PELE SUBDIVISION
2424 BOLIER AVE MCKINLEYVILLE, CA
SMALL PROJECT STORMWATER CONTROL PLAN
MCKINLEYVILLE, CA

Prepared By:

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Arcata, CA 95521
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December 2025

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APPENDICES

1. PURPOSE

The intent of this Small Project Stormwater Control Plan is to demonstrate the ability to achieve drainage and stormwater compliance required by the McKinleyville CSD Ordnance and the Humboldt County MS4 Stormwater Permit.

2. PROJECT DESCRIPTION

The project site is located at 2424 Bolier Ave, McKinleyville CA. The proposal involves subdividing the existing 2.01 acre parcel (APN 510-371-010) into three (3) parcels: Parcel 1 (1.16 acres), Parcel 2 (0.40 acres), and Parcel 3 (0.45 acres).

2.1. EXISTING CONDITIONS

The existing project site (Appendix A – Site Map) is comprised of one parcel with residential development. Existing land cover is a mix of residential structures, gravels roads and driveways, grass/lawns, and landscaping.

2.2. PROPOSED CONDITIONS

Proposed development (Appendix A – Site Map) involves subdividing the existing parcel into three (3) separate parcels. The proposal includes no changes to parcel 1, the addition of a 2,400 sf primary residence and 720 sf accessory dwelling unit on Parcel 2, and the addition of a 720 sf accessory dwelling unit on Parcel 3.

3. STORMWATER MITIGATION REQUIREMENTS

McKinleyville Community Plan Policy 3310(5) requires this project to construct onsite detention facilities to retain the storm flows from the post-development 100-year (Q_{100}) storm and released the flow at a rate no greater than the pre-developed 2-year (Q_2) storm flow.

The subdivision is also required to comply with County Code Section 337-13, given that the project is within the Humboldt County MS4 area and will create or replace greater than or equal to 2,500 SF and less than 5,000 SF of impervious surface, the project is classified as a "Small Project." As a "Small Project" located within Humboldt County's MS4 area, the project must include at least one site-design runoff reduction measure. While you are required to calculate the project's run-off reductions, the MS4 regulations do not impose a numeric standard or target for the reduction (Humboldt LID Manual, 2021). The Small Project Calculator was used to calculate the project's run-off reductions (Appendix C).

4. METHODS

4.1. DRAINAGE AREAS AND RUNOFF COEFFICIENTS

To demonstrate how each parcel can achieve drainage and stormwater compliance separately, each of the proposed parcels was delineated into a separate Drainage Management Area (DMA), resulting in three (3) DMAs. Parcel 1/DMA 1 does not include any new or replaced impervious areas. Therefore, no stormwater analysis or mitigation requirements are required for Parcel 1/DMA 1.

DMAs 2 and 3 were delineated based on the new parcel areas (Appendix A – Site Map). The pre- and post-development, weighted runoff coefficients (C) fore each DMA was determined based on land cover (Table 4.1.1). The DMA areas and weighted C values are summarized in Table 4.2.1.

Table 4.1.1: Land Cover Runoff Coefficients

Land Cover	Runoff Coefficient (C)
Roofs, Asphalt, and Concrete	0.95
Landscape, Lawns, Grass and Gravel	0.25

4.2. Pre-Development 2-Year Storm Flows & Volumes

The Rational Method was used to determine the peak flow for the 2-year storm event under pre-development conditions. The Triangular Unit Hydrograph method was used to determine the volume from the 2-year storm event under pre-development conditions (Table 4.2.1).

A minimum time of concentration of 10 minutes was used to estimate rainfall intensity. The 2-year, 10-minute rain fall intensity is 1.44 in/hr (PF Data Server, 2025). NOAA precipitation frequency data is presented in Appendix B and calculations are provided in Appendix F.

Table 4.2.1: Pre-Development 2-Year Storm Flows & Volumes (Appendix D)

DMA	Description	Area (acres)	Runoff Coefficient (C)	2-Year Peak Discharge (Q_2) (cfs)	2-Year Runoff Volume (ft^3)
1	Parcel 1	1.16	0.30	N/A	N/A
2	Parcel 2	0.40	0.26	0.15	136
3	Parcel 3	0.45	0.29	0.19	171

4.3. Post-Development 100-Year Flows & Volumes

The Rational Method was used to determine the peak flow from the 100-year storm event under post-development conditions. The Triangular Unit Hydrograph method was used to determine the volume from the 100-year storm event under post-development conditions (Table 4.3.1).

A minimum time of concentration of 10 minutes was used to estimate rainfall intensity. The 100-year, 10-minute rain fall intensity is 3.61 in/hr (PF Data Server, 2025). NOAA precipitation frequency data is presented in Appendix B and calculations are provided in Appendix F.

Table 4.3.1: Post-Development 100-Year Storm Flows & Volumes

DMA	Description	Area (acres)	Runoff Coefficient (C)	100-Year Peak Discharge (Q_{100}) (cfs)	100-Year Runoff Volume (ft^3)
1	Parcel 1	1.16	0.30	N/A	N/A
2	Parcel 2	0.40	0.38	0.54	488
3	Parcel 3	0.45	0.32	0.52	466

4.4. Site Design Measure and Run-Off Reductions for Small Projects

The 'Small Projects Calculator' from the LID Manual was used to estimate the percent reduction in impervious surface run-off value. The MS4 General Permit requires a calculation of the project runoff reduction resulting from the use of site design measures (Humboldt LID Manual, 2021). However, for Small Projects, there is no numeric standard or target, only that at least one site design measure is used.

There are numerous existing trees within each DMA, thus, tree preservation is proposed as the site design measure. There is more than sufficient tree canopy area to mitigate runoff for both DMA 2 and DMA 3. The minimum canopy required to be retained in DMA 2 and DMA 3 is 3,179 sf and 1,923 sf, respectively. Table 4.4.1 outlines the summary of the 'Small Project Calculator' (Appendix C).

Table 4.4.1: Summary of Run-Off Reduction Resulting from Use of Site Design Measures for Small Projects

DMA	Impervious Surface Runoff Value to be Reduced (Gal/24 hrs)	Proposed Site Design Measure	New Impervious Surface Runoff Value Achieved (Gal/24 hrs)	% Reduction in Impervious Surface Runoff Value
1	N/A	N/A	N/A	N/A
2	1,259	Tree Preservation	0	>100%
3	775	Tree Preservation	0	>100%

4.5. RETENTION BASIN SIZING

The McKinleyville Community Plan Policy 3310(5) requires this project to construct onsite detention facilities to retain the storm flows from the post-development 100-year (Q_{100}) storm and release the flow at a rate no greater than the pre-developed 2-year (Q_2) storm flows.

Based on these requirements, the volume from the post-development 100-year storm was subtracted from the pre-development 2-year storm ($PostV_{100}$ - $PreV_2$) and was used to size retention basins for DMA 2 and DMA 3. The retention basins were sized as bioretention basins per the LID Manual (Table 4.5.1). Calculations are provided in Appendix F.

Bioretention media porosities, design specifications and full calculations are presented in Appendix F. Appendix E contains a Preliminary Stormwater Control Plan and a Bioretention Specifications and Checklist from the Humboldt LID Manual.

Table 4.5.1: Required Storage Volume and Proposed Bioretention Area & Volume

DMA	Required Storage Volume Required ($PostV_{100} - PreV_2$) (ft^3)	Surface Area (ft^2)	Volume (ft^3)	Volume (gal)
1	N/A	N/A	N/A	N/A
2	352	282	353	2,637
3	317	236	295	2,206

5. CONCLUSION

The intent of this Small Project Stormwater Control Plan is to demonstrate the ability to achieve drainage and stormwater compliance required by the McKinleyville CSD Ordnance and the Humboldt County MS4 Stormwater Permit. The Site Map in Appendix A shows the preliminary locations of the proposed bioretention basins in DMA 2 and DMA 3. No new development is proposed in DMA 1, thus no bioretention basins are required. Depending on the exact details of the post-developed conditions of the DMAs, the locations and dimensions of the bioretention basins are subject to change.

