US Army Corps
of Engineers
Alaska District

Public Notice of Application for Permit

JUNEAU FIELD OFFICE
Regulatory Division (1145)
CEPOA-RD
Post Office Box 22270
Juneau, Alaska 99802-2270

PUBLIC NOTICE DATE: December 23, 2024

EXPIRATION DATE: January 7, 2024

REFERENCE NUMBER: POA-2023-00089

WATERWAY: Grant Creek

*****PUBLIC NOTICE REVISION*****

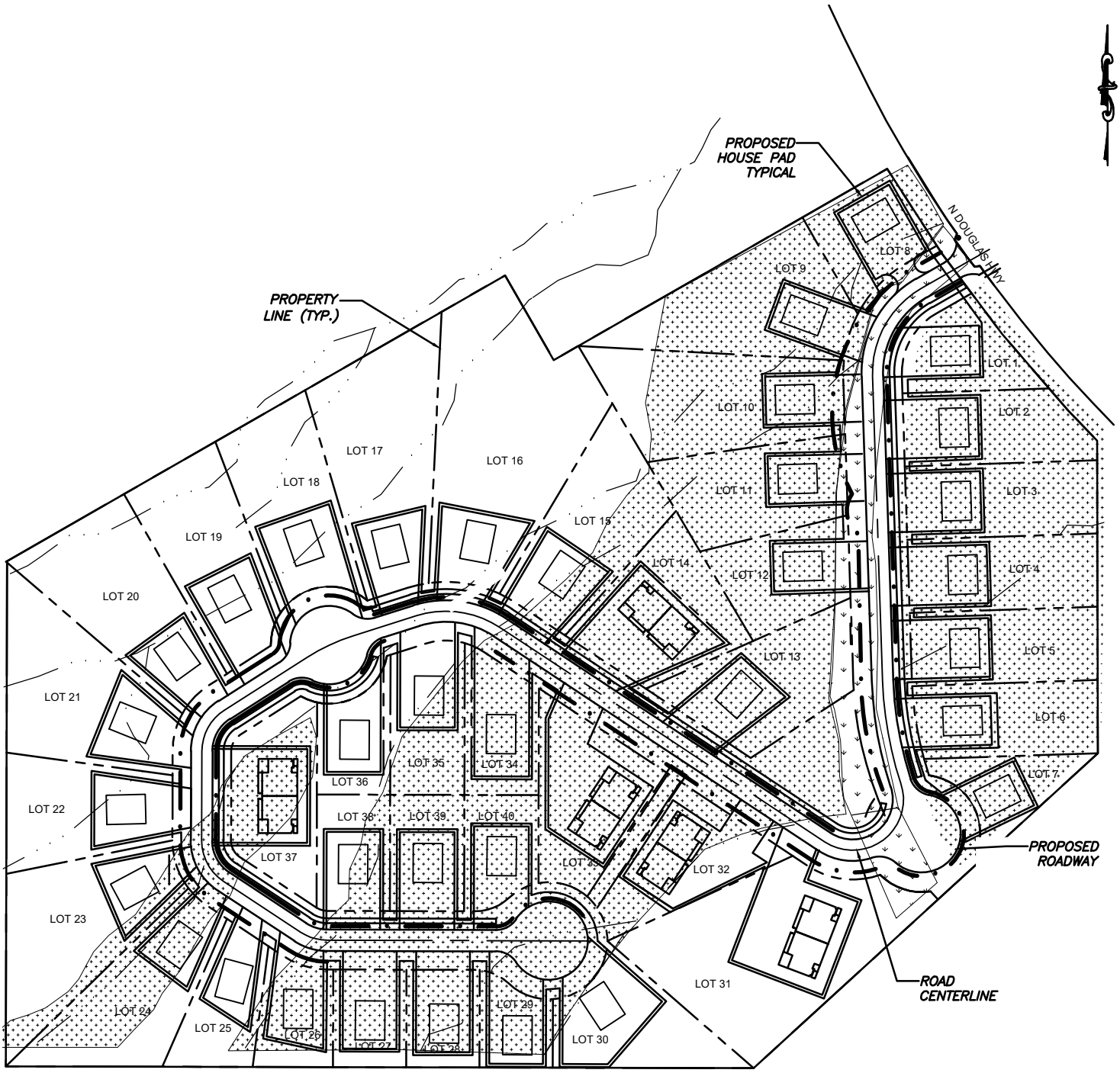
On October 24, 2024, the Alaska District U.S. Army Corps of Engineers issued a public notice for Department of the Army (DA) permit number POA-2023-00089, Grant Creek for a DA permit application from Tlingit Haida Regional Housing Authority, for a new subdivision development. The project site is located within. Section 22, T. 41 S., R. 67 E., Copper River Meridian; USGS Quad Map Juneau B-2; Latitude 58.3025º N., Longitude 134.4504º W.; Seet Kanax Duteen Subdivision, in Juneau, Alaska.

The notices and plans showed that the wetland impacts for the project would be 4.1 acres within the 17-acre project area.

This information is incorrect and should instead read: wetland impacts for the project would be 5 acres within the 17-acre project area.

All other information contained in the previous notice remains the same. Please bring this announcement to the attention of anyone you know who is or may be interested. Please contact Delana Wilks at (907) 201-5021, or by email at Delana.P.Wilks@usace.army.mil if further information is desired concerning this notice.

District Engineer
U.S. Army, Corps of Engineers



TOTAL LOTS DEVELOPED: 40
TOTAL PROJECT AREA: 17.62 ACRES
TOTAL AREA DISTURBED: 8.12 ACRES
PROJECT AREA IN WETLANDS:
PFO= 3.53 ACRES
PSS–PEM= 0.68 ACRES
TOTAL ROAD LENGTH: 2025 LF
ROAD LENGTH IN WETLANDS: 1400 LF
STREAM LENGTH IMPACTED: 2245 LF

SITE PLAN

APPLICATION BY:
TLINGIT–HAIDA REGIONAL HOUSING AUTHORITY 5446 JENKINS DRIVE JUNEAU, AK 99801

THRHA JUNEAU

AT: JUNEAU

LOCATED IN: TRACT II, USS 2135 JUNEAU
Lat 58°18'8"N, Long. 134°27'4"W

DATE: 10–7–24

SHEET 3

R&M ENGINEERING-KETCHIKAN, INC.
ENGINEERS ARCHITECTS SURVEYORS

7180 REVILLA ROAD, SUITE 300, KETCHIKAN, ALASKA 99901
PHONE: 907-225-7917 FAX: 907-225-3441 www.ketchikanengineer.com

October 4, 2024

City and Borough of Juneau
permits@juneau.gov
Re: Seet Kanax Duteen Subdivision Drainage Report

The purpose of this memorandum is to provide a narrative for a storm water drainage study that was conducted for the subject project.

Project Description

This project is located on the uphill side of the North Douglas Highway just North of Kowee Creek. The property encompasses a total are of 17.6 acres composed primarily of Palustrine Forested wetlands with sparse areas of Shrub/Emergent. Currently, the site is mostly undeveloped forest with a single gravel logging road transecting the parcel.

This project proposes to improve the existing gravel road and provide access to the upper portion of the parcel by constructing a paved roadway and pedestrian path. The new roadway will have domestic water/sewer and storm water drainage features. Concurrently, this project proposes to subdivide the entirety of the parcel into 40 smaller lots for development of residential houses with pads.

Strom Water Drainage Study Narrative

The following assumptions were made:

1. The drainage basin affecting this parcel extends to the boundary shown in the drainage map only. The area upgradient of this boundary (to the southwest) is extremely steep. Any water droplets entering this area would be quickly consolidated into channel flow that would either divert around or through the parcel. These drainage channels are shown on the drainage map.
2. All storm water drainage on the parcel to the southeast above the existing gravel road is intercepted by the ditch line and transported across the gravel road before it enters the subject parcel. See the drainage map.
3. The major drainage channel that meanders from the southwest to northwest end of the parcel intercepts all storm water runoff from the northwest and transports it off site. This drainage pathway will be maintained.
4. No significant amount of stormwater runoff enters the existing ditch lines or existing 24” culverts from offsite.
5. All new building pads and structures will divert storm water runoff to the new roadway ditches. Any building pads build over an existing stream or drainage pathway will require a culvert to maintain existing drainage pathways.

An analysis of the total storm water discharges for different storm intervals was conducted using the Rational Method. Rainfall intensities for the storm frequencies were obtained using NOAA Atlas 14. Analysis of culverts and ditches was performed using HY-8 and AutoCAD Hydraflow modeling.

Pre-Development Conditions

Strom water enters the site from the southwest corner from either fully developed small channel flows or direct transmission of rainfall droplets. A large portion of the water droplets infiltrate into the organic overburden layer that covers the site. Once the ground has saturated, the water droplets begin to move to the northeast via sheet flow and small channels. The down gradient varies from 45 degrees to 5 degrees which further consolidates the storm water runoff into small channels throughout the site. Some of these channels diverge off the parcel, while others discharge to the western ditch line of the existing gravel road. From here, water flows in the ditch channel to the southern ditch line of the North Douglass Highway, through a 24" CPP culvert (EX. NW 24" CPP) across Douglass Highway, onto an undeveloped private parcel, and to the marine waters of Gastineau Channel below. Strom water enters the area to the east of the existing gravel road from direct transmission of rainfall droplets. Storm water that is not infiltrated into the overburden layer is consolidated into small channel flows that discharge into the westernmost ditch line of the North Douglass Highway. From here, this storm water is transported across the North Douglass Highway via a 24" CPP culvert (EX SE 24" CPP), onto an undeveloped private parcel; and eventually, to the marine waters of Gastineau Channel below.

Post-Development Conditions

Storm water runoff will originate similar to the pre-development conditions with the exception of direct transmission of rainwater droplets to the newly developed areas. Storm water runoff from undeveloped areas will be intercepted by vegetated slopes and new ditches. New structures and pads will transport storm water via roof leaders and sheet flow to new ditches. The new road way will transport storm water via sheet flow to new ditches or new storm water collection systems composed of catch basins and culverts. These new storm water improvements will transport storm water down to the North Douglass Highway ditch line where it shall maintain pre-development drainage pathways and discharge points.

Results

Storm Interval (year)	Pre-Development Runoff (cfs)		Post-Development Runoff (cfs)	
	EX. NW 24" CPP	EX. SE 24" CPP	EX. NW 24" CPP	EX. SE 24" CPP
2	7.1	1.2	10.0	1.1
5	8.4	1.4	11.7	1.3
10	10.0	1.7	14.0	1.5
25	11.5	1.9	16.2	1.7
50	12.6	2.1	17.6	1.9
100	14.1	2.4	19.8	2.1

Proposed Ditch Geometry

The proposed ditch geometry was determined using the calculated stormwater runoff flow rate at the lowest ditch area (see map). A 3' deep V-ditch with 2H:1V fore- and back-slopes was found to adequately convey the 100-year discharge.

Proposed Culverts

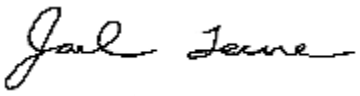
The culverts in the primary storm water system for this development shall be 18" and 24" CPP (see map).

Attachments

1. Pre- and Post-Development Drainage Maps
2. Rational Method Spreadsheet
3. EX. NW 24" CPP
4. EX. SE 24" CPP
5. Ditch Analysis

Please call or email me with questions. 907-225-7917 ext. 2 or jteune@rmketchikan.com

Sincerely,



R&M Engineering-Ketchikan, Inc.

