RI Engineering, Inc.

DRAINAGE CALCULATIONS

For

New ADU, Driveway, and Site Improvements
2700 Paseo Robles Avenue
Santa Clara County, California
APN 825-29-008

Date: May 25, 2021

Prepared For:
Aamir Jamil

Prepared By:
RI Engineering, Inc.
Project Number 19-089-1

5/25/2021

Jamil ADU, Driveway, & Site Improvements
Paseo Robles Ave
Santa Clara County, California
May 2021

Design Criteria/Design Approach

Storm drainage calculations described in this document have been done in conformance with the County of Santa Clara Drainage Manual 2007, the SCVURPPP C.3 Stormwater Handbook, and the Guidelines for Stormwater Management Requirements for Projects in South Santa Clara County June 2015.

Project Description:

The proposed project is situated on a 10 acre lot on Paseo Robles Avenue in Santa Clara County, CA. The project consists of the construction a new ADU, pool, tennis court, pool house, and additional 15' wide AC driveway with access to Paseo Robles Avenue. Associated improvements include concrete walkways, new connection to existing septic system and a drainage system. The proposed development area is approximately 2.14 acres and 48,970 square feet of new/replaced impervious area will be created by the project.

Existing Conditions:

The lot is currently covered by grasses, and other vegetation. The site slopes an average grade of 10% from the eastern property corner to the western property corner. According to the USDA-NRCS "EASTERN SANTA CLARA AREA, CALIFORNIA," the project site is mapped as one soil type: "Climara Clay, 9 to 30 percent slopes". The soil is in Hydrologic Soil Group D. The soil type has an average estimated surface saturated infiltration rate of 0.1 inches per hour.

Proposed Development:

The proposed drainage patterns on site are designed to match the existing condition and follow low impact development guidelines from the SCVURPPP C.3 Manual. The project will have a two drainage management areas (DMA 1 & DMA 2). Bio-Filtration will be utilized to treat runoff from impervious surfaces.

DMA "1" includes the impervious area in the Parcel (11,310 sf) created by the ADU improvements, a portion of the existing northern 12' wide AC driveway that will remain, and some of the existing driveway that will be re-paved. Runoff from the proposed ADU will discharge onto splash blocks and be directed away from the structure. The natural topography will cause the runoff from these impervious areas to sheet flow to the northwest towards a bio-retention trench that will be constructed near the northwestern property line along a level contour. The bio-retention trench will intercept the runoff and treat it. The bio-retention trench will overflow when it is overwhelmed and sheet flow down the hill to the west to mimic existing conditions. (see Drainage Maps and calculations).

DMA "2" includes the impervious area in the Parcel (37,660 sf) created by the pool improvements, a portion of the existing driveway that will be re-paved, new AC paving near the residence, the new 15' wide AC driveway, the tennis court and the pool house. Runoff from these impervious areas is collected in catch basins and piped with a new on-site stormdrain system to a bio-retention area located approximately 150 feet to the southwest of the existing residence. The bio-retention area will treat runoff from impervious areas and will overflow when it is overwhelmed down the hill to the west towards its natural drainage path to mimic existing conditions. (see Drainage Maps and calculations).

The bio-retention treatment areas have been sized using the 4% rule as specified in the C.3 manual.

Downstream Assessment:

The entire site drains from the east to the west. The runoff is directed away from the improvements and conveyed towards bio-filtration treatment measures using swales and an onsite stormdrain system. Overflow from the bio-retention areas will flow to the west towards The Institute Golf Course. Runoff surface flows across the pervious surfaces of the golf course to the west and eventually ends up at Little Llagas Creek. There are no downstream drainage issues anticipated from the project improvements.

Conclusions:

The proposed drainage system has been designed to convey stormwater from impervious surfaces to bio-retention areas per the recommendations of the C.3 manual. No adverse downstream effects are expected as a result of this project.