The bioretention basins should be equipped with weir overflows, or similar, to control the outlet flow to the calculated peak discharge of the pre-development 2-year storm.

6. REFERENCES

National Oceanic and Atmospheric Administration. (2017). Precipitation Frequency Data Server Online

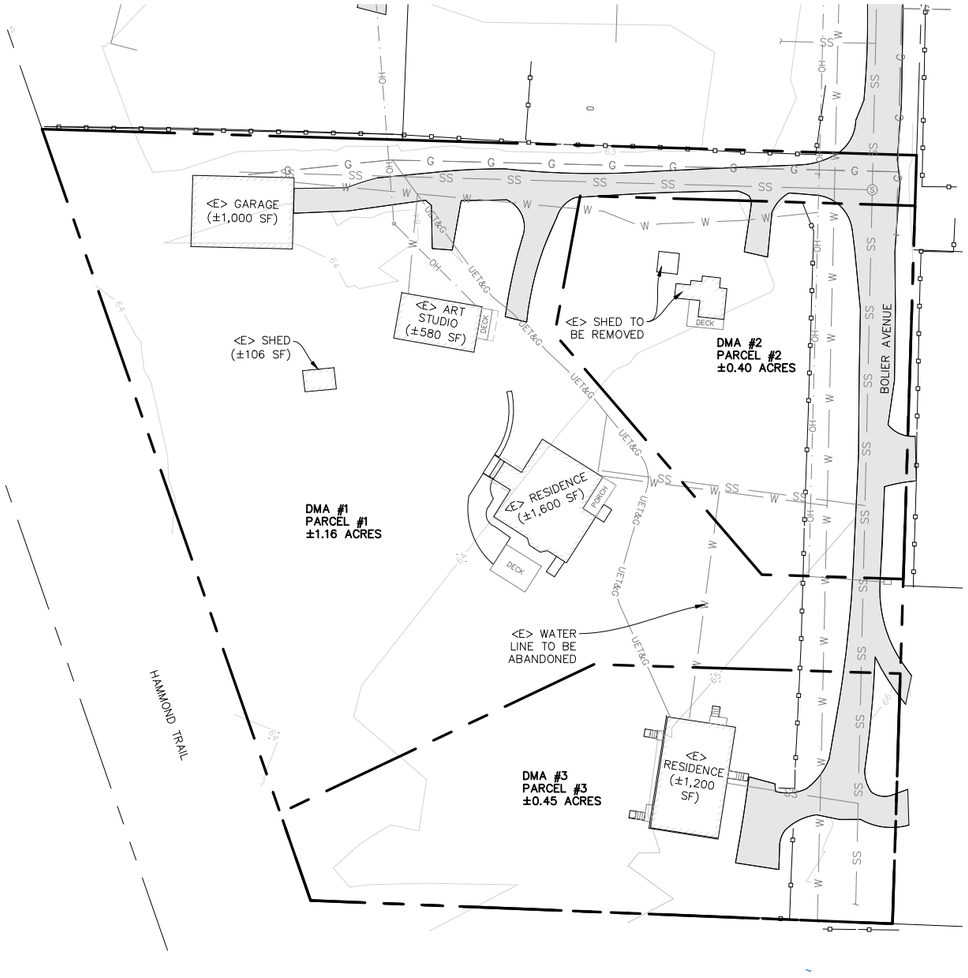
Web Application. NOAA.

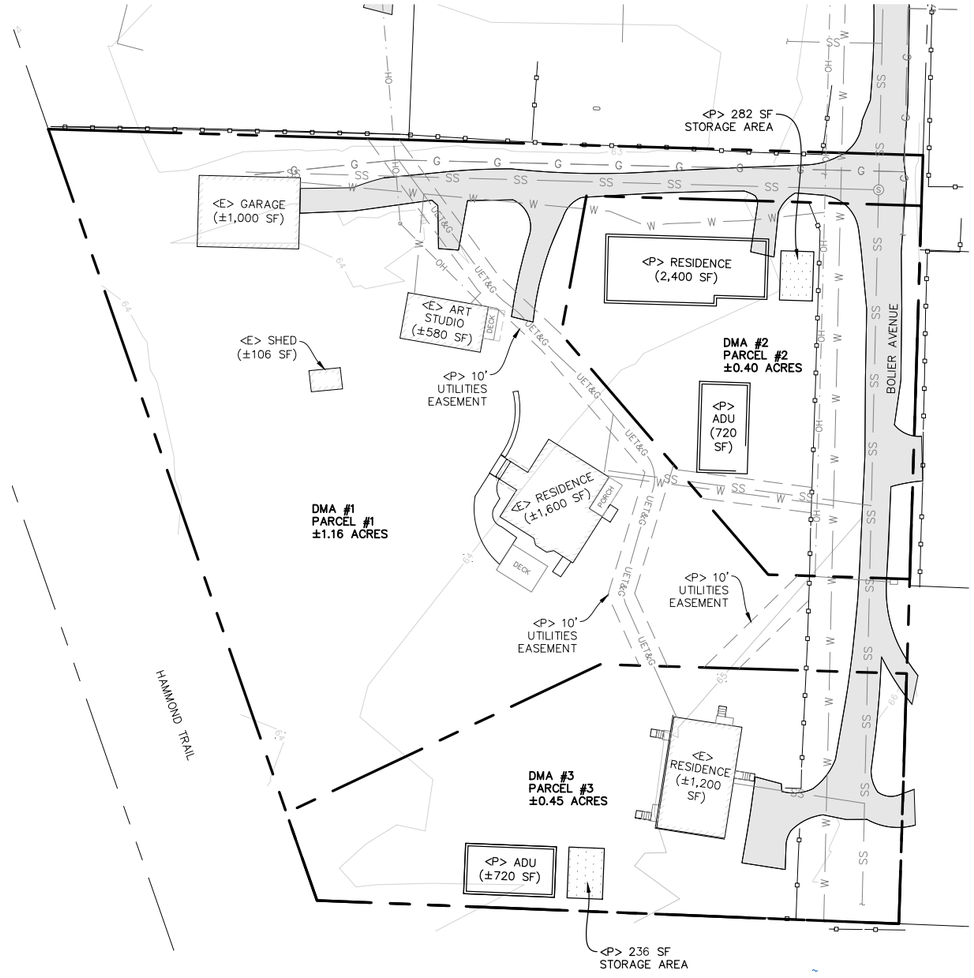
Watt, C., Dower, R., Wells, R., Umbertis, S., Blough, J., & Jack, D. (2016, June 30). Humboldt County Low Impact Development Stormwater Manual.

McKinleyville Community Services District. (2018, November 7). McKinleyville Community Services

District Rules & Regulations.

