaborative

TREE SCHEDULE:

BOTANICAL NAME	COMMON NAME	SIZE	SPACING	WUCOLS
Arbutus unedo	Strawberry Tree	48" Box	Per Plan	L
Cercis occidentalis	Western Redbud	36" Box	Per Plan	VL
Magnolia grandiflora 'Little Gem'	Little Gem Southern Magnolia	36" Box	Per Plan	M
Melaleuca quinquenervia	Paperbark Tree	36" Box	Per Plan	L
Platanus racemosa	Western Sycamore	24" Box	Per Plan	M
Prunus caroliniana	Carolina Cherry Laurel	36" Box	Per Plan	L
Prunus salicina	Japanese Plum	15 gal.	Per Plan	L
Podocarpus elongatus 'Monmal'	Icee Blue Yellowwood	24 gal.	Per Plan	M
Salix laevigata	Red Willow	24" Box	Per Plan	H
Salix lasiolepis	Arroyo Willow	24" Box	Per Plan	H
Salix lucida ssp. Lasiandra	Pacific Willow	24" Box	Per Plan	H

VINE/ESPALIER SCHEDULE:

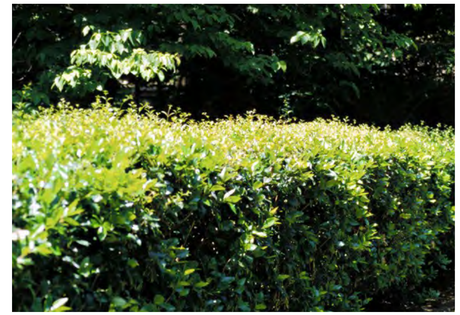
BOTANICAL NAME	COMMON NAME	SIZE	SPACING	
Vitis californica ' Roger's Red'	Roger's Red California Grape	1 gal.	Per Plan	L
Vitis labrusca 'Concord'	Concord Grape	Bare Root	Per Plan	L
Eriobotrya japonica	Japanese Loquat	5 gal.	Per Plan	L

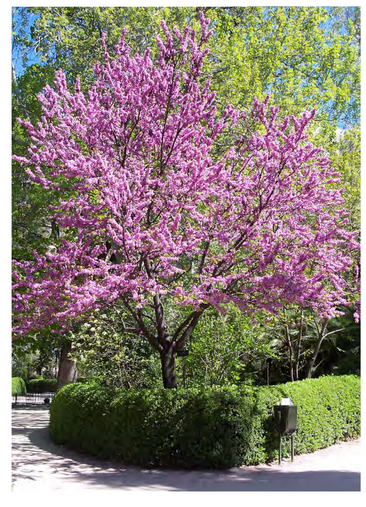
SHRUB SCHEDULE:

BOTANICAL NAME	COMMON NAME	SIZE	SPACING	WUCOLS
Arctostaphylos densiflora 'Harmony'	Harmony Manzanita	5 gal.	48" o.c.	L
Buxus microphyllus var. japonicus 'Green Beauty'	Green Beauty Japanese Boxwood	1 gal.	16" o.c.	M
Calamagrostis x acutifolia 'Karl Foerster'	Feather Reed Grass	1 gal.	18" o.c.	M
Camellia sasanqua 'Shishi Gashira'	Shishi Gashira Camellia	5 gal.	30" o.c.	M
Dianella revoluta 'Little Rev'	Little Rev Flax Lily	1 gal.	18" o.c.	M
Euonymus fortunei	Wintercreeper Euonymus	5 gal.	24" o.c.	M
Festuca mairei	Atlas Fescue	1 gal.	24" o.c.	L
Festuca mairei	Atlas Fescue	5 gal.	30" o.c.	L
Frangula californica 'San Bruno'	San Bruno Coffeeberry	5 gal.	36" o.c.	L
Hakonechloa macra 'Aureola'	Golden Japanese Forest Grass	1 gal.	24" o.c.	M
Heteromeles arbutifolia	Toyon	15 gal.	60" o.c.	L
Ilex vomitoria 'Stoke's Dwarf'	Stoke's Dwarf Yaupon Holly	5 gal.	24" o.c.	L
Juncus patens	Spreading Rush	1 gal.	18" o.c.	L
Ligustrum japonicum 'Texanum'	Waxleaf Privet	5 gal.	30" o.c.	M
Lomandra longifolia 'Arctic Frost'	Arctic Frost Mat Rush	1 gal.	24" o.c.	L
Miscanthus sinensis var. condensatus	Large Silver Grass	1 gal.	36" o.c.	M
Muhlenbergia lindheimeri	Lindheimer's Muhly	1 gal.	24" o.c.	L
Podocarpus macrophyllus 'Maki'	Fern Podocarpus	5 gal.	30" o.c.	M
Polystichium munitum	Western Sword Fern	1 gal.	24" o.c.	M
Rhaphiolepis umbellata 'Minor'	Dwarf Yeddo Hawthorn	5 gal.	24" o.c.	L
Rosa floribunda 'Icecap'	Icecap Rose	5 gal.	30" o.c.	M
Salvia 'Amistad'	Friendship Sage	5 gal.	30" o.c.	-

GROUNDCOVER SCHEDULE:

BOTANICAL NAME	COMMON NAME	SIZE	SPACING	WUCOLS
Marathon II	Turf	Sodded	-	H
Carex pansa	Sand Dune Sedge	1 gal.	18" o.c.	M
Carex tumulicola	Foothill Sedge	1 gal.	18" o.c.	L
Geranium 'Rozanne'	Rozanne Geranium	1 gal.	24" o.c.	L
Heuchera maxima	Island Alum Root	1 gal.	12" o.c.	M
Sesleria autumnalis	Autumn Moor Grass	1 gal.	16" o.c.	M
Trachelospermum asiaticum	Asiatic Jasmine	1 gal.	24" o.c.	M

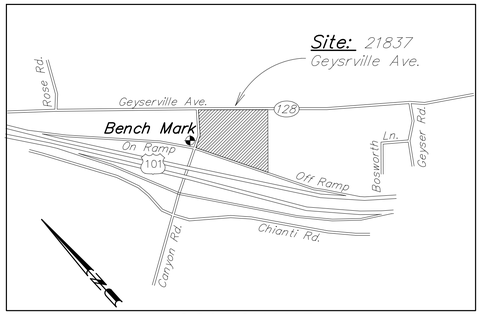




21837 GEYSERVILLE AVENUE - VESTING TENTATIVE MAP

21837 Geyserville Ave, Geyserville, California

APN 140-180-035



LOCATION MAP

NOT TO SCALE

SHEET INDEX

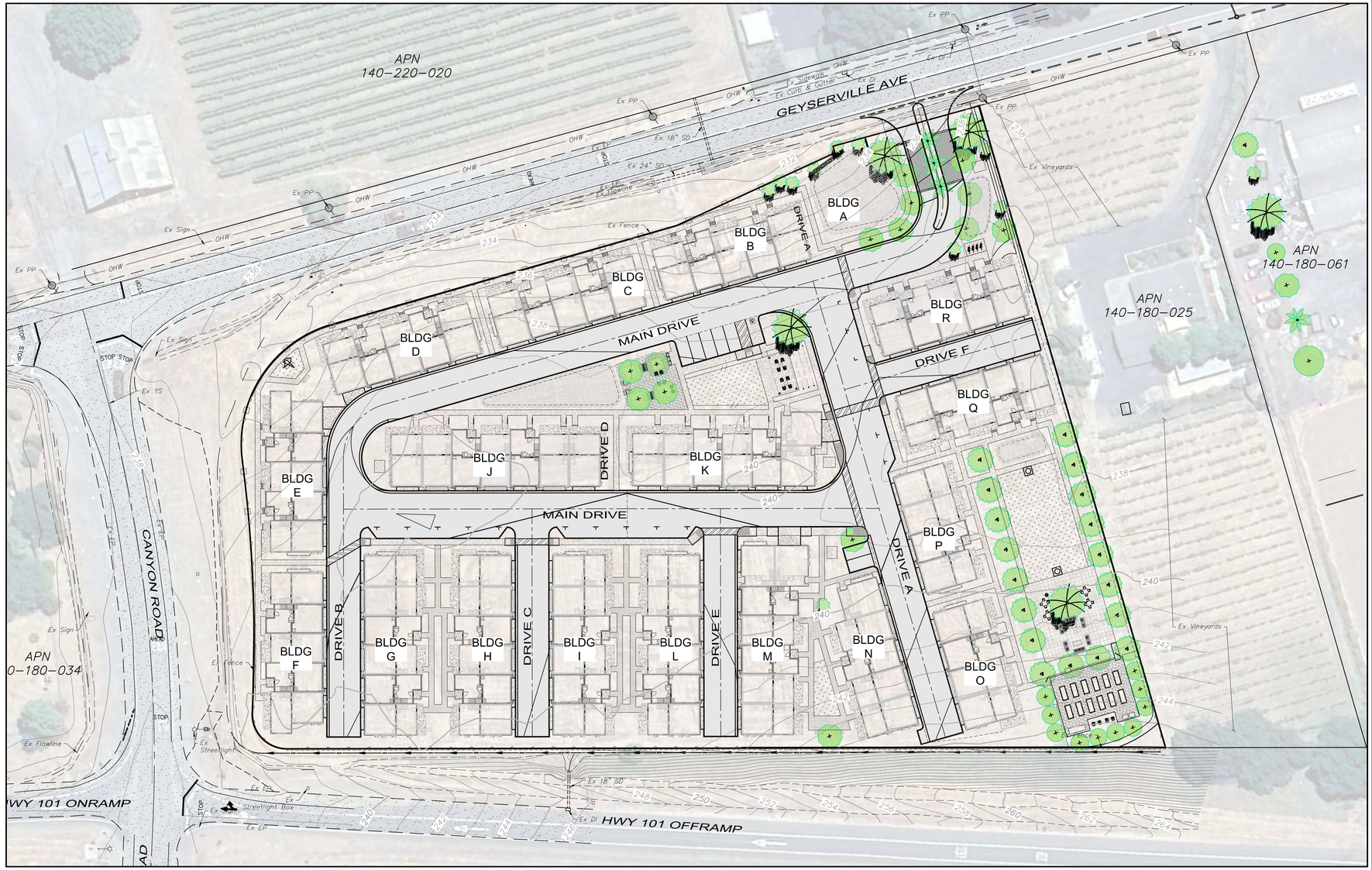
1.	C1.0	TITLE SHEET
2.	C2.0	SITE LAYOUT & TYPICAL STREET SECTIONS
3.	C2.1	VESTING TENTATIVE MAP
4–9.	C3.0–C3.5	PRELIMINARY GRADING & DRAINAGE PLANS
10–11.	C4.0–C4.1	PRELIMINARY UTILITY PLANS

SITE INFORMATION

TOTAL NO. OF UNITS:	93
SITE AREA:	5.11 ACRES
PRESENT ZONING:	R3 B6 20 DU, RC50 SR
LAND USE:	UR 20
HIGH FIRE SEVERITY ZONE:	YES

LEGEND

PROPOSED	EXISTING	DESCRIPTION
		PROPERTY BOUNDARY
		CURB & GUTTER
		SANITARY SEWER & MANHOLE
		SANITARY SEWER & CLEANOUT
		SANITARY SEWER LATERAL
		STORM DRAIN & MANHOLE
		STORM DRAIN & DRAINAGE INLET (DI)
		STORM DRAIN & AREA DRAIN (AD)
		ROOF DRAIN & DOWN SPOUT (DS)
		WATER SERVICE / WM WATER SERVICE / RPBP
		FIRE LINE / DDCV
		BLOW-OFF
		WATER MAIN & GATE VALVE
		FIRE HYDRANT
		STREET SIGN
		STREET NAME SIGN
		JOINT TRENCH COMPOSITE DRY UTILITY (BY OTHERS)
		TRANSFORMER (BY OTHERS)
		LIGHT STANDARD
		UTILITY POLE W/WO GUY WIRE
1 C3.0		DETAIL 1 ON SHEET C3.0
		DRAINAGE SWALE
		DAYLIGHT LINE
		APPROXIMATE LIMIT OF GRADING/DISTURBANCE
300	300	INDEX CONTOUR
299	299	INTERMEDIATE CONTOUR
GB		GRADE BREAK W/ SLOPE SYMBOL



OVERALL SITE PLAN

40' 20' 0 20' 40' 80' 120'

Graphic Scale: 1" = 40'

APPLICANT

City Ventures Homebuilding LLC
444 Spear Street, Suite 200
San Francisco, CA 94105
(646) 522-4260

ENGINEER

David R. Brown RCE 41833
Adobe Associates, Inc.
1220 N Dutton Avenue
Santa Rosa, CA 95401
Phone: (707) 541-2300

ARCHITECT

WHA Architects
200 Commerce, Suite 200
Irvine CA, 92602-5000
Phone: (949) 250-0607

SURVEYOR

Aaron R Smith PLS 7901
Adobe Associates, Inc.
1220 N Dutton Avenue
Santa Rosa, CA 95401
Phone: (707) 541-2300

LANDSCAPE

C2 Collaborative
100 Avenida Miramar
San Clemente, CA 92672
Phone: (949) 366-6624

GEOTECHNICAL

Quantum Geotechnical, Inc.
6288 San Ignacio Ave Suite A
San Jose, CA 95119
Phone: (408) 629-3822

ABBREVIATIONS

AAI	ADOBE ASSOCIATES, INC.	ESMT	EASEMENT	PUE	PUBLIC UTILITY EASEMENT
AB	AGGREGATE BASE	EX	EXISTING	RCE	REGISTERED CIVIL ENGINEER
AC	ASPHALT CONCRETE	FL	FLOWLINE	RCP	REINFORCED CONCRETE PIPE
AD	AREA DRAIN	FG	FINISH GRADE	R/W	RIGHT OF WAY
BLDG	BUILDING	FH	FIRE HYDRANT	RWL	RECLAIMED WATER LINE
BM	BENCH MARK	FS	FINISHED SURFACE	S	SLOPE
BOV	BLOWOFF VALVE	FSS	FIRE SAFE STANDARD	SAD	SEE ARCHITECTURAL DRAWINGS
C	COMPACT PARKING	GB	GRADE BREAK	SD	STORM DRAIN
CB	CATCH BASIN	GR	GRATE	SS	SANITARY SEWER
CL	CLASS	IG	INVERT GRADE	STA	STATION
℄	CENTERLINE	LF	LINEAR FEET	STD	STANDARD
CMP	CORRUGATED METAL PIPE	MAX	MAXIMUM	TC	TOP OF CURB
CO	CLEANOUT	ME	MATCH EXISTING	TOP	TOP OF PIPE
CONC	CONCRETE	MH	MANHOLE	TYP	TYPICAL
DI	DROP INLET	MIN	MINIMUM	W	WATER
DWG	DRAWING	NTS	NOT TO SCALE	WM	WATER METER
DWY	DRIVEWAY	NO	NUMBER	WV	WATER VALVE
EG	EXISTING GROUND	OC	ON CENTER	WWF	WELDED WIRE FABRIC
EP	EDGE OF PAVEMENT	PL	PROPERTY LINE		
EL	ELEVATION	PP	POWER POLE		

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21837 GEYSERVILLE AVENUE
VESTING TENTATIVE MAP
TITLE SHEET
21837 Geyserville Ave, Geyserville, California
APN 140-180-035

SCALE: AS SHOWN
Date: April 2, 2025
Design by: KM
Drawn by: KM
Checked by: CT,DB

Sheet
C1.0
1 of 11 Sheets
Job 24264

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SITE LAYOUT

30' 15' 0 15' 30' 60' 90'

Graphic Scale: 1" = 30'

LEGEND

• • • • • • • • · ADA ACCESSIBLE PATH OF TRAVEL (POT)

THE PATH OF TRAVEL (POT) IDENTIFIED IN THESE CONSTRUCTION DOCUMENTS IS COMPLIANT WITH THE CURRENT APPLICABLE CALIFORNIA BUILDING CODE ACCESSIBILITY PROVISIONS FOR PATH OF TRAVEL REQUIREMENTS FOR ALTERATIONS, ADDITIONS AND STRUCTURAL REPAIRS. AS PART OF THE DESIGN OF THIS PROJECT, THE POT WAS EXAMINED AND ANY ELEMENTS, COMPONENTS OR PORTIONS OF THE POT THAT WERE DETERMINED TO BE NONCOMPLIANT HAVE BEEN IDENTIFIED; AND THE CORRECTIVE WORK NECESSARY TO BRING THEM INTO COMPLIANCE HAS BEEN INCLUDED WITHIN THE SCOPE OF THIS PROJECT'S WORK THROUGH DETAILS, DRAWINGS AND SPECIFICATIONS INCORPORATED INTO THESE CONSTRUCTION DOCUMENTS.

A MAIN DRIVE - TYPICAL SECTION
NTS

B DRIVE A - TYPICAL SECTION
NTS

C DRIVE B TO E - TYPICAL SECTIONS
NTS

No.	Date	Description	Approved

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21837 GEYSERVILLE AVENUE VESTING TENTATIVE MAP

SITE LAYOUT & TYPICAL STRETT SECTIONS

21837 Geyserville Ave, Geyserville, California
APN 140-180-035

SCALE: AS SHOWN
Date: April 2, 2025
Design by: KM
Drawn by: KM
Checked by: CT,DB

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C2.0
2 of 11 Sheets
Job 24264

T:\2024 PROJECTS\24264\dwg\Adobe-Design\Tentative Map\24264_C2.0 Site Layout & Typical Street Sections.dwg, Quan Nguyen, 4/2/2025 11:29:18 AM

Vesting Tentative Map

For Condominium Purposes:

93 Residential Condo Units

21837 Geyserville Avenue, Geyserville Ca.

Assessor's Parcel Number 140-180-035

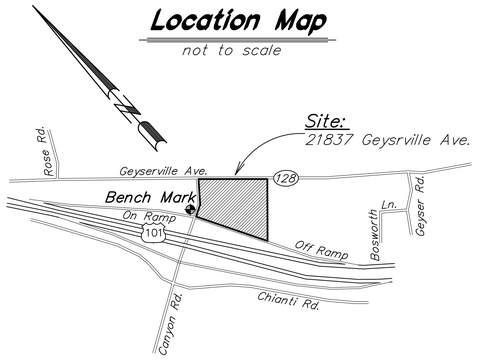
Per Gov. Code Section 66456.1, the subdivider intends to file and reserves the right to file multiple final maps.

CURRENT ZONING

HR (High Density Residential)

Location Map

not to scale



SURVEYOR/ENGINEER:

ADOBE ASSOCIATES, INC.
1220 N. Dutton Avenue
Santa Rosa, CA. 95401
(707) 541-2300 phone
(707) 541-2301 fax
asmith@adobeinc.com

OWNER/SUBDIVIDER:

City Ventures Homebuilding, LLC
c/o Michael Brewer
444 Spear Street, Suite 200
San Francisco, CA 94105
(646) 522-4260

General Notes

Property owner information is based upon that "Grant Deed" recorded under Document Number 2015-098500 of Official Records, Sonoma County Records. Property lines shown hereon are based upon found monumentation and record information delineated from that same "Grant Deed" recorded under Document Number 2015-098500. A field survey was performed by Adobe Associates, Inc. on June 1, 2005 and December 9, 2024.