Attachments:

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Paseo Robles Ave
Santa Clara County, CA
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Total Parcel Area (sf)		435,600
Hydologic Soil Type	D	

DRIANAGE MANAGEMENT AREA 1
Residence and Pool Area

Pre-Development Existing Impervious Area (sf)	**10,330**
Post-Development Impervious Area (sf)	
Existing Residence (roof)	4,830
Concrete walk around residence	2,580
New AC Paving around residence	7,720
New 15' wide AC driveway	6,540
Concrete Parking Area	1,390
Parking Area Storage Shed	300
Tennis Court	7,200
Concrete Pool Patio	6,250
Pool House	850
Total Post-Development Impervious Area	**37,660**

DRIANAGE MANAGEMENT AREA 2
ADU Areas

Pre-Development Existing Impervious Area (sf)	**6,650**
Post-Development Impervious Area (sf)	
AC Driveway	580
Concrete Walk and Patio	860
ADU (roof)	2,370
Replaced Northern Driveway	2,900
Existing Northern Driveway to remain	4,600
Total Impervious Area	**11,310**

TOTAL EXISTING IMPERVIOUS	**16,980**	**SF**
TOTAL POST CONSTRUCTION IMPERVIOUS	**48,970**	**SF**

Table 1

Aamir Jamil
Paseo Robles Ave
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HYDROLOGY
10-year and 100-year storm event

M.A.P. 18
Soil Class: D

Determine PRE Development Runoff Coefficient: C

Feature	Area (sf)	Area (acres)	C	AxC
Pervious	418,620	9.61	0.45	4.32
Impervious	16,980	0.39	0.90	0.35
Totals:	**435,600**	**10.00**		**4.68**

Pre Development $C_{AVERAGE}$= 0.47
Time of Concentration: **Pre- Tc = 10 mins**

Determine Pre Developed Q for a 10-year and 100-year storm.

	10-year	100-year
Pre- I (in/hr)*=	2.00	2.81
Q Pre Developed (cfs)=	**9.36**	**13.15**

Determine POST Development Runoff Coefficient: C

Feature	Area (sf)	Area (acres)	C	AxC
Pervious Area	386,630	8.88	0.45	3.99
Impervious Area	48,970	1.12	0.90	1.01
Total	**435,600**	**10.00**		**5.01**

Post Development $C_{AVERAGE}$= 0.50
Time of Concentration: **Post- Tc = 10 mins**

Determine Post Developed Q for 10-year and 100-year storm.

	10-year	100-year
Post- I (in/hr)*=	2.00	2.81
Q Post Developed (cfs)=	**10.02**	**14.08**
ΔQ (cfs)=	**0.66**	**0.93**

* from Santa Clara County 2007 Drainage Manual (Fig. B-5: IDF from M.A.P.)