Joel Teune, P.E

REVISIONS:

SEET KANAX DUTEEN STREET AND UTILITY DESIGN

STATUS:

EXHIBIT

DRAWN BY: JPT
CHECKED BY: JPT
DATE: 10/6/2024
PROJECT #: 222321.10

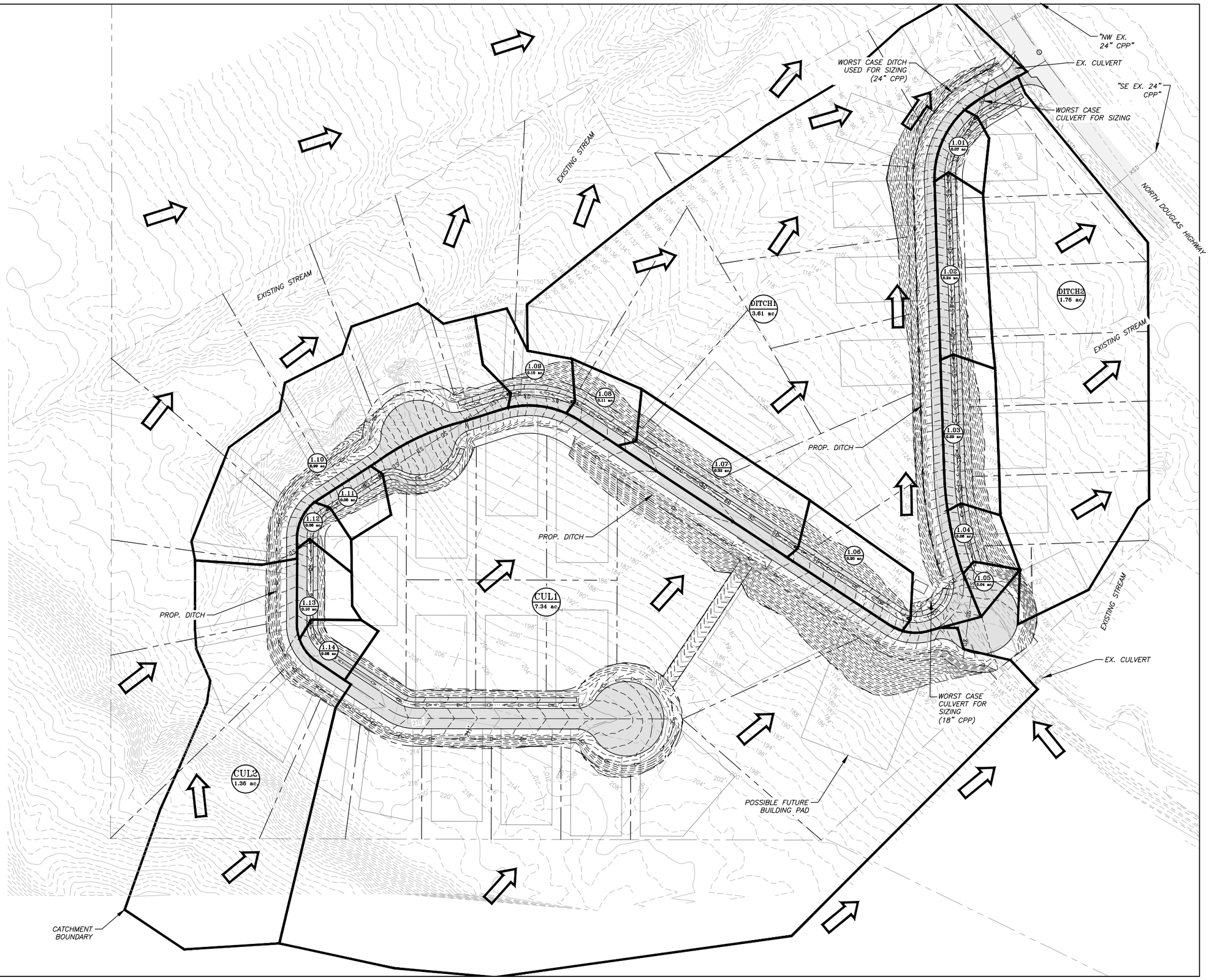
R&M ENGINEERING-KETCHIKAN, INC.
7180 REVILLA ROAD, SUITE 300
KETCHIKAN, ALASKA 99901
PH: 907.225.7187
AELC 576

SHEET DESCRIPTION:

DRAINAGE MAP - PRE CONSTRUCTION

SHEET:

N/A of N/A



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AELC 576

SHEET DESCRIPTION:

DRAINAGE MAP - POST CONSTRUCTION

SHEET:

1 of 1

EXHIBIT C-1
Rational Formula Drainage Area Calculations
Seet Kanax Duteen

----------SEE MAP----------

DRAINAGE AREA	TOTAL AREA	UNDEVELOPED AREA	RESIDENTIAL	PAVEMENT	TOTAL C x A	OVERLAND FLOW LENGTH	OVERLAND FLOW FALL	GUTTER FLOW LENGTH	GUTTER FLOW FALL	VELOCITY	Calc. Tc	USE Tc	I2	Q2	I5	Q5	I10	Q10	I25	Q25	I50	Q50	I100	Q100
NO.	AC.	0.4	0.45	0.85		ft.	ft.	ft.	ft.	ft/s	min	min	In/Hr	cfs	In/Hr	cfs	In/Hr	cfs	In/Hr	cfs	In/Hr	cfs	In/Hr	cfs
1.01	0.07	0.00	0.02	0.05	0.05	80.0	1.0	0.0	1.0	0.8	1.7	10.0	1.36	0.1	1.6	0.1	1.9	0.1	2.2	0.1	2.4	0.1	2.7	0.1
1.02	0.24	0.00	0.12	0.12	0.16	195.0	23.0	0.0	1.0	2.4	1.3	10.0	1.36	0.2	1.6	0.2	1.9	0.3	2.2	0.3	2.4	0.4	2.7	0.4
1.03	0.22	0.00	0.13	0.09	0.14	155.0	18.0	0.0	1.0	2.4	1.1	10.0	1.36	0.2	1.6	0.2	1.9	0.3	2.2	0.3	2.4	0.3	2.7	0.4
1.04	0.06	0.00	0.02	0.04	0.04	60.0	6.0	0.0	1.0	2.2	0.4	10.0	1.36	0.1	1.6	0.1	1.9	0.1	2.2	0.1	2.4	0.1	2.7	0.1
1.05	0.04	0.00	0.01	0.03	0.03	55.0	11.0	0.0	1.0	3.2	0.3	10.0	1.36	0.0	1.6	0.0	1.9	0.1	2.2	0.1	2.4	0.1	2.7	0.1
1.06	0.20	0.00	0.13	0.07	0.12	137.0	11.0	0.0	1.0	2.0	1.1	10.0	1.36	0.2	1.6	0.2	1.9	0.2	2.2	0.3	2.4	0.3	2.7	0.3
1.07	0.32	0.00	0.24	0.08	0.18	205.0	11.0	0.0	1.0	1.6	2.1	10.0	1.36	0.2	1.6	0.3	1.9	0.3	2.2	0.4	2.4	0.4	2.7	0.5
1.08	0.11	0.00	0.07	0.04	0.07	80.0	7.0	0.0	1.0	2.1	0.6	10.0	1.36	0.1	1.6	0.1	1.9	0.1	2.2	0.1	2.4	0.2	2.7	0.2
1.09	0.15	0.00	0.12	0.03	0.08	85.0	5.0	0.0	1.0	1.7	0.8	10.0	1.36	0.1	1.6	0.1	1.9	0.2	2.2	0.2	2.4	0.2	2.7	0.2
1.10	0.99	0.00	0.85	0.14	0.50	415.0	38.0	0.0	1.0	2.1	3.2	10.0	1.36	0.7	1.6	0.8	1.9	1.0	2.2	1.1	2.4	1.2	2.7	1.4
1.11	0.08	0.00	0.03	0.05	0.06	69.0	6.0	0.0	1.0	2.1	0.6	10.0	1.36	0.1	1.6	0.1	1.9	0.1	2.2	0.1	2.4	0.1	2.7	0.2
1.12	0.06	0.00	0.03	0.03	0.04	30.0	5.0	0.0	1.0	2.9	0.2	10.0	1.36	0.1	1.6	0.1	1.9	0.1	2.2	0.1	2.4	0.1	2.7	0.1
1.13	0.10	0.00	0.04	0.06	0.07	90.0	5.0	0.0	1.0	1.7	0.9	10.0	1.36	0.1	1.6	0.1	1.9	0.1	2.2	0.2	2.4	0.2	2.7	0.2
1.14	0.08	0.00	0.04	0.04	0.05	30.0	4.0	0.0	1.0	2.6	0.2	10.0	1.36	0.1	1.6	0.1	1.9	0.1	2.2	0.1	2.4	0.1	2.7	0.1
CUL1	7.34	0.00	6.81	0.53	3.52	300.0	50.0	750.0	100.0	5.1	3.5	10.0	1.36	4.8	1.6	5.6	1.9	6.7	2.2	7.7	2.4	8.4	2.7	9.5
CUL2	1.36	0.00	1.31	0.05	0.63	300.0	60.0	133.0	25.0	3.9	1.8	10.0	1.36	0.9	1.6	1.0	1.9	1.2	2.2	1.4	2.4	1.5	2.7	1.7
DITCH1	3.61	0.00	3.61	0.00	1.62	30.0	1.0	1.0	1.0	1.3	0.4	10.0	1.36	2.2	1.6	2.6	1.9	3.1	2.2	3.6	2.4	3.9	2.7	4.4
DITCH 2	1.76	0.00	1.76	0.00	0.79	30.0	1.0	1.0	1.0	1.3	0.4	10.0	1.36	1.1	1.6	1.3	1.9	1.5	2.2	1.7	2.4	1.9	2.7	2.1
EX NW CUL	13.10	13.10	0.00	0.00	5.24	300.0	50.0	1000.0	192.0	5.9	3.7	10.0	1.36	7.1	1.6	8.4	1.9	10.0	2.2	11.5	2.4	12.6	2.7	14.1
EX SE CUL	2.19	2.19	0.00	0.00	0.88	300.0	35.0	150.0	15.0	3.0	2.5	10.0	1.36	1.2	1.6	1.4	1.9	1.7	2.2	1.9	2.4	2.1	2.7	2.4

----------POST-CONST.----------

PRE-CONST.

EX CUL NW PRE	7.1	8.4	10.0	11.5	12.6	14.1
EX CUL NW POST	10.0	11.7	14.0	16.2	17.6	19.8
EX CUL SE PRE	1.2	1.4	1.7	1.9	2.1	2.4
EX CUL SE POST	1.1	1.3	1.5	1.7	1.9	2.1

TOTAL FLOWS @ EACH EXIST. 24" CPP

HY-8 Culvert Analysis Report

Table 1 - Project Headwater Table

Crossing Name	Culvert Name	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	HW / D (ft)	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Outlet Velocity (ft/s)
PRE - NW EX. 24" CPP	PRE - NW EX. 24" CPP	14.10	14.10	69.69	2.37	1.437	1.19	1.33	1.35	1.35	6.24
POST - NW EX. 24" CPP	POST - NW EX. 24" CPP	19.80	19.80	70.71	3.39	3.248	1.69	2.00	1.60	1.60	7.36

Crossing Input: PRE - NW EX. 24" CPP

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	User-Defined	
Discharge List	Define...	
TAILWATER DATA		
Channel Type	Enter Constant Tailwater Elevation	
Channel Invert Elevation	66.000	ft
Constant Tailwater Elevation	66.000	ft
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	10.000	ft
Crest Length	100.000	ft
Crest Elevation	74.860	ft
Roadway Surface	Paved	
Top Width	40.000	ft