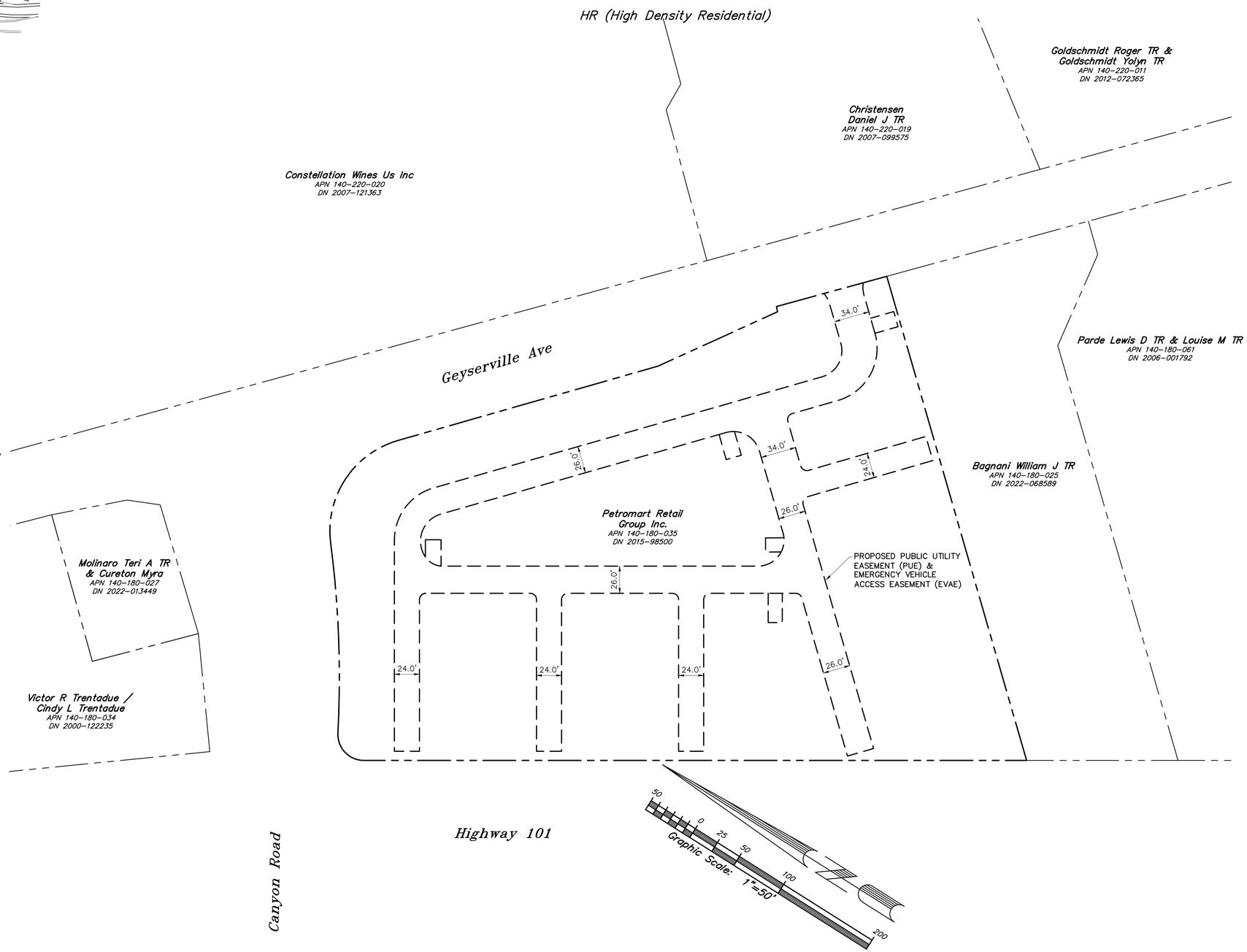
A "Record of Survey" is in process with this office and will be submitted to the County of Sonoma for review and subsequent recording pursuant to Section 8762 of the Professional Land Surveyor's Act.

Utilities and features shown hereon are based upon physical features observed at the time of this survey, such as paint markings, overhead wiring, utility poles, and utility boxes. For the location of under ground utilities, a subsurface utility locating company should be contacted.

Contours shown hereon are a 1' (one foot) vertical interval and are shown based upon a field survey performed by Adobe Associates, Inc., on June 1, 2005 and December 9, 2024.

Bench Mark:

Found 1/2" Iron Pin, 9.80 miles Southerly along U.S. Highway 101 from the junction of State Highway 128 at the North edge of Cloverdale, 218.2' Northeast of the center of the Northbound Lanes of Highway 101, 68.6' Northwest of the centerline of Canyon Road, 4.6' Northwest of a fence corner, access is though a 5" aluminum cap. Elevation = 239.25' (Datum NAVD 1988)



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21837 GEYSERVILLE AVENUE
VESTING TENTATIVE MAP
VESTING TENTATIVE MAP
21837 Geyserville Ave, Geyserville, California
APN 140-180-035

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Date: April 2, 2025
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Checked by: CT,DB

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3 of 11 Sheets
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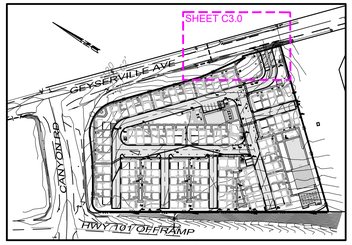
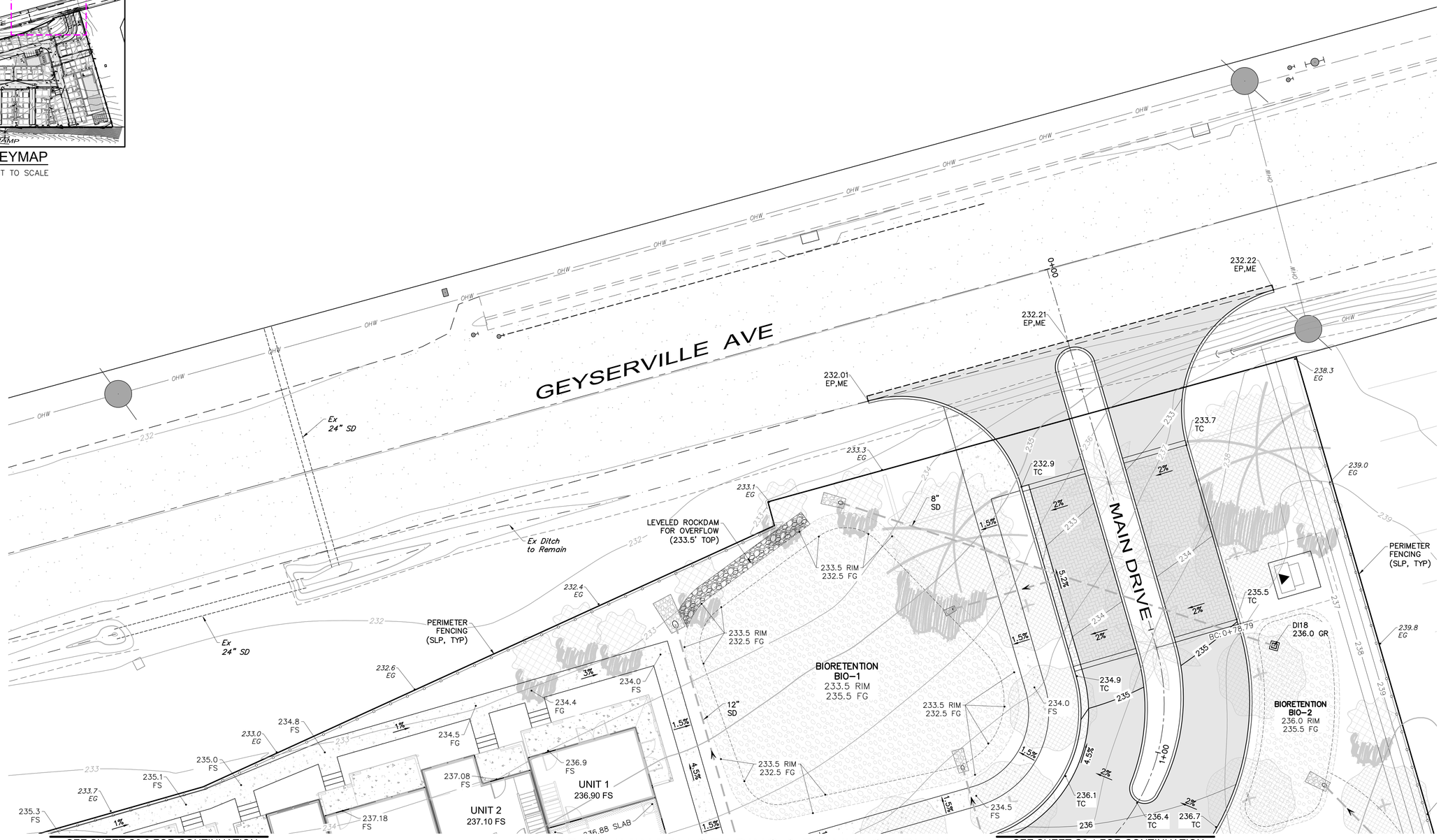


KEYMAP

NOT TO SCALE



SEE SHEET C3.3 FOR CONTINUATION

SEE SHEET C3.1 FOR CONTINUATION

PRELIMINARY GRADING & DRAINAGE PLAN

10' 5' 0 5' 10' 20' 30'

Graphic Scale: 1" = 10'

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21837 GEYSERVILLE AVENUE
VESTING TENTATIVE MAP
PRELIMINARY GRADING & DRAINAGE PLAN
21837 Geyserville Ave, Geyserville, California
APN 140-180-035

SCALE: AS SHOWN
Date: April 2, 2025
Design by: KM
Drawn by: KM
Checked by: CT,DB

Sheet
C3.0
4 of 11 Sheets
Job 24264

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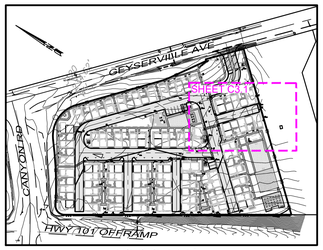

KEYMAP
NOT TO SCALE

PRELIMINARY GRADING & DRAINAGE PLAN

Graphic Scale: 1" = 10'

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21837 GEYSERVILLE AVENUE
VESTING TENTATIVE MAP
PRELIMINARY GRADING & DRAINAGE PLAN

21837 Geyserville Ave, Geyserville, California
APN 140-180-035

SCALE: AS SHOWN
Date: April 2, 2025
Design by: KM
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Checked by: CT,DB

Sheet
C3.1
5 of 11 Sheets
Job 24264

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KEYMAP

NOT TO SCALE

PRELIMINARY GRADING & DRAINAGE PLAN

10' 5' 0 5' 10' 20' 30'

Graphic Scale: 1" = 10'

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21837 GEYSERVILLE AVENUE
VESTING TENTATIVE MAP
PRELIMINARY GRADING & DRAINAGE PLAN
21837 Geyserville Ave, Geyserville, California
APN 140-180-035

SCALE: AS SHOWN
Date: April 2, 2025
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Checked by: CT,DB

Sheet
C3.2
6 of 11 Sheets
Job 24264

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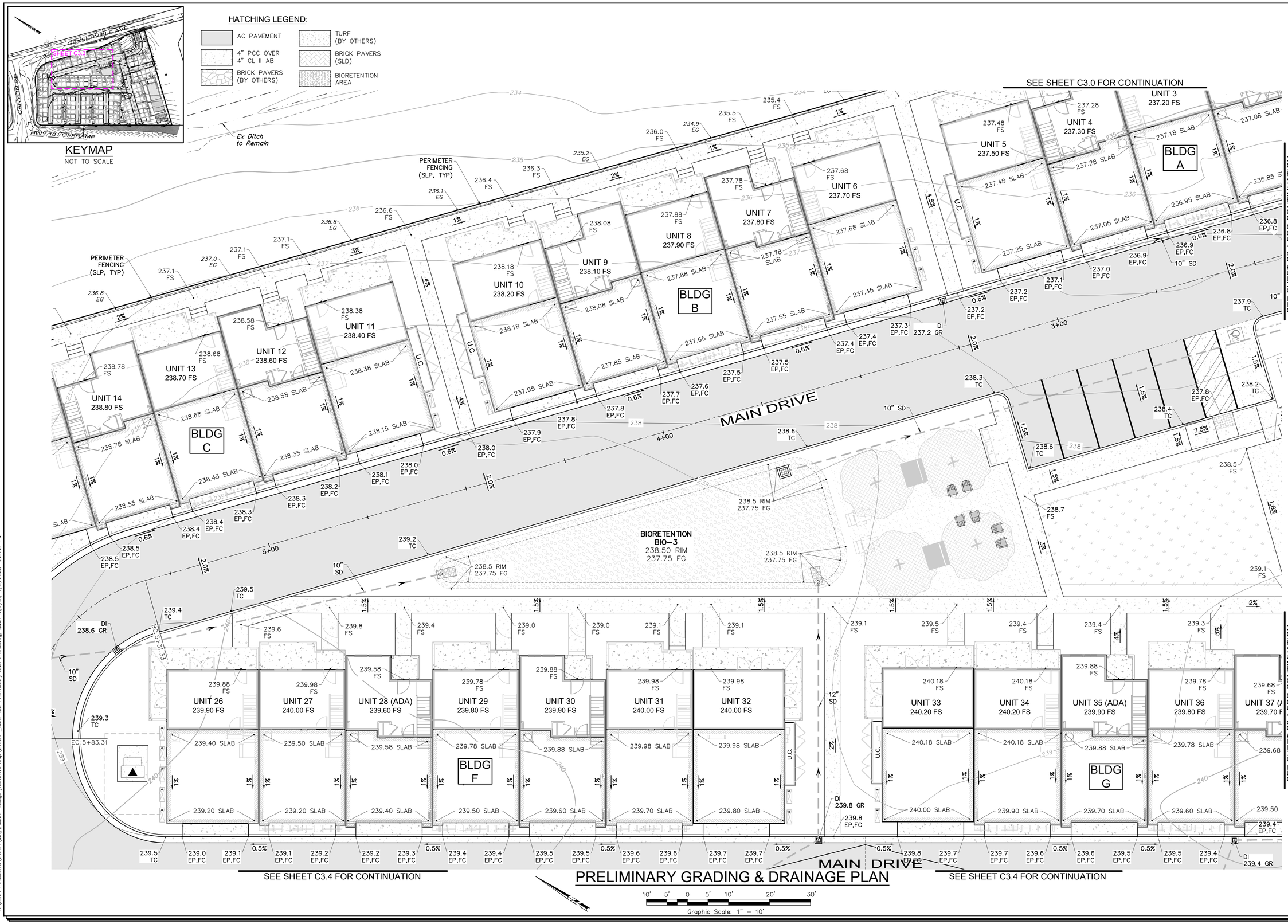

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21837 GEYSERVILLE AVENUE
VESTING TENTATIVE MAP
PRELIMINARY GRADING & DRAINAGE PLAN

21837 Geyserville Ave, Geyserville, California
APN 140-180-035

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Date: April 2, 2025
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Drawn by: KM
Checked by: CT,DB

Sheet C3.3
7 of 11 Sheets
Job 24264

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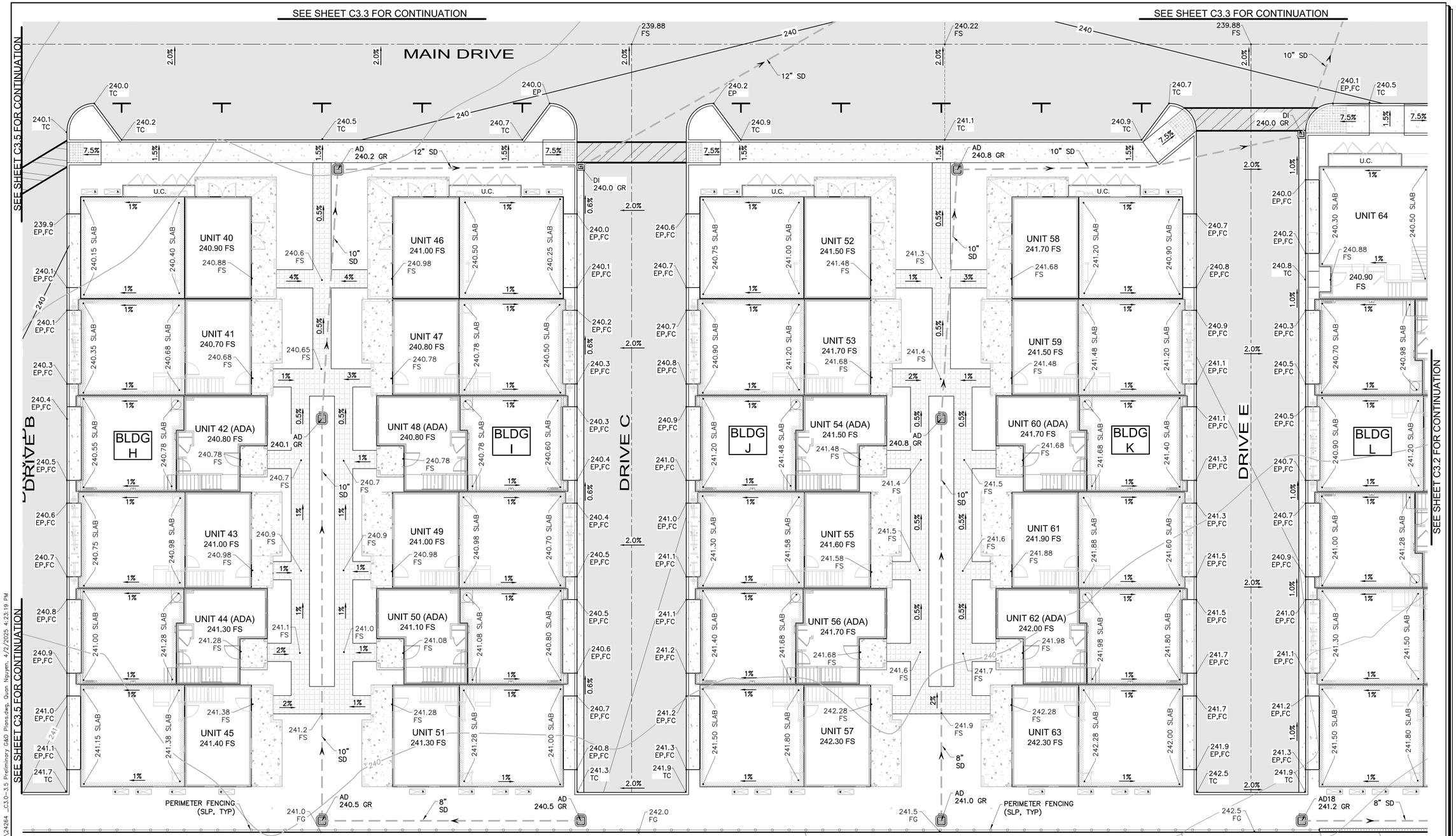

KEYMAP
NOT TO SCALE

HATCHING LEGEND:

- AC PAVEMENT
- 4" PCC OVER 4" CL II AB
- BRICK PAVERS (BY OTHERS)
- TURF (BY OTHERS)
- BRICK PAVERS (SLD)
- BIORETENTION AREA

PRELIMINARY GRADING & DRAINAGE PLAN

10' 5' 0 5' 10' 20' 30'
Graphic Scale: 1" = 10'

No.	Date	Description	Approved

Revisions

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21837 GEYSERVILLE AVENUE
VESTING TENTATIVE MAP
PRELIMINARY GRADING & DRAINAGE PLAN

21837 Geyserville Ave, Geyserville, California
APN 140-180-035

SCALE: AS SHOWN
Date: April 2, 2025
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C3.4
8 of 11 Sheets
Job 24264