APPENDIX A: SITE PLAN





LEGEND:

- PROPERTY LINE
- 500 – CONTOUR LINE
- SS – EXISTING SEWER LINE
- W – EXISTING WATER LINE
- GAS – EXISTING GAS LINE
- EXISTING FENCE LINE
- OH – EXISTING OVERHEAD LINE

EXISTING SITE PLAN

PROPOSED SITE PLAN

22x34 SHEET: 1"=40'
11x17 SHEET: 1"=80'

0 20 40 80

N

DATE	REVISIONS	DRAWN BY

NORTHPOINT
CONSULTING GROUP, INC.
1117 Samoa Blvd., Arcata, CA 95521

PELE

APN:510-371-010-000

PRELIMINARY STORMWATER CONTROL PLAN - SITE MAP

PROJ. MGR.: MA
DRAWN BY: LJM
DATE: 11/17/2025
SCALE: AS SHOWN

SHEET
C0
25-070

APPENDIX B: NOAA PRECIPITATION FREQUENCY ESTIMATES

NOAA Atlas 14, Volume 6, Version 2
Location name: Mckinleyville, California, USA*
Latitude: 40.9495°, Longitude: -124.1206°
Elevation: 63 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	**1.61** (1.40-1.85)	**2.00** (1.75-2.32)	**2.58** (2.24-2.99)	**3.07** (2.65-3.59)	**3.79** (3.16-4.61)	**4.39** (3.56-5.47)	**5.04** (3.97-6.46)	**5.75** (4.39-7.61)	**6.79** (4.94-9.41)	**7.66** (5.36-11.0)
10-min	**1.15** (1.01-1.33)	**1.44** (1.26-1.66)	**1.85** (1.61-2.14)	**2.20** (1.90-2.57)	**2.72** (2.26-3.31)	**3.15** (2.56-3.92)	**3.61** (2.85-4.63)	**4.12** (3.15-5.45)	**4.87** (3.55-6.74)	**5.49** (3.85-7.91)
15-min	**0.924** (0.812-1.07)	**1.16** (1.02-1.34)	**1.49** (1.30-1.72)	**1.78** (1.53-2.08)	**2.19** (1.82-2.66)	**2.54** (2.06-3.16)	**2.91** (2.30-3.73)	**3.32** (2.54-4.39)	**3.92** (2.86-5.44)	**4.42** (3.10-6.38)
30-min	**0.622** (0.544-0.718)	**0.778** (0.682-0.900)	**1.00** (0.872-1.16)	**1.19** (1.03-1.39)	**1.47** (1.22-1.79)	**1.70** (1.38-2.12)	**1.96** (1.54-2.50)	**2.23** (1.71-2.95)	**2.63** (1.92-3.65)	**2.97** (2.08-4.28)
60-min	**0.436** (0.382-0.502)	**0.546** (0.478-0.630)	**0.701** (0.611-0.811)	**0.835** (0.722-0.977)	**1.03** (0.858-1.25)	**1.20** (0.969-1.49)	**1.37** (1.08-1.76)	**1.56** (1.20-2.07)	**1.85** (1.35-2.56)	**2.08** (1.46-3.00)
2-hr	**0.335** (0.293-0.386)	**0.412** (0.360-0.475)	**0.518** (0.452-0.601)	**0.611** (0.528-0.715)	**0.745** (0.620-0.906)	**0.856** (0.694-1.07)	**0.975** (0.769-1.25)	**1.10** (0.844-1.46)	**1.29** (0.941-1.79)	**1.45** (1.01-2.09)
3-hr	**0.288** (0.252-0.332)	**0.351** (0.307-0.405)	**0.439** (0.382-0.508)	**0.514** (0.444-0.601)	**0.623** (0.517-0.757)	**0.711** (0.577-0.886)	**0.807** (0.636-1.03)	**0.910** (0.695-1.20)	**1.06** (0.771-1.47)	**1.18** (0.827-1.70)
6-hr	**0.221** (0.194-0.255)	**0.267** (0.233-0.308)	**0.330** (0.288-0.382)	**0.383** (0.331-0.448)	**0.460** (0.382-0.559)	**0.521** (0.423-0.649)	**0.586** (0.462-0.750)	**0.656** (0.501-0.867)	**0.755** (0.550-1.05)	**0.836** (0.586-1.21)
12-hr	**0.163** (0.143-0.188)	**0.197** (0.172-0.227)	**0.243** (0.211-0.281)	**0.281** (0.243-0.328)	**0.334** (0.278-0.406)	**0.377** (0.306-0.469)	**0.421** (0.332-0.539)	**0.468** (0.357-0.618)	**0.533** (0.388-0.739)	**0.586** (0.410-0.844)
24-hr	**0.118** (0.106-0.135)	**0.144** (0.129-0.164)	**0.178** (0.158-0.203)	**0.206** (0.182-0.237)	**0.244** (0.209-0.290)	**0.274** (0.230-0.331)	**0.304** (0.251-0.377)	**0.336** (0.270-0.427)	**0.380** (0.294-0.502)	**0.415** (0.311-0.565)
2-day	**0.079** (0.071-0.090)	**0.097** (0.087-0.111)	**0.120** (0.107-0.138)	**0.139** (0.123-0.160)	**0.164** (0.141-0.195)	**0.184** (0.155-0.222)	**0.203** (0.167-0.252)	**0.224** (0.180-0.284)	**0.251** (0.194-0.331)	**0.272** (0.204-0.371)
3-day	**0.062** (0.055-0.070)	**0.076** (0.068-0.087)	**0.094** (0.084-0.108)	**0.109** (0.096-0.126)	**0.129** (0.110-0.153)	**0.144** (0.121-0.174)	**0.159** (0.131-0.197)	**0.174** (0.140-0.221)	**0.195** (0.151-0.257)	**0.211** (0.158-0.288)
4-day	**0.052** (0.046-0.059)	**0.064** (0.057-0.073)	**0.079** (0.071-0.091)	**0.092** (0.081-0.106)	**0.108** (0.093-0.129)	**0.121** (0.102-0.147)	**0.134** (0.110-0.166)	**0.146** (0.118-0.186)	**0.164** (0.126-0.216)	**0.177** (0.132-0.241)
7-day	**0.037** (0.033-0.043)	**0.046** (0.041-0.053)	**0.058** (0.051-0.066)	**0.067** (0.059-0.077)	**0.079** (0.067-0.094)	**0.088** (0.074-0.106)	**0.096** (0.079-0.120)	**0.105** (0.085-0.134)	**0.117** (0.091-0.155)	**0.127** (0.095-0.172)
10-day	**0.030** (0.027-0.035)	**0.038** (0.034-0.043)	**0.047** (0.042-0.054)	**0.054** (0.048-0.063)	**0.064** (0.055-0.076)	**0.071** (0.060-0.086)	**0.078** (0.064-0.097)	**0.085** (0.068-0.108)	**0.095** (0.073-0.125)	**0.102** (0.076-0.138)
20-day	**0.020** (0.018-0.023)	**0.026** (0.023-0.029)	**0.032** (0.028-0.037)	**0.037** (0.032-0.042)	**0.043** (0.037-0.051)	**0.047** (0.040-0.058)	**0.052** (0.043-0.064)	**0.056** (0.045-0.072)	**0.062** (0.048-0.082)	**0.066** (0.049-0.090)
30-day	**0.017** (0.015-0.019)	**0.021** (0.019-0.024)	**0.026** (0.023-0.030)	**0.030** (0.027-0.035)	**0.035** (0.030-0.042)	**0.039** (0.032-0.047)	**0.042** (0.034-0.052)	**0.045** (0.036-0.058)	**0.050** (0.038-0.066)	**0.053** (0.039-0.072)
45-day	**0.014** (0.013-0.017)	**0.018** (0.016-0.021)	**0.022** (0.020-0.025)	**0.025** (0.022-0.029)	**0.029** (0.025-0.035)	**0.032** (0.027-0.039)	**0.035** (0.029-0.043)	**0.038** (0.030-0.048)	**0.041** (0.031-0.054)	**0.043** (0.032-0.059)
60-day	**0.013** (0.011-0.015)	**0.016** (0.014-0.018)	**0.020** (0.017-0.022)	**0.022** (0.020-0.026)	**0.026** (0.022-0.031)	**0.028** (0.023-0.034)	**0.030** (0.025-0.037)	**0.032** (0.026-0.041)	**0.035** (0.027-0.046)	**0.037** (0.028-0.050)

