

APPENDIX G
Stormwater Diversion Design

2010 Report of Waste Discharge, Bishop Mill Project

RBB

Bishop Mill
Upgradient Watershed Diversion
Inyo County, California

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use		Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
Sub1	Sagebrush (w/ grass understory)	(poor)	C	.4	80
Total Area / Weighted Curve Number				.4	80
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Sub-Area Time of Concentration Details

Sub-Area Identifier/	Flow Length (ft)	Slope (ft/ft)	Mannings's n	End Area (sq ft)	Wetted Perimeter (ft)	Velocity (ft/sec)	Travel Time (hr)
Sub1							
SHEET	100	0.4000	0.150				0.076
SHALLOW	50	0.4000	0.050				0.001
						Time of Concentration	0.1
							=====

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Hydrograph Peak/Peak Time Table

Sub-Area or Reach Identifier	Peak Flow and Peak Time (hr) by Rainfall Return Period	
	25-Yr (cfs) (hr)	100-Yr (cfs) (hr)

SUBAREAS

Sub1	0.74 11.94	1.27 11.94
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REACHES

OUTLET	0.74	1.27
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Upgradient Diversion Channel (v-ditch)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.035	
Channel Slope	0.15000	ft/ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Discharge	1.30	ft ³ /s

Results

Normal Depth	0.31	ft
Flow Area	0.28	ft ²
Wetted Perimeter	1.95	ft
Hydraulic Radius	0.15	ft
Top Width	1.85	ft
Critical Depth	0.41	ft
Critical Slope	0.03246	ft/ft
Velocity	4.56	ft/s
Velocity Head	0.32	ft
Specific Energy	0.63	ft
Froude Number	2.05	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.31	ft
Critical Depth	0.41	ft
Channel Slope	0.15000	ft/ft
Critical Slope	0.03246	ft/ft



POINT PRECIPITATION FREQUENCY ESTIMATES FROM NOAA ATLAS 14



California 37.45 N 118.3501 W 4186 feet

from "Precipitation-Frequency Atlas of the United States" NOAA Atlas 14, Volume I, Version 4
G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M. Yekta, and D. Riley
NOAA, National Weather Service, Silver Spring, Maryland, 2006

Extracted: Mon Jun 28 2010

Confidence Limits	Seasonality	Related Info	GIS data	Maps	Docs	Return to State Map
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Precipitation Frequency Estimates (inches)																		
ARI* (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.07	0.11	0.14	0.19	0.23	0.33	0.41	0.60	0.81	1.03	1.17	1.31	1.47	1.56	1.79	2.02	2.27	2.49
2	0.09	0.14	0.18	0.24	0.29	0.42	0.52	0.78	1.06	1.35	1.54	1.72	1.94	2.06	2.36	2.67	3.02	3.31
5	0.13	0.20	0.24	0.33	0.40	0.58	0.72	1.07	1.47	1.89	2.16	2.42	2.75	2.91	3.32	3.75	4.29	4.74
10	0.16	0.25	0.31	0.41	0.51	0.72	0.89	1.31	1.79	2.32	2.66	2.99	3.39	3.58	4.04	4.55	5.25	5.82
25	0.22	0.33	0.41	0.56	0.69	0.95	1.14	1.67	2.25	2.94	3.38	3.79	4.29	4.52	5.04	5.64	6.55	7.31
50	0.27	0.41	0.51	0.69	0.85	1.15	1.36	1.97	2.63	3.45	3.97	4.46	5.01	5.27	5.82	6.49	7.58	8.49
100	0.33	0.50	0.62	0.84	1.04	1.39	1.61	2.30	3.04	4.00	4.61	5.18	5.79	6.08	6.64	7.38	8.64	9.73
200	0.40	0.61	0.75	1.01	1.26	1.65	1.88	2.66	3.48	4.59	5.31	5.96	6.62	6.94	7.49	8.29	9.74	11.02
500	0.51	0.77	0.96	1.29	1.60	2.07	2.31	3.22	4.13	5.45	6.32	7.09	7.81	8.16	8.66	9.55	11.26	12.83
1000	0.60	0.91	1.13	1.53	1.89	2.43	2.68	3.70	4.67	6.15	7.16	8.03	8.78	9.15	9.60	10.54	12.46	14.27

* These precipitation frequency estimates are based on a partial duration series. ARI is the Average Recurrence Interval. Please refer to [NOAA Atlas 14 Document](#) for more information. NOTE: Formatting forces estimates near zero to appear as zero.