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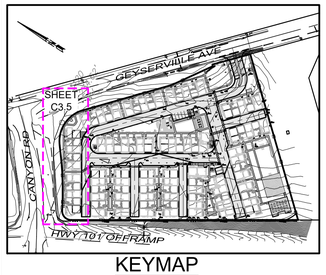
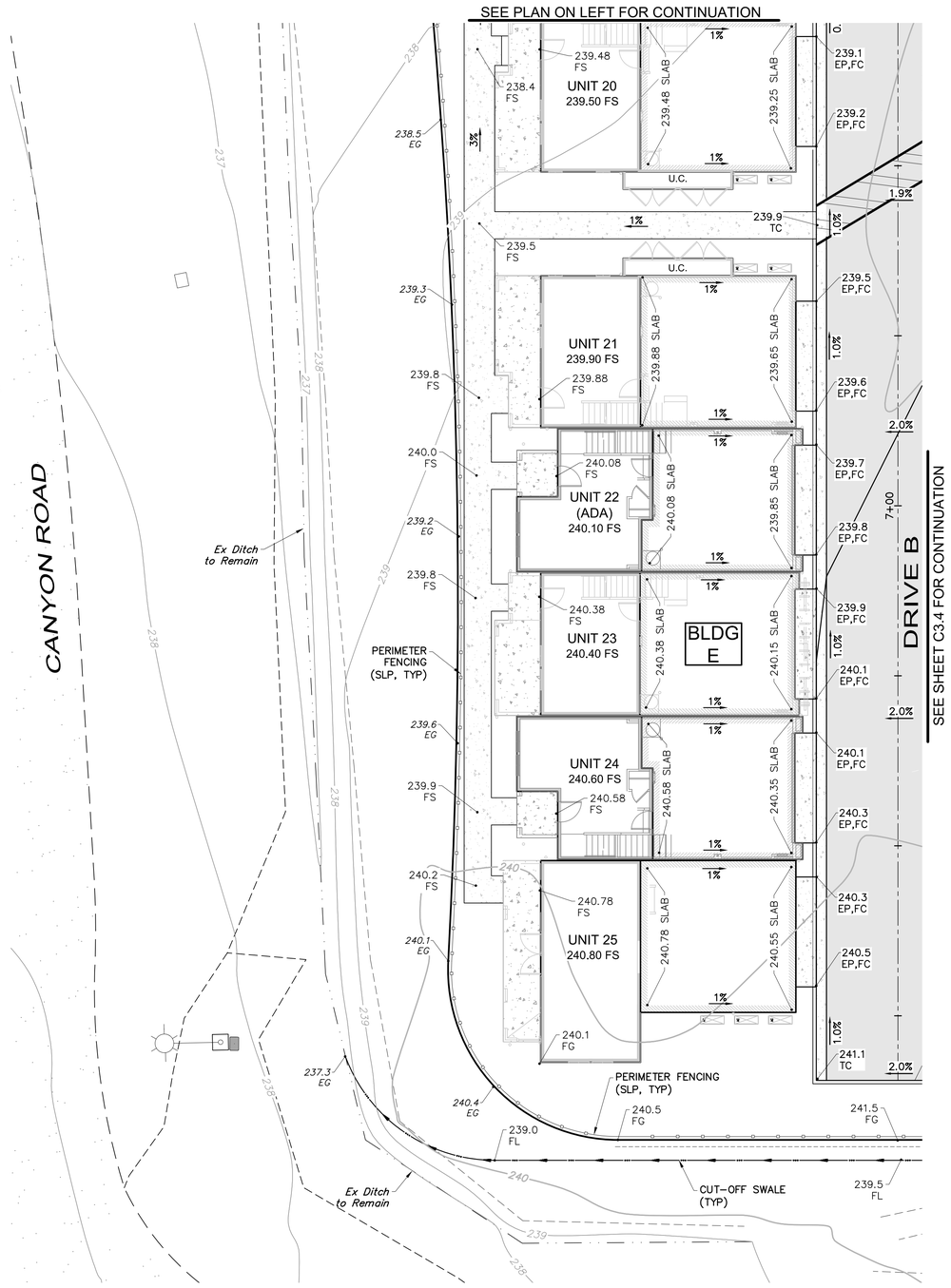


KEYMAP

NOT TO SCALE

HATCHING LEGEND:

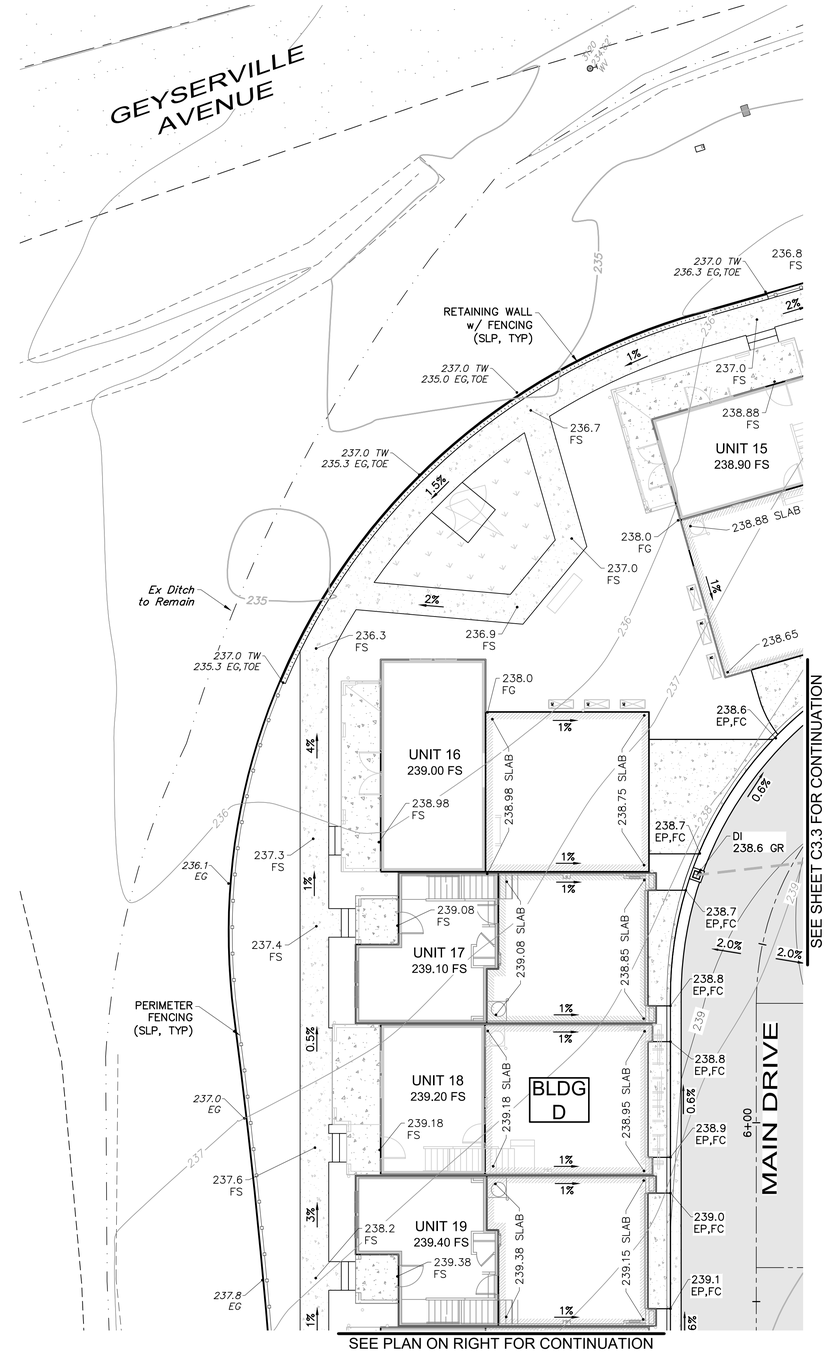
- AC PAVEMENT
- 4" PCC OVER 4" CL II AB
- BRICK PAVERS (BY OTHERS)
- TURF (BY OTHERS)
- BRICK PAVERS (SLD)
- BIORETENTION AREA



PRELIMINARY GRADING & DRAINAGE PLAN

10' 5' 0 5' 10' 20' 30'

Graphic Scale: 1" = 10'



PRELIMINARY GRADING & DRAINAGE PLAN

10' 5' 0 5' 10' 20' 30'

Graphic Scale: 1" = 10'

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21837 GEYSERVILLE AVENUE
VESTING TENTATIVE MAP
PRELIMINARY GRADING & DRAINAGE PLAN

21837 Geyserville Ave, Geyserville, California

APN 140-180-035

SCALE: AS SHOWN

Date: April 2, 2025

Design by: KM

Drawn by: KM

Checked by: CT,DB

Sheet C3.5

9 of 11 Sheets

Job 24264

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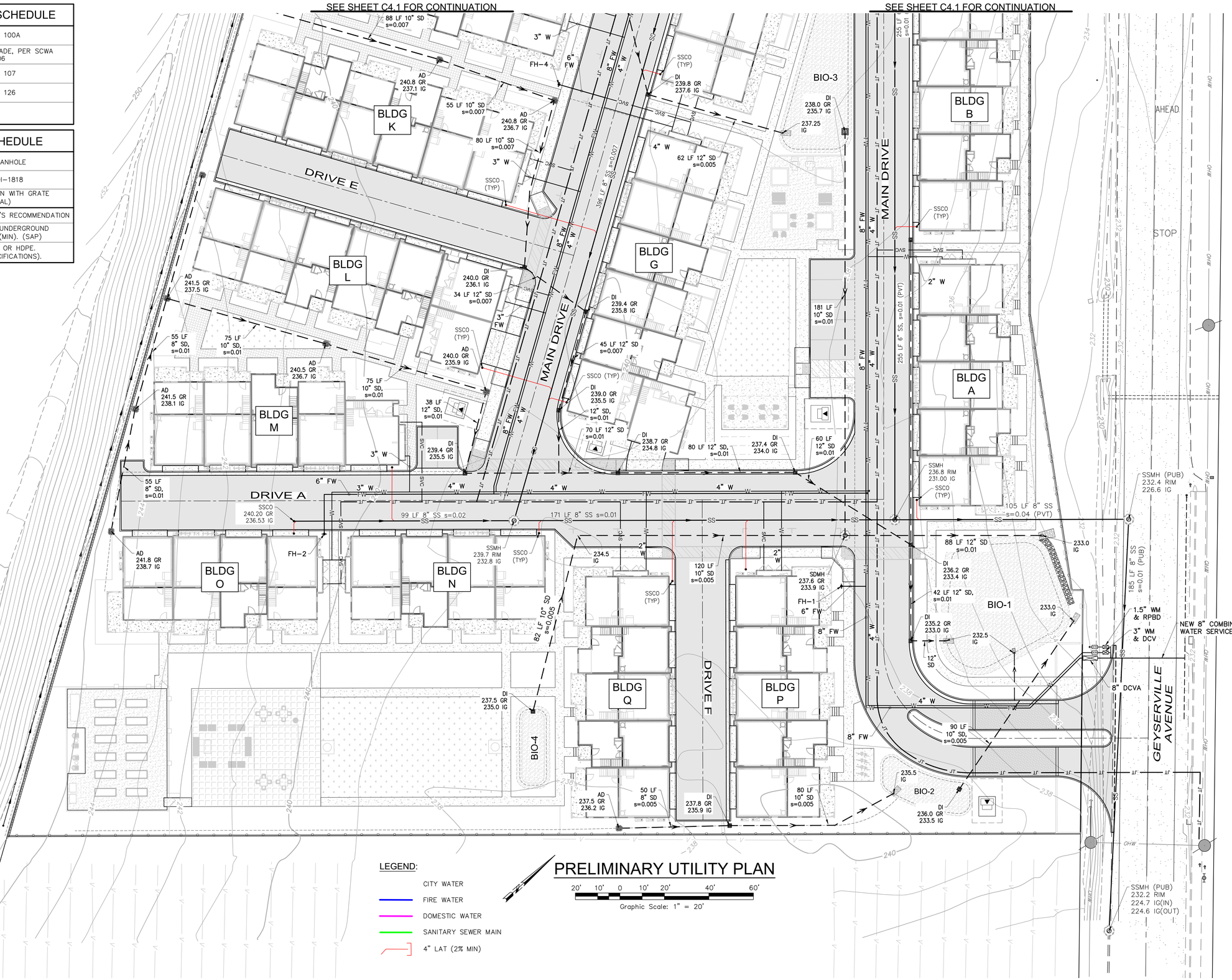
SANITARY SEWER SCHEDULE	
SSMH	PER SCWA STD 100A
SSCO'S	ADJUST TO GRADE, PER SCWA STD 105 OR 106
SS TRENCH	PER SCWA STD 107
SS LATERALS	PER SCWA STD 126
ALL SS MAIN SHALL BE SDR-26	

STORM DRAIN SCHEDULE	
SDMH	48" STORM DRAIN MANHOLE
DI	OLDCASTLE MODEL DI-1818
AD	12" NDS AREA DRAIN WITH GRATE (OR APPROVED EQUAL)
FOUNDATION DRAINS PER GEOTECH'S RECOMMENDATION	
ALL DOWNSPOUTS TO BE TIED TO UNDERGROUND SD SYSTEM WITH 4" SD, S=0.010 (MIN). (SAP)	
STORM DRAIN PIPE SHALL BE PVC OR HDPE. (MEETING CALTRANS SEC. 64 SPECIFICATIONS).	



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21837 GEYSERVILLE AVENUE VESTING TENTATIVE MAP
PRELIMINARY UTILITY PLAN
21837 Geyserville Ave, Geyserville, California
APN 140-180-035

SCALE: AS SHOWN
Date: April 2, 2025
Design by: KM
Drawn by: KM
Checked by: CT,DB

Sheet
C4.0
10 of 11 Sheets
Job 24264

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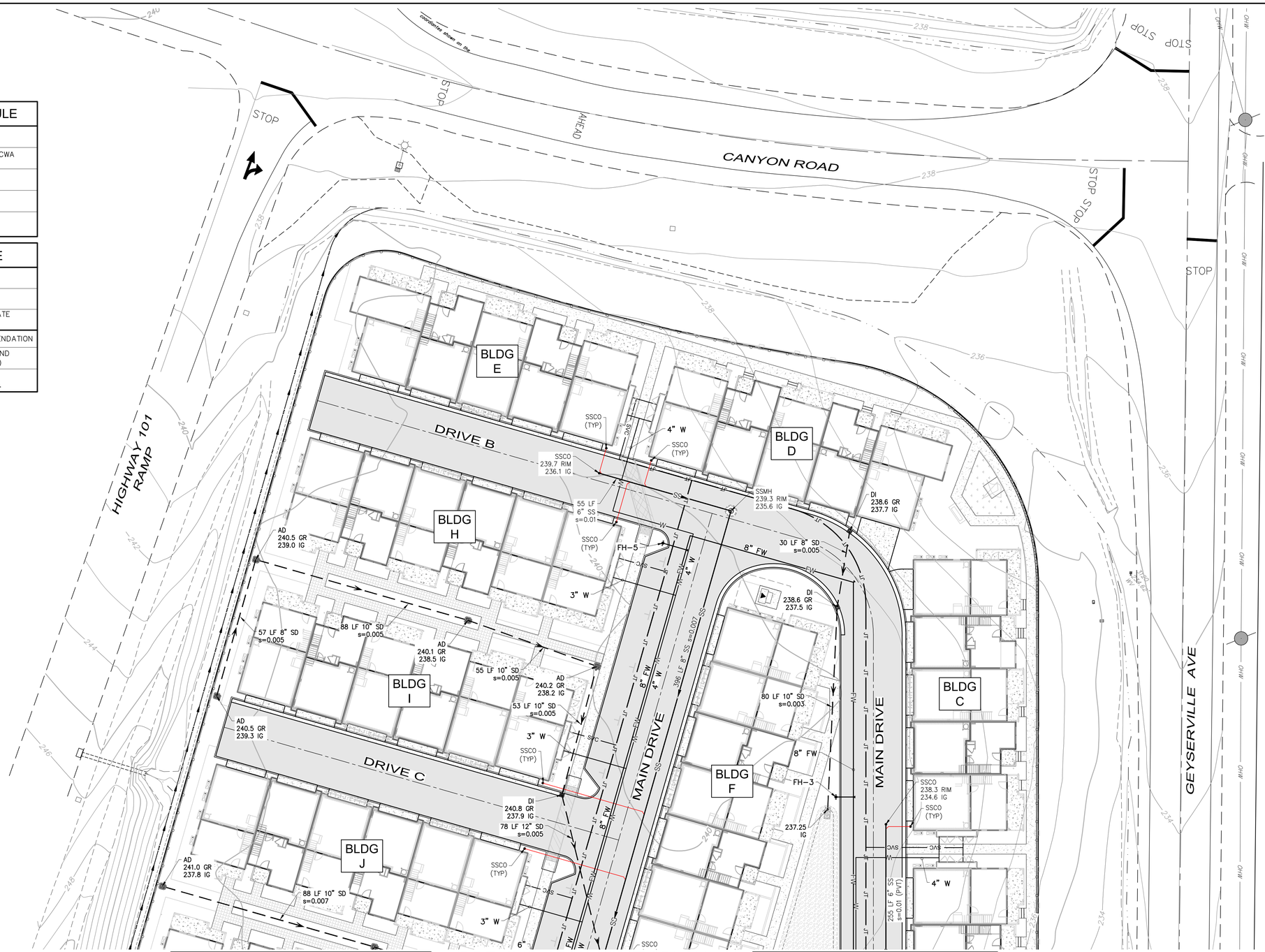
SANITARY SEWER SCHEDULE	
SSMH	PER SCWA STD 100A
SSCO'S	ADJUST TO GRADE, PER SCWA STD 105 OR 106
SS TRENCH	PER SCWA STD 107
SS LATERALS	PER SCWA STD 126
ALL SS MAIN SHALL BE SDR-26	

STORM DRAIN SCHEDULE	
SDMH	48" STORM DRAIN MANHOLE
DI	OLDCASTLE MODEL DI-1818
AD	12" NDS AREA DRAIN WITH GRATE (OR APPROVED EQUAL)
FOUNDATION DRAINS PER GEOTECH'S RECOMMENDATION	
ALL DOWNSPOUTS TO BE TIED TO UNDERGROUND SD SYSTEM WITH 4" SD, S=0.010 (MIN). (SAP)	
STORM DRAIN PIPE SHALL BE PVC OR HDPE. (MEETING CALTRANS SEC. 64 SPECIFICATIONS).	



SEE SHEET C4.0 FOR CONTINUATION

PRELIMINARY UTILITY PLAN

SEE SHEET C4.0 FOR CONTINUATION

20' 10' 0 10' 20' 40' 60'

Graphic Scale: 1" = 20'

LEGEND:

- CITY WATER
- FIRE WATER
- DOMESTIC WATER
- SANITARY SEWER MAIN
- 4" LAT (2% MIN)

Revisions			
No.	Date	Description	Approved

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REGISTERED PROFESSIONAL ENGINEER DAVID R. BROWN No. 41833 Exp.3/31/2026 CIVIL STATE OF CALIFORNIA

David R. Brown, RCE 41833
My license expires 3/31/2026

21837 GEYSERVILLE AVENUE
VESTING TENTATIVE MAP
PRELIMINARY UTILITY PLAN
21837 Geyserville Ave, Geyserville, California
APN 140-180-035

SCALE: AS SHOWN
Date: April 2, 2025
Design by: KM
Drawn by: KM
Checked by: CT,DB

Sheet
C4.1
11 of 11 Sheets
Job 24264

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Drainage Analysis

For the

Vesting Tentative Map

21387 Geyserville Ave, Geyserville CA
APN 140-180-035

JN 24264
April 2, 2025

Prepared for:
City Ventures Homebuilding LLC
444 Spear Street, Suite 200
San Francisco, CA 94105
(646) 522-4260

Timothy L. Schram, RCE 67890
My license expires 6/30/2025

Prepared by:

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Prepared By: RMS
Checked By:

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1. Drainage Narrative

Vesting Tentative Map
Drainage Narrative

Project Description

This project is located at 21837 Geyserville Ave in Geyserville, California. The overall project site is approximately 5.1 acres. The existing property is currently undeveloped with grass throughout, see attached **Section 2, Aerial Photo** and **Section 3, Existing Conditions Map**. This project proposes grading and drainage improvements for 92 units living complex, associated hardscaping and landscaping.