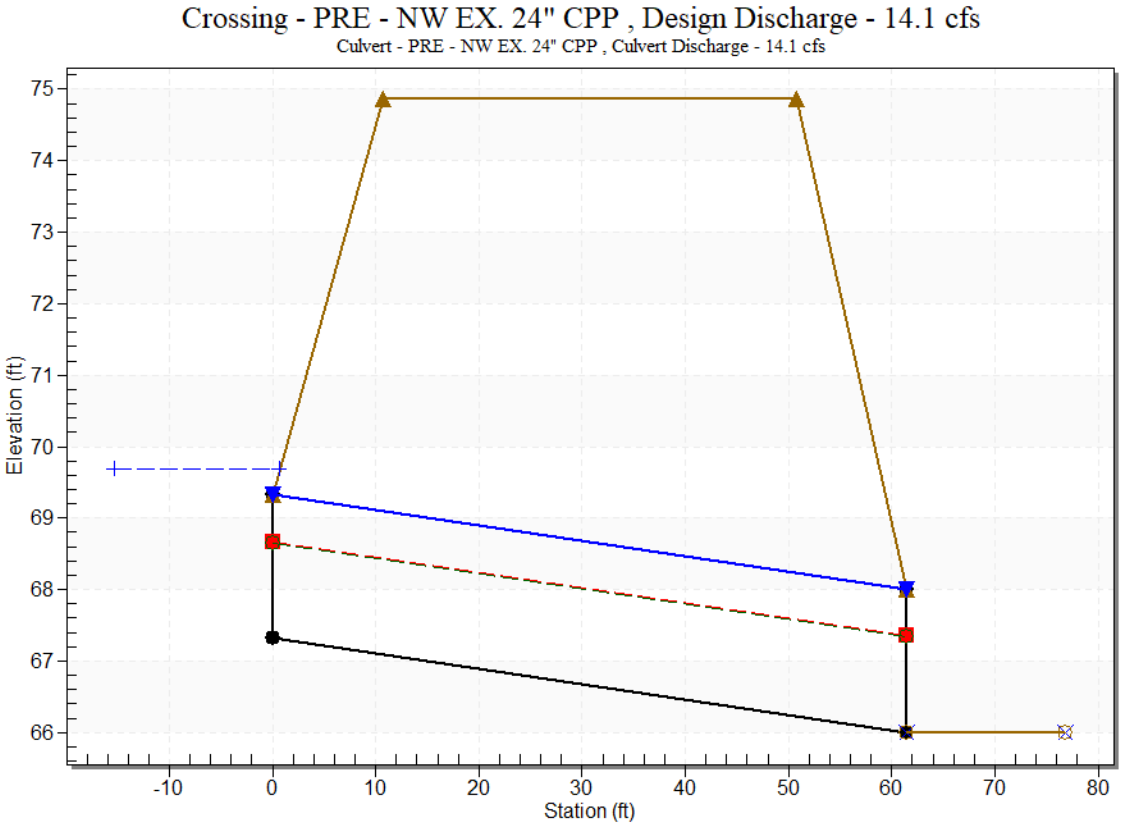
Culvert Input: PRE - NW EX. 24" CPP

Parameter	Value	Units
CULVERT DATA		
Name	PRE - NW EX. 24" CPP	
Shape	Circular	
Material	Corrugated PE	
Diameter	2.000	ft
Embedment Depth	0.000	in
Manning's n	0.024	
Culvert Type	Straight	
Inlet Configuration	Thin Edge Projecting (Ke=0.9)	
Inlet Depression?	No	
SITE DATA		
Site Data Input Option	Culvert Invert Data	
Inlet Station	0.000	ft
Inlet Elevation	67.320	ft
Outlet Station	61.500	ft
Outlet Elevation	66.000	ft
Number of Barrels	1	
Computed Culvert Slope	0.021463	ft/ft

Table 2 - Culvert Summary Table: PRE - NW EX. 24" CPP

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	HW / D (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
11.50	11.50	69.33	2.01	0.831	1.00	6-FFc	1.16	1.22	1.22	0.00	5.75	0.00
14.10	14.10	69.69	2.37	1.437	1.19	6-FFc	1.33	1.35	1.35	0.00	6.24	0.00
35.25	31.43	74.92	6.73	7.599	3.80	6-FFc	2.00	1.88	1.88	0.00	10.25	0.00

Water Surface Profile Plot for Culvert: PRE - NW EX. 24" CPP



Crossing Input: POST - NW EX. 24" CPP

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	User-Defined	
Discharge List	Define...	
TAILWATER DATA		
Channel Type	Enter Constant Tailwater Elevation	
Channel Invert Elevation	66.000	ft
Constant Tailwater Elevation	66.000	ft
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	10.000	ft
Crest Length	100.000	ft
Crest Elevation	74.860	ft
Roadway Surface	Paved	
Top Width	40.000	ft

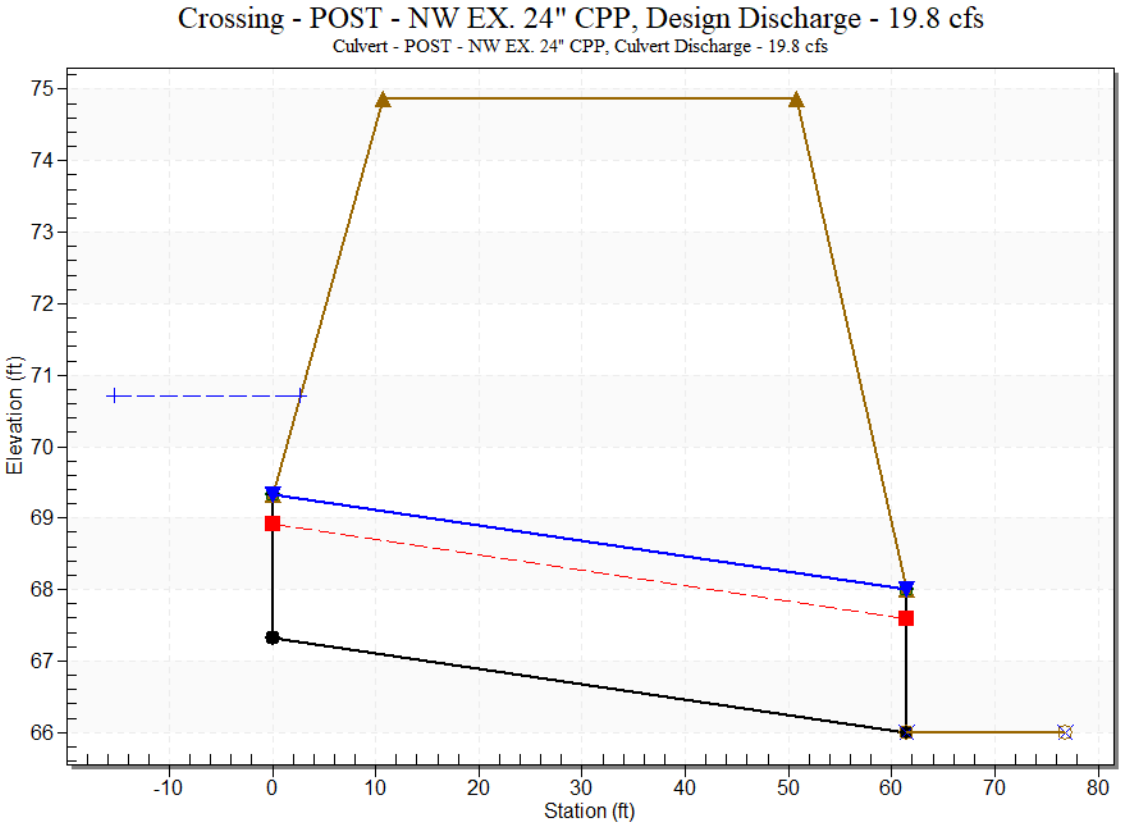
Culvert Input: POST - NW EX. 24" CPP

Parameter	Value	Units
CULVERT DATA		
Name	POST - NW EX. 24" CPP	
Shape	Circular	
Material	Corrugated PE	
Diameter	2.000	ft
Embedment Depth	0.000	in
Manning's n	0.024	
Culvert Type	Straight	
Inlet Configuration	Thin Edge Projecting (Ke=0.9)	
Inlet Depression?	No	
SITE DATA		
Site Data Input Option	Culvert Invert Data	
Inlet Station	0.000	ft
Inlet Elevation	67.320	ft
Outlet Station	61.500	ft
Outlet Elevation	66.000	ft
Number of Barrels	1	
Computed Culvert Slope	0.021463	ft/ft

Table 3 - Culvert Summary Table: POST - NW EX. 24" CPP

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	HW / D (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
16.20	16.20	70.03	2.71	1.985	1.35	6-FFc	1.48	1.45	1.45	0.00	6.64	0.00
19.80	19.80	70.71	3.39	3.248	1.69	6-FFc	2.00	1.60	1.60	0.00	7.36	0.00
39.60	31.52	74.96	6.76	7.638	3.82	6-FFc	2.00	1.88	1.88	0.00	10.27	0.00

Water Surface Profile Plot for Culvert: POST - NW EX. 24" CPP



HY-8 Culvert Analysis Report

Table 1 - Project Headwater Table

Crossing Name	Culvert Name	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	HW / D (ft)	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Outlet Velocity (ft/s)
PRE - SE EX. 24" CPP	PRE - SE EX. 24" CPP	1.90	1.90	69.08	0.69	0.0*	0.34	0.42	0.48	0.48	3.30
POST - SE EX. 24" CPP	POST - SE EX. 24" CPP	2.40	2.40	69.17	0.78	0.0*	0.39	0.47	0.54	0.54	3.52

* Full Flow Headwater elevation is below inlet invert.

Crossing Input: PRE - SE EX. 24" CPP

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	User-Defined	
Discharge List	Define...	
TAILWATER DATA		
Channel Type	Enter Constant Tailwater Elevation	
Channel Invert Elevation	66.840	ft
Constant Tailwater Elevation	66.840	ft
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	9.700	ft
Crest Length	100.000	ft
Crest Elevation	74.730	ft
Roadway Surface	Paved	
Top Width	40.000	ft

Culvert Input: PRE - SE EX. 24" CPP

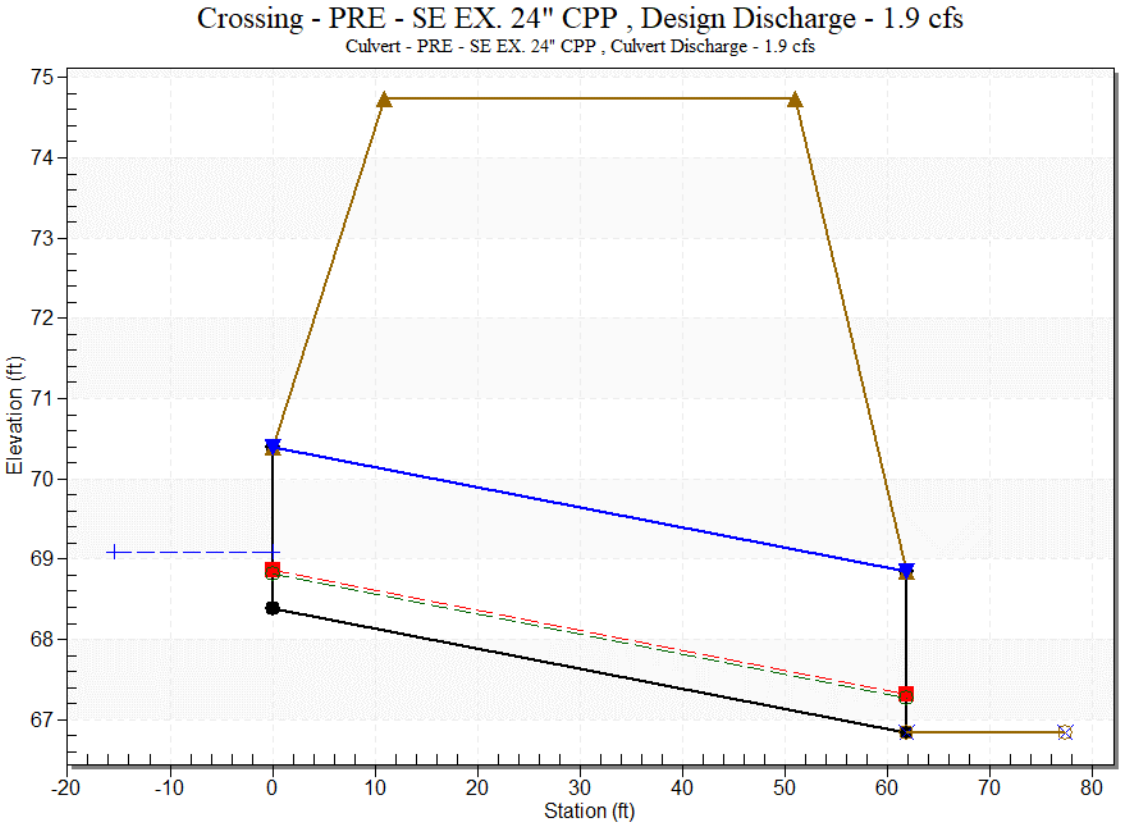
Parameter	Value	Units
CULVERT DATA		
Name	PRE - SE EX. 24" CPP	
Shape	Circular	
Material	Corrugated PE	
Diameter	2.000	ft
Embedment Depth	0.000	in
Manning's n	0.024	
Culvert Type	Straight	
Inlet Configuration	Thin Edge Projecting (Ke=0.9)	
Inlet Depression?	No	
SITE DATA		
Site Data Input Option	Culvert Invert Data	
Inlet Station	0.000	ft
Inlet Elevation	68.390	ft
Outlet Station	61.900	ft
Outlet Elevation	66.840	ft
Number of Barrels	1	
Computed Culvert Slope	0.025040	ft/ft

Table 2 - Culvert Summary Table: PRE - SE EX. 24" CPP

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	HW / D (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
1.70	1.70	69.04	0.65	0.0*	0.33	6-FFc	0.40	0.45	0.45	0.00	3.20	0.00
1.90	1.90	69.08	0.69	0.0*	0.34	6-FFc	0.42	0.48	0.48	0.00	3.30	0.00
29.45	29.04	74.74	5.89	6.353	3.18	6-FFc	2.00	1.85	1.85	0.00	9.58	0.00

* Full Flow Headwater elevation is below inlet invert.