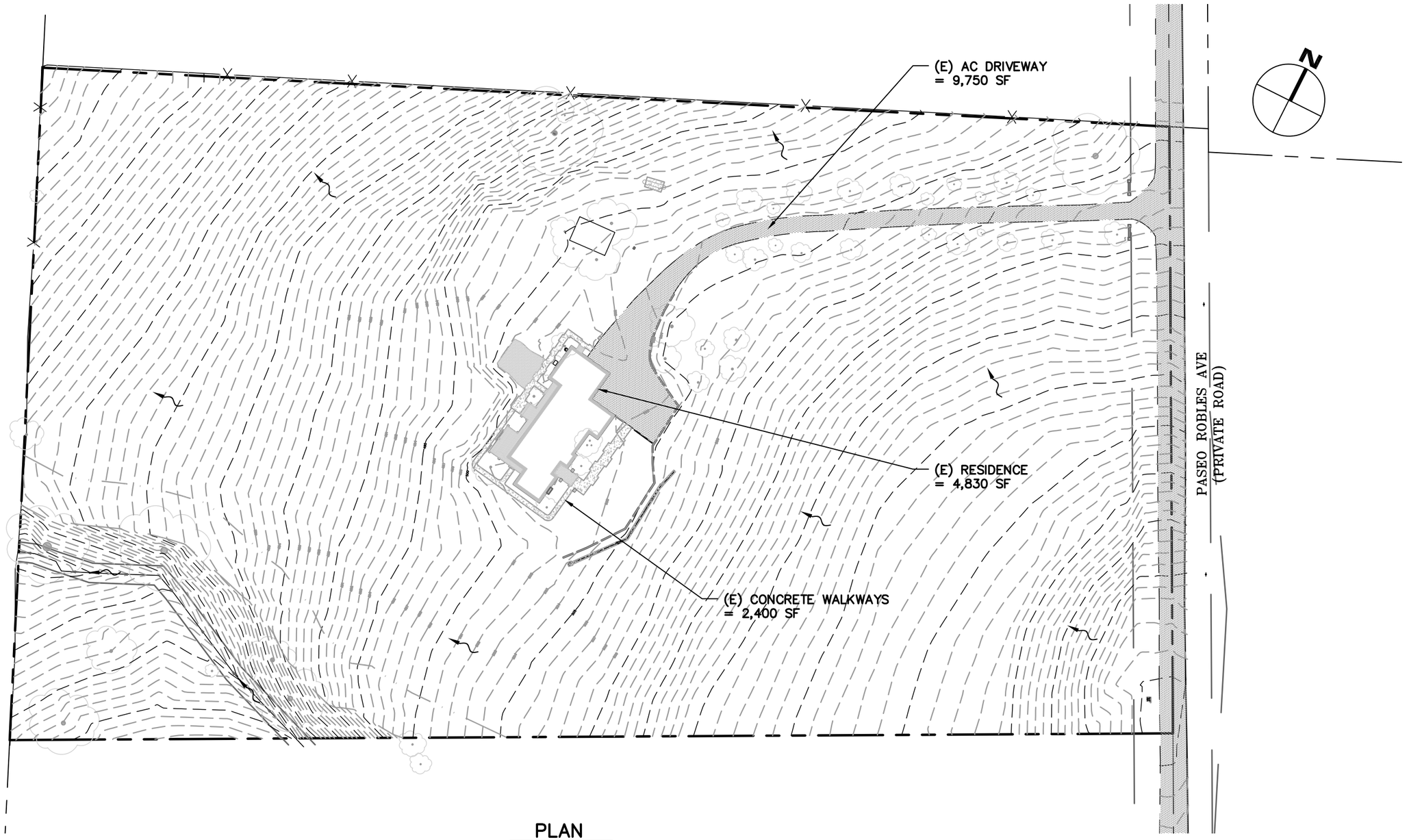
Table 2

BIO-TREATMENT SIZING

BMP TYPE AND ID NUMBER	TOTAL AREA		IMPERVIOUS AREA		PERVIOUS AREA		Treatment Area	Treatment Provided	Adequate Sizing
	sq. ft.	Ac.	sq. ft.	Ac.	sq. ft.	Ac.			
DMA #1	37,660	0.86	37,660	0.86	0	0.00			
Bio-Treatment Area 1							1506	1,550	OK
DMA #2	11,310	0.26	11,310	0.26	0	0.00			
Bio-Treatment Area 2							452	480	OK
TOTAL	48,970	1.12	48,970	1.12	0	0.00	1,959	2,030	OK

**Treatment area required is based on hydraulic sizing method of 4% RULE (MOST CONSERVATIVE)*

TABLE 3



PLAN

80' 0 80' 160'

1 INCH = 80 FEET

EXISTING CONDITIONS

IMPERVIOUS AREA (sf)	PERVIOUS AREA (sf)	TOTAL AREA (sf)
16,980	418,620	435,600

R.I Engineering, Inc.

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NEW ADU, DRIVEWAY, AND SITE IMPROVEMENTS
FOR
AAMIR JAMIL
2700 PASEO ROBLES AVENUE
SAN MARTIN, CA 95046
APN 825-29-008