Existing slopes in the area of the project development range from 1 to 10 percent. Runoff from the highway 101 off ramp currently flows easterly to the site from an existing 18-inch drain pipe. Existing slopes from the center of the property site flow easterly towards an existing drainage ditch located along Geyserville Ave. The drainage ditch flows towards an existing 18-inch stormdrain pipe that continues to flow east past Geyserville Ave. Existing on-site and off-site drainage patterns will be maintained.

For the proposed development, the design intent is to maintain the natural and existing drainage course. Pre and post construction conditions are shown on the **Section 3, Existing Conditions Map** and **Section 4, Proposed Conditions Map**. Drainage outlets have been placed to limit concentrated runoff as much as feasible, discharging into proposed bioretention facilities prior to sheet flowing through existing vegetation away from the project site. Runoff from the proposed project flows through a storm drain system easterly, discharging into the existing roadside swales located along Geyserville Ave until ultimately discharging east of the project site. Historic drainage patterns will remain and release points off the property will not be changed due to the development.

Methodology

Post construction conditions are shown on **Section 4, Proposed Conditions Map.** The attached **Section 5, Weighted Runoff Curve Number Calculator** has been used to calculate pre and post construction curve numbers. Volume capture and treatment will be provided with a bio-retention facility. Due to the existing site grading, a portion of the AC driveway apron and sidewalk slopes away from the property towards the existing drainage swale located along Geyserville Ave making it difficult to treat. The bioretention facility (Bioretention-4) will be increased in size to provide offset volume capture. Volume capture will be offset with the bio-retention facility.

The BMP for the project was designed using the *City of Santa Rosa's LID Storm Water Calculator.* Attached **Section 6, Santa Rosa LID Calculator** has been used to calculate the BMP sizing. The type of BMP design used for the calculations was *P1-02 Roadside Bioretention – No Curb and Gutter.* From the curve number analysis in **Section 5, Weighted Runoff Curve Number Calculator** post-construction curve numbers for DA1-DA4 were input into the LID calculator. The BMP was sized using the *BMP Sizing Tool* section of the LID calculator until the BMP reached a percent requirement of one hundred percent for the bioretention. The BMP area for DA-1 is 2,029 SF, DA-2 is 2,875 SF, DA-3 is 529 SF and DA-4 is 667 SF.

Bioretention-2 from DA2 will be designed to have 1' of ponding water which will reduce the BMP volume depth by 1.25'. **Section 6, Santa Rosa LID Calculator** shows the calculation of bioretention-2 which shows a BMP volume depth of 4.75 ft, but with the design of 1' of ponding water will reduce the BMP volume depth of 3.5 ft which is shown in **Section 4, Proposed Conditions Map.**

Table C-2 in the FMDM was used to determine the runoff curve numbers based on land use, hydraulic soil group (Soil Type C). Land use cover types used for this report was open space (Good), roofs and impervious area. Table C-2 runoff curve numbers were used in **Section 5, Weighted Runoff Curve Number Calculator.**

The Incremental Rational Method has been used to calculate the 10-year and 100-year peak runoff in accordance with the Sonoma County Water Agency (SCWA) Flood Management Design Manual (FMDM, 2020) as shown in **Section 8, 10-yr and 100-yr Incremental Rational Method Drainage Study.** Rainfall Intensity was taken from the NOAA Atlas 14, Point Precipitation Frequency Estimates and an Intensity Duration Frequency Curve (IDF Curve), see **Section 9, NOAA Atlas 14 – Point Precipitation Frequency Estimates & Intensity Duration Frequency Curve (IDF Curve).** The runoff coefficients (C-value) used for the Incremental Rational Method analysis were the most conservative for each hydrologic area to provide a more conservative analysis of peak flows in the storm drains and swales based on the Hydrologic Soil groups for each soil type and are presented in **Appendix II - Soil Analysis**.

Table C-1 in the FMDM was used to determine the runoff coefficient based on land use, hydraulic soil group (Soil Type C), and average slope. Land use and average slope were approximated using aerial imagery. Land use categories used for this report was Open Space (AG), Low Density (LD), Medium Density (MD), and High Density (HD). Table 3-3 in the FMDM was used to determine the estimated time of concentration (7 mins, 10 mins, 15 mins) based on the size of the drainage area.

Hydraulic Toolbox 4.4 was used to calculate the normal depth in conveyance facilities**.**

Hydraulics have been calculated using a Manning's roughness of 0.035 for grass lined and rock lines swales, and 0.012 for all pipes. **Appendix I – 10-yr Storm Event Stormdrain/Swale Analysis** present these hydraulic calculations for representative drainage features in worst-case scenarios (highest flow, lowest slope). The results indicate that the proposed drainage system has been sized to convey the design 10-yr flows adequately, and that the system has extra capacity to handle and contain flows from 100-yr storm events. **Section 10, Overland Release Map** for depicted flow routes during potential 100-yr flood events or conveyance system failure.

Conclusion

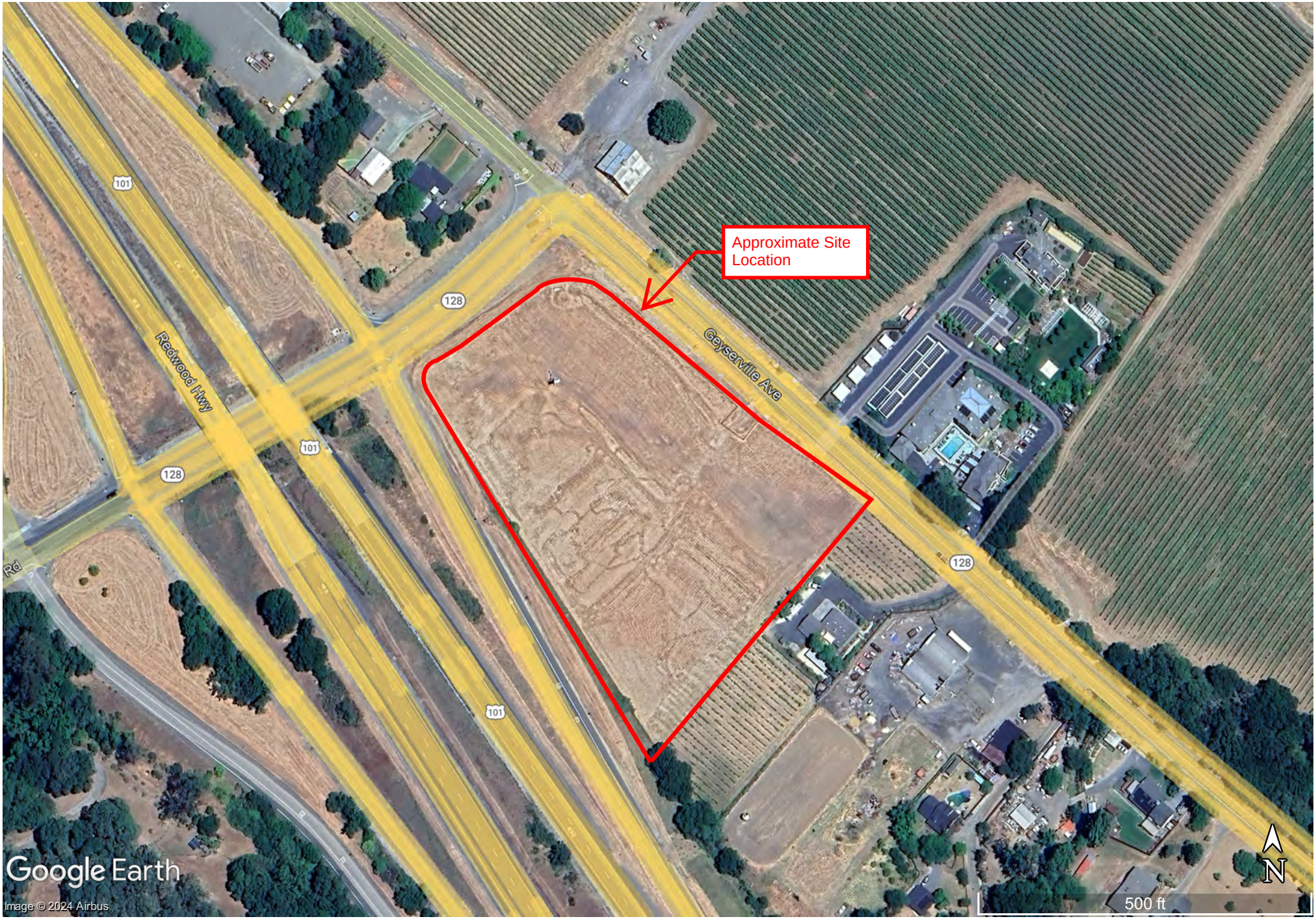
The proposed site improvements include measures to provide onsite runoff treatment and storage, meeting current LID criteria. The proposed site improvements will be directed towards existing vegetation for treatment. Due to the existing site grading, a portion of the AC walkway and sidewalk slopes away from the property frontage towards the existing drainage swale along Geyserville Ave. This portion of the driveway will be offset for storage volume towards the bioretention. Pollutants due to the addition of pavement may be a potential impact of the design and will be reduced due to runoff being directed through a bioretention facility and existing vegetation before leaving the property.

Potential impacts of the proposed design would be modifying the existing flow routing of the residence and watershed tributary boundaries. Possible impacts from the proposed improvements design would be an increase in pollutants due to the additional impervious surfacing. Pollutants will be treated via existing vegetation prior to discharging from the site, thereby alleviating the possible impacts of this development.

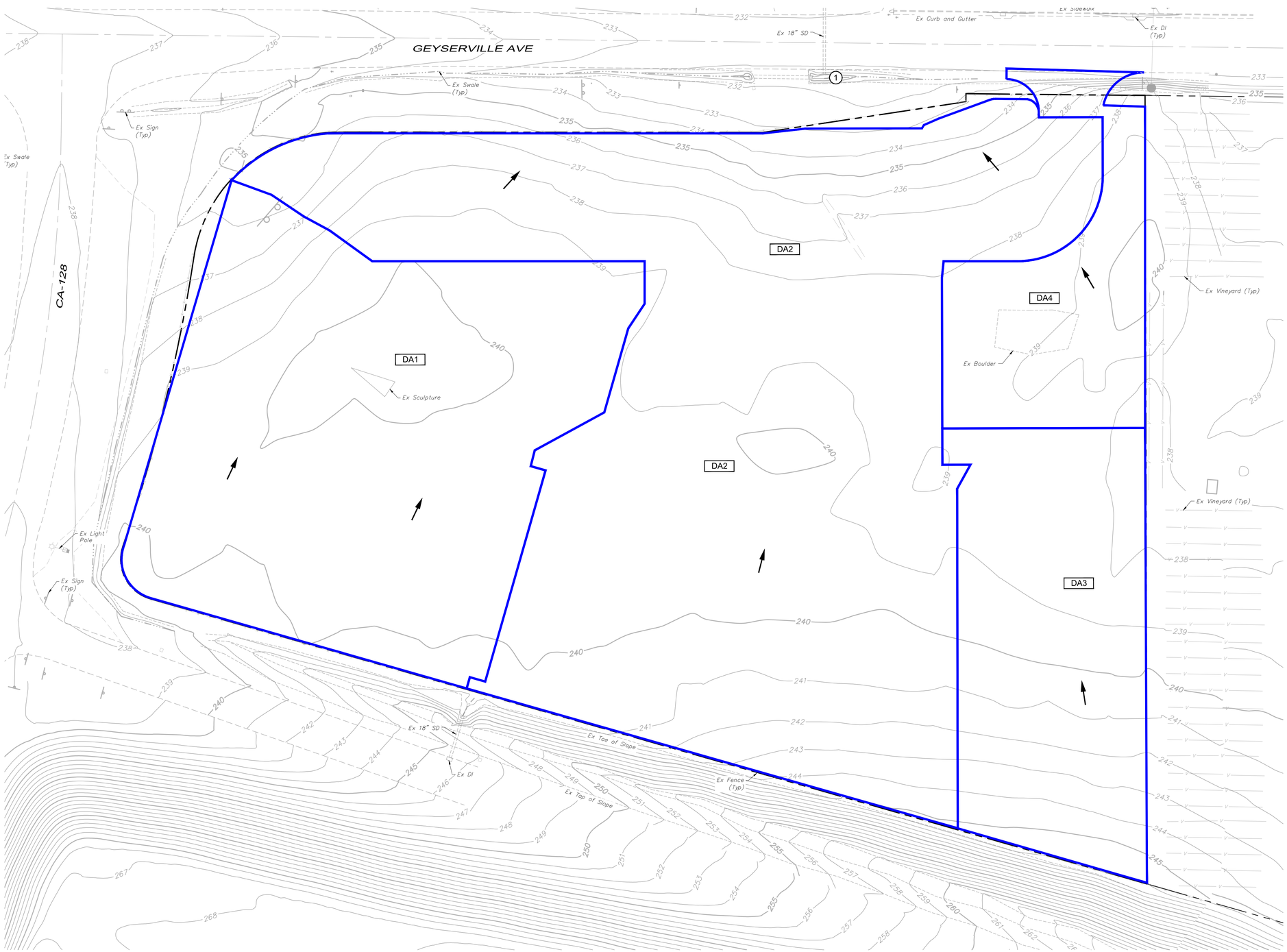
In accordance with the SCWA Flood Control Design Criteria, all drainage facilities are designed to convey, without surcharge, runoff from the 10-yr storm event. The project adheres to and meets Sonoma County Code Chapter 11 and Chapter 11A. Autodesk *Hydraulic Toolbox* has been used to calculate normal depth in the storm drain pipes and swales.

2. Aerial Photo

Geyserville Ave Tentative Map



3. Existing Conditions Map



DRAINAGE AREA TABLE

D1 = 1.42 AC (51,670 SF)
HYDROLOGICAL SOIL TYPE=C

D2 = 2.65 AC (115,234 SF)
HYDROLOGICAL SOIL TYPE=C

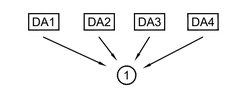
D3 = 0.70 AC (30,298 SF)
HYDROLOGICAL SOIL TYPE=C

D4 = 0.39 AC (17,185 SF)
HYDROLOGICAL SOIL TYPE=C

DRAINAGE AREA LEGEND

DA1	DRAINAGE MANAGEMENT AREA
1	POINT OF CONCENTRATION
	DRAINAGE AREA BOUNDARY
	PROPERTY LINE (℄)
	DIRECTION OF FLOW

DRAINAGE ROUTING



NOTE:

2-FT & 10-FT CONTOURS SHOWN ARE FROM LIDAR AND ARE SHOWN FOR GRAPHIC PURPOSES ONLY

REFER TO SUBMITTED GRADING & DRAINAGE PLANS FOR INVERTS, FLOW LINES, TOP OF GRATE ELEVATIONS AND DRAINAGE SPECIFICATIONS

THIS MAP IS FOR REFERENCE ONLY

30' 15' 0 15' 30' 60' 90'

Graphic Scale: 1" = 30'

April 2, 2025

EXISTING CONDITIONS MAP

VESTING TENTATIVE MAP
21837 Geyserville Ave, Geyserville, CA
APN 140-180-035

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4. Proposed Conditions Map

DRAINAGE AREA TABLE

D1 =1.42 AC (61,670 SF)
CN=93
HYDROLOGICAL SOIL TYPE=C

D2 =2.65 AC (115,234 SF)
CN=92
HYDROLOGICAL SOIL TYPE=C

D3 =0.70 AC (30,298 SF)
CN=84
HYDROLOGICAL SOIL TYPE=C

D4 =0.39 AC (17,185 SF)
CN=91
HYDROLOGICAL SOIL TYPE=C

DRAINAGE AREA LEGEND

- DA1 — DRAINAGE MANAGEMENT AREA
- (1) — POINT OF CONCENTRATION
- DRAINAGE AREA BOUNDARY
- PROPERTY LINE (℄)
- DIRECTION OF FLOW
- STORM DRAIN LINE

DRAINAGE ROUTING

DA1 → (1)
DA2 → (2)
DA3 → (3)
DA4 → (4)

HATCHING LEGEND:

- AC PAVEMENT
- 4" PCC OVER 4" CL II AB
- BRICK PAVERS (BY OTHERS)
- TURF (BY OTHERS)
- BRICK PAVERS (SLD)
- BIORETENTION AREA

NOTE:

REFER TO SUBMITTED GRADING & DRAINAGE PLANS FOR INVERTS, FLOW LINES, TOP OF GRATE ELEVATIONS AND DRAINAGE SPECIFICATIONS

THIS MAP IS FOR REFERENCE ONLY

30' 15' 0 15' 30' 60' 90'

Graphic Scale: 1" = 30'

March 27, 2025

PROPOSED CONDITIONS MAP

VESTING TENTATIVE MAP
21837 Geyserville Ave, Geyserville, CA
APN 140-180-035

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5. Weighted Runoff Curve Number and Runoff

Weighted Runoff Curve Number

Project:	**24264**	By:	**RMS**	Date:	**4/2/2025**
Location:	**DA1**				

----- POST-Construction Condtitions -----

1. Runoff Curve Number

Soil Name and Hydrologic Group (Appendix A)	Cover Description (cover type, treatment and hydrologic condition; percent impervious; unconnected/connected impervious ratio)	TR-55 CN*			Area Acres Miles^2 Percent	Product of CNxArea
		Tables 2-2(a-d)	Figure 2-3	Figure 2-4		
Arbuckle Gravelly, Hydrologic Soil Group C	Ex. Open Space (Good)	74			0.27	19.76
Arbuckle Gravelly, Hydrologic Soil Group C	Proposed Roof	98			0.73	71.25
Arbuckle Gravelly, Hydrologic Soil Group C	Proposed Impervious Area	98			0.43	41.75
						0.00
						0.00
						0.00
						0.00
						0.00
						0.00

*Use only one CB source per line

Totals 1.42 132.752

CN (weighted) = Total Product / Total Area = 93.49 **Use CN** 93

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Weighted Runoff Curve Number

Project:	**24264**	By:	**RMS**	Date:	**4/2/2025**
Location:	**DA2**				

----- POST-Construction Condtitions -----

1. Runoff Curve Number

Soil Name and Hydrologic Group (Appendix A)	Cover Description (cover type, treatment and hydrologic condition; percent impervious; unconnected/connected impervious ratio)	TR-55 CN*			Area Acres Miles^2 Percent	Product of CNxArea
		Tables 2-2(a-d)	Figure 2-3	Figure 2-4		
Arbuckle Gravelly, Hydrologic Soil Group C	Ex. Open Space (good)	74			0.630	46.62
Arbuckle Gravelly, Hydrologic Soil Group C	Proposed Roof	98			1.02	99.96
Arbuckle Gravelly, Hydrologic Soil Group C	Proposed Impervious Area	98			1.00	98.00
						0.00
						0.00
						0.00
						0.00
						0.00
						0.00

*Use only one CB source per line

Totals 2.65 244.58

CN (weighted) = Total Product / Total Area = 92.29 **Use CN** 92

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Weighted Runoff Curve Number

Project:	**24264**	By:	**RMS**	Date:	**4/2/2025**
Location:	**DA3**				

----- POST-Construction Condtitions -----

1. Runoff Curve Number

Soil Name and Hydrologic Group (Appendix A)	Cover Description (cover type, treatment and hydrologic condition; percent impervious; unconnected/connected impervious ratio)	TR-55 CN* Tables 2-2(a-d)	TR-55 CN* Figure 2-3	TR-55 CN* Figure 2-4	Area Acres Miles^2 Percent	Product of CNxArea
Arbuckle Gravelly, Hydrologic Soil Group C	Ex. Open Space (good)	74			0.411	30.44
Arbuckle Gravelly, Hydrologic Soil Group C	Proposed Roof	98			0.16	15.68
Arbuckle Gravelly, Hydrologic Soil Group C	Proposed Impervious Area	98			0.13	12.61
						0.00
						0.00
						0.00
						0.00
						0.00
						0.00