[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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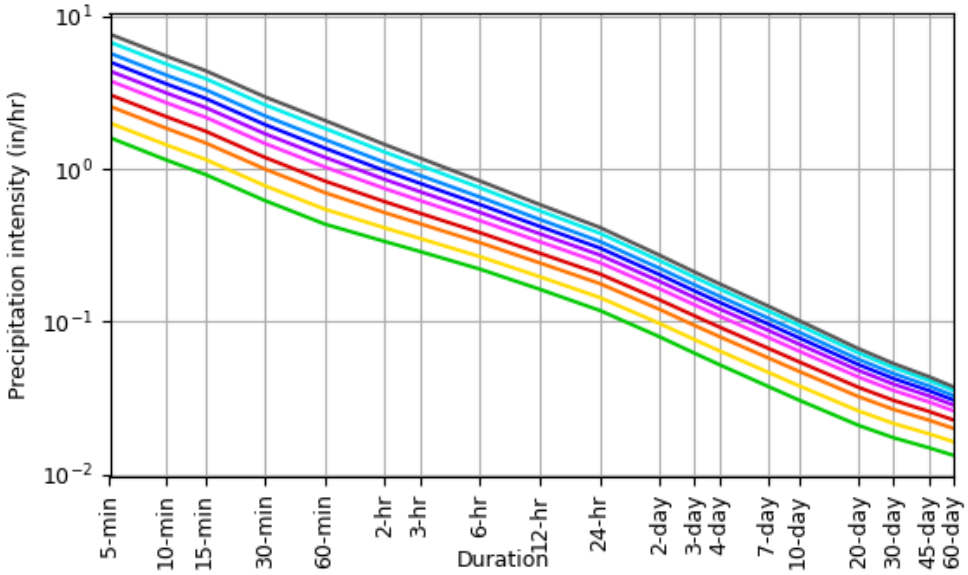
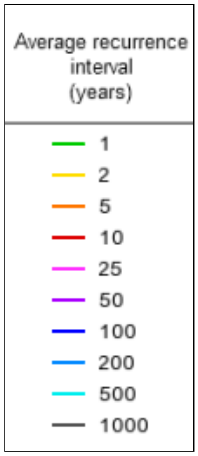
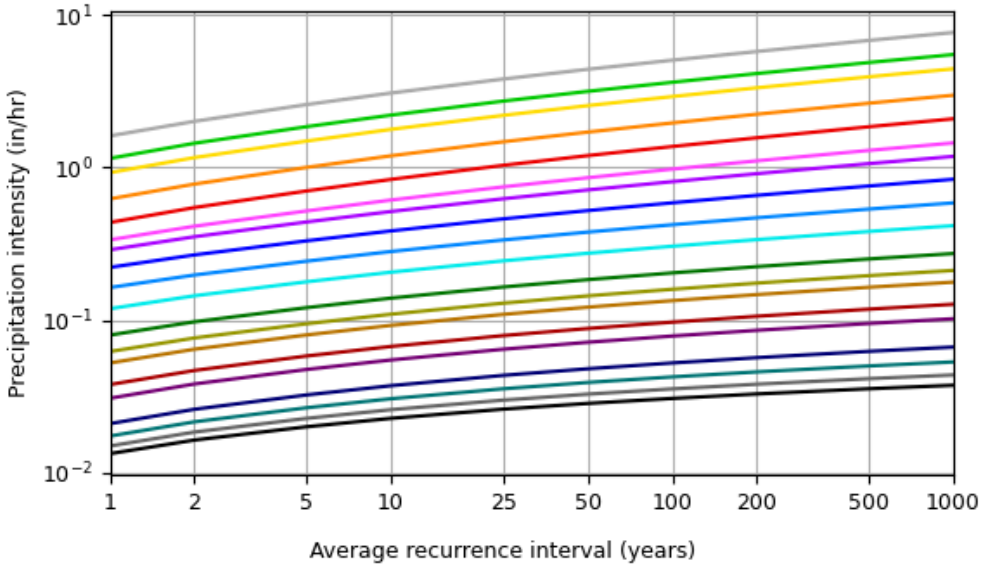
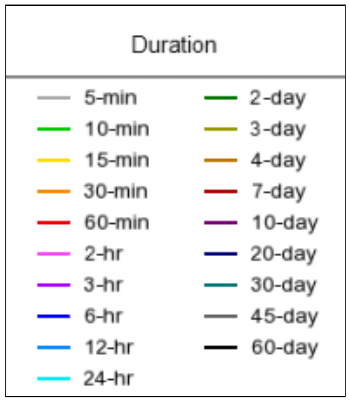
PF graphical

PDS-based intensity-duration-frequency (IDF) curves
Latitude: 40.9495°, Longitude: -124.1206°









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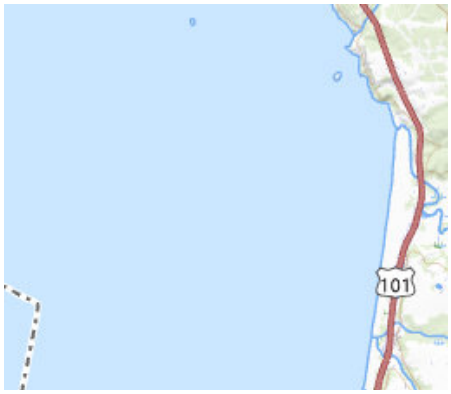
Maps & aerials

Small scale terrain



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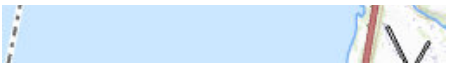

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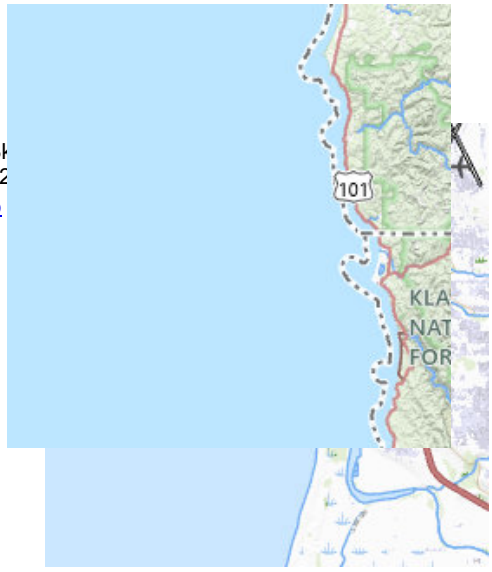

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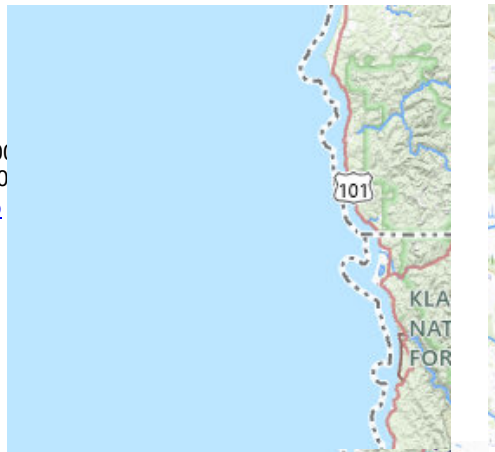