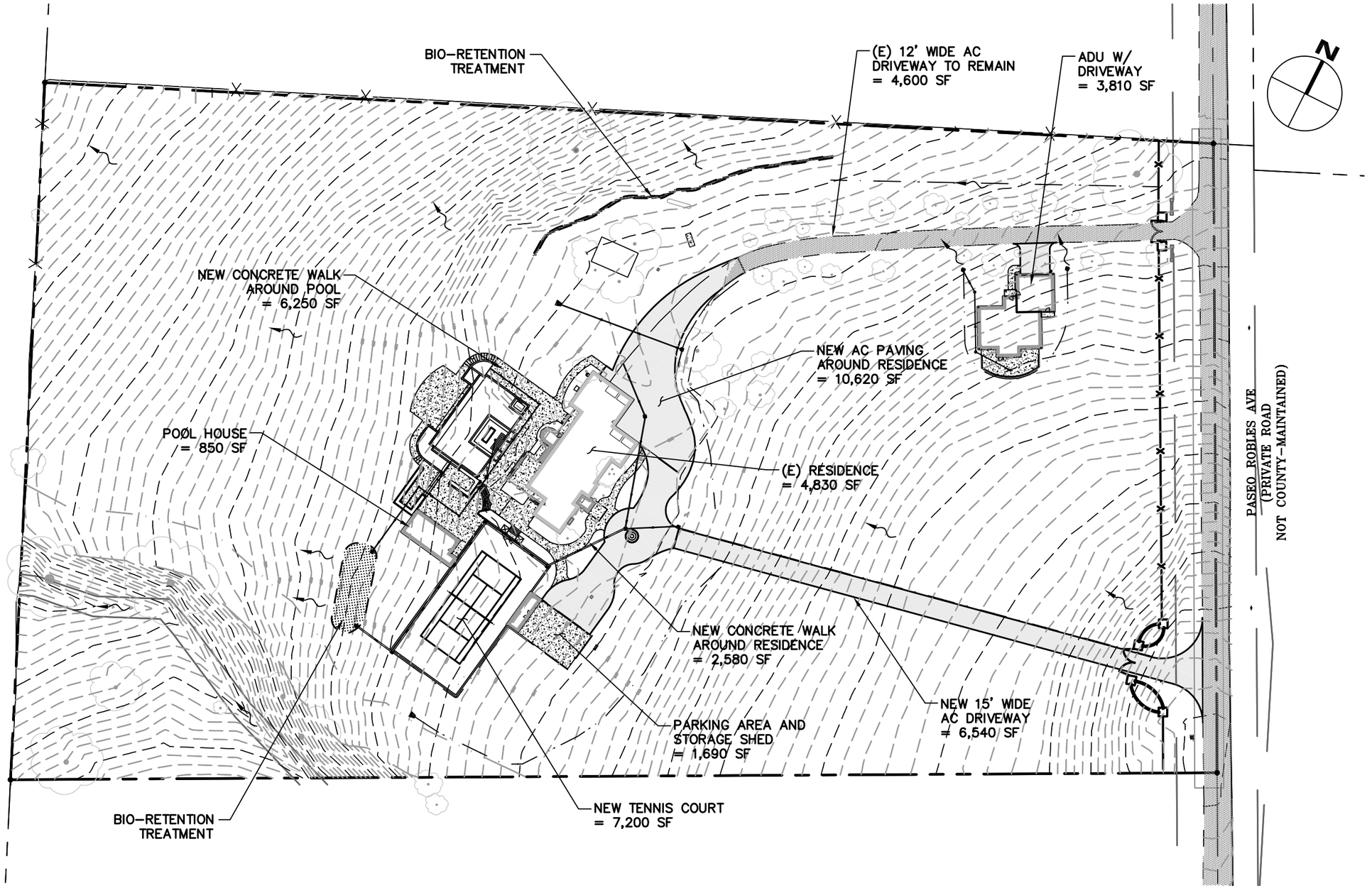
EXISTING DRAINAGE MAP

project no.
19-089-1

date
MAY 2021

scale
AS SHOWN

dwg name
DrainageMap1.DWG



PLAN

80' 0 80' 160'