*Use only one CB source per line

Totals 0.70 58.7288

CN (weighted) = Total Product / Total Area = 83.90 **Use CN** 84

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Weighted Runoff Curve Number

Project:	**24264**	By:	**RMS**	Date:	**4/2/2025**
Location:	**DA4**				

----- POST-Construction Condtitions -----

1. Runoff Curve Number

Soil Name and Hydrologic Group (Appendix A)	Cover Description (cover type, treatment and hydrologic condition; percent impervious; unconnected/connected impervious ratio)	TR-55 CN* Tables 2-2(a-d)	TR-55 CN* Figure 2-3	TR-55 CN* Figure 2-4	Area Acres Miles^2 Percent	Product of CNxArea
Arbuckle Gravelly, Hydrologic Soil Group C	Ex. Open Space (Good)	74			0.11	8.14
Arbuckle Gravelly, Hydrologic Soil Group C	Proposed Roof	98			0.17	16.66
Arbuckle Gravelly, Hydrologic Soil Group C	Proposed Impervious Area	98			0.11	10.78
						0.00
						0.00
						0.00
						0.00
						0.00
						0.00
				Totals	0.39	35.58

*Use only one CB source per line

CN (weighted) = Total Product / Total Area = 91.23 **Use CN** 91

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Table C-2. Runoff Curve Numbers (CNs) for Urban Areas (Synthetic Unit Hydrograph Method)

Cover Type and Hydrologic Condition[1]	Average Percent Impervious Area[2]	Curve Numbers for Hydrologic Soil Group			
		A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.)[3]:					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only)[4]		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:[5]					
1/8 acre or less (town houses)	70	81	87	91	93
1/4 acre	49	68	79	86	89
1/3 acre	41	63	76	84	87
1/2 acre	32	58	73	82	86
1 acre	24	53	70	80	84
2 acres	11	46	65	77	82
Developing urban areas, newly graded areas (pervious areas only, no vegetation)[6]		77	86	91	94
Idle land (*CN*s are determined using cover types in Table C-3)					

[1] *Average runoff condition, and $I_a = 0.2S$.*

[2] *The average percent impervious area shown was used to develop the composite* CN*s. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a* CN *of 98, and pervious areas are considered equivalent to open space in good hydrologic condition.*

6. Santa Rosa LID Calculator

STORM WATER CALCULATOR

LID BMP Summary Page & Site Global Values

Project Information:

Project Name:	Geyserville
Address/Location:	21837 Geyserville Ave
Designer:	RMS
Date:	4/2/2025

Site Information:

Mean Seasonal Precipitation (MSP) of Project Site:	41.00	(inches)
K=MSP/30 K=	1.37	
Impervious area - pre development:	0.0	ft^2
Impervious area - post development:	158,558.0	ft^2

Based upon the pre and post development impervious area, the post construction BMP requirement is:

100% Capture & Treatment

Summary of Saved BMP Results:

		Tributary Area		Requirements		BMP Design Results						
							Hydromodification Control		Flow Base Treatment		Delta Volume Capture	
	BMP ID:	Tributary Area (ft^2.)	Runoff Reduction Measures (Y/N)	Type of Requirement Met	Type of BMP Design	Percent Achieved	Required $V_{Hydromod}$ (ft^3)	Achieved (ft^3)	Required Q Treatment (cfs)	Achieved (ft^3)	Required Vdelta (ft^3)	Achieved (ft^3)
1	DA1	61,670	No	Hydromod Volume Capture	Priority 1: P1-02 Roadside Bioretention - No Curb and Gutter	105.1	3859.9253	4058.0000				
2	DA2	115,234	No	Hydromod Volume Capture	Priority 1: P1-02 Roadside Bioretention - No Curb and Gutter	104.1	6622.4980	6892.8001				
3	DA3	30,298	No	Hydromod Volume Capture	Priority 1: P1-02 Roadside Bioretention - No Curb and Gutter	106.0	848.6470	899.3000				
4	DA4	17,185	No	Hydromod Volume Capture	Priority 1: P1-02 Roadside Bioretention - No Curb and Gutter	103.0	906.6806	933.8000				
5												
6												
7												
8												
9												
10												
11												
12												
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STORM WATER CALCULATOR

BMP Tributary Parameters

Project Name: Geyserville

BMP ID:	DA1
BMP Design Criteria:	100% Capture & Treatment
Type of BMP Design:	Priority 1: P1-02 Roadside Bioretention - No Curb and Gutter
BMP's Physical Tributary Area:	61,670.0 ft^2
Description/Notes:	

Hydromodification Requirement: 100% Volume Capture; $V_{HYDROMOD}$

$V_{HYDROMOD}$ = 3,859.93 ft^3

Post development hydrologic soil type within tributary area:	C: 0.05 - 0.15 in/hr infiltration (transmission) rate
Post development ground cover description:	Brush: weed-grass mixture with brush major element - Poor (<50% ground cover)
CN_{POST}:	
User Composite post development CN:	93.0

BMP Sizing Tool: Hydromodification Requirement

Percent of Goal Achieved = 105.13 %

	BMP Volume Below Ground			Ponded Water Above Ground	
Porosity:	0.40				
Depth below perforated pipe if present:	3.75	ft	Depth:	0.50	ft
Width:	0.00	ft	Width:	0.00	ft
Length:	0.00	ft	Length:	0.00	ft
Area:	2,029.00	ft^2	Area:	2,029.00	ft^2

STORM WATER CALCULATOR

BMP Tributary Parameters

Project Name: Geyserville

BMP ID:	DA2
BMP Design Criteria:	100% Capture & Treatment
Type of BMP Design:	Priority 1: P1-02 Roadside Bioretention - No Curb and Gutter
BMP's Physical Tributary Area:	115,234.0 ft^2
Description/Notes:	

Hydromodification Requirement: 100% Volume Capture; $V_{HYDROMOD}$

$V_{HYDROMOD}$ = 6,622.50 ft^3

Post development hydrologic soil type within tributary area:	C: 0.05 - 0.15 in/hr infiltration (transmission) rate
Post development ground cover description:	Brush: weed-grass mixture with brush major element - Poor (<50% ground cover)
CN_{POST}:	
User Composite post development CN:	92.0

BMP Sizing Tool: Hydromodification Requirement

Percent of Goal Achieved = 104.08 %

	BMP Volume Below Ground		Ponded Water Above Ground	
Porosity:	0.40			
Depth below perforated pipe if present:	4.75	ft	Depth: 0.50	ft
Width:	0.00	ft	Width: 0.00	ft
Length:	0.00	ft	Length: 0.00	ft
Area:	2,872.00	ft^2	Area: 2,872.00	ft^2

STORM WATER CALCULATOR

BMP Tributary Parameters

Project Name: Geyserville

BMP ID:	DA3
BMP Design Criteria:	100% Capture & Treatment
Type of BMP Design:	Priority 1: P1-02 Roadside Bioretention - No Curb and Gutter
BMP's Physical Tributary Area:	30,298.0 ft^2
Description/Notes:	

Hydromodification Requirement: 100% Volume Capture; $V_{HYDROMOD}$

$V_{HYDROMOD}$ = 848.65 ft^3

Post development hydrologic soil type within tributary area:	C: 0.05 - 0.15 in/hr infiltration (transmission) rate
Post development ground cover description:	Brush: weed-grass mixture with brush major element - Poor (<50% ground cover)
CN_{POST}:	
User Composite post development CN:	84.0

BMP Sizing Tool: Hydromodification Requirement

Percent of Goal Achieved = 105.97 %

	BMP Volume Below Ground			Ponded Water Above Ground	
Porosity:	0.40				
Depth below perforated pipe if present:	3.00	ft	Depth:	0.50	ft
Width:	0.00	ft	Width:	0.00	ft
Length:	0.00	ft	Length:	0.00	ft
Area:	529.00	ft^2	Area:	529.00	ft^2

STORM WATER CALCULATOR

BMP Tributary Parameters

Project Name: Geyserville

BMP ID:	DA4
BMP Design Criteria:	100% Capture & Treatment
Type of BMP Design:	Priority 1: P1-02 Roadside Bioretention - No Curb and Gutter
BMP's Physical Tributary Area:	17,185.0 ft^2
Description/Notes:	

Hydromodification Requirement: 100% Volume Capture; $V_{HYDROMOD}$

$V_{HYDROMOD}$ = 906.68 ft^3

Post development hydrologic soil type within tributary area:	C: 0.05 - 0.15 in/hr infiltration (transmission) rate
Post development ground cover description:	Brush: weed-grass mixture with brush major element - Poor (<50% ground cover)
CN_{POST}:	
User Composite post development CN:	91.0

BMP Sizing Tool: Hydromodification Requirement

Percent of Goal Achieved = 102.99 %

	BMP Volume Below Ground			Ponded Water Above Ground	
Porosity:	0.40				
Depth below perforated pipe if present:	2.25	ft	Depth:	0.50	ft
Width:	0.00	ft	Width:	0.00	ft
Length:	0.00	ft	Length:	0.00	ft
Area:	667.00	ft^2	Area:	667.00	ft^2

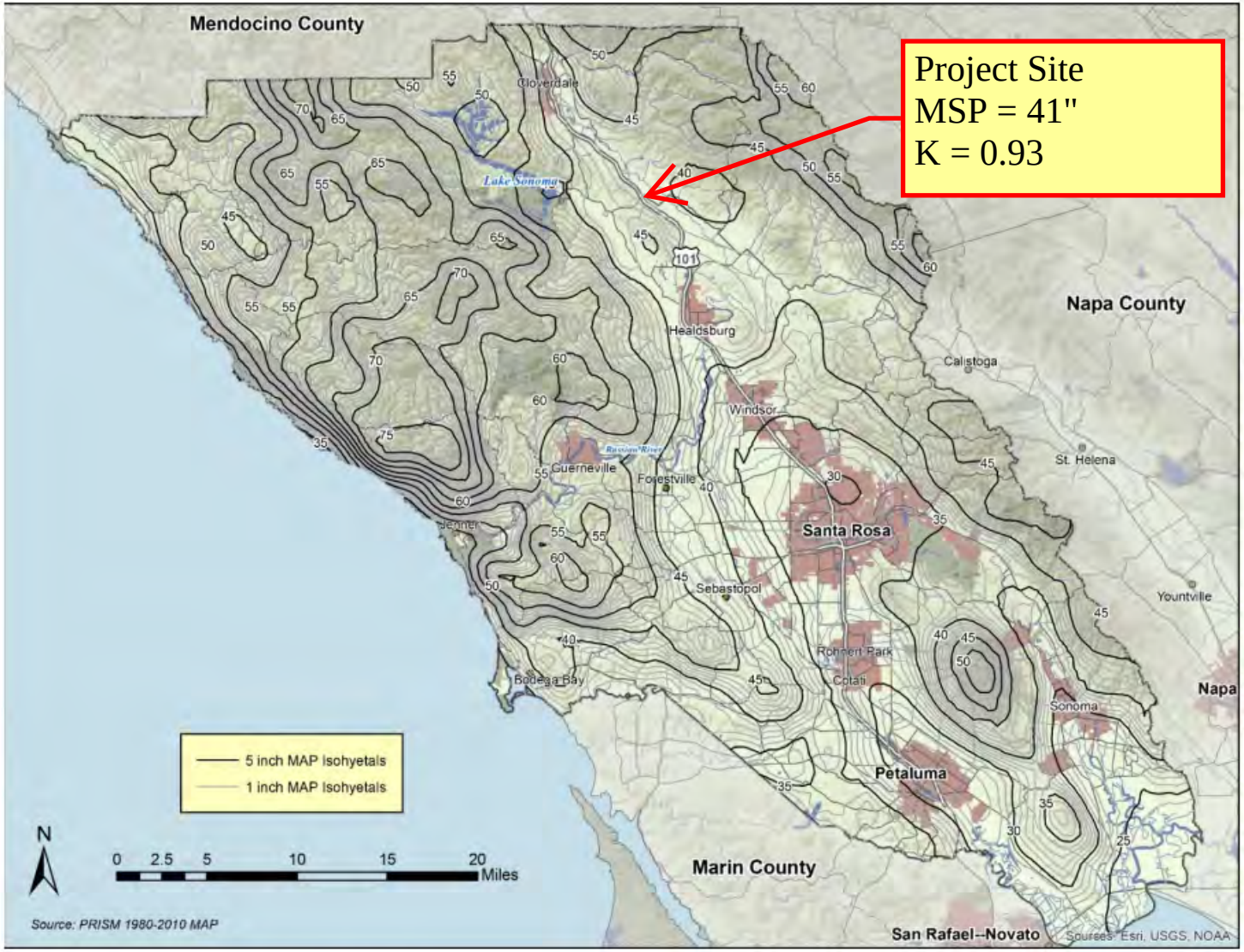
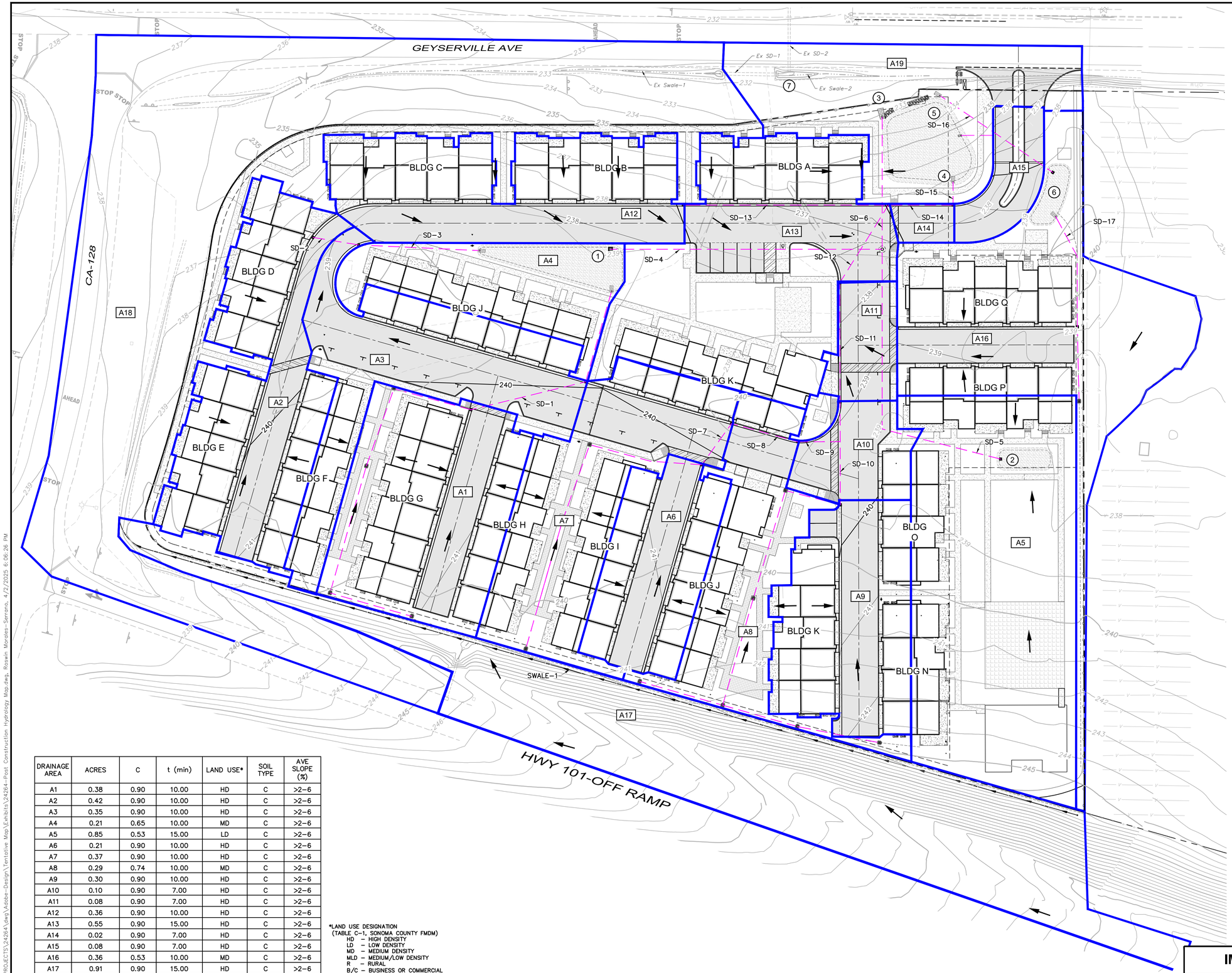


Figure D.2-1. Mean Annual Precipitation

7. Post-Construction Hydrology Map



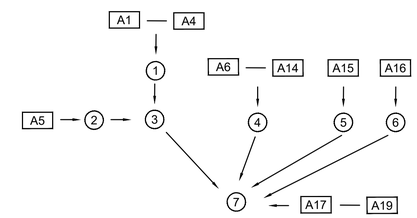
DRAINAGE AREA LEGEND

- A1 — DRAINAGE MANAGEMENT AREA
- 1 — POINT OF CONCENTRATION
- DRAINAGE AREA BOUNDARY
- PROPERTY LINE (P.L.)
- DIRECTION OF FLOW
- STORM DRAIN LINE

HATCHING LEGEND:

- AC PAVEMENT
- 4" PCC OVER 4" CL II AB
- BRICK PAVERS (BY OTHERS)
- TURF (BY OTHERS)
- BRICK PAVERS (SLD)
- BIORETENTION AREA

DRAINAGE ROUTING



DRAINAGE AREA	ACRES	C	t (min)	LAND USE*	SOIL TYPE	AVE SLOPE (%)
A1	0.38	0.90	10.00	HD	C	>2–6
A2	0.42	0.90	10.00	HD	C	>2–6
A3	0.35	0.90	10.00	HD	C	>2–6
A4	0.21	0.65	10.00	MD	C	>2–6
A5	0.85	0.53	15.00	LD	C	>2–6
A6	0.21	0.90	10.00	HD	C	>2–6
A7	0.37	0.90	10.00	HD	C	>2–6
A8	0.29	0.74	10.00	MD	C	>2–6
A9	0.30	0.90	10.00	HD	C	>2–6
A10	0.10	0.90	7.00	HD	C	>2–6
A11	0.08	0.90	7.00	HD	C	>2–6
A12	0.36	0.90	10.00	HD	C	>2–6
A13	0.55	0.90	15.00	HD	C	>2–6
A14	0.02	0.90	7.00	HD	C	>2–6
A15	0.08	0.90	7.00	HD	C	>2–6
A16	0.36	0.53	10.00	MD	C	>2–6
A17	0.91	0.90	15.00	HD	C	>2–6
A18	1.53	0.74	15.00	MD	C	>2–6
A19	0.38	0.68	10.00	MD	C	>2–6

*LAND USE DESIGNATION
(TABLE C-1, SONOMA COUNTY FMDM)
HD – HIGH DENSITY
LD – LOW DENSITY
MD – MEDIUM DENSITY
MLD – MEDIUM/LOW DENSITY
R – RURAL
B/C – BUSINESS OR COMMERCIAL
I – INDUSTRIAL
P – PARKS AND RECREATION
AG – AGRICULTURAL OR OPEN SAPACE

NOTE:

2–FT & 10–FT CONTOURS SHOWN ARE FROM LIDAR AND ARE SHOWN FOR GRAPHIC PURPOSES ONLY

REFER TO SUBMITTED GRADING & DRAINAGE PLANS FOR INVERTS, FLOW LINES, TOP OF GRATE ELEVATIONS AND DRAINAGE SPECIFICATIONS

THIS MAP IS FOR REFERENCE ONLY

30' 15' 0 15' 30' 60' 90'
Graphic Scale: 1" = 30'

March 27, 2025

IMPERVIOUS AREA MAP

VESTING TENTATIVE MAP
21837 Geyserville Ave, Geyserville, CA
APN 140-180-035

adobe associates, inc.
civil engineering I land surveying I wastewater
1220 N. Dutton Ave., Santa Rosa, CA 95401
P. (707) 541-2300 F. (707) 541-2301
Website: www.adobeinc.com
"A Service You Can Count On!"