* Upper bound of the 90% confidence interval Precipitation Frequency Estimates (inches)																		
ARI** (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.09	0.13	0.16	0.22	0.27	0.38	0.46	0.69	0.93	1.21	1.37	1.53	1.71	1.81	2.06	2.31	2.61	2.87
2	0.11	0.17	0.21	0.28	0.34	0.48	0.60	0.89	1.22	1.59	1.81	2.01	2.26	2.39	2.73	3.06	3.48	3.83
5	0.15	0.23	0.28	0.38	0.47	0.67	0.82	1.23	1.68	2.22	2.54	2.83	3.20	3.39	3.84	4.30	4.95	5.48
10	0.19	0.29	0.36	0.48	0.59	0.82	1.01	1.51	2.06	2.72	3.12	3.49	3.94	4.16	4.67	5.23	6.05	6.73
25	0.25	0.39	0.48	0.64	0.80	1.09	1.30	1.91	2.60	3.45	3.97	4.45	5.00	5.26	5.83	6.52	7.58	8.50
50	0.32	0.48	0.60	0.80	0.99	1.33	1.56	2.26	3.05	4.05	4.69	5.25	5.87	6.16	6.77	7.53	8.80	9.91
100	0.39	0.59	0.73	0.99	1.22	1.61	1.87	2.66	3.55	4.72	5.49	6.13	6.83	7.14	7.77	8.61	10.12	11.46
200	0.47	0.72	0.89	1.20	1.49	1.94	2.21	3.12	4.10	5.45	6.37	7.12	7.88	8.21	8.82	9.75	11.52	13.09
500	0.61	0.93	1.16	1.56	1.93	2.48	2.77	3.83	4.93	6.57	7.69	8.60	9.44	9.81	10.36	11.44	13.52	15.48
1000	0.73	1.11	1.38	1.86	2.30	2.96	3.25	4.45	5.65	7.49	8.84	9.84	10.76	11.14	11.64	12.80	15.19	17.48

* The upper bound of the confidence interval at 90% confidence level is the value which 5% of the simulated quantile values for a given frequency are greater than.

** These precipitation frequency estimates are based on a partial duration series. ARI is the Average Recurrence Interval.

Please refer to [NOAA Atlas 14 Document](#) for more information. NOTE: Formatting prevents estimates near zero to appear as zero.

* Lower bound of the 90% confidence interval Precipitation Frequency Estimates (inches)																		
ARI** (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.06	0.10	0.12	0.16	0.20	0.29	0.36	0.52	0.71	0.90	1.01	1.14	1.27	1.35	1.56	1.76	1.97	2.16
2	0.08	0.13	0.16	0.21	0.26	0.37	0.46	0.68	0.93	1.18	1.33	1.49	1.68	1.78	2.06	2.32	2.62	2.88
5	0.11	0.17	0.21	0.29	0.36	0.51	0.64	0.94	1.28	1.64	1.86	2.09	2.37	2.51	2.88	3.24	3.70	4.09
10	0.14	0.22	0.27	0.36	0.45	0.63	0.78	1.15	1.56	1.99	2.27	2.56	2.89	3.07	3.49	3.92	4.49	4.98
25	0.19	0.28	0.35	0.47	0.59	0.81	0.99	1.44	1.94	2.50	2.84	3.21	3.62	3.83	4.31	4.80	5.55	6.19

50	0.22	0.34	0.42	0.57	0.70	0.96	1.16	1.68	2.25	2.89	3.29	3.71	4.18	4.42	4.93	5.47	6.35	7.10
100	0.27	0.40	0.50	0.68	0.83	1.12	1.34	1.93	2.56	3.30	3.76	4.25	4.76	5.03	5.54	6.13	7.14	8.02
200	0.31	0.47	0.58	0.78	0.97	1.30	1.53	2.19	2.88	3.73	4.24	4.80	5.35	5.64	6.16	6.78	7.93	8.92
500	0.37	0.57	0.70	0.95	1.18	1.57	1.81	2.56	3.34	4.32	4.92	5.57	6.16	6.46	6.96	7.63	8.93	10.11
1000	0.43	0.65	0.80	1.08	1.34	1.78	2.03	2.86	3.69	4.79	5.44	6.17	6.79	7.10	7.56	8.27	9.68	10.99

* The lower bound of the confidence interval at 90% confidence level is the value which 5% of the simulated quantile values for a given frequency are less than.

** These precipitation frequency estimates are based on a partial duration maxima series. ARI is the Average Recurrence Interval.

Please refer to [NOAA Atlas 14 Document](#) for more information. NOTE: Formatting prevents estimates near zero to appear as zero.

Text version of tables

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Related Information

Maps & Aerials

[Click here](#) to see topographic maps and aerial photographs available for this location from [Microsoft Research Maps](#)

Watershed/Streamflow Information

[Click here](#) to see watershed and streamflow information available for this location from the U.S. Environmental Protection Agency's site

Climate Data Sources

National Climatic Data Center (NCDC) database

Locate NCDC climate stations within:

or of this location. Digital ASCII data can be obtained directly from [NCDC](#).

Note: Precipitation frequency results are based on analysis of precipitation data from a variety of sources, but largely NCDC. The following links provide general information about observing sites in the area, regardless of if their data was used in this study. For detailed information about the stations used in this study, please refer to the matching documentation available at the [PF Document](#) page

Natural Resources Conservation Service's (NRCS) SNOTEL dataset

At present, there are more than 700 [SNOTEL sites](#) typically located in the mountainous regions of the [Western U.S.](#) that report daily and/or hourly precipitation, air temperature, snow water equivalent and snow depth data.

[US Department of Commerce](#)
[National Oceanic and Atmospheric Administration](#)
[National Weather Service](#)
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