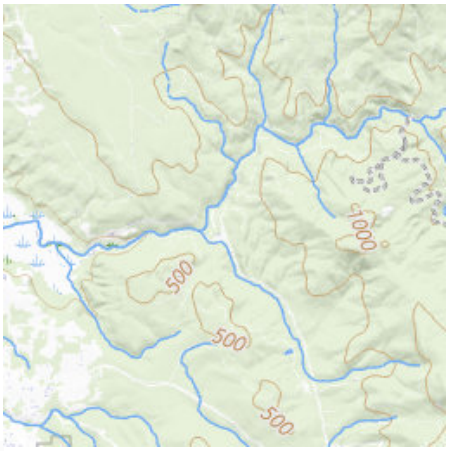

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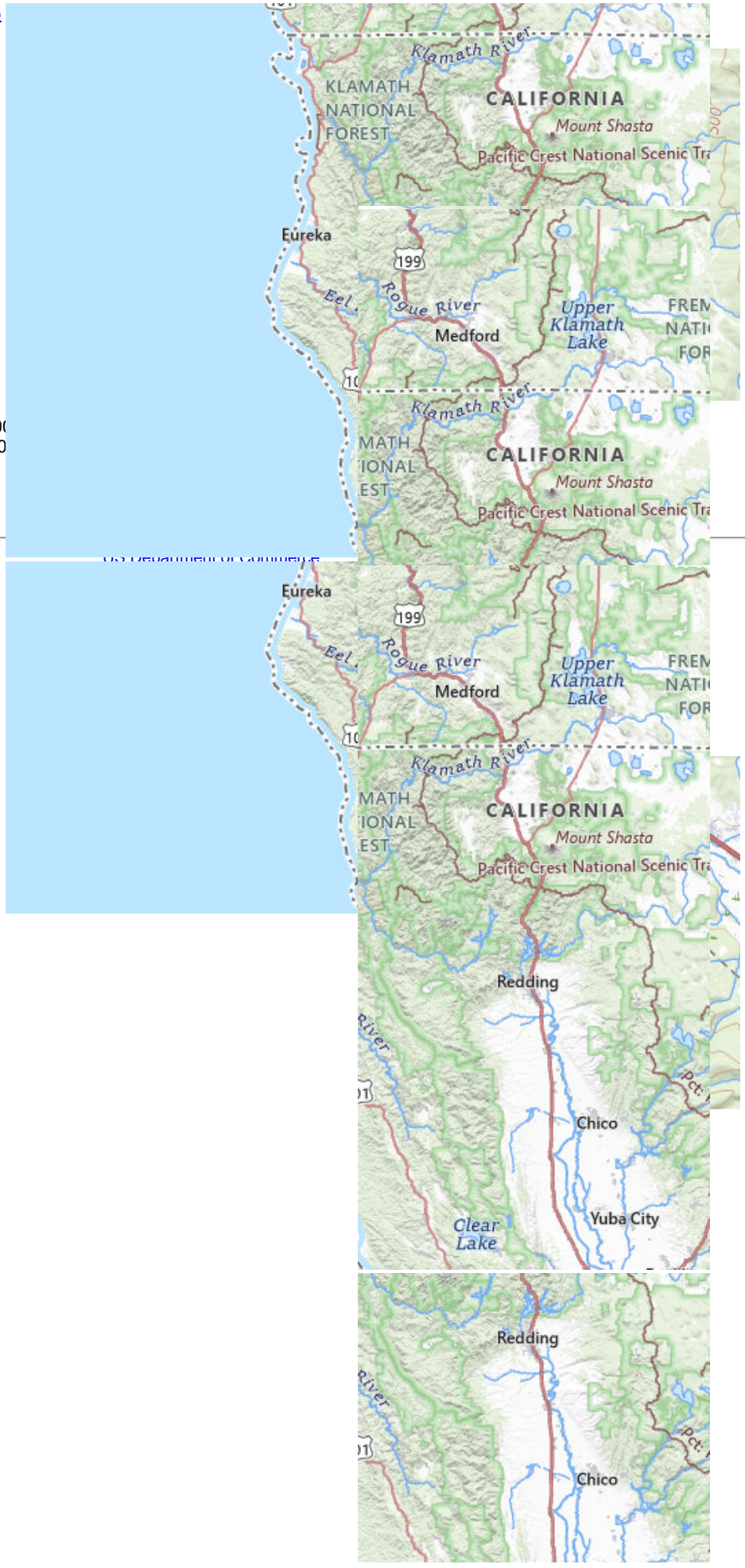
Klamath River
KLAMATH
NATIONAL
FOREST
CALIFORNIA
Mount Shasta
Pacific Crest National Scenic Tra
Eureka
199
Rogue River
Medford
Upper
Klamath
Lake
Redding
Chico
Yuba City
Clear
Lake


Clear
Lake
Yuba City

APPENDIX C: SMALL PROJECTS CALCULATOR

Small Projects Calculator
Humboldt Low Impact Development Stormwater Manual

Project Information						***Formulas/Notes***
DMA Name:				**DMA 2**		
Total Post-Project Impervious Surface Area (square feet)			**A**	**3120**	square feet	
24 hour - 85th Percentile Design Storm			**B**	**0.65**	inch	**B** = Select Design Storm Value (0.65-inch Humboldt Bay Area, 1.3-inch Shelter Cove)
Impervious Surface Runoff Value (Potential Stormwater Runoff due to impervious surface area and design storm value)			**C**	**1259**	Gallons per 24 hours	**C = A x B x 0.083 x 7.48**
Pervious Self-Retaining Area (SRA) Credit (if applicable, if none enter 0)						
Self-Retaining Area (square feet)	**0**	**3.5**	**SRA Credit**	**0**	square feet	**SRA Credit = Self-Retaining Area x Multiplier** Select **Multiplier** (3.5 Humboldt Bay Area, 1.3 Shelter Cove)
Site Design Measure Credits						
Tree Planting and Preservation						
New Trees		# of trees				
100 square feet per deciduous tree	**D**	**0**	**E**	**0**	square feet	**E = D x 100**
200 square feet per evergreen tree	**F**	**0**	**G**	**0**	square feet	**G = F x 200**
Existing Trees (Credit for 50% of existing canopy area)		Canopy diameter (feet)				
Tree #1	H_1	**90**	J_1	**3179**	square feet	$J_1 = 3.14 \times (H_1/2)^2 \times 0.50$
Tree #2	H_2		J_2	**0**	square feet	$J_2 = 3.14 \times (H_2/2)^2 \times 0.50$
Tree #3	H_3		J_3	**0**	square feet	$J_3 = 3.14 \times (H_3/2)^2 \times 0.50$
Rain Barrel or Cisterns (55 gallon minimum)						
Square foot credit per gallon based on 24-hour, 85th Percentile Design Storm	**K**	**2.48**				**K** = Select square foot credit per gallon (2.48 Humboldt Bay Area, 1.24 Shelter Cove)
		Gallons				
Rain Barrels	**L**		**M**	**0**	square feet	**M = L x K**
Cisterns	**N**		**O**	**0**	square feet	**O = N x K**
~~**Infiltration Trench/Basin (55 gallon minimum ~ 21 ft^{3**})**~~		~~cubic feet~~				
~~volume(ft^3) = length x width x depth~~	~~**P**~~	~~**0**~~	~~**Q**~~	~~**0**~~	~~square feet~~	~~**Q = P x R x K x 7.48**~~
~~porosity (approximate %)~~	~~**R**~~	~~**35%**~~				
Impervious Area Disconnection						
Credit per square foot of impervious area feeding into pervious area			**S**		square feet	**S =** Enter square foot value
Soil Quality Improvement						
Credit per square foot of soil quality improvement			**T**		square feet	**T =** Enter square foot value
Green Roof						
Credit per square foot of green roof installation			**U**		square feet	**U =** Enter square foot value
PPPP (Porous Asphalt, Pervious Concrete, Permeable Pavers)						
Credit per square foot installed			**V**		square feet	**V =** Enter square foot value
Vegetated Swales						
Credit per square foot of vegetated swale			**W**		square feet	**W =** Enter square foot value
Stream Setbacks and Buffers						
Credit per square foot of stream setback and buffer#			**X**		square feet	**X =** Enter square foot value
Credits Total			**Y**	**3179**	square feet	**Y = SRA Credit + E + G + J_1 + J_2 + J_3 + M + O + Q + S + T + U + V + W + X**
Post-Project Impervious Surface Area minus Site Design Measure Credits			**Z**	**-59**	square feet	**Z = A - Y**
NEW Impervious Surface Runoff Value (Potential Stormwater Runoff due to impervious surface area and design storm after implementation of Site Design Measures)			**AA**	**-24**	Gallons per 24 hours	**AA = Z x B x 0.083 x 7.48**
Percent reduction in Impervious Surface Runoff Value*			**BB**	**101.9**	%	**BB = ((C - AA) / C) x 100%**