T:\2024 PROJECTS\24264\dwg\Adobe-Design\Tentative Map\Exhibits\24264-Post Construction Hydrology Map.dwg, Rosavin Morales-Serrano, 4/2/2025 6:06:26 PM

8. 10 and 100 Year Rational Method Drainage Study

Incremental Rational Method Drainage Study

10 -Yr Storm Event Post Construction

Project: 24264-Tentative Map **Date:** 4/2/2025

Point of Concentration	Area	Elevation	Distance	Slope	V(ft/s)	Travel Time (min)	Total Time (min)	I	C	A	A_{total}	AC	Sum AC	Q (cfs)	Remarks
10 year															
ON SITE FLOW RATES															
1	A 1	-	-	-	-	10.00	10.00	2.35	0.90	0.38	0.38	0.34	0.34	0.80	Total Flow to SD-1 and Flow to SD-4
1	A 2	-	-	-	-	10.00	10.00	2.35	0.90	0.42	0.42	0.37	0.37	0.88	Overland Flow to SD-2 and Flow to SD-3
1	A 3	-	-	-	-	10.00	10.00	2.35	0.90	0.35	0.35	0.32	0.32	0.74	Overland Flow to SD-3 and Flow to SD-4
1								Combines A2, A3						1.62	Total Flow to SD-3 and Flow to SD-4
1	A 4	-	-	-	-	10.00	10.00	2.35	0.65	0.21	0.21	0.14	0.14	0.33	Overland Flow to SD-4
1								Combines A1-A4						2.75	Total Flow to SD-4 and Flow to SD-6
2	A 5	-	-	-	-	15.00	15.00	1.91	0.53	0.85	0.85	0.45	0.45	0.86	Total Flow to SD-5 and Flow to SD-6
3								Combines A1-A5						3.61	Total Flow to SD-6 & Flow to Ex Swale-2 & Ex SD-2
4	A 6	-	-	-	-	10.00	10.00	2.35	0.90	0.21	0.21	0.19	0.19	0.45	Overland Flow to SD-7 and Flow to SD-8
4	A 7	-	-	-	-	10.00	10.00	2.35	0.90	0.37	0.37	0.33	0.33	0.78	Overland Flow to SD-7 and Flow to SD-8
4								Combines A6, A7						1.22	Total Flow to SD-7 & SD-8 and Flow to SD-9
4	A 8	-	-	-	-	10.00	10.00	2.35	0.74	0.29	0.29	0.21	0.21	0.50	Overland Flow to SD-9
4								Combines A6, A7, A8						1.72	Total Flow to SD-9 and Flow to SD-11
4	A 9	-	-	-	-	10.00	10.00	2.35	0.90	0.30	0.30	0.27	0.27	0.64	Total Flow to SD-10 And Flow to SD-11
4	A 10	-	-	-	-	7.00	7.00	2.82	0.90	0.10	0.10	0.09	0.09	0.25	Overland Flow to SD-11
4								Combines A6-A10						2.61	Total Flow to SD-11 and Flow to SD-12
4	A 11	-	-	-	-	7.00	7.00	2.82	0.90	0.08	0.08	0.07	0.07	0.20	Overland Flow to SD-12
4								Combines A6-A11						2.81	Total Flow to SD-12 and Flow to SD-14
4	A 12	-	-	-	-	10.00	10.00	2.35	0.90	0.36	0.36	0.32	0.32	0.76	Total Flow to SD-13 and Flow to SD-14
4	A 13	-	-	-	-	15.00	15.00	1.91	0.90	0.55	0.55	0.50	0.50	0.95	Overland Flow to SD-14
4								Combines A6- A13						4.52	Total Flow to SD-14 and Flow to SD-15
4	A 14	-	-	-	-	7.00	7.00	2.82	0.90	0.02	0.02	0.02	0.02	0.05	Overland Flow to SD-15
4								Combines A6-A14						4.57	Total Flow to SD-15& Flow to Ex-Swale-2 & Ex SD-2
5	A 15	-	-	-	-	7.00	7.00	2.82	0.90	0.08	0.08	0.07	0.07	0.20	Total Flow to SD-16 & Flow to Ex Swale-2 & Ex SD-2
6	A 16	-	-	-	-	10.00	10.00	2.35	0.53	0.36	0.36	0.19	0.19	0.45	Total Flow to SD-17 & Flow to Ex Swale-2 & Ex SD-2
7	A 17	-	-	-	-	15.00	15.00	1.91	0.90	0.91	0.91	0.82	0.82	1.57	Overland Flow to Swale-1 and Flow to Ex-Swale-1

7	A 18	-	-	-	-	15.00	15.00	1.91	0.74	1.53	1.53	1.13	1.13	2.17	Overland Flow to Ex-Swale-1
7								Combines A17, A18						3.74	Total Flow to Ex Swale-1 & Ex SD-1 & Flow to Ex SD-2
7	A 19	-	-	-	-	10.00	10.00	2.35	0.68	0.38	0.38	0.26	0.26	0.61	Overland Flow to Ex Swale-2 and Flow to Ex SD-2
7								Combines A1-A19						13.18	Total Flow to Ex SD-2

ON SITE - POST CONSTRUCTION RUNOFF COEFFICIENT

DRAINAGE AREA	ACRES	C	t (min)	LAND USE*	SOIL TYPE	AVE SLOPE (%)
A 1	0.38	0.90	10.00	HD	C	>2-6
A 2	0.42	0.90	10.00	HD	C	>2-6
A 3	0.35	0.90	10.00	HD	C	>2-6
A 4	0.21	0.65	10.00	MD	C	>2-6
A 5	0.85	0.53	15.00	LD	C	>2-6
A 6	0.21	0.90	10.00	HD	C	>2-6
A 7	0.37	0.90	10.00	HD	C	>2-6
A 8	0.29	0.74	10.00	MD	C	>2-6
A 9	0.30	0.90	10.00	HD	C	>2-6
A 10	0.10	0.90	7.00	HD	C	>2-6
A 11	0.08	0.90	7.00	HD	C	>2-6
A 12	0.36	0.90	10.00	HD	C	>2-6
A 13	0.55	0.90	15.00	HD	C	>2-6
A 14	0.02	0.90	7.00	HD	C	>2-6
A 15	0.08	0.90	7.00	HD	C	>2-6
A 16	0.36	0.53	10.00	MD	C	>2-6
A 17	0.91	0.90	15.00	HD	C	>2-6
A 18	1.53	0.74	15.00	MD	C	>2-6
A 19	0.38	0.68	10.00	MD	C	>2-6

***Land Use Designation**

HD - High Density
LD - Low Density
MD - Medium Density
MLD - Medium/Low Density
R - Rural
B/C - Business or Commercial
I - Industrial
P - Parks and Recreation
AG - Agricultural or Open Space

Reference Table C-1 of the Sonoma County FMDM, 2020.

Rainfall Intensity vs Duration

$$I = 7.62 / t^{0.51}$$

I = intensity (in/hour)

t = time of concentration (minutes)

Incremental Rational Method Drainage Study

100 -Yr Storm Event Post Construction

Project: 24264-Tentative Map **Date:** 4/2/2025

Point of Concentration	Area	Elevation	Distance	Slope	V(ft/s)	Travel Time (min)	Total Time (min)	I	C	A	A_{total}	AC	Sum AC	Q (cfs)	Remarks
100 year															
ON SITE FLOW RATES															
1	A 1	-	-	-	-	10.00	10.00	3.48	0.90	0.38	0.38	0.34	0.34	1.18	Total Flow to SD-1 and Flow to SD-4
1	A 2	-	-	-	-	10.00	10.00	3.48	0.90	0.42	0.42	0.37	0.37	1.30	Overland Flow to SD-2 and Flow to SD-3
1	A 3	-	-	-	-	10.00	10.00	3.48	0.90	0.35	0.35	0.32	0.32	1.10	Overland Flow to SD-3 and Flow to SD-4
1								Combines A2, A3						2.40	Total Flow to SD-3 and Flow to SD-4
1	A 4	-	-	-	-	10.00	10.00	3.48	0.65	0.21	0.21	0.14	0.14	0.48	Overland Flow to SD-4
1								Combines A1-A4						4.06	Total Flow to SD-4 and Flow to SD-6
2	A 5	-	-	-	-	15.00	15.00	2.84	0.53	0.85	0.85	0.45	0.45	1.28	Total Flow to SD-5 and Flow to SD-6
3								Combines A1-A5						5.34	Total Flow to SD-6 & Flow to Ex Swale-2 & Ex SD-2
4	A 6	-	-	-	-	10.00	10.00	3.48	0.90	0.21	0.21	0.19	0.19	0.66	Overland Flow to SD-7 and Flow to SD-8
4	A 7	-	-	-	-	10.00	10.00	3.48	0.90	0.37	0.37	0.33	0.33	1.15	Overland Flow to SD-7 and Flow to SD-8
4								Combines A6, A7						1.81	Total Flow to SD-7 & SD-8 and Flow to SD-9
4	A 8	-	-	-	-	10.00	10.00	3.48	0.74	0.29	0.29	0.21	0.21	0.73	Overland Flow to SD-9
4								Combines A6, A7, A8						2.54	Total Flow to SD-9 and Flow to SD-11
4	A 9	-	-	-	-	10.00	10.00	3.48	0.90	0.30	0.30	0.27	0.27	0.94	Total Flow to SD-10 And Flow to SD-11
4	A 10	-	-	-	-	7.00	7.00	4.17	0.90	0.10	0.10	0.09	0.09	0.38	Overland Flow to SD-11
4								Combines A6-A10						3.86	Total Flow to SD-11 and Flow to SD-12
4	A 11	-	-	-	-	7.00	7.00	4.17	0.90	0.08	0.08	0.07	0.07	0.30	Overland Flow to SD-12
4								Combines A6-A11						4.16	Total Flow to SD-12 and Flow to SD-14
4	A 12	-	-	-	-	10.00	10.00	3.48	0.90	0.36	0.36	0.32	0.32	1.13	Total Flow to SD-13 and Flow to SD-14
4	A 13	-	-	-	-	15.00	15.00	2.84	0.90	0.55	0.55	0.50	0.50	1.40	Overland Flow to SD-14
4								Combines A6- A13						6.69	Total Flow to SD-14 and Flow to SD-15
4	A 14	-	-	-	-	7.00	7.00	4.17	0.90	0.02	0.02	0.02	0.02	0.08	Overland Flow to SD-15
4								Combines A6-A14						6.76	Total Flow to SD-15& Flow to Ex-Swale-2 & Ex SD-2
5	A 15	-	-	-	-	7.00	7.00	4.17	0.90	0.08	0.08	0.07	0.07	0.30	Total Flow to SD-16 & Flow to Ex Swale-2 & Ex SD-2
6	A 16	-	-	-	-	10.00	10.00	3.48	0.53	0.36	0.36	0.19	0.19	0.66	Total Flow to SD-17 & Flow to Ex Swale-2 & Ex SD-2
7	A 17	-	-	-	-	15.00	15.00	2.84	0.90	0.91	0.91	0.82	0.82	2.32	Overland Flow to Swale-1 and Flow to Ex-Swale-1

7	A 18	-	-	-	-	15.00	15.00	2.84	0.74	1.53	1.53	1.13	1.13	3.21	Overland Flow to Ex-Swale-1
7								Combines A17, A18						5.54	Total Flow to Ex Swale-1 & Ex SD-1 & Flow to Ex SD-2
7	A 19	-	-	-	-	10.00	10.00	3.48	0.68	0.38	0.38	0.26	0.26	0.90	Overland Flow to Ex Swale-2 and Flow to Ex SD-2
7								Combines A1-A19						19.51	Total Flow to Ex SD-2

ON SITE - POST CONSTRUCTION RUNOFF COEFFICIENT

DRAINAGE AREA	ACRES	C	t (min)	LAND USE*	SOIL TYPE	AVE SLOPE (%)
A 1	0.38	0.90	10.00	HD	C	>2-6
A 2	0.42	0.90	10.00	HD	C	>2-6
A 3	0.35	0.90	10.00	HD	C	>2-6
A 4	0.21	0.65	10.00	MD	C	>2-6
A 5	0.85	0.53	15.00	LD	C	>2-6
A 6	0.21	0.90	10.00	HD	C	>2-6
A 7	0.37	0.90	10.00	HD	C	>2-6
A 8	0.29	0.74	10.00	MD	C	>2-6
A 9	0.30	0.90	10.00	HD	C	>2-6
A 10	0.10	0.90	7.00	HD	C	>2-6
A 11	0.08	0.90	7.00	HD	C	>2-6
A 12	0.36	0.90	10.00	HD	C	>2-6
A 13	0.55	0.90	15.00	HD	C	>2-6
A 14	0.02	0.90	7.00	HD	C	>2-6
A 15	0.08	0.90	7.00	HD	C	>2-6
A 16	0.36	0.53	10.00	MD	C	>2-6
A 17	0.91	0.90	15.00	HD	C	>2-6
A 18	1.53	0.74	15.00	MD	C	>2-6
A 19	0.38	0.68	10.00	MD	C	>2-6

***Land Use Designation**

HD - High Density
LD - Low Density
MD - Medium Density
MLD - Medium/Low Density
R - Rural
B/C - Business or Commercial
I - Industrial
P - Parks and Recreation
AG - Agricultural or Open Space

Reference Table C-1 of the Sonoma County FMDM, 2020.

Rainfall Intensity vs Duration

$$I = 11.14 / t^{0.505}$$

I = intensity (in/hour)

t = time of concentration (minutes)

Table C-1. Runoff Coefficients (*Cs*) (Incremental Rational Method)

Land Use	Lot Size (acres)	Impervious Fraction	Average Slope (%)			
			0-2	>2-6	>6-12	>12
Soil Type A						
Residential[1]						
Rural		0.03	0.24	0.28	0.34	0.38
Very low density	2	0.11	0.29	0.34	0.38	0.42
	1	0.24	0.38	0.42	0.46	0.49
Low density	1/2	0.32	0.43	0.47	0.50	0.53
	1/3	0.41	0.50	0.53	0.56	0.58
Medium-low density	1/4	0.49	0.55	0.58	0.60	0.62
Medium density	1/8	0.70	0.70	0.71	0.73	0.74
Medium-high density	1/18	1	0.90	0.90	0.90	0.90
Business, commercial, etc.		1	0.90	0.90	0.90	0.90
General industrial		1	0.90	0.90	0.90	0.90
Parks and recreation		0.05	0.25	0.25	0.30	0.35
Ag and open space		0.02	0.23	0.23	0.28	0.33
Soil Type B						
Residential[1]						
Rural		0.03	0.28	0.33	0.39	0.43
Very low density	2	0.11	0.34	0.38	0.43	0.47
	1	0.24	0.42	0.45	0.50	0.53
Low density	1/2	0.32	0.47	0.50	0.54	0.57
	1/3	0.41	0.53	0.56	0.59	0.61
Medium-low density	1/4	0.49	0.58	0.60	0.63	0.65
Medium density	1/8	0.70	0.71	0.73	0.74	0.76
Medium-high density	1/18	1	0.90	0.90	0.90	0.90
Business, commercial, etc.		1	0.90	0.90	0.90	0.90
General industrial		1	0.90	0.90	0.90	0.90
Parks and recreation		0.05	0.25	0.30	0.34	0.40
Ag and open space		0.02	0.23	0.28	0.33	0.38
Soil Type C						
Residential[1]						
Rural		0.03	0.33	0.38	0.43	0.47
Very low density	2	0.11	0.38	0.42	0.47	0.51
	1	0.24	0.45	0.49	0.53	0.57
Low density	1/2	0.32	0.50	0.53	0.57	0.60

9. NOAA Atlas 14 – Point Precipitation Frequency Estimates & Intensity Duration Frequency Curve (IDF Curve)

NOAA Atlas 14, Volume 6, Version 2
Location name: Geyserville, California, USA*
Latitude: 38.7133°, Longitude: -122.917°
Elevation: 239 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

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

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

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

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	1.87 (1.67-2.14)	2.32 (2.05-2.64)	2.89 (2.56-3.30)	3.35 (2.93-3.85)	3.96 (3.34-4.75)	4.44 (3.65-5.45)	4.91 (3.92-6.22)	5.40 (4.16-7.06)	6.05 (4.45-8.30)	6.55 (4.63-9.35)
10-min	1.34 (1.19-1.53)	1.66 (1.48-1.89)	2.07 (1.83-2.36)	2.40 (2.10-2.77)	2.84 (2.39-3.41)	3.18 (2.61-3.91)	3.52 (2.81-4.45)	3.87 (2.99-5.06)	4.33 (3.19-5.95)	4.69 (3.32-6.70)
15-min	1.08 (0.964-1.23)	1.34 (1.19-1.52)	1.67 (1.48-1.90)	1.93 (1.70-2.23)	2.29 (1.93-2.75)	2.56 (2.10-3.15)	2.84 (2.26-3.59)	3.12 (2.41-4.08)	3.50 (2.57-4.80)	3.78 (2.68-5.40)
30-min	0.758 (0.674-0.862)	0.938 (0.832-1.07)	1.17 (1.03-1.33)	1.35 (1.19-1.56)	1.60 (1.35-1.92)	1.79 (1.47-2.21)	1.99 (1.59-2.51)	2.18 (1.69-2.85)	2.45 (1.80-3.36)	2.65 (1.87-3.78)
60-min	0.537 (0.477-0.610)	0.663 (0.589-0.755)	0.827 (0.731-0.944)	0.958 (0.840-1.10)	1.14 (0.956-1.36)	1.27 (1.04-1.56)	1.41 (1.12-1.78)	1.54 (1.19-2.02)	1.73 (1.28-2.38)	1.88 (1.33-2.68)
2-hr	0.419 (0.373-0.476)	0.511 (0.454-0.582)	0.628 (0.556-0.717)	0.720 (0.631-0.830)	0.841 (0.709-1.01)	0.931 (0.765-1.14)	1.02 (0.814-1.29)	1.11 (0.856-1.45)	1.22 (0.900-1.68)	1.31 (0.925-1.87)
3-hr	0.363 (0.323-0.413)	0.441 (0.391-0.501)	0.538 (0.476-0.614)	0.614 (0.538-0.708)	0.713 (0.600-0.855)	0.785 (0.646-0.966)	0.856 (0.684-1.08)	0.927 (0.716-1.21)	1.02 (0.748-1.40)	1.08 (0.766-1.55)
6-hr	0.282 (0.251-0.320)	0.341 (0.303-0.388)	0.415 (0.367-0.473)	0.471 (0.413-0.543)	0.544 (0.458-0.652)	0.597 (0.490-0.733)	0.647 (0.517-0.819)	0.697 (0.538-0.911)	0.760 (0.559-1.04)	0.805 (0.569-1.15)
12-hr	0.204 (0.182-0.232)	0.253 (0.224-0.288)	0.312 (0.276-0.356)	0.357 (0.313-0.412)	0.415 (0.349-0.497)	0.456 (0.375-0.561)	0.496 (0.396-0.627)	0.534 (0.413-0.698)	0.583 (0.429-0.800)	0.618 (0.437-0.882)
24-hr	0.144 (0.130-0.164)	0.183 (0.165-0.209)	0.231 (0.207-0.263)	0.267 (0.238-0.307)	0.313 (0.270-0.371)	0.346 (0.293-0.417)	0.378 (0.313-0.465)	0.408 (0.330-0.516)	0.447 (0.348-0.586)	0.475 (0.359-0.642)
2-day	0.096 (0.086-0.109)	0.122 (0.110-0.139)	0.155 (0.138-0.176)	0.179 (0.159-0.206)	0.211 (0.182-0.249)	0.233 (0.197-0.281)	0.255 (0.211-0.313)	0.275 (0.222-0.348)	0.302 (0.235-0.395)	0.320 (0.242-0.433)
3-day	0.074 (0.066-0.084)	0.095 (0.085-0.108)	0.120 (0.107-0.137)	0.139 (0.124-0.160)	0.163 (0.141-0.193)	0.181 (0.153-0.218)	0.198 (0.164-0.243)	0.214 (0.173-0.270)	0.234 (0.183-0.307)	0.249 (0.188-0.337)
4-day	0.062 (0.055-0.070)	0.079 (0.071-0.090)	0.100 (0.090-0.114)	0.116 (0.103-0.133)	0.137 (0.118-0.162)	0.151 (0.128-0.182)	0.165 (0.137-0.203)	0.179 (0.144-0.226)	0.196 (0.152-0.257)	0.208 (0.157-0.282)
7-day	0.044 (0.039-0.050)	0.056 (0.050-0.063)	0.070 (0.063-0.080)	0.082 (0.072-0.094)	0.096 (0.083-0.113)	0.106 (0.090-0.128)	0.116 (0.096-0.142)	0.125 (0.101-0.158)	0.137 (0.107-0.179)	0.145 (0.110-0.197)
10-day	0.035 (0.031-0.040)	0.044 (0.040-0.051)	0.056 (0.050-0.064)	0.065 (0.058-0.075)	0.076 (0.066-0.090)	0.084 (0.071-0.102)	0.092 (0.076-0.113)	0.099 (0.080-0.126)	0.109 (0.085-0.143)	0.115 (0.087-0.156)
20-day	0.023 (0.020-0.026)	0.029 (0.026-0.033)	0.037 (0.033-0.042)	0.043 (0.038-0.049)	0.050 (0.043-0.060)	0.056 (0.047-0.067)	0.061 (0.050-0.075)	0.065 (0.053-0.083)	0.071 (0.055-0.094)	0.075 (0.057-0.102)
30-day	0.018 (0.016-0.021)	0.023 (0.021-0.027)	0.030 (0.026-0.034)	0.034 (0.030-0.039)	0.040 (0.035-0.048)	0.044 (0.037-0.053)	0.048 (0.040-0.059)	0.052 (0.042-0.066)	0.056 (0.044-0.074)	0.060 (0.045-0.081)
45-day	0.015 (0.013-0.017)	0.019 (0.017-0.022)	0.024 (0.022-0.028)	0.028 (0.025-0.032)	0.033 (0.028-0.039)	0.036 (0.030-0.043)	0.039 (0.032-0.048)	0.042 (0.034-0.053)	0.046 (0.035-0.060)	0.048 (0.036-0.065)
60-day	0.013 (0.012-0.015)	0.017 (0.015-0.019)	0.021 (0.019-0.024)	0.024 (0.022-0.028)	0.028 (0.024-0.034)	0.031 (0.026-0.038)	0.034 (0.028-0.042)	0.036 (0.029-0.046)	0.039 (0.031-0.052)	0.041 (0.031-0.056)

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

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

Please refer to NOAA Atlas 14 document for more information.