Water Surface Profile Plot for Culvert: PRE - SE EX. 24" CPP



Crossing Input: POST - SE EX. 24" CPP

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	User-Defined	
Discharge List	Define...	
TAILWATER DATA		
Channel Type	Enter Constant Tailwater Elevation	
Channel Invert Elevation	66.840	ft
Constant Tailwater Elevation	66.840	ft
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	9.700	ft
Crest Length	100.000	ft
Crest Elevation	74.730	ft
Roadway Surface	Paved	
Top Width	40.000	ft

Culvert Input: POST - SE EX. 24" CPP

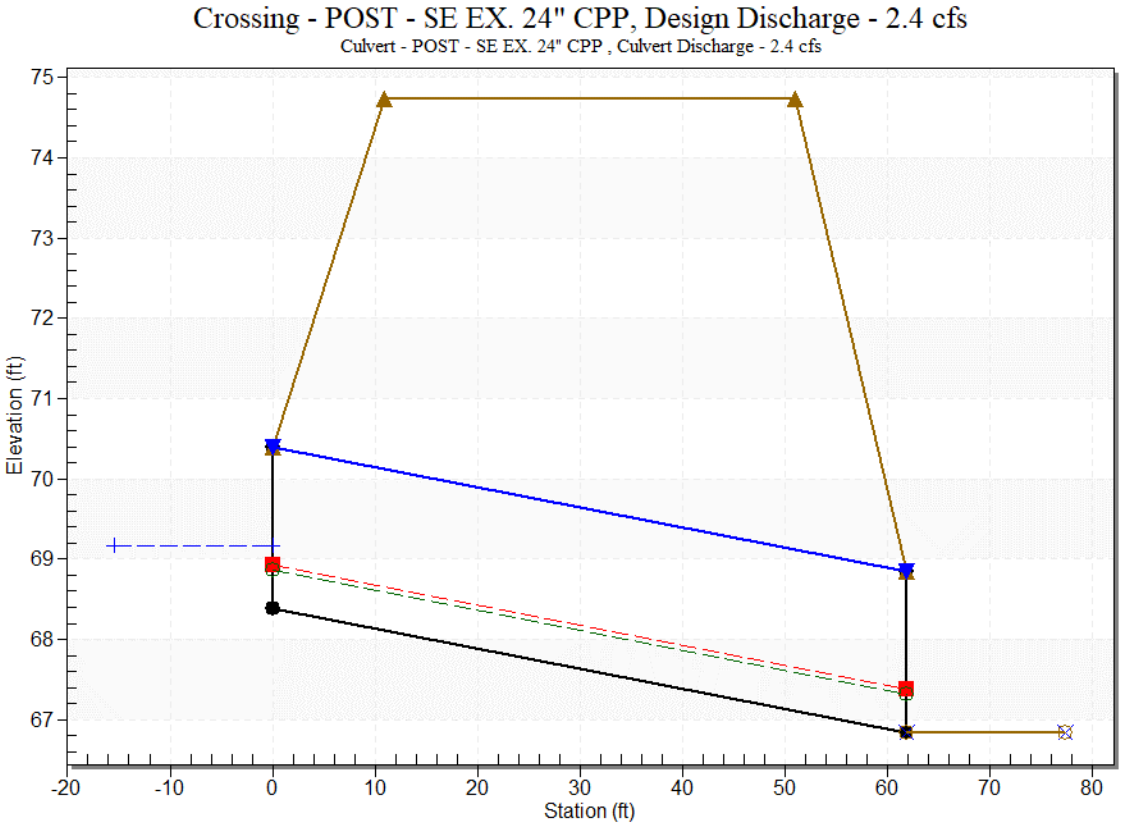
Parameter	Value	Units
CULVERT DATA		
Name	POST - SE EX. 24" CPP	
Shape	Circular	
Material	Corrugated PE	
Diameter	2.000	ft
Embedment Depth	0.000	in
Manning's n	0.024	
Culvert Type	Straight	
Inlet Configuration	Thin Edge Projecting (Ke=0.9)	
Inlet Depression?	No	
SITE DATA		
Site Data Input Option	Culvert Invert Data	
Inlet Station	0.000	ft
Inlet Elevation	68.390	ft
Outlet Station	61.900	ft
Outlet Elevation	66.840	ft
Number of Barrels	1	
Computed Culvert Slope	0.025040	ft/ft

Table 3 - Culvert Summary Table: POST - SE EX. 24" CPP

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	HW / D (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
2.10	2.10	69.12	0.73	0.0*	0.36	6-FFc	0.44	0.50	0.50	0.00	3.39	0.00
2.40	2.40	69.17	0.78	0.0*	0.39	6-FFc	0.47	0.54	0.54	0.00	3.52	0.00
30.00	29.07	74.75	5.90	6.363	3.18	6-FFc	2.00	1.85	1.85	0.00	9.59	0.00

* Full Flow Headwater elevation is below inlet invert.

Water Surface Profile Plot for Culvert: POST - SE EX. 24" CPP



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Oct 7 2024

DITCH1

Triangular

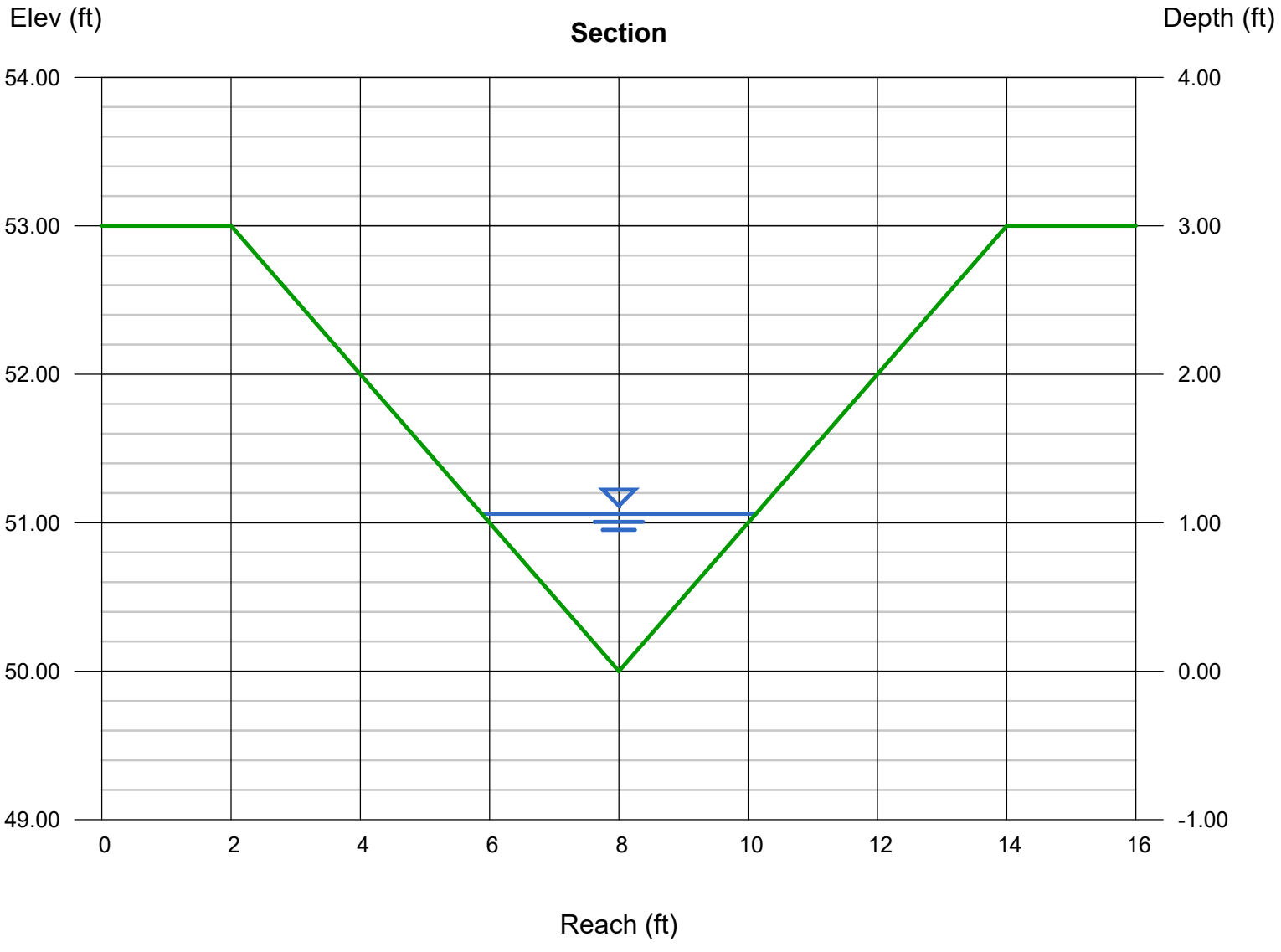
Side Slopes (z:1)	= 2.00, 2.00
Total Depth (ft)	= 3.00
Invert Elev (ft)	= 50.00
Slope (%)	= 6.00
N-Value	= 0.025