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PROPOSED CONDITIONS

IMPERVIOUS AREA (sf)	PERVIOUS AREA (sf)	TOTAL AREA (sf)
48,970	386,630	435,600

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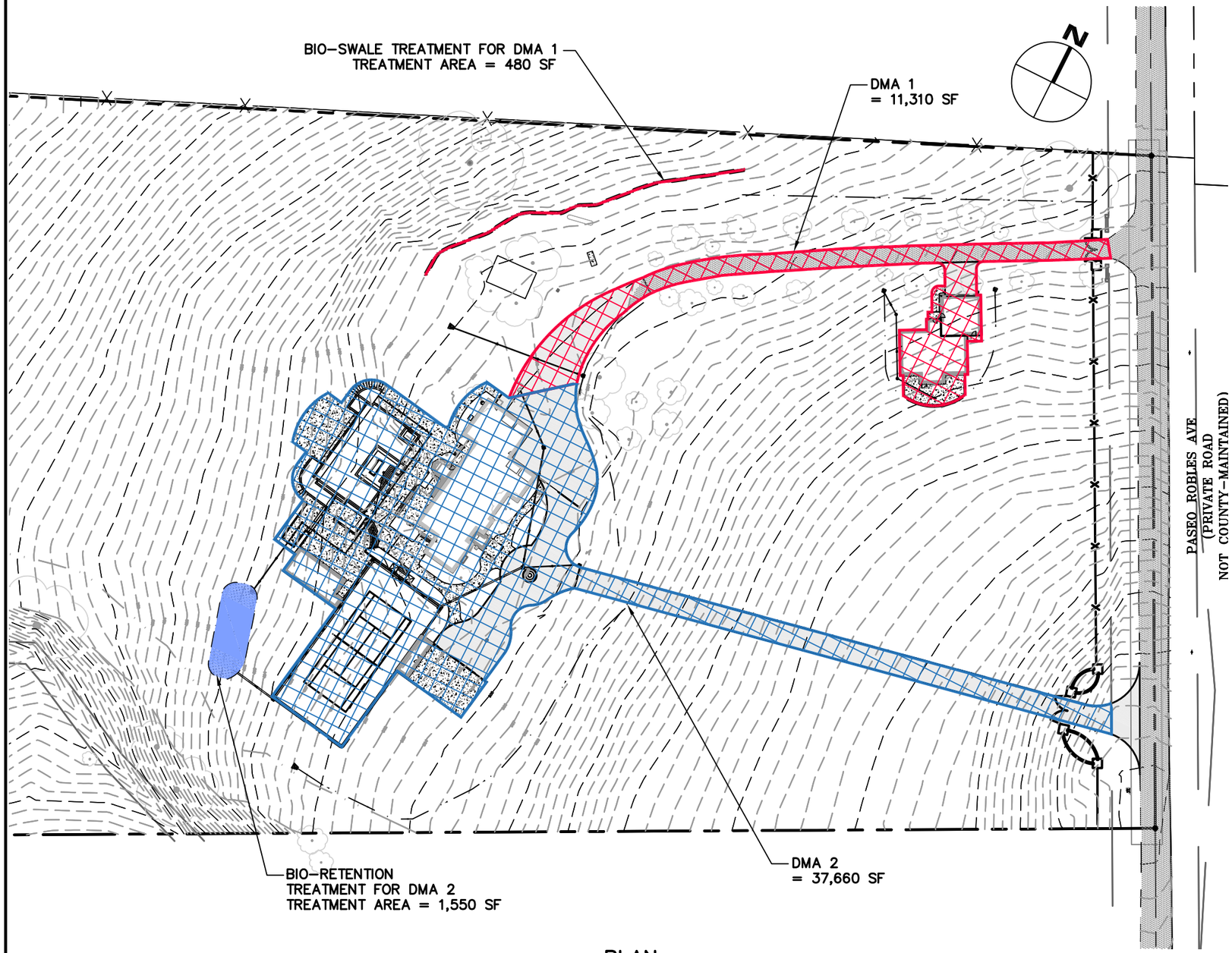
POST-DEVELOPMENT DRAINAGE MAP

project no.
19-089-1

date
MAY 2021

scale
AS SHOWN

dwg name
DrainageMap1.DWG



PLAN

80' 0 80' 160'

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LEGEND

- DRAINAGE MANAGEMENT AREA #1
- DRAINAGE MANAGEMENT AREA #2
- BIO–TREATMENT AREA #1
- BIO–TREATMENT AREA #2

AREA CALCULATIONS

BIO–TREATMENT AREA	TRIBUTARY AREA (sf)	REQUIRED TREATMENT AREA OF BIO–TREATMENT (sf) PER 4% RULE	PROVIDED TREATMENT AREA OF BIO–TREATMENT (sf)
1	DMA "A": 11,310	452	480
2	DMA "B": 37,660	1,506	1,550

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STORMWATER MANAGEMENT MAP

project no. 19-089-1

date MAY 2021

scale AS SHOWN

dwg name DrainageMap1.DWG