***The MS4 General Permit requires a calculation of the project runoff reduction resulting from the use of site design measures. However, there is no numeric standard or target for runoff reduction required for Small Projects.**

~~****Infiltration Trench/Basin calculations are based on porosity (35%). Increased trench dimensions (volume) are required to meet 55 gallon minimum capacity.**~~

Green — Fill In [Enter Value]

Red — Calculated Value

Black — Fixed Value/Selectable Val

Conversions Used:

1 inch = 0.083 feet

1 cubic foot = 7.48 gallons

check with agency with project area jurisdiction for requirements

Small Projects Calculator
Humboldt Low Impact Development Stormwater Manual

Project Information						***Formulas/Notes***
DMA Name:				**DMA 3**		
Total Post-Project Impervious Surface Area (square feet)			A	1920	square feet	
24 hour - 85th Percentile Design Storm			B	0.65	inch	**B** = Select Design Storm Value (0.65-inch Humboldt Bay Area, 1.3-inch Shelter Cove)
Impervious Surface Runoff Value (Potential Stormwater Runoff due to impervious surface area and design storm value)			C	775	Gallons per 24 hours	**C = A x B x 0.083 x 7.48**
Pervious Self-Retaining Area (SRA) Credit (if applicable, if none enter 0)						
Self-Retaining Area (square feet)	0	3.5	SRA Credit	0	square feet	**SRA Credit = Self-Retaining Area x Multiplier** Select **Multiplier** (3.5 Humboldt Bay Area, 1.3 Shelter Cove)
Site Design Measure Credits						
Tree Planting and Preservation						
New Trees		# of trees				
100 square feet per deciduous tree	D		E	0	square feet	**E = D x 100**
200 square feet per evergreen tree	F		G	0	square feet	**G = F x 200**
Existing Trees (Credit for 50% of existing canopy area)		Canopy diameter (feet)				
Tree #1	H_1	70	J_1	1923	square feet	$J_1 = 3.14 \times (H_1/2)^2 \times 0.50$
Tree #2	H_2		J_2	0	square feet	$J_2 = 3.14 \times (H_2/2)^2 \times 0.50$
Tree #3	H_3		J_3	0	square feet	$J_3 = 3.14 \times (H_3/2)^2 \times 0.50$
Rain Barrel or Cisterns (55 gallon minimum)						
Square foot credit per gallon based on 24-hour, 85th Percentile Design Storm	K	2.48				**K** = Select square foot credit per gallon (2.48 Humboldt Bay Area, 1.24 Shelter Cove)
		Gallons				
Rain Barrels	L		M	0	square feet	**M = L x K**
Cisterns	N		O	0	square feet	**O = N x K**
~~**Infiltration Trench/Basin (55 gallon minimum ~ 21 ft^{3**})**~~		~~cubic feet~~				
~~volume(ft^3) = length x width x depth~~	~~P~~	~~0~~	~~Q~~	~~0~~	~~square feet~~	~~**Q = P x R x K x 7.48**~~
~~porosity (approximate %)~~	~~R~~	~~35%~~				
Impervious Area Disconnection						
Credit per square foot of impervious area feeding into pervious area			S		square feet	**S =** Enter square foot value
Soil Quality Improvement						
Credit per square foot of soil quality improvement			T		square feet	**T =** Enter square foot value
Green Roof						
Credit per square foot of green roof installation			U		square feet	**U =** Enter square foot value
PPPP (Porous Asphalt, Pervious Concrete, Permeable Pavers)						
Credit per square foot installed			V		square feet	**V =** Enter square foot value
Vegetated Swales						
Credit per square foot of vegetated swale			W		square feet	**W =** Enter square foot value
Stream Setbacks and Buffers						
Credit per square foot of stream setback and buffer#			X		square feet	**X =** Enter square foot value
Credits Total			Y	1923	square feet	**Y = SRA Credit + E + G + J_1 + J_2 + J_3 + M + O + Q + S + T + U + V + W + X**
Post-Project Impervious Surface Area minus Site Design Measure Credits			Z	-3	square feet	**Z = A - Y**
NEW Impervious Surface Runoff Value (Potential Stormwater Runoff due to impervious surface area and design storm after implementation of Site Design Measures)			AA	-1	Gallons per 24 hours	**AA = Z x B x 0.083 x 7.48**
Percent reduction in Impervious Surface Runoff Value*			BB	100.2	%	**BB = ((C - AA) / C) x 100%**

***The MS4 General Permit requires a calculation of the project runoff reduction resulting from the use of site design measures. However, there is no numeric standard or target for runoff reduction required for Small Projects.**

~~****Infiltration Trench/Basin calculations are based on porosity (35%). Increased trench dimensions (volume) are required to meet 55 gallon minimum capacity.**~~

Green — Fill In [Enter Value]

Red — Calculated Value

Black — Fixed Value/Selectable Val

Small Projects Calculator, Version 2.0 - June 29, 2016

Conversions Used:

1 inch = 0.083 feet

1 cubic foot = 7.48 gallons

check with agency with project area jurisdiction for requirements

3.5	2.48	0.65
1.3	1.24	1.3

APPENDIX D: STORMWATER INFORMATION SHEET

STORMWATER INFORMATION SHEET

Instructions

Construction and development projects within portions of unincorporated Humboldt County (McKinleyville, the greater Eureka area, and Shelter Cove) and the Cities of Eureka, Arcata, Fortuna, and Trinidad are subject to stormwater runoff and pollution control requirements of State Water Resources Control Board Water Quality Order No. 2013-0001-DWQ; NPDES General Permit No. CAS0000004 [Municipal Separate Storm Sewer (MS4) General Permit].
The following checklist is to be completed by you (the applicant) to determine which plans and specifications for stormwater runoff control are required as part of a Building or Development Permit application for projects located in areas subject to MS4 requirements.

I. Construction Project Information and Checklist (Completed by Applicant)

Site Location Address: 2424 Bolier Ave, McKinleyville, CA

Assessor Parcel Number (APN): 510-371-010

Anticipated Construction Start Date: TBD

Anticipated Construction Completion Date: TBD

Total area of Land Surface Disturbance: 3,840 square ft. or 0.09 acres

If project disturbs ≥ 1 acre of land surface then provide the State Construction General Permit WDID No.: N/A

Check and/or list all applicable permits directly associated with project construction or grading activity:

- ☐ State Construction General Permit (CGP)
- ☐ State 401 Water Quality Certification
- ☐ U.S. Army Corps 404 Permit
- ☐ CA Fish and Wildlife 1600
- ☐ Other (list): _____

Is the construction site part of larger common plan of development or sale (check as applicable)?

☐ YES ☑ NO ☐ Unknown

Name of larger common plan/project (if applicable): _____

Impervious Surface Area:

Pre-Project Impervious Surface: 4,722 square ft.

New or Replaced Impervious Surface: 3,840 square ft.

Total Post-Project Impervious Surface: 8,326 square ft.

Check Project Type as determined from LID Manual Part A, Table 1 - Applicable Post-Construction Standards Based on Project Type

Project Type:	Notes:
☑ Exempt	Sign and Certify this form.
☐ Small Project	Sign and Certify this form. Follow instructions in Part B of LID Manual.
☐ Regulated Project	Sign and Certify this form. Follow instructions in Part C of LID Manual
☐ Regulated Project with ≥ 1 acre of created or replaced impervious surface	Sign and Certify this form. Follow instructions in Part C of LID Manual.
☐ Regulated Redevelopment, Roads, or Linear Underground Project	Sign and Certify this form. Requirements vary; contact County or City Department with project jurisdiction.

Stormwater runoff from the project site discharges to (check as applicable):

☐ Storm Drain System (including road side ditches and other conveyances)

☐ Directly to waters of the State or U.S. (e.g. river, lake, stream, ocean, wetland) Name of Waterbody: _____

Name of nearest waterbody receiving runoff from site: Mad River

Indicate distance from project site to nearest watercourse: ~1,275 ft.