Calculations

Compute by:	Known Q
Known Q (cfs)	= 19.80

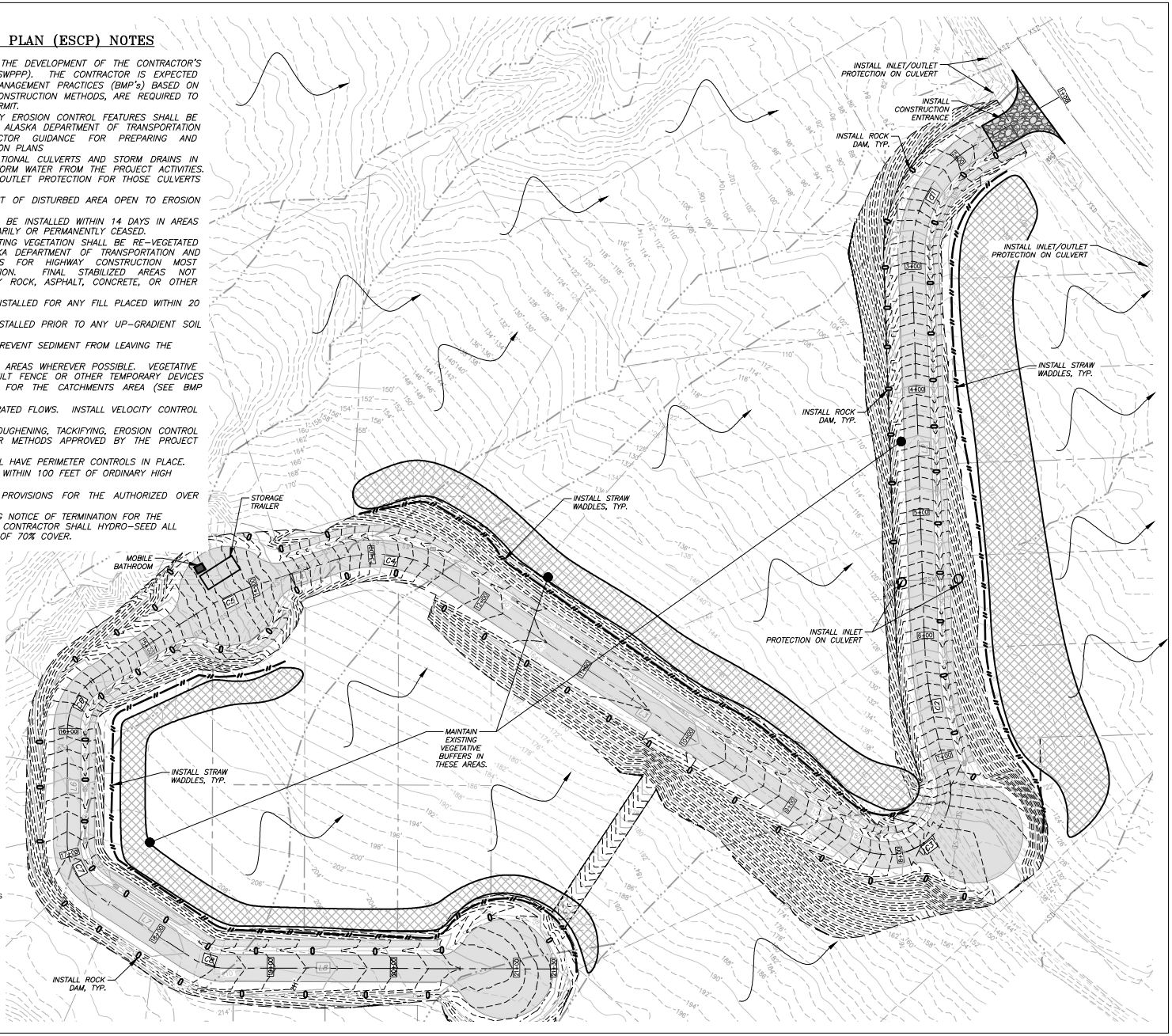
Highlighted

Depth (ft)	= 1.06
Q (cfs)	= 19.80
Area (sqft)	= 2.25
Velocity (ft/s)	= 8.81
Wetted Perim (ft)	= 4.74
Crit Depth, Yc (ft)	= 1.44
Top Width (ft)	= 4.24
EGL (ft)	= 2.27



EROSION AND SEDIMENT CONTROL PLAN (ESCP) NOTES

1. THE ESCP IS A GENERAL PLAN FOR GUIDING THE DEVELOPMENT OF THE CONTRACTOR'S STORMWATER POLLUTION PREVENTION PLAN (SWPPP). THE CONTRACTOR IS EXPECTED TO PROVIDE ADDITIONAL DETAILS AND BEST MANAGEMENT PRACTICES (BMP's) BASED ON THE CONTRACTOR'S ACTUAL SCHEDULE AND CONSTRUCTION METHODS, ARE REQUIRED TO COMPLY WITH THE CONSTRUCTION GENERAL PERMIT.
2. SEDIMENT CONTROL MEASURES AND TEMPORARY EROSION CONTROL FEATURES SHALL BE BASED ON THE BMPS AS CONTAINED IN THE ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES MANUAL "CONTRACTOR GUIDANCE FOR PREPARING AND EXECUTING STORM WATER POLLUTION PREVENTION PLANS
3. THE CONTRACTOR SHALL IDENTIFY ALL OPERATIONAL CULVERTS AND STORM DRAINS IN THE PROJECT THAT WILL BE IMPACTED BY STORM WATER FROM THE PROJECT ACTIVITIES. THE CONTRACTOR SHALL PROVIDE INLET AND OUTLET PROTECTION FOR THOSE CULVERTS AND STORM DRAINS.
4. THE CONTRACTOR SHALL MINIMIZE THE AMOUNT OF DISTURBED AREA OPEN TO EROSION AT ANY ONE TIME.
5. EROSION AND SEDIMENT CONTROL BMPS SHALL BE INSTALLED WITHIN 14 DAYS IN AREAS WHERE EARTHWORK DISTURBANCE HAS TEMPORARILY OR PERMANENTLY CEASED.
6. ALL DISTURBED GROUND CAPABLE OF SUPPORTING VEGETATION SHALL BE RE-VEGETATED ACCORDING TO SECTION 618 OF THE ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION MOST CURRENT ADDITION FOR FINAL STABILIZATION. FINAL STABILIZED AREAS NOT RE-VEGETATED SHALL BE 100% COVERED BY ROCK, ASPHALT, CONCRETE, OR OTHER PERMANENT NON-ERODABLE MATERIAL.
7. TEMPORARY PERIMETER CONTROLS SHALL BE INSTALLED FOR ANY FILL PLACED WITHIN 20 FEET OF ORDINARY HIGH WATER.
8. TEMPORARY SEDIMENT CONTROLS SHALL BE INSTALLED PRIOR TO ANY UP-GRADIENT SOIL DISTURBANCE OCCURS.
9. PROVIDE SEDIMENT CONTROLS AS NEEDED TO PREVENT SEDIMENT FROM LEAVING THE SITE.
10. RETAIN A VEGETATIVE BUFFER STRIP IN UPLAND AREAS WHEREVER POSSIBLE. VEGETATIVE BUFFER STRIPS MAY BE USED IN LIEU OF SILT FENCE OR OTHER TEMPORARY DEVICES PROVIDED THEY ARE OF SUFFICIENT WIDTH FOR THE CATCHMENTS AREA (SEE BMP DETAILS).
11. AVOID CONDITIONS WHICH PROMOTE CONCENTRATED FLOWS. INSTALL VELOCITY CONTROL BMPS WHEN CONCENTRATED FLOWS OCCUR.
12. SLOPE PROTECTION SHALL INCLUDE SLOPE ROUGHENING, TACKIFYING, EROSION CONTROL BLANKETS, SEEDING, ROCK LINING, OR OTHER METHODS APPROVED BY THE PROJECT ENGINEER.
13. ALL STOCKPILES OF ERODIBLE MATERIALS SHALL HAVE PERIMETER CONTROLS IN PLACE.
14. ERODIBLE MATERIALS MAY NOT BE STOCKPILED WITHIN 100 FEET OF ORDINARY HIGH WATER.
15. THE CONTRACTOR'S SWPPP SHALL INCLUDE PROVISIONS FOR THE AUTHORIZED OVER BURDEN PLACEMENT AREAS.
16. PRIOR TO COMPLETION OF PROJECT AND FILING NOTICE OF TERMINATION FOR THE APDES CONSTRUCTION GENERAL PERMIT THE CONTRACTOR SHALL HYDRO-SEED ALL ERODIBLE SLOPES AND ESTABLISH A MINIMUM OF 70% COVER.



SCALE 1"=40'

THIS DRAWING MAY BE REDUCED, VERIFY SCALE BEFORE USING

0 20 40 80 120 160 FEET
0 5 10 20 30 40 50 METERS

1 METER = 3.2808333 U.S. SURVEY FEET
1 U.S. ACRE = 0.4047 HECTARES

REVISIONS:

SEET KANAX DUTEEN
STREET AND UTILITY DESIGN

STATUS:
30% DD

DRAWN BY: JPT
CHECKED BY: JPT
DATE: 10/6/2024
PROJECT #: 222321.10

R&M ENGINEERING-KETCHIKAN, INC.
7180 REVILLA ROAD, SUITE 300
KETCHIKAN, ALASKA 99901
PH: 907.225.7187
AELC 576

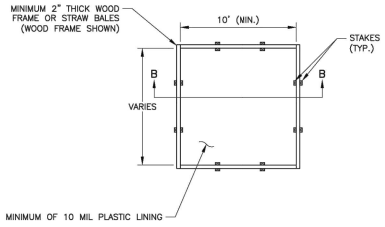
STATE OF ALASKA 49th
JOEL P. TEUNE
121948
REGISTERED PROFESSIONAL ENGINEER

SHEET DESCRIPTION:
ESCP PLAN AND NOTES

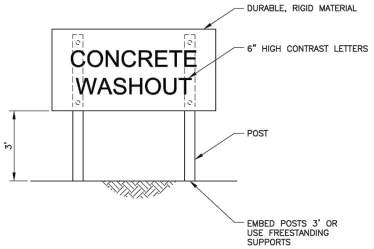
P1

SHEET:
28 of 46

BMP 6.00 – CONCRETE WASHOUT

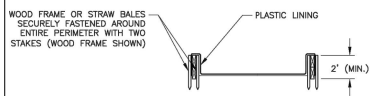


PLAN

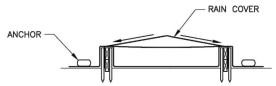


WASHOUT SIGN

NOT TO SCALE



SECTION B–B



MAINTENANCE

1. CLEAN EXISTING WASHOUTS BEFORE THE WASHOUT IS 50 PERCENT FULL. SOLIDIFY WITH BAGGED GROUT, VACUUM AND DISPOSE OF LIQUIDS IN AN APPROVED MANNER, OR ALLOW FOR EVAPORATION (CHECK WITH THE LOCAL SANITARY SEWER AUTHORITY TO DETERMINE IF THERE ARE SPECIAL DISPOSAL REQUIREMENTS FOR CONCRETE WASH WATER).
2. IF NECESSARY, PROVIDE AN ALTERNATE WASHOUT DURING EXISTING WASHOUT CLEANING.
3. RELINE SELF–INSTALLED CONTAINERS AFTER EACH CLEANING, BECAUSE EQUIPMENT CAN DAMAGE THE LINER. BEFORE RELINING, INSPECT THE CONTAINMENT STRUCTURE FOR SIGNS OF WEAKENING OR DAMAGE AND MAKE ANY NECESSARY REPAIRS. THEN LINE THE STRUCTURE WITH NEW PLASTIC SHEETING, CHECKING THAT IT IS FREE OF HOLES, TEARS, AND OTHER DAMAGE.
4. REPAIR DAMAGED WASHOUTS BEFORE THE NEXT CONCRETE POUR. IF NECESSARY, PROVIDE NEW WASHOUTS UNTIL THE EXISTING WASHOUTS ARE OPERATIONAL.
5. CONTAIN ANY SPILL OR DISCHARGE OF CONCRETE WASTE MATERIALS.
6. REPLACE OR INSTALL NEW SIGNAGE AS NEEDED.

REMOVAL

1. AN OPERATIONAL CONCRETE WASHOUT SHOULD REMAIN IN PLACE UNTIL ALL CONCRETE FOR THE PROJECT (OR PHASE OF THE PROJECT) IS POURED. WHEN THE CONCRETE WASHOUT IS NO LONGER NEEDED, THE LIQUID MUST BE EVAPORATED OR VACUUMED FOR DISPOSAL AND THE HARDENED SOLIDS MUST BE BROKEN UP, REMOVED, AND PROPERLY DISPOSED OF. DISPOSAL LOCATION TO BE APPROVED BY ENGINEER.
2. REMOVE FROM THE SITE PRE–FABRICATED WASHOUTS AND MATERIALS USED TO CONSTRUCT ABOVE–GRADE CONTAINMENT AREA AND PROPERLY DISPOSE OF THEM.
3. BACKFILL AND STABILIZE HOLES, DEPRESSIONS OR OTHER GROUND DISTURBANCE CAUSED BY THE CREATION OR REMOVAL OF THE WASHOUT WITH AN APPROVED BMP.

CONCRETE WASHOUT GENERAL NOTES:

MATERIALS

PRE–FABRICATED CONTAINERS: MADE OF STURDY MATERIALS THAT ARE WATER TIGHT.