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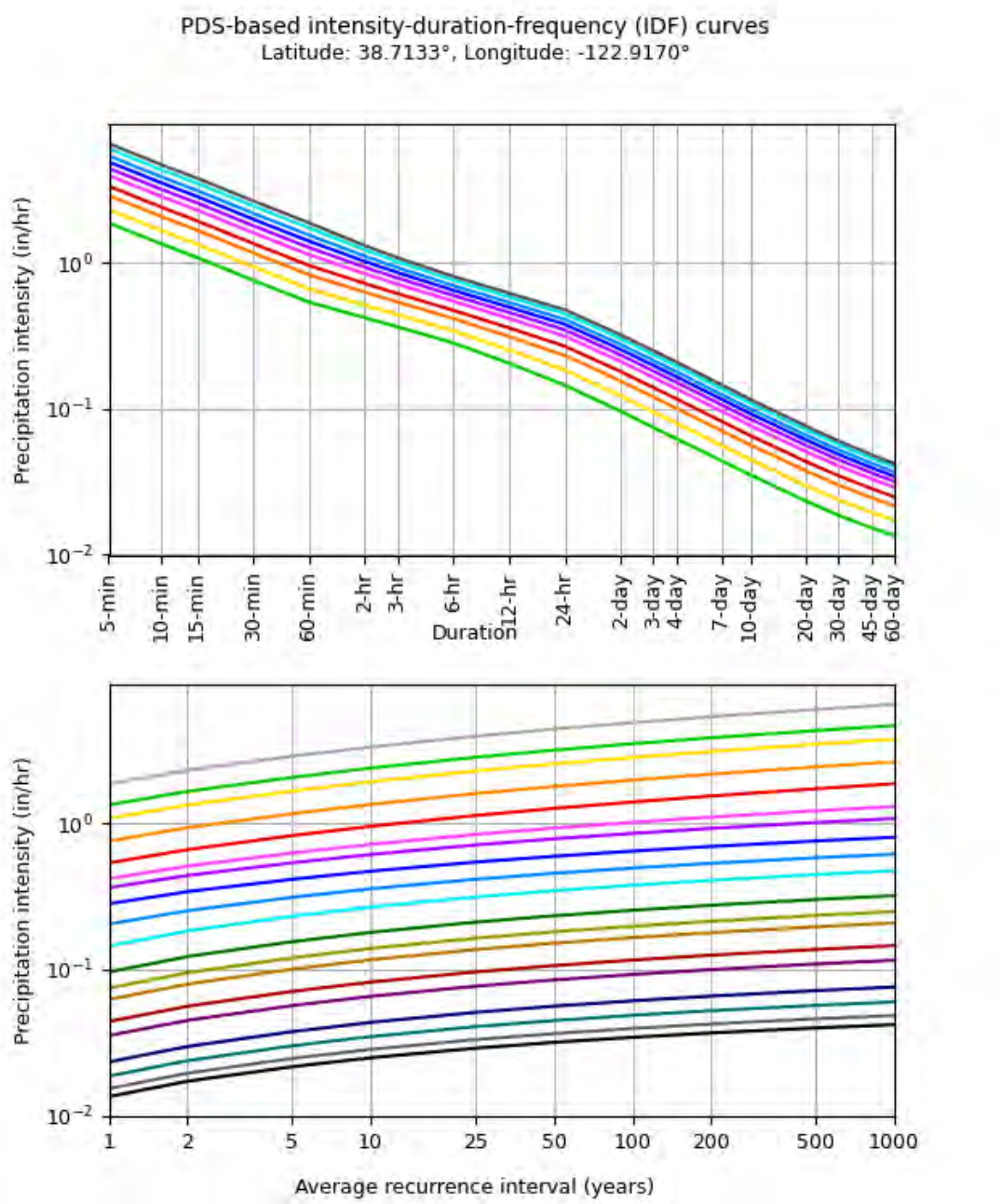
PF graphical



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Created (GMT): Tue Dec 17 18:58:18 2024

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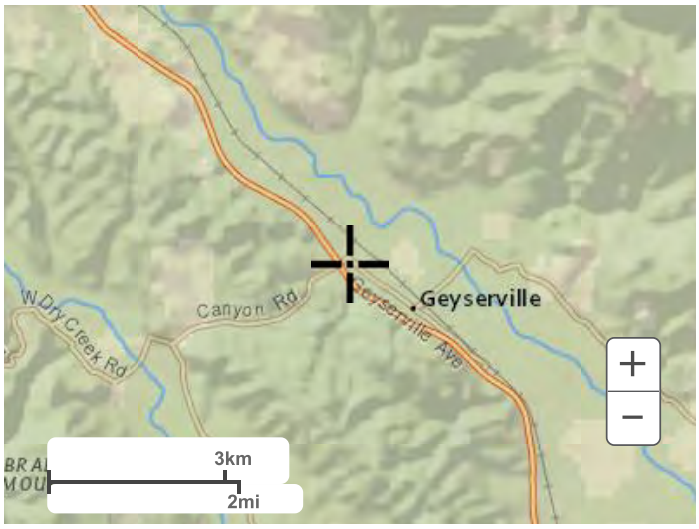
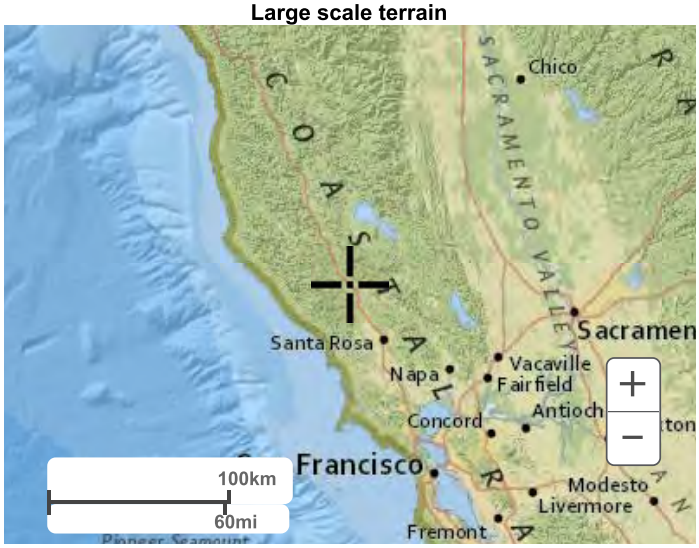
Maps & aerials

Small scale terrain

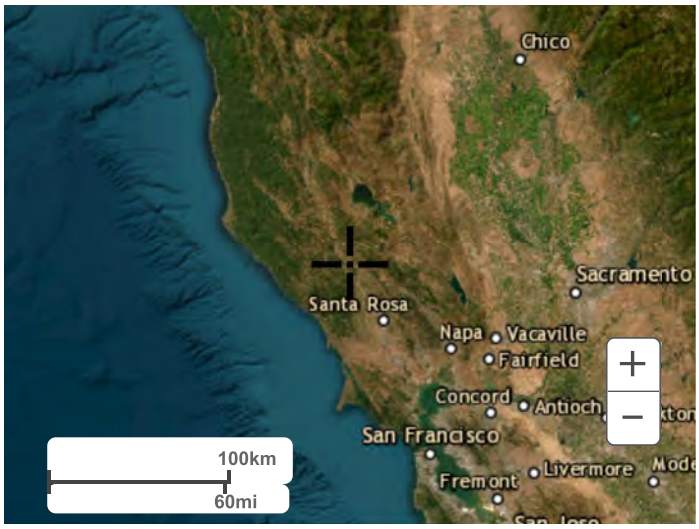


Large scale terrain



Large scale map

Large scale aerial



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

Disclaimer

10. 100-Year Overland Release Map

DRAINAGE AREA LEGEND

- PROPERTY LINE (℄)
- DIRECTION OF FLOW
- 100-YEAR OVERLAND RELEASE ROUTE

HATCHING LEGEND:

- AC PAVEMENT
- 4" PCC OVER 4" CL II AB
- BRICK PAVERS (BY OTHERS)
- TURF (BY OTHERS)
- BRICK PAVERS (SLD)
- BIORETENTION AREA

NOTE:

2-FT & 10-FT CONTOURS SHOWN ARE FROM LIDAR AND ARE SHOWN FOR GRAPHIC PURPOSES ONLY

REFER TO SUBMITTED GRADING & DRAINAGE PLANS FOR INVERTS, FLOW LINES, TOP OF GRATE ELEVATIONS AND DRAINAGE SPECIFICATIONS

THIS MAP IS FOR REFERENCE ONLY

30' 15' 0 15' 30' 60' 90'

Graphic Scale: 1" = 30'

March 27, 2025

IMPERVIOUS AREA MAP

VESTING TENTATIVE MAP
21837 Geyserville Ave, Geyserville, CA
APN 140-180-035

adobe associates, inc.
civil engineering | land surveying | wastewater
1220 N. Dutton Ave., Santa Rosa, CA 95401
P. (707) 541-2300 F. (707) 541-2301
Website: www.adobeinc.com
"A Service You Can Count On!"

T:\2024 PROJECTS\24264\dwg\Adobe-Design\Tentative Map\Exhibits\24264-100-Year Overland Release Map.dwg, Roswin Morales-Serrano, 4/2/2025 1:36:35 PM

Appendix I

10-Year Storm Event Storm Drain/Swale Analysis

Hydraulic Analysis Report

Project Data

Project Title: 24264-Geyserville Ave

Designer: RMS

Project Date: Tuesday, April 2, 2025

Project Units: U.S. Customary Units

Notes:

Channel Analysis: SD-1

Notes: A1

Input Parameters

Channel Type: Circular

Pipe Diameter: 0.6700 ft

Longitudinal Slope: 0.0050 ft/ft

Manning's n: 0.0120

Flow: 0.8000 cfs

Result Parameters

Depth: 0.4757 ft

Area of Flow: 0.2677 ft^2

Wetted Perimeter: 1.3429 ft

Hydraulic Radius: 0.1994 ft

Average Velocity: 2.9882 ft/s

Top Width: 0.6080 ft

Froude Number: 0.7936

Critical Depth: 0.4227 ft

Critical Velocity: 3.4137 ft/s

Critical Slope: 0.0069 ft/ft

Critical Top Width: 0.65 ft

Calculated Max Shear Stress: 0.1484 lb/ft^2

Calculated Avg Shear Stress: 0.0622 lb/ft^2

Channel Analysis: SD-2

Notes: A2

Input Parameters

Channel Type: Circular

Pipe Diameter: 0.6700 ft

Longitudinal Slope: 0.0050 ft/ft

Manning's n: 0.0120

Flow: 0.8800 cfs

Result Parameters

Depth: 0.5152 ft

Area of Flow: 0.2909 ft^2

Wetted Perimeter: 1.4331 ft

Hydraulic Radius: 0.2030 ft

Average Velocity: 3.0247 ft/s

Top Width: 0.5648 ft

Froude Number: 0.7426

Critical Depth: 0.4439 ft

Critical Velocity: 3.5489 ft/s

Critical Slope: 0.0073 ft/ft

Critical Top Width: 0.63 ft

Calculated Max Shear Stress: 0.1608 lb/ft^2

Calculated Avg Shear Stress: 0.0633 lb/ft^2

Channel Analysis: SD-3

Notes: A2, A3

Input Parameters

Channel Type: Circular

Pipe Diameter: 0.6700 ft

Longitudinal Slope: 0.0150 ft/ft

Manning's n: 0.0120

Flow: 1.6200 cfs

Result Parameters

Depth: 0.5474 ft

Area of Flow: 0.3084 ft^2

Wetted Perimeter: 1.5124 ft

Hydraulic Radius: 0.2039 ft

Average Velocity: 5.2537 ft/s

Top Width: 0.5182 ft

Froude Number: 1.2002

Critical Depth: 0.5895 ft

Critical Velocity: 4.9305 ft/s

Critical Slope: 0.0134 ft/ft

Critical Top Width: 0.44 ft

Calculated Max Shear Stress: 0.5123 lb/ft^2

Calculated Avg Shear Stress: 0.1908 lb/ft^2

Channel Analysis: SD-4

Notes: A1-A4

Input Parameters

Channel Type: Circular

Pipe Diameter: 1.0000 ft

Longitudinal Slope: 0.0050 ft/ft

Manning's n: 0.0120

Flow: 2.7500 cfs

Result Parameters

Depth: 0.8267 ft

Area of Flow: 0.6944 ft^2

Wetted Perimeter: 2.2829 ft

Hydraulic Radius: 0.3042 ft

Average Velocity: 3.9603 ft/s

Top Width: 0.7570 ft

Froude Number: 0.7287

Critical Depth: 0.7109 ft

Critical Velocity: 4.6048 ft/s

Critical Slope: 0.0070 ft/ft

Critical Top Width: 0.91 ft

Calculated Max Shear Stress: 0.2579 lb/ft^2

Calculated Avg Shear Stress: 0.0949 lb/ft^2

Channel Analysis: SD-5

Notes: A5

Input Parameters

Channel Type: Circular

Pipe Diameter: 0.6700 ft

Longitudinal Slope: 0.0050 ft/ft

Manning's n: 0.0120

Flow: 0.8600 cfs

Result Parameters

Depth: 0.5048 ft

Area of Flow: 0.2850 ft^2

Wetted Perimeter: 1.4087 ft

Hydraulic Radius: 0.2023 ft

Average Velocity: 3.0176 ft/s

Top Width: 0.5775 ft

Froude Number: 0.7570

Critical Depth: 0.4387 ft

Critical Velocity: 3.5154 ft/s

Critical Slope: 0.0072 ft/ft

Critical Top Width: 0.64 ft

Calculated Max Shear Stress: 0.1575 lb/ft^2

Calculated Avg Shear Stress: 0.0631 lb/ft^2

Channel Analysis: SD-6

Notes: A1-A5

Input Parameters

Channel Type: Circular

Pipe Diameter: 1.0000 ft

Longitudinal Slope: 0.0100 ft/ft

Manning's n: 0.0120

Flow: 3.6100 cfs

Result Parameters

Depth: 0.7670 ft

Area of Flow: 0.6464 ft^2

Wetted Perimeter: 2.1340 ft

Hydraulic Radius: 0.3029 ft

Average Velocity: 5.5850 ft/s

Top Width: 0.8455 ft

Froude Number: 1.1257

Critical Depth: 0.8105 ft

Critical Velocity: 5.2938 ft/s

Critical Slope: 0.0089 ft/ft

Critical Top Width: 0.78 ft

Calculated Max Shear Stress: 0.4786 lb/ft^2

Calculated Avg Shear Stress: 0.1890 lb/ft^2

Channel Analysis: SD-7

Notes: A7, A8

Input Parameters

Channel Type: Circular

Pipe Diameter: 0.6700 ft

Longitudinal Slope: 0.0100 ft/ft

Manning's n: 0.0120

Flow: 1.2200 cfs

Result Parameters

Depth: 0.5062 ft

Area of Flow: 0.2858 ft^2

Wetted Perimeter: 1.4118 ft

Hydraulic Radius: 0.2024 ft

Average Velocity: 4.2691 ft/s

Top Width: 0.5759 ft

Froude Number: 1.0680

Critical Depth: 0.5225 ft

Critical Velocity: 4.1359 ft/s

Critical Slope: 0.0093 ft/ft

Critical Top Width: 0.56 ft

Calculated Max Shear Stress: 0.3159 lb/ft^2

Calculated Avg Shear Stress: 0.1263 lb/ft^2

Channel Analysis: SD-8

Notes: A7, A8

Input Parameters

Channel Type: Circular

Pipe Diameter: 0.6700 ft

Longitudinal Slope: 0.0100 ft/ft

Manning's n: 0.0120

Flow: 1.2200 cfs

Result Parameters

Depth: 0.5062 ft

Area of Flow: 0.2858 ft^2

Wetted Perimeter: 1.4118 ft

Hydraulic Radius: 0.2024 ft

Average Velocity: 4.2691 ft/s

Top Width: 0.5759 ft

Froude Number: 1.0680

Critical Depth: 0.5225 ft

Critical Velocity: 4.1359 ft/s

Critical Slope: 0.0093 ft/ft

Critical Top Width: 0.56 ft

Calculated Max Shear Stress: 0.3159 lb/ft^2

Calculated Avg Shear Stress: 0.1263 lb/ft^2

Channel Analysis: SD-9

Notes: A6-A8

Input Parameters

Channel Type: Circular

Pipe Diameter: 0.6700 ft

Longitudinal Slope: 0.0175 ft/ft

Manning's n: 0.0120

Flow: 1.7200 cfs

Result Parameters

Depth: 0.5375 ft

Area of Flow: 0.3031 ft^2

Wetted Perimeter: 1.4872 ft

Hydraulic Radius: 0.2038 ft

Average Velocity: 5.6738 ft/s

Top Width: 0.5338 ft

Froude Number: 1.3268

Critical Depth: 0.6020 ft

Critical Velocity: 5.1529 ft/s

Critical Slope: 0.0148 ft/ft

Critical Top Width: 0.40 ft

Calculated Max Shear Stress: 0.5869 lb/ft^2

Calculated Avg Shear Stress: 0.2226 lb/ft^2

Channel Analysis: SD-10

Notes: A9

Input Parameters

Channel Type: Circular

Pipe Diameter: 0.6700 ft

Longitudinal Slope: 0.0050 ft/ft

Manning's n: 0.0120

Flow: 0.6400 cfs

Result Parameters

Depth: 0.4061 ft

Area of Flow: 0.2235 ft^2

Wetted Perimeter: 1.1956 ft

Hydraulic Radius: 0.1870 ft

Average Velocity: 2.8631 ft/s

Top Width: 0.6548 ft

Froude Number: 0.8635

Critical Depth: 0.3762 ft

Critical Velocity: 3.1399 ft/s

Critical Slope: 0.0063 ft/ft

Critical Top Width: 0.66 ft

Calculated Max Shear Stress: 0.1267 lb/ft^2

Calculated Avg Shear Stress: 0.0583 lb/ft^2

Channel Analysis: SD-11

Notes: A6-A10

Input Parameters

Channel Type: Circular

Pipe Diameter: 1.0000 ft

Longitudinal Slope: 0.0050 ft/ft

Manning's n: 0.0120

Flow: 2.6100 cfs

Result Parameters

Depth: 0.7830 ft

Area of Flow: 0.6597 ft^2

Wetted Perimeter: 2.1723 ft

Hydraulic Radius: 0.3037 ft

Average Velocity: 3.9562 ft/s

Top Width: 0.8245 ft

Froude Number: 0.7794

Critical Depth: 0.6924 ft

Critical Velocity: 4.4983 ft/s

Critical Slope: 0.0067 ft/ft

Critical Top Width: 0.92 ft

Calculated Max Shear Stress: 0.2443 lb/ft^2

Calculated Avg Shear Stress: 0.0948 lb/ft^2

Channel Analysis: SD-12

Notes: A6-A11

Input Parameters

Channel Type: Circular

Pipe Diameter: 1.0000 ft

Longitudinal Slope: 0.0050 ft/ft

Manning's n: 0.0120

Flow: 2.8100 cfs

Result Parameters

Depth: 0.8491 ft

Area of Flow: 0.7109 ft^2

Wetted Perimeter: 2.3436 ft

Hydraulic Radius: 0.3033 ft

Average Velocity: 3.9530 ft/s

Top Width: 0.7160 ft

Froude Number: 0.6991

Critical Depth: 0.7188 ft

Critical Velocity: 4.6504 ft/s

Critical Slope: 0.0071 ft/ft

Critical Top Width: 0.90 ft

Calculated Max Shear Stress: 0.2649 lb/ft^2

Calculated Avg Shear Stress: 0.0946 lb/ft^2

Channel Analysis: SD-13

Notes: A12

Input Parameters

Channel Type: Circular

Pipe Diameter: 0.6700 ft

Longitudinal Slope: 0.0050 ft/ft

Manning's n: 0.0120

Flow: 0.7600 cfs

Result Parameters

Depth: 0.4576 ft

Area of Flow: 0.2565 ft^2

Wetted Perimeter: 1.3034 ft

Hydraulic Radius: 0.1968 ft

Average Velocity: 2.9627 ft/s

Top Width: 0.6236 ft

Froude Number: 0.8140

Critical Depth: 0.4116 ft

Critical Velocity: 3.3462 ft/s

Critical Slope: 0.0068 ft/ft

Critical Top Width: 0.65 ft

Calculated Max Shear Stress: 0.1428 lb/ft^2

Calculated Avg Shear Stress: 0.0614 lb/ft^2

Channel Analysis: SD-14

Notes: A6-A13

Input Parameters

Channel Type: Circular

Pipe Diameter: 1.5000 ft

Longitudinal Slope: 0.0050 ft/ft

Manning's n: 0.0120

Flow: 4.5200 cfs

Result Parameters

Depth: 0.8041 ft

Area of Flow: 0.9647 ft^2

Wetted Perimeter: 2.4646 ft

Hydraulic Radius: 0.3914 ft

Average Velocity: 4.6853 ft/s

Top Width: 1.4961 ft

Froude Number: 1.0282

Critical Depth: 0.8159 ft

Critical Velocity: 4.6013 ft/s

Critical Slope: 0.0048 ft/ft

Critical Top Width: 1.49 ft

Calculated Max Shear Stress: 0.2509 lb/ft^2

Calculated Avg Shear Stress: 0.1221 lb/ft^2

Channel Analysis: SD-15

Notes: A6-A14

Input Parameters

Channel Type: Circular

Pipe Diameter: 1.5000 ft

Longitudinal Slope: 0.0050 ft/ft

Manning's n: 0.0120

Flow: 4.5700 cfs

Result Parameters

Depth: 0.8095 ft

Area of Flow: 0.9728 ft^2

Wetted Perimeter: 2.4754 ft

Hydraulic Radius: 0.3930 ft

Average Velocity: 4.6978 ft/s

Top Width: 1.4953 ft

Froude Number: 1.0264

Critical Depth: 0.8203 ft

Critical Velocity: 4.6214 ft/s

Critical Slope: 0.0048 ft/ft

Critical Top Width: 1.49 ft

Calculated Max Shear Stress: 0.2526 lb/ft^2

Calculated Avg Shear Stress: 0.1226 lb/ft^2

Channel Analysis: SD-16

Notes: A15

Input Parameters

Channel Type: Circular

Pipe Diameter: 0.5000 ft

Longitudinal Slope: 0.0100 ft/ft

Manning's n: 0.0120

Flow: 0.2000 cfs

Result Parameters

Depth: 0.1974 ft

Area of Flow: 0.0721 ft^2

Wetted Perimeter: 0.6794 ft

Hydraulic Radius: 0.1061 ft

Average Velocity: 2.7750 ft/s

Top Width: 0.4888 ft

Froude Number: 1.2736

Critical Depth: 0.2239 ft

Critical Velocity: 2.3492 ft/s

Critical Slope: 0.0064 ft/ft

Critical Top Width: 0.50 ft

Calculated Max Shear Stress: 0.1232 lb/ft^2

Calculated Avg Shear Stress: 0.0662 lb/ft^2

Channel Analysis: SD-17

Notes: A16

Input Parameters

Channel Type: Circular

Pipe Diameter: 0.5000 ft

Longitudinal Slope: 0.0100 ft/ft

Manning's n: 0.0120

Flow: 0.4500 cfs

Result Parameters

Depth: 0.3202 ft

Area of Flow: 0.1328 ft^2

Wetted Perimeter: 0.9277 ft

Hydraulic Radius: 0.1432 ft

Average Velocity: 3.3886 ft/s

Top Width: 0.4799 ft

Froude Number: 1.1352

Critical Depth: 0.3418 ft

Critical Velocity: 3.1464 ft/s

Critical Slope: 0.0083 ft/ft

Critical Top Width: 0.47 ft

Calculated Max Shear Stress: 0.1998 lb/ft^2

Calculated Avg Shear Stress: 0.0893 lb/ft^2

Channel Analysis: Swale-1

Notes: A17

Input Parameters

Channel Type: Triangular

Side Slope 1 (Z1): 2.0000 ft/ft

Side Slope 2 (Z2): 2.0000 ft/ft

Longitudinal Slope: 0.0100 ft/ft

Manning's n: 0.0120

Flow: 1.5700 cfs

Result Parameters

Depth: 0.4346 ft

Area of Flow: 0.3778 ft^2

Wetted Perimeter: 1.9438 ft

Hydraulic Radius: 0.1944 ft

Average Velocity: 4.1553 ft/s

Top Width: 1.7386 ft

Froude Number: 1.5708

Critical Depth: 0.5207 ft

Critical Velocity: 2.8954 ft/s

Critical Slope: 0.0038 ft/ft

Critical Top Width: 2.08 ft

Calculated Max Shear Stress: 0.2712 lb/ft^2

Calculated Avg Shear Stress: 0.1213 lb/ft^2

Channel Analysis: Ex-Swale-1

Notes: A17, A18

Input Parameters

Channel Type: Triangular

Side Slope 1 (Z1): 2.0000 ft/ft

Side Slope 2 (Z2): 2.0000 ft/ft

Longitudinal Slope: 0.0183 ft/ft

Manning's n: 0.0120

Flow: 3.7400 cfs

Result Parameters

Depth: 0.5374 ft

Area of Flow: 0.5776 ft^2

Wetted Perimeter: 2.4033 ft

Hydraulic Radius: 0.2403 ft

Average Velocity: 6.4754 ft/s

Top Width: 2.1496 ft

Froude Number: 2.2014

Critical Depth: 0.7368 ft

Critical Velocity: 3.4443 ft/s

Critical Slope: 0.0034 ft/ft

Critical Top Width: 2.95 ft

Calculated Max Shear Stress: 0.6137 lb/ft^2

Calculated Avg Shear Stress: 0.2744 lb/ft^2

Channel Analysis: Ex-Swale-2

Notes: A19

Input Parameters

Channel Type: Triangular

Side Slope 1 (Z1): 2.0000 ft/ft

Side Slope 2 (Z2): 2.0000 ft/ft

Longitudinal Slope: 0.0181 ft/ft

Manning's n: 0.0120

Flow: 0.6100 cfs

Result Parameters

Depth: 0.2728 ft

Area of Flow: 0.1488 ft^2

Wetted Perimeter: 1.2200 ft

Hydraulic Radius: 0.1220 ft

Average Velocity: 4.0982 ft/s

Top Width: 1.0912 ft

Froude Number: 1.9555

Critical Depth: 0.3567 ft

Critical Velocity: 2.3966 ft/s

Critical Slope: 0.0043 ft/ft

Critical Top Width: 1.43 ft

Calculated Max Shear Stress: 0.3081 lb/ft^2

Calculated Avg Shear Stress: 0.1378 lb/ft^2

Channel Analysis: Ex SD-1

Notes: A17, A18

Input Parameters

Channel Type: Circular

Pipe Diameter: 2.0000 ft

Longitudinal Slope: 0.0060 ft/ft

Manning's n: 0.0120

Flow: 3.7400 cfs

Result Parameters

Depth: 0.6018 ft

Area of Flow: 0.7961 ft^2

Wetted Perimeter: 2.3226 ft

Hydraulic Radius: 0.3427 ft

Average Velocity: 4.6981 ft/s

Top Width: 1.8346 ft

Froude Number: 1.2569

Critical Depth: 0.6772 ft

Critical Velocity: 3.9928 ft/s

Critical Slope: 0.0038 ft/ft

Critical Top Width: 1.89 ft

Calculated Max Shear Stress: 0.2253 lb/ft^2

Calculated Avg Shear Stress: 0.1283 lb/ft^2

Channel Analysis: Ex SD-2

Notes: A1-A19

Input Parameters

Channel Type: Circular

Pipe Diameter: 1.5000 ft

Longitudinal Slope: 0.0070 ft/ft

Manning's n: 0.0120

Flow: 0.0000 cfs

Result Parameters

Depth: 1.1621 ft

Area of Flow: 1.4691 ft^2

Wetted Perimeter: 3.2288 ft

Hydraulic Radius: 0.4550 ft

Average Velocity: 8.9717 ft/s

Top Width: 1.2532 ft

Froude Number: 1.4603

Critical Depth: 1.3572 ft

Critical Velocity: 7.8379 ft/s

Critical Slope: 0.0118 ft/ft

Critical Top Width: 0.88 ft

Calculated Max Shear Stress: 1.0878 lb/ft^2

Calculated Avg Shear Stress: 0.4259 lb/ft^2

Appendix II
Soil Analysis

United States Department of Agriculture

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Sonoma County, California

December 9, 2024

Custom Soil Resource Report
Soil Map

Map Scale: 1:1,860 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 25 50 100 150

Feet: 0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Sonoma County, California
Survey Area Data: Version 18, Sep 8, 2024

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 26, 2022—Apr 25, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AkB	Arbuckle gravelly loam, 0 to 5 percent slopes	8.1	99.8%
JoF	Josephine loam, 30 to 50 percent slopes	0.0	0.2%
YnA	Yolo loam, 0 to 10 percent slopes, moist, MLRA 14	0.0	0.0%
Totals for Area of Interest		**8.1**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or

landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Sonoma County, California

AkB—Arbuckle gravelly loam, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: hf9y
Elevation: 100 to 1,600 feet
Mean annual precipitation: 12 to 35 inches
Mean annual air temperature: 57 to 64 degrees F
Frost-free period: 200 to 280 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Arbuckle and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Arbuckle

Setting

Landform: Terraces, hills
Landform position (two-dimensional): Backslope, toeslope
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from sedimentary rock

Typical profile

H1 - 0 to 6 inches: gravelly loam
H2 - 6 to 27 inches: loam
H3 - 27 to 72 inches: gravelly clay loam

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.1 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: R014XG924CA - Loamy Upland
Hydric soil rating: No

Minor Components

Haire

Percent of map unit: 7 percent
Hydric soil rating: No

Pleasanton

Percent of map unit: 7 percent
Hydric soil rating: No

Unnamed

Percent of map unit: 1 percent
Landform: Depressions
Hydric soil rating: Yes

JoF—Josephine loam, 30 to 50 percent slopes

Map Unit Setting

National map unit symbol: hfft
Elevation: 1,200 to 5,000 feet
Mean annual precipitation: 50 inches
Mean annual air temperature: 55 degrees F
Frost-free period: 125 to 260 days
Farmland classification: Not prime farmland

Map Unit Composition

Josephine and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Josephine

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Residuum weathered from sedimentary rock

Typical profile

H1 - 0 to 13 inches: gravelly loam
H2 - 13 to 35 inches: gravelly clay loam
H3 - 35 to 45 inches: gravelly fine sandy loam
H4 - 45 to 59 inches: weathered bedrock

Properties and qualities

Slope: 30 to 50 percent
Depth to restrictive feature: 40 to 60 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Available water supply, 0 to 60 inches: Moderate (about 7.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: R014XG924CA - Loamy Upland
Hydric soil rating: No

Minor Components

Boomer

Percent of map unit: 5 percent
Hydric soil rating: No

Hugo

Percent of map unit: 5 percent
Hydric soil rating: No

Laughlin

Percent of map unit: 5 percent
Hydric soil rating: No

YnA—Yolo loam, 0 to 10 percent slopes, moist, MLRA 14

Map Unit Setting

National map unit symbol: 2w89n
Elevation: 10 to 850 feet
Mean annual precipitation: 25 to 57 inches
Mean annual air temperature: 57 to 63 degrees F
Frost-free period: 220 to 260 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Yolo, moist, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Yolo, Moist

Setting

Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from igneous, metamorphic and sedimentary rock

Typical profile

Ap - 0 to 6 inches: loam
A - 6 to 24 inches: silt loam
C1 - 24 to 45 inches: silt loam

C2 - 45 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 10 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Maximum salinity: Nonsaline (0.3 to 0.5 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 12.4 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 3c
Hydrologic Soil Group: B
Ecological site: R014XG907CA - Loamy Bottom
Hydric soil rating: No

Minor Components

Cortina

Percent of map unit: 5 percent

Cole

Percent of map unit: 5 percent

Bale

Percent of map unit: 5 percent

Appendix III

Fact Sheet – Bioretention

FACT SHEET- BIORETENTION

BIORETENTION

Also know as: Rain garden, roadside bioretention, and bioretention cell

DESCRIPTION

The bioretention area best management practice (BMP) functions as a soil and plant-based filtration and infiltration feature that removes pollutants through a variety of natural physical, biological, and chemical treatment processes.

ADVANTAGES

- Can be designed to achieve Treatment, Delta Volume Capture, or Hydromodification requirements.
- Enhances water quality of downstream water bodies through natural processes.
- Aesthetically pleasing.
- The vegetation can provide shade and wind breaks, absorbs noise, reduces heat island effects and improves an area's landscape.
- Provides habitat for birds and attracts other pollinators like butterflies and bees.
- Does not interrupt utility installation.
- Does not interfere with tree planting.

FACT SHEET- BIORETENTION

LIMITATIONS

- Specialized design is required for areas where street slopes exceed 10%.
- Should not be used in areas of know contamination. If soil and/or groundwater contamination is present on the site or within a 100' radius of the proposed BMP location, the North Coast Regional Water Quality Control Board will need to be contacted and the site reviewed.
- Should not be used in areas of high groundwater. In general a minimum of 2' of clearance should be provided between the bottom of the bioretention cell and seasonal high groundwater.
- Should not be used in areas of slope instability where infiltrated storm water may cause failure. Slope stability should be determined by a licensed geotechnical engineer.
- Do not use in locations that can negatively impact building foundation or footings. Location shall be approved by a licensed Geotechnical Engineer.

KEY DESIGN FEATURES

<u>ALL BIORETENTION</u>

- Structural soil should be used within the bioretention area requiring load bearing capacity (adjacent to roadways and/or buildings).
- Structural soil, if used, shall be installed as described in Appendix E.
- Some BMPs may not require the use of structural soil and a more organic type planting soil and/or treatment media may be used in its place. It may be possible in some cases to use native soil or to amend the native soil so that it is suitable. Use of non-structural soil will depend on evaluation of the criteria in "Chapter 4-Site Assessment" as well as consideration of structural needs and may require evaluation by a licensed Geotechnical Engineer.
- Underlining native soil should remain un-compacted to preserve infiltration capacity. Fence off the area during construction to protect it from compaction.
- Bottom of bioretention should be un-lined to allow infiltration into native soil.
- Moisture barrier must be installed vertically to protect road sub-base and any trenches adjacent to the bioretention area.
- If used, pervious concrete shall be designed and installed as described in Appendix E and protected during construction to prevent sediment loading.
- If the porous gutter design option is used additional trash and sediment capture BMPs is required.
- A curb opening type design may be used in place of a porous gutter if appropriate for the project and does not require additional trash capture.
- Bioretention areas shall be planted with plants from the approved **Plant List** and **Tree List** included in Appendix F and shall be planted to achieve 51% cover.
- All bioretention areas shall be designed with a designated high flow bypass inlet for storms larger than the design storm.

- For designs that include perforated pipe, the 6" perforated pipe must be installed a minimum of 6" below the adjacent road structural section.
- Perforated pipe shall be installed in straight runs only.
- The volume below the perforated pipe must be sufficient to hold and infiltrate the design volume.

SIZING DESIGN- GOAL AND REQUIREMENTS

- **For all projects:** The treatment component requires that all of the runoff generated by this water quality design storm from impermeable surfaces must be treated on site for the pollutants of concern.
- ***For projects that increase the amount of impervious surface, but create or replace less than a total of one acre:*** The **Delta Volume Capture** component requires that any increase in volume due to development for the water quality design storm must be infiltrated and/or reused on site. Further discussion of the Treatment and Delta Volume Capture requirements and the accompanying formulas can be found in Chapter 6.
- ***For projects that create or replace one acre or more of impervious surface*:** These larger projects must mitigate their impacts by meeting the **Hydromodification Requirement** by capturing 100% of the post development volume generated by the water quality rain event.
- All calculations shall be completed using the "Storm Water Calculator" available at www.srcity.org/stormwaterLID.

INSPECTION AND MAINTENANCE REQUIREMENTS

A maintenance plan shall be provided with the Final SWLID Submittal. The maintenance plan shall include recommended maintenance practices, state the parties responsible for maintenance and upkeep, specify the funding source for ongoing maintenance with provisions for full replacement when necessary and provide site specific inspection checklist.

At a minimum maintenance shall include the following:

- Dry street sweeping upon completion of construction
- Dry street sweeping annually, and
    - When water is observed flowing in the gutter during a low intensity storm.
    - Algae is observed in the gutter.
    - Sediment/debris covers 1/3 of the gutter width or more.
- Inspect twice annually for sedimentation and trash accumulation in the gutter. Obstructions and trash shall be removed and properly disposed of.
- Inspect twice during the rainy season for ponded water.
- Pesticides and fertilizers shall not be used in the bioretention area.
- Plants should be pruned, weeds pulled and dead plants replaced as needed.