If your project is covered under the State Water Resources Control Board Construction General Permit (CGP), attach a copy of the submitted Stormwater Pollution Prevention Plan (SWPPP) including the Notice of Intent and WDID Number.

If a CGP is not required for your project, submit appropriate construction site BMP plans as required by County or City Department with project jurisdiction.

II. Certification (Completed by Owner or Authorized Applicant/Agent)

I, the below signed, confirm that I have accurately described my project to the best of my ability, and that I have not purposely omitted any detail affecting my project's classification for stormwater regulation

Printed Name: Celine Pelé

Signature: Celine Pelé Date: 12-15-25

III. For Official Use Only

Permit No.: Submittal Date: Received By:

APPENDIX E: PROJECT INFORMATION AND CERTIFICATION

2.0 STORMWATER CONTROL PLAN FOR SMALL PROJECTS/SINGLE-FAMILY HOMES (2,500 – 5,000 SQ. FT.)

Introduction

This form is required to document compliance with MS4 requirements for projects that create or replace between 2,500 and 5,000 square feet of impervious surface. To comply with these regulations, projects must include at least one reduction measure. Examples of reduction measures are shown below in Step 2. You are encouraged to include more reduction measures in your design, but only one is required. You must illustrate the added impervious surface and identify reduction measures on your site plan. While you are required to calculate your project's run-off reductions, there is no numeric standard or target required by the MS4 regulations.

Step-by-Step Instructions Overview

The steps are:

1. Select a minimum of one site design measure.
2. Identify the runoff reduction measures you will use
3. Calculate runoff reduction using the Small Projects Calculator (Attachment 1).
4. Sign and Submit your SCP with your building permit application

Step 1: Project Data

Total Pre-Project Impervious Surface Area (square feet)	4,722
Total New or Replaced Impervious Surface Area (square feet) [Sum of impervious area that will be constructed as part of the project]	3,840
Total Post-Project Impervious Surface Area (square feet)	8,326
To be completed by staff member: **Building Permit #**	

Step 2: Select a minimum of one Site Design Measure & show it on the Plot Plan

Site Design Measures (Select a minimum of one)

The following design strategies, in addition to at least one of the measures to the right, shall be considered applicable for all projects:

- Minimize compaction of highly permeable soils
- Limit clearing and grading of native vegetation at the site to the minimum area needed to build the project, allow access, and provide fire protection
- Minimize impervious surfaces by concentrating development on the least-sensitive portions of the site, while leaving the remaining land in a natural, undisturbed state

- ☑ 1. Tree Planting and Preservation
- ☐ 2. Rain Barrels or Cisterns
- ☐ 3. Rooftop/ Impervious Area Disconnection
- ☐ 4. Soil Quality Improvement
- ☐ 5. Green Roof
- ☐ 6. PPPP Alternative engineered hardscaping surfaces (Pervious concrete, Porous asphalt, Permeable Pavers)
- ☐ 7. Vegetated Swales
- ☐ 8. Stream Setbacks and Buffers
- ☐ ~~9. On-site infiltration~~(REMOVED FROM CONSIDERATION)

Step 3: Calculate runoff reduction using small projects calculator

Use *Small Projects Calculator - Humboldt LID Stormwater Manual* (Attachment 1)

Step 4: Delineate impervious areas and locations of runoff reduction measures

On a site plan or sketch, show the impervious area (e.g. a roof, or portion of a roof, or a pavedarea) that will drain to your site design measure such as Rain Barrels or Cisterns, Impervious Area Disconnection, Soil QualityImprovement, PPPP, Vegetated Swales, ~~Infiltration trenches~~, and Stream Setbacks and Buffers. Typically, these delineations follow roof ridge lines or grade breaks. Alternatively, or in addition, show the type and extent of site design measures such as PPPP, Tree Planting and Preservation, Green Roof, or Soil Quality Improvement. An example sketch is included as Attachment 2.

Confirm your design and submittal meet minimum requirements and specifications indicated on the Site Design Measure Sheets included in Attachment 3. Include a copy of the Site Design Measure Sheet or equivalent with your submittal.

Step 5: Sign and submit your plan

Consult with City or County Planning and Building Services (PBS) department staff as applicable about when and how to submit your SCP.

Signature and Certification

I, the below signed, confirm that I have accurately described my project to the best of my ability and that I have not purposely omitted any detail affecting my project's classification for stormwater regulation. I hereby certify that the site design measures identified herein as being incorporated into my project have been designed in accordance with the approved BMP Fact Sheet or equivalent, which is attached to this checklist and is included in the final site plans submitted to the appropriate County or City Department.

Signature

12.15.25
Date

Celine Pele
Print Name

I am the:

☑ Owner ☐ Representative ☐ Other:_____

Attachments:

APPENDIX F: CALCULATIONS

DMA-1/Parcel 1

Summary of Impervious and Pervious Surfaces

Existing Surface	Surface Type	Area (sf)
Garage	Impervious	1000
Shed	Impervious	106
Art Studio	Impervious	580
Residence	Impervious	1600
Gravel Roads/Driveways	Pervious	4068
Landscape	Pervious	43176

Total Impervious Area (sf) = 3286
Total Pervious Area (sf) = 47244
Total Area Check (sf) = 50530

Pre-Development Weighted Runoff Coefficient

Surface Type	Area (sf)	Runoff Coefficient	Area × Runoff Coefficient
Impervious	3286	0.95	3122
Gravel Roads/Driveways	4068	0.25	1017
Landscape	43176	0.25	10794
Total Area (sf) =	50530	**∑ (A×C) =**	14933

Weighted Runoff Coefficient = 0.30

Q_2 (Rational Method)	
Weighted Runoff Coefficient	0.30
Intensity (2-year, 10min) (in/hr) =	1.44
Area (sf) =	50530
Area (ac) =	1.16
$PreQ_2$ (cfs) =	0.49

$PreV_2$ (Triangular Unit Hydrograph Method)	
$PreV_2$ (ft^3) =	444
$PreV_2$ (gal) =	3323

($PreV_2$= 0.5*(3*d)*$PreQ_2$)

DMA-2/Parcel 2

Summary of Impervious and Pervious Surfaces

Existing Surface	Surface Type	Area (sf)
Shed	Impervious	67
Shed	Impervious	219
Gravel Roads/Driveways	Pervious	2911
Landscape	Pervious	14227

Total Impervious Area (sf) = 286
Total Pervious Area (sf) = 17138
Total Area Check (sf) = 17424

Pre-Development Weighted Runoff Coefficient

Surface Type	Area (sf)	Runoff Coefficient	Area × Runoff Coefficient
Impervious	286	0.95	272
Gravel Roads/Driveways	2911	0.25	728
Landscape	14227	0.25	3557
Total Area (sf) =	17424	**∑ (A×C) =**	4556

Weighted Runoff Coefficient = 0.26

Q_2 (Rational Method)	
Weighted Runoff Coefficient	0.26
Intensity (2-year, 10min) (in/hr) =	1.44
Area (sf) =	17424
Area (ac) =	0.40
$PreQ_2$ (cfs) =	0.15

$PreV_2$ (Triangular Unit Hydrograph Method)	
$PreV_2$ (ft^3) =	136
$PreV_2$ (gal) =	1014

($PreV_2$= 0.5*(3*d)*$PreQ_2$)

DMA-3/Parcel 3

Summary of Impervious and Pervious Surfaces

Existing Surface	Surface Type	Area (sf)
Residence	Impervious	150
Gravel Roads/Driveways	Pervious	1743
Landscape	Pervious	17709

Total Impervious Area (sf) = 150
Total Pervious Area (sf) = 19452
Total Area Check (sf) = 19602