FABRICATED ON–SITE CONTAINMENT:

1. BARRIER/SIDEWALLS: MAKE SIDEWALLS OF AN ABOVE–GRADE CONTAINMENT AREA FROM EARTHEN BERMS, BARRIER WALLS, WOOD PLANKS, OR OTHER MATERIALS THAT WILL BE STRUCTURALLY SOUND WHEN FILLED WITH WASTE MATERIALS.
2. LINER: IMPERMEABLE PLASTIC SHEETING OF AT LEAST 10 MIL THICKNESS, AND FREE OF HOLES, TEARS, AND OTHER DEFECTS THAT COMPROMISE THE IMPERMEABILITY OF THE MATERIAL.
3. ANCHORS: SECURE THE LINER FOR ABOVE–GRADE CONTAINMENT AREAS AND SIDEWALL MATERIALS OTHER THAN BERMS WITH ANCHORS. USE SANDBAGS, 8 –INCH WIRE STAPLES, AND WOOD OR METAL STAKES AS ANCHORS, BUT NOT LIMITED TO ONLY THEM.

SIGNS: DURABLE, RIGID MATERIAL WITH 6–INCH HIGH CONTRASTING LETTERS, PLACED AT A HEIGHT OF AT LEAST 3 FEET ABOVE GROUND LEVEL.

RAIN COVER: SECURE, NON–COLLAPSING, NON–WATER COLLECTING RAIN COVER, REQUIRED PRIOR TO PREDICTED WET WEATHER TO PREVENT ACCUMULATION AND OVERFLOW OF PRECIPITATION.

INSTALLATION

1. INSTALL SIGNS WITHIN 30 FEET OF THE WASHOUT.
2. IF THE WASHOUT IS LOCATED ON UNDEVELOPED PROPERTY OR OFF–PAVEMENT, PROVIDE A STABILIZED CONSTRUCTION EXIT.
3. PLACE CONCRETE WASHOUT CONTAINMENT A MINIMUM OF 50 FEET FROM STORM DRAINS, OPEN DITCHES, OR WATERBODIES, OR PROVIDE SECONDARY CONTAINMENT FOR THE WASHOUT.
4. PROVIDE SUFFICIENT CAPACITY TO HANDLE THE EXPECTED VOLUME OF SOLIDS AND WASH WATER AT 50% MAX CAPACITY AND ALLOW 12 INCHES MINIMUM OF FREEBOARD.
5. PRE–FABRICATED WASHOUT CONTAINERS ARE USUALLY DELIVERED ASSEMBLED. IF ASSEMBLY IS REQUIRED, FOLLOW MANUFACTURER'S INSTRUCTIONS.
6. SELF–INSTALLED CONTAINMENT:
   a. ABOVE–GRADE WASHOUT: CONSTRUCT THE SIDEWALLS TO THE DIMENSIONS SHOWN ON THE DRAWINGS. IF NOT USING AN EARTHEN BERM FOR THIS PURPOSE, ENSURE THAT THE SIDEWALL MATERIAL IS SECURE AND EACH UNIT IS BUTTED TIGHTLY END TO END. LINE THE ENTIRE AREA WITH THE LINING MATERIAL, BRINGING THE SHEETING UP OVER THE SIDEWALLS AND SECURING THE ENDS WITH SANDBAGS, STAPLES OR OTHER APPROPRIATE ANCHORS.
   b. BELOW–GRADE WASHOUT: EXCAVATE A FLAT, SUBSURFACE PIT TO THE DESIRED SIZE AND CAPACITY FOR THE CONTAINMENT AREA. THE RESULTING SIDEWALL SHOULD NOT EXCEED 3:1 SLOPES. PREVENT DAMAGE TO THE LINER BY KEEPING THE BASE OF THE PIT FREE OF ROCKS AND DEBRIS. USE THE EXCAVATED MATERIAL TO CREATE A BERM ALONG THREE SIDES OF THE PIT, LEAVING THE SIDE PROVIDING ACCESS RELATIVELY FLAT. IT IS RECOMMENDED THAT THE BERM BE AT LEAST 1–FOOT HIGHER THAN EXISTING GROUND. LINE THE ENTIRE AREA WITH THE LINING MATERIAL, BRINGING THE SHEETING UP OVER THE SIDEWALLS AND BERM, AND SECURING THE ENDS WITH SANDBAGS OR OTHER APPROPRIATE ANCHORS.

INSPECTION

1. INSPECT AND VERIFY THAT CONCRETE WASHOUT BMPS ARE IN PLACE PRIOR TO THE COMMENCEMENT OF CONCRETE WORK.
2. DETERMINE IF THE CONCRETE WASHOUT IS FILLED TO 50 PERCENT CAPACITY.
3. FOR SELF–INSTALLED CONTAINMENT:
   a. INSPECT THE PLASTIC LINER TO ENSURE IT IS SECURELY ANCHORED AND INTACT.
   b. INSPECT THE SIDEWALLS FOR LEAKS. ENSURE THE CONSTRUCTION DOESN'T DAMAGE THE SIDEWALLS.
4. FOR PRE–FABRICATED CONTAINMENT, INSPECT THE UNIT FOR LEAKS AND POTENTIAL DAMAGE.
5. CHECK TO ENSURE THAT EACH WASHOUT SIGN IS STILL SECURE AND VISIBLE.
6. IF THERE IS EVIDENCE THAT WASHOUTS ARE OCCURRING IN LOCATIONS OTHER THAN THE DESIGNATED WASHOUT: IMPROVE EXISTING SIGNAGE, INSTALL ADDITIONAL SIGNAGE, INCREASE COMMUNICATION WITH CONCRETE TRUCK DRIVERS, AND PROVIDE CONCRETE TRUCK DRIVERS WITH MAPS OF WASHOUT LOCATIONS WITH RESPECT TO POUR LOCATIONS.

REVISIONS:

SEET KANAX DUTEEN
STREET AND UTILITY DESIGN

STATUS:
30% DD

DRAWN BY: JPT
CHECKED BY: JPT
DATE: 10/6/2024
PROJECT #:222321.10

R&M ENGINEERING-KETCHIKAN, INC.
7180 REVILLA ROAD, SUITE 300
KETCHIKAN, ALASKA 99901
PH: 907.225.7187
AELC 576

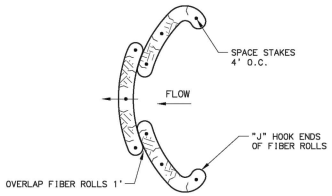
STATE OF ALASKA 49th
JOEL P. TEUNE
121948
REGISTERED PROFESSIONAL ENGINEER

SHEET DESCRIPTION:
ESCP DETAILS

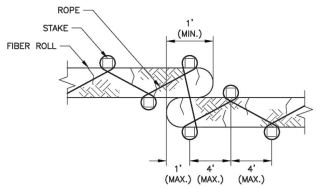
P2

SHEET:
29 of 46

BMP 10.00 – FIBER ROLLS



PLAN



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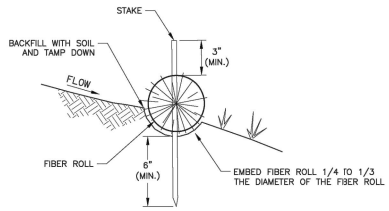
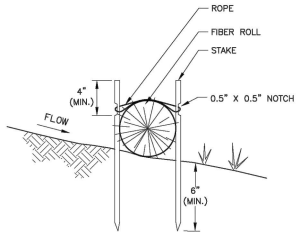


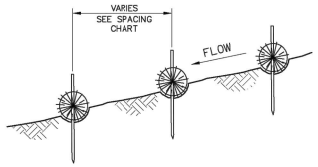
SECTION

TRENCHED INSTALLATION
NOT TO SCALE



SECTION

ROPE INSTALLATION
NOT TO SCALE



TYPICAL SPACING CHART	
SLOPE	SPACING (FEET)
1:1	10
2:1	20
3:1	30

SLOPE INSTALLATION
NOT TO SCALE

TRENCHED INSTALLATION NOTES:
1. DIG TRENCHES AND PLACE FIBER ROLLS IN THE TRENCHES.
2. CURVE BACK THE UPSLOPE END OF THE FIBER ROLL IN A "J" HOOK.
3. SPREAD EXCAVATED MATERIAL EVENLY ALONG THE UPHILL SLOPE AND COMPACT USING HAND TAMPING OR OTHER METHODS.
4. STAKE THE ROLL EVERY 4 FEET AND WITHIN 1–FOOT OF THE ENDS. LEAVE 3 INCHES OF THE STAKE ABOVE THE ROLL.
5. DRIVE STAKES THROUGH THE MIDDLE OF THE FIBER ROLL.
6. IF REQUIRED, PILOT HOLES FOR THE STAKES MAY BE CREATED BY DRIVING A STRAIGHT BAR THROUGH THE ROLL.

SLOPE INSTALLATION NOTES:
1. INSTALL ON A SLOPE TO SHORTEN THE SLOPE LENGTH.
2. START INSTALLATION DOWNSLOPE.
3. SPACE ROLLS ACCORDING TO THE SPACING CHART AND DECREASE SPACING ON MORE ERODIBLE SOILS AND INCREASE SPACING ON ROCKY SOILS.

FIBER ROLL GENERAL NOTES:

MATERIALS

FIBER ROLLS: THE NETTING MAY BE UV–DEGRADABLE POLYPROPYLENE, BIODEGRADABLE BURLAP, JUTE OR COIR. THE FILLINGS MAY BE STRAW, FLAX, RICE, OR COCONUT–FIBER. MINIMUM DIAMETER OF 6 INCHES.

STAKES: 1–INCH BY 1–INCH WOODEN STAKES 24 INCHES LONG (18 INCHES IF SOILS ARE ROCKY) OR ⅜–INCH REBAR WITH SAFETY CAPS OR ⅜–INCH TO 1 ½–INCH DIAMETER LIVE WILLOW CUTTINGS. IF USING LIVE WILLOW CUTTINGS, DO NOT INSTALL ROPE.

INSTALLATION
1. PLACE FIBER ROLLS PERPENDICULAR TO FLOW AND PARALLEL TO THE SLOPE CONTOUR.
2. AT THE END OF THE ROLL, TURN THE END UPSLOPE TO PREVENT RUN–OFF FROM GOING AROUND THE ROLL END.

INSPECTION
1. ENSURE THAT THE ROLLS ARE IN CONTACT WITH THE SOIL AND THOROUGHLY ENTRENCHED.
2. LOOK FOR SCOURING UNDERNEATH THE ROLLS.
3. LOOK FOR SPLIT, TORN, UNRAVELING, OR SLUMPING FIBER ROLLS.
4. ENSURE EQUIPMENT HAS NOT DRIVEN OVER THE INSTALLED FIBER ROLLS.

MAINTENANCE
1. REPLACE DAMAGED SECTIONS OF FIBER ROLL.
2. REMOVE ACCUMULATED SEDIMENT UPSLOPE OF THE ROLL BEFORE IT REACHES ONE–HALF THE DISTANCE BETWEEN THE TOP OF THE FIBER ROLL AND THE GROUND SURFACE. WHEN PROTECTING A WATER BODY OR STORM DRAIN INLET, REMOVE ACCUMULATED SEDIMENT UPSLPE OF THE ROLL WHEN IT REACHES ONE–THIRD OF THE DISTANCE BETWEEN THE TOP OF THE FIEBER ROLL AND THE GROUND SURFACE.

REMOVAL
1. REMOVE FIBER ROLLS WHEN THE AREA IS STABILIZED OR WHEN THEY ARE NO LONGER NECESSARY.
2. COLLECT AND DISPOSE OF THE ACCUMULATED SEDIMENT.
3. REMOVE AND DISPOSE OF FIBER ROLLS.
4. FILL THE TRENCHES AND STAKE HOLES TO BLEND WITH THE ADJACENT GROUND AND REVEGETATE AS NECESSARY.

RETENTION
1. LEAVE FIBER ROLLS IN PLACE WHEN THE AREA IS STABILIZED OR WHEN THEY ARE NOT NECESSARY.
2. COLLECT AND DISPOSE OF THE ACCUMULATED SEDIMENT.
3. REMOVE AND DISPOSE OF THE NETTING, STAKES, AND ROPE.