Pre-Development Weighted Runoff Coefficient

Surface Type	Area (sf)	Runoff Coefficient	Area × Runoff Coefficient
Impervious	150	0.95	143
Gravel Roads/Driveways	1743	0.25	436
Landscape	17709	0.25	4427
Total Area (sf) =	19602	**∑ (A×C) =**	5006

Weighted Runoff Coefficient = 0.26

Q_2 (Rational Method)	
Weighted Runoff Coefficient	0.26
Intensity (2-year, 10min) (in/hr) =	1.44
Area (sf) =	19602
Area (ac) =	0.45
$PreQ_2$ (cfs) =	0.17

$PreV_2$ (Triangular Unit Hydrograph Method)	
$PreV_2$ (ft^3) =	149
$PreV_2$ (gal) =	1114

($PreV_2$= 0.5*(3*d)*$PreQ_2$)

DMA	Area (ac.)	<P> Runoff Coefficients	100-year Peak Q (cfs)	100-year Volume (CF)
1	1.16	0.30	N/A	N/A
2	0.40	0.38	0.54	488
3	0.45	0.32	0.52	466

DMA	Post-Development Impervious Surface (sf)	85th%, 24-hr (gal/24-hr)	85th%, 24-hr (CF/24-hr)
1	3286	N/A	N/A
2	3120	N/A	N/A
3	1920	N/A	N/A

Pre-Development 2-Year Storm Flows & Volumes					
DMA	Description	Area (ac.)	<E> Runoff Coefficients	2-year Peak Discharge (Q_2) (cfs)	2-year Volume (ft^3)
1	Parcel 1	1.16	0.30	0.49	444
2	Parcel 2	0.40	0.26	0.15	136
3	Parcel 3	0.45	0.29	0.19	171

DMA	Required Storage Volume ($PostV_{100}$-$PreV_2$) (ft^3)	Bioretention Basin Surface Area (SF)	Bioretention Basin Volume (CF)	Bioretention Basin Volume (gal)
1	N/A	N/A	N/A	N/A
2	352	282	353	2637
3	295	236	295	2207

DMA-1/Parcel 1

Summary of Impervious and Pervious Surfaces

Existing Surface	Surface Type	Area (sf)
Garage	Impervious	1000
Shed	Impervious	106
Art Studio	Impervious	580
Residence	Impervious	1600
Gravel Roads/Driveways	Pervious	4068
Landscape	Pervious	43176

Total Impervious Area (sf) = 3286
Total Pervious Area (sf) = 47244
Total Area Check (sf) = 50530

Post-Development Weighted Runoff Coefficient

Surface Type	Area (sf)	Runoff Coefficient	Area × Runoff Coefficient
Impervious	3286	0.95	3122
Gravel Roads/Driveways	4068	0.25	1017
Landscape	43176	0.25	10794
Total Area (sf) =	50530	**∑ (A×C) =**	14933

Weighted Runoff Coefficient = 0.30

Q_{100} (Rational Method)	
Weighted Runoff Coefficient	0.30
Intensity (2-year, 10min) (in/hr) =	3.61
Area (sf) =	50530
Area (ac) =	1.16
$PostQ_{100}$ (cfs) =	1.24

$PreV_{100}$ (Triangular Unit Hydrograph Method)	
$PostV_{100}$ (ft^3) =	N/A
$PostV_{100}$ (gal) =	N/A

($PreV_2$= 0.5*(3*d)*$PostQ_2$)

$PostQ_{100}$-$PreQ_2$=	N/A
$PostV_{100}$-$PreV_2$ (ft^3) =	N/A
$PostV_{100}$-$PreV_2$ (gal) =	N/A

DMA-1 Proposed Bioretention Basin

Area (sf) = N/A

Layer	Layer thickness (ft)	Total Layer Vol (CF)	% Porosity	Storage Volume (CF)
Soil	1.5	N/A	15%	N/A
Gravel	1.5	N/A	35%	N/A
Ponding	0.5	N/A	100%	N/A

Total basin Storage Volume (ft^3)= 0

Total Required Storage Volume: N/A
($PostV_{100}$-$PreV_2$)

DMA-2/Parcel 2

Summary of Impervious and Pervious Surfaces

Existing Surface	Surface Type	Area (sf)
Residence	Impervious	2400
ADU	Impervious	720
Gravel Roads/Driveways	Pervious	2911
Landscape	Pervious	11393

Total Impervious Area (sf) = 3120
Total Pervious Area (sf) = 14304
Total Area Check (sf) = 17424

Post-Development Weighted Runoff Coefficient

Surface Type	Area (sf)	Runoff Coefficient	Area × Runoff Coefficient
Impervious	3120	0.95	2964
Gravel Roads/Driveways	2911	0.25	728
Landscape	11393	0.25	2848
Total Area (sf) =	17424	**∑ (A×C) =**	6540

Weighted Runoff Coefficient = 0.38

Q_{100} (Rational Method)	
Weighted Runoff Coefficient	0.38
Intensity (2-year, 10min) (in/hr) =	3.61
Area (sf) =	17424
Area (ac) =	0.40
$PostQ_{100}$ (cfs) =	0.54

$PreV_{100}$ (Triangular Unit Hydrograph Method)	
$PostV_{100}$ (ft^3) =	488
$PostV_{100}$ (gal) =	3649

($PreV_2$= 0.5*(3*d)*$PostQ_2$)

$PostQ_{100}$-$PreQ_2$=	0.39
$PostV_{100}$-$PreV_2$ (ft^3) =	352
$PostV_{100}$-$PreV_2$ (gal) =	2,635

DMA-2 Proposed Bioretention Basin

Area (sf) = 282

Layer	Layer thickness (ft)	Total Layer Vol (CF)	% Porosity	Storage Volume (CF)
Soil	1.5	423	15%	63
Gravel	1.5	423	35%	148
Ponding	0.5	141	100%	141

Total basin Storage Volume (ft^3)= 353

Total Required Storage Volume: 352
($PostV_{100}$-$PreV_2$)

DMA-3/Parcel 3

Summary of Impervious and Pervious Surfaces

Existing Surface	Surface Type	Area (sf)
Residence	Impervious	1200
ADU	Impervious	720
Gravel Roads/Driveways	Pervious	1743
Landscape	Pervious	15939

Total Impervious Area (sf) = 1920
Total Pervious Area (sf) = 17682
Total Area Check (sf) = 19602

Post-Development Weighted Runoff Coefficient

Surface Type	Area (sf)	Runoff Coefficient	Area × Runoff Coefficient
Impervious	1920	0.95	1824
Gravel Roads/Driveways	1743	0.25	436
Landscape	15939	0.25	3985
Total Area (sf) =	19602	**∑ (A×C) =**	6245

Weighted Runoff Coefficient = 0.32

Q_{100} (Rational Method)	
Weighted Runoff Coefficient	0.32
Intensity (2-year, 10min) (in/hr) =	3.61
Area (sf) =	19602
Area (ac) =	0.45
$PostQ_{100}$ (cfs) =	0.52

$PreV_{100}$ (Triangular Unit Hydrograph Method)	
$PostV_{100}$ (ft^3) =	466
$PostV_{100}$ (gal) =	3484

($PreV_2$= 0.5*(3*d)*$PostQ_2$)

$PostQ_{100}$-$PreQ_2$=	0.33
$PostV_{100}$-$PreV_2$ (ft^3) =	295
$PostV_{100}$-$PreV_2$ (gal) =	2,206

DMA-3 Proposed Bioretention Basin

Area (sf) = 236

Layer	Layer thickness (ft)	Total Layer Vol (CF)	% Porosity	Storage Volume (CF)
Soil	1.5	354	15%	53
Gravel	1.5	354	35%	124
Ponding	0.5	118	100%	118

Total basin Storage Volume (ft^3)= 295

Total Required Storage Volume: 295
($PostV_{100}$-$PreV_2$)