REVISIONS:

SEET KANAX DUTEEN
STREET AND UTILITY DESIGN

STATUS:
30% DD

DRAWN BY: JPT
CHECKED BY: JPT
DATE: 10/6/2024
PROJECT #: 222321.10

R&M ENGINEERING-KETCHIKAN, INC.
7180 REVILLA ROAD, SUITE 300
KETCHIKAN, ALASKA 99901
PH: 907.225.7187
AELC 576

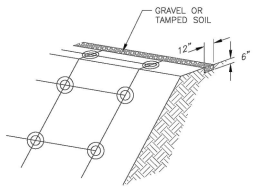
STATE OF ALASKA
49th
JOEL P. TEUNE
121948
REGISTERED PROFESSIONAL ENGINEER

SHEET DESCRIPTION:
ESCP DETAILS

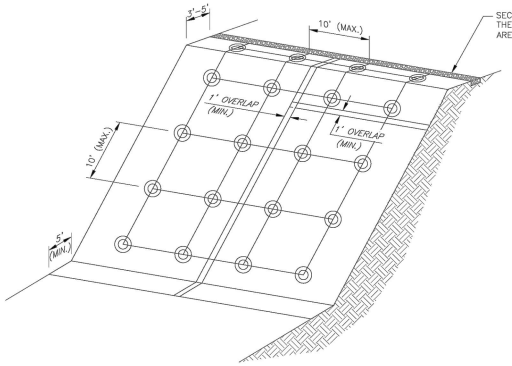
P3

SHEET:
30 of 46

BMP 12.00 – PLASTIC COVERING



TRENCHED DETAIL



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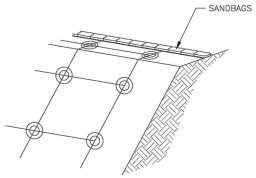


WEIGHTED DETAIL

PLASTIC COVERING NOTES:

MATERIALS

PLASTIC COVERING: PLASTIC COVERING SHALL MEET THE REQUIREMENTS OF ASTM D 4397 FOR POLYETHYLENE SHEETING HAVING A MINIMUM THICKNESS OF 6 MIL.

FASTENERS OR WEIGHTS: FASTENERS OR WEIGHTING OBJECTS, SUCH AS SANDBAGS, TIRES, OR OTHER SIMILAR MATERIALS.

INSTALLATION

1. INSTALL PLASTIC PARALLEL WITH THE SLOPE, NOT PERPENDICULAR. PLASTIC MAY BE INSTALLED PERPENDICULAR TO A SLOPE IF THE SLOPE LENGTH IS LESS THAN 10 FEET. OVERLAP UPHILL SHEET OVER DOWNHILL SHEET A MINIMUM OF 1–FOOT.
2. SECURE THE PLASTIC SHEETING AT THE TOP OF THE SLOPE BY KEYING INTO A TRENCH OR WEIGHT WITH A CONTINUOUS LINE OF SANDBAGS SO THAT NO WATER CAN FLOW UNDERNEATH.
3. INSTALL WEIGHTS ON ROPES OR FASTENERS IN A 10–FOOT MAXIMUM GRID, TO SECURE THE PLASTIC TIGHTLY AGAINST THE SOIL.
4. INSPECT WEIGHTS TO MAKE SURE THEY ARE STILL IN PLACE, REPLACE AS NEEDED OR ADD ADDITIONAL WEIGHT IF THERE IS NOT A SUFFICIENT AMOUNT ON THE SLOPE.
5. TAPE, FASTEN, OR WEIGHT SEAMS ALONG THEIR ENTIRE LENGTH WITH A MINIMUM OF 1–FOOT OF OVERLAP AT ALL SEAMS.
6. SECURE EDGES TO PREVENT WATER FROM ERODING GROUND UNDERNEATH AND WIND FROM LIFTING THE COVER.

INSPECTION

1. INSPECT SHEETING AFTER INSTALLATION AND ACCORDING TO ESTABLISHED SCHEDULES.
2. CHECK FOR EROSION, UNDERMINING, ANCHORAGE (KEYING AND EMBEDDING) FAILURE, TORN SHEETS, AND DETERIORATION.

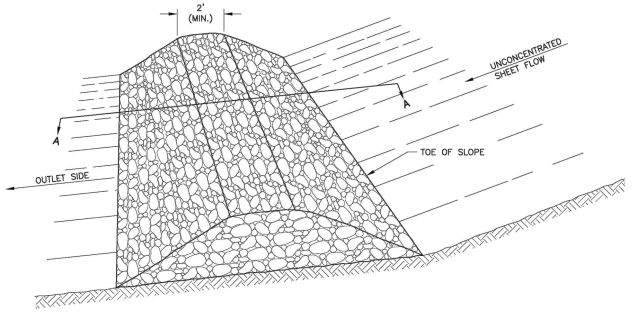
MAINTENANCE

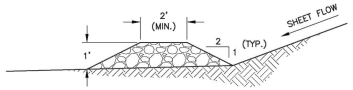
1. REPAIR FAILURES AS SOON AS PRACTICABLE.
2. IF WASHOUT OR BREAKAGES OCCUR, REPAIR DAMAGE TO THE SLOPE AND REINSTALL THE MATERIAL AS SOON AS PRACTICABLE.

REMOVAL

1. REMOVE PLASTIC SHEETING AND WEIGHTS PRIOR TO STABILIZING THE AREA OR WHEN CONSTRUCTION ACTIVITY IS COMPLETED.
2. AFTER REMOVAL, FILL TRENCHES TO BLEND WITH THE ADJACENT GROUND AND REVEGETATE, AS NECESSARY.

BMP 16.00 – ROCK FILTER BERM





SECTION A–A
NOT TO SCALE

ROCK FILTER BERM NOTES:

MATERIALS

ROCK: WELL GRADED 3–INCH MINUS THAT WILL NOT RELEASE SEDIMENT AND HAS LESS THAN 5 PERCENT PASSING THE #200 SIEVE.

INSTALLATION

1. PLACE THE ROCK BERM AS SHOWN ON THE PLANS WITHIN 24 HOURS AFTER GRUBBING.

INSPECTION

1. OBSERVE FOR BERM CONTINUITY INCLUDING COLLAPSE, DAMAGE, COMPROMISED INTEGRITY, OR OTHER FUNCTIONAL INADEQUACIES.
2. LOOK FOR EVIDENCE OF SEDIMENT FLOW OR EROSION ON THE DOWNHILL EDGE OF THE BERM.
3. NOTE DEPTH OF SEDIMENT BEHIND BERM TO SEE IF SEDIMENT IS CLOSE TO ONE–HALF THE BERM HEIGHT.
4. LOOK TO SEE IF THE BERM IS FILTERING OR WHETHER IT HAS BECOME CLOGGED OR OTHERWISE NON–FUNCTIONING.

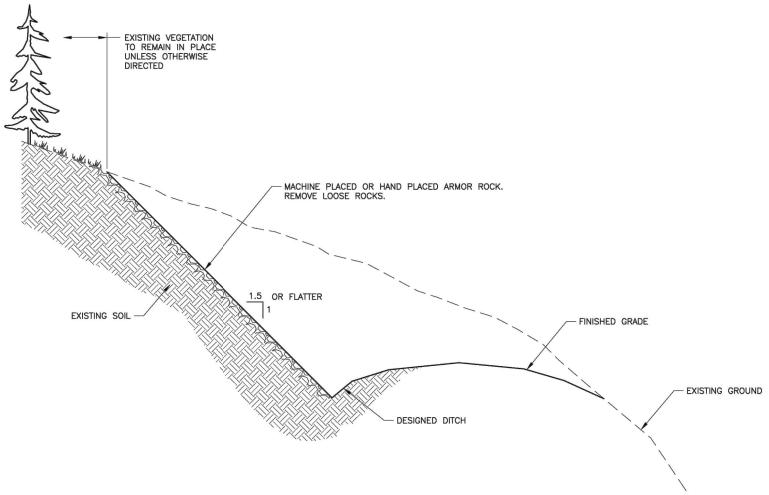
MAINTENANCE

1. REPAIR OR RESTORE ANY BERM DISCONTINUITIES, DAMAGE, OR POINTS OF FAILURE.
2. REMOVE ACCUMULATED SEDIMENT BEFORE IT REACHES ONE–HALF OF THE BERM HEIGHT OR ONE–THIRD OF THE AVAILABLE STORAGE IF PROTECTING A WATER BODY OR STORM DRAIN INLET.

REMOVAL

1. INCORPORATE THE ROCK BERM INTO THE SLOPE, UNLESS DIRECTED OTHERWISE. STABILIZE BARE GROUND AND THE FILL SLOPE.

BMP 17.00 – ROCK SLOPE ARMOR



ROCK SLOPE ARMOR NOTES:

MATERIALS

ROCK: COBBLE, GRAVEL, CRUSHED GRAVEL, CRUSHED ROCK, OR ANY COMBINATION OF THESE, MEETING SPECIFICATIONS AT 610–2.01 (DITCH LINING), 611–2.01 (RIPRAP), OR 703–2.10 (POROUS BACKFILL). USE ANGULAR ROCK ON SLOPES STEEPER THAN 2:1.

INSTALLATION

1. PREPARE THE SLOPE AS DESCRIBED IN THE CONTRACT OR AS DIRECTED BY THE ENGINEER.
2. MINIMIZE CONCENTRATED RUN–ON FROM CROSS–GRADIENT AND UP–GRADIENT SOURCES BY SITE GRADING AND/OR DIRECTING OR DIVERTING RUN–ON OR RUN–OFF AWAY FROM THE SLOPE FACE.
3. IF SPECIFIED ON THE PLANS OR DIRECTED BY THE ENGINEER, INSTALL THE FILTER FABRIC OR FILTER LAYER. AFTER CLEARING DEBRIS FROM SLOPE INSTALL FILTER FABRIC ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.
4. INSTALL THE ROCK STARTING AT THE BOTTOM OF THE SLOPE AND PROCEEDING IN HORIZONTAL LIFTS UPWARDS.
5. PLACE STONES TO THE THICKNESS, HEIGHT, AND LENGTH SHOWN ON THE PLANS. DUMP SMALL ROCKS AND SPREAD BY BULLDOZER OR OTHER SUITABLE EQUIPMENT. DURING SPREADING, DO NOT CRACK THE ROCK.

INSPECTION

1. INSPECT FOR DAMAGE TO THE ROCK ARMOR, INCLUDING DISPLACED STONES, SLUMPING, AND EROSION AT EDGES, ESPECIALLY DOWNSLOPE.

MAINTENANCE

1. REPAIR DAMAGED ROCK ARMOR SLOPE OR EDGES AS SOON AS PRACTICABLE AND BEFORE FURTHER DAMAGE CAN OCCUR.

REVISIONS:

SEET KANAX DUTEEN
STREET AND UTILITY DESIGN

STATUS:
30% DD

DRAWN BY: JPT
CHECKED BY: JPT
DATE: 10/6/2024
PROJECT #: 222321.10

R&M ENGINEERING-KETCHIKAN, INC.
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STATE OF ALASKA
49th
JOEL P. TEUNE
121948
REGISTERED PROFESSIONAL ENGINEER

SHEET DESCRIPTION:
ESCP DETAILS

P4

SHEET:
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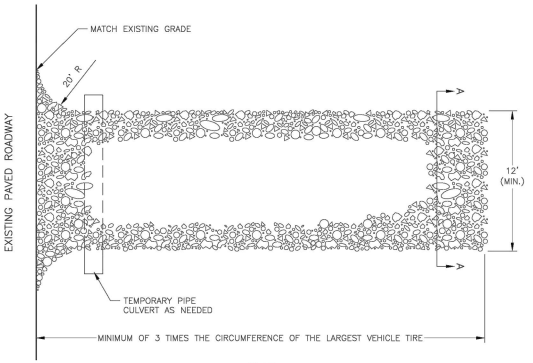
BMP 23.00 – STABILIZED ROCK CONSTRUCTION EXIT

SECTION A–A



PLAN

ROCK CONSTRUCTION EXIT
NOT TO SCALE

STABILIZED CONSTRUCTION EXIT GENERAL NOTES:
INSTALLATION
1. INSTALL STABILIZED CONSTRUCTION EXIT PRIOR TO EARTH WORK.
2. CLEAR THE EXIT AREA OF ALL VEGETATION, ROOTS, AND OTHER MATERIAL.
3. PROVIDE DRAINAGE TO CARRY WATER TO A SEDIMENT TRAP, VEGETATIVE SEDIMENT FILTER OR OTHER PROTECTED OUTLET.
4. EXCAVATE AND GRADE THE AREA FOR ROCK PLACEMENT.
5. INSTALL SIGNS, FENCING OR BARRICADES TO CHANNEL OUTGOING TRAFFIC TO THE STABILIZED CONSTRUCTION EXIT.

INSPECTION
1. INSPECT STABILIZED CONSTRUCTION EXIT FOR SEDIMENT ACCUMULATION AND MATERIAL DISPLACEMENT.
2. INSPECT ROADWAY FOR SEDIMENT TRACK–OUT.
3. INSPECT DITCHES TO ENSURE NO SEDIMENT ACCUMULATION.

MAINTENANCE
1. MAINTAIN EACH EXIT IN A CONDITION THAT WILL PREVENT TRACKING OF MUD OR SEDIMENT ONTO PUBLIC RIGHT–OF–WAY.
2. REPAIR AND/OR CLEAN OUT ANY STRUCTURES USED TO TRAP SEDIMENT.
3. REMOVE ALL MUD AND SEDIMENT DEPOSITED ON PAVED ROADWAYS.
4. ADD MORE SIGNS, FENCING OR BARRICADES WHEN VEHICLES ARE EXITING THE PROJECT WITHOUT USING THE STABILIZED CONSTRUCTION EXIT. INSTALL ADDITIONAL STABILIZED CONSTRUCTION EXITS IF NEEDED, YET USE SIGNS AND BARRICADES TO MINIMIZE THE NUIMBER OF STABILIZED CONSTRUCTION EXITS.
5. PREVENT TRACK–OUT BY USING ADDITIONAL BMPs, SUCH AS A TIRE WASH.

REMOVAL
1. REMOVE THE STABILIZED CONSTRUCTION EXIT AND ANY SEDIMENT TRAPPING STRUCTURES AFTER THEY ARE NO LONGER NEEDED, OR WITH FINAL SITE STABILIZATION.
2. REGRADE AND PERMANENTLY STABILIZE THE REMAINING DISTURBED AREAS ACCORDING TO THE PLANS.

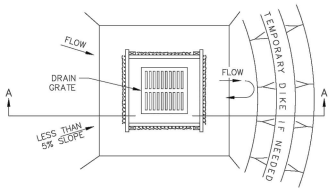
ROCK CONSTRUCTION EXIT NOTES:
MATERIALS
ROCK: 2– TO 3–INCH COARSE AGGREGATE OR 3– TO 6–INCH QUARRY SPALL OR ANGULAR ROCK, WHICHEVER IS APPROPRIATE TO THE PROJECT FLEET.

INSTALLATION
1. PLACE THE FILTER FABRIC AND ROCK TO THE SPECIFIC GRADE SHOWN ON THE PLANS.

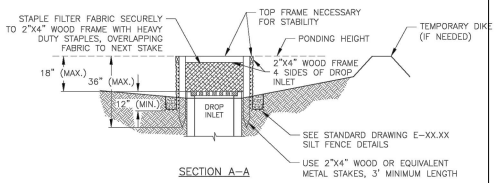
MAINTENANCE
1. REMOVE ACCUMULATED SEDIMENT OR MUD.
2. REPLACE ROCK MATERIAL WHEN SURFACE VOIDS ARE FILLED WITH SEDIMENT. REPLACE FABRIC AS NEEDED.
3. TOP DRESS WITH 2 TO 3 INCHES OF COARSE AGGREGATE OR 3– TO 6–INCH COARSE ROCK WHEN THE PAD BECOMES LADEN WITH SEDIMENT.

INSPECTION
1. INSPECT FOR ROCK THAT HAS BEEN DISPLACED FROM THE PAD.

BMP 28.00 – FILTER FABRIC FOR AREA INLETS



PLAN



SECTION A–A

FILTER FABRIC FOR AREA INLETS
NOT TO SCALE

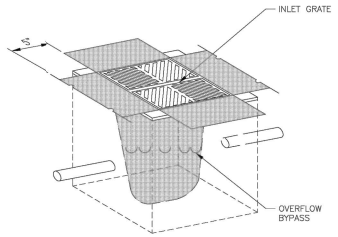
AREA INLET FILTER FABRIC NOTES:
MATERIALS
PREFABRICATED UNITS: UPON APPROVAL BY THE ENGINEER, USE IN PLACE OF THE DESIGN SHOWN ON THIS DRAWING.

FILTER FABRIC: (SILT FENCE) SHALL COMPLY WITH SECTION 729–2.04 SILT FENCE.

INSTALLATION
1. IF PREFABRICATED BARRIERS ARE USED, INSTALL AS SPECIFIED BY THE VENDOR OR MANUFACTURER.
2. PLACE A STAKE AT EACH CORNER OF THE INLET OR IN A CIRCULAR PATTERN AROUND THE INLET NO MORE THAN 3 FEET APART. DRIVE STAKES INTO THE GROUND A MINIMUM OF 12 INCHES.
3. ENSURE STABILITY BY BRACING AT THE TOP.
4. INSTALL FILTER FABRIC (SILT FENCE) AS SHOWN ON DRAWING BMP–20.00 SILT FENCE.

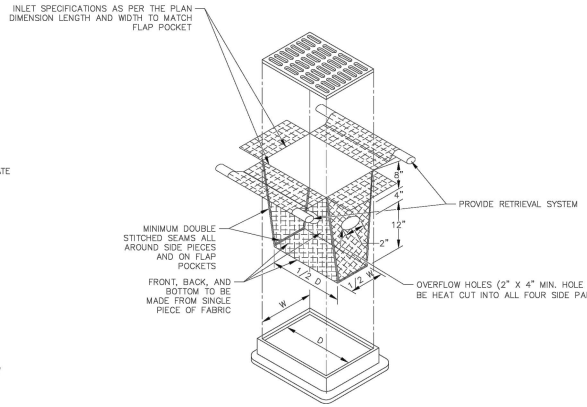
INSPECTION, MAINTENANCE, AND REMOVAL
1. SEE STORM DRAIN INLET SEDIMENT PROTECTION GENERAL NOTES ON BMP–25.00 [STORM DRAIN INLET SEDIMENT PROTECTION (NOTES & AREA INLET FIBER ROLL OR GRAVEL/SAND BAG BERM)] NOTES FOR INSPECTION, MAINTENANCE, AND REMOVAL.

BMP 29.00 – SEDIMENT CONTROL INLET HAT FOR AREA DRAINS OR CURB INLETS



PERSPECTIVE

SEDIMENT CONTROL INLET HAT
FOR AREA DRAINS OR CURB INLETS
NOT TO SCALE



PERSPECTIVE

FILTER BAG INSERT
FOR AREA DRAINS OR CURB INLETS
NOT TO SCALE

AREA DRAINS OR CURB INLET NOTES:
MATERIALS
PREFABRICATED UNITS: UPON APPROVAL BY THE ENGINEER, USE IN PLACE OF THE DESIGN SHOWN ON THIS DRAWING.

SEDIMENT CONTROL INLET HATS: SHALL BE A POLYETHYLENE HAT–LIKE STRUCTURE COVERING THE INLET WITH SMALL WEEP HOLES ON THE SIDE PROVIDING A FILTERING FUNCTION FOR THE STORMWATER RUNOFF, AND A LARGE OPENING ABOVE THE WEEP HOLES FOR EMERGENCY OVERFLOW.

FILTER BAG INSERTS: SHALL CONSIST OF A REPLACEABLE FILTER BAG REINFORCED WITH AN OUTER POLYESTER MESH FABRIC.

1. THE FILTER BAG SHALL BE SUSPENDED FROM A GALVANIZED STEEL RING, REBAR OR STEEL RODS, OR FRAME THAT FITS WITHIN A GRATE UTILIZING A STAINLESS STEEL BAND AND LOCKING CLAMP.
2. CONSTRUCT THE FILTER BAG THAT IS SUSPENDED FROM A FRAME OF A POLYPROPYLENE FILTER GEOTEXTILE FABRIC, THAT MEETS THE FOLLOWING MINIMUM REQUIREMENTS:

	ASTM METHOD	VALUE	UNITS
UNIT WEIGHT	––	4	OUNCE/SQ YD
FLOW RATE	––	145	GALLONS/MINUTE/SQ FT
PERMITTIVITY	D4491	0.5	PER SECOND
GRAB TENSILE STRENGTH	D4632	200	POUNDS
PUNCTURE STRENGTH	D6241	80	POUNDS
TEAR STRENGH	D4533	50	POUNDS
DEBRIS CAPACITY	––	2	CUBIC FT

3. DOUBLE STITCH ALL EDGES AND SEAMS.
4. THE FILTER BAG INSERT SHALL HAVE OVAL, EDGE–HEAT–SEALED OVERFLOW HOLES, MINIMUM 2 INCHES X 4 INCHES, CUT INTO ALL FOUR PANEL SIDES.
5. PROVIDE BUILT–IN OVERFLOW BYPASS.
6. THE INLET STRUCTURE'S GRATE OVERFLOW CAPACITY IS AT A MINIMUM EQUAL TO THE DESIGN FLOW CAPACITY.
7. PROVIDE A RETRIEVAL SYSTEM, SUCH AS FLAPS, HANDLES, OR CORDS, TO ALLOW REMOVAL OF THE BELOW–INLET GRATE BARRIER WITHOUT SPILLING THE COLLECTED MATERIAL.

STORM DRAIN INLET SEDIMENT PROTECTION GENERAL NOTES
INSTALLATION
1. IF PREFABRICATED BARRIERS ARE USED, INSTALL AS SPECIFIED BY THE VENDOR OR MANUFACTURER.

INSPECTION
1. CHECK FOR SEDIMENT DEPTH. CLEANING IS REQUIRED WHEN SEDIMENT HAS ACCUMULATED TO ONE–THIRD THE DESIGN DEPTH (OR LESS WHEN SPECIFIED BY THE MANUFACTURER OF PREFABRICATED BARRIERS).
2. CHECK FOR UNDERMINING OR BYPASSING, SUCH AS EVIDENCE THAT SEDIMENT IS ENTERING THE INLET OR THAT RUN–OFF IS BYPASSING THE BARRIER AND ENTERING THE INLET UNTREATED.

MAINTENANCE
1. IF PREFABRICATED BARRIERS ARE USED, MAINTAIN THEM AS SPECIFIED BY THE VENDOR OR MANUFACTURER.
2. CORRECT UNDERMINING OR BYPASSING FAILURES.
3. REMOVE ACCUMULATED SEDIMENT BEFORE IT REACHES ONE–THIRD OF THE AVAILABLE STORAGE OF THE SEDIMENT PROTECTION DEVICE OR LESS WHEN SPECIFIED BY THE MANUFACTURER.
4. REMOVE AND DISPOSE OF ANY ROCK OR DEBRIS THAT HAS ACCUMULATED BEHIND THE SEDIMENT BARRIER TO PREVENT FURTHER CLOGGING.
5. REPLACE FRAYED OR TORN FABRIC OR MATERIALS AND REPAIR ANY STRUCTURAL DAMAGE AS SOON AS PRACTICABLE.

REMOVAL
1. LEAVE INLET SEDIMENT PROTECTION DEVICES IN PLACE AND OPERATIONAL UNTIL THE DRAINAGE AREA IS PERMANENTLY STABILIZED.
2. REMOVE AND DISPOSE OF TRAPPED OR REMAINING SEDIMENT.
3. STABILIZE DISTURBED SOIL AREAS RESULTING FROM REMOVAL OF BARRIERS OR SEDIMENT.

REVISIONS:

SEET KANAX DUTEEN
STREET AND UTILITY DESIGN

STATUS:
30% DD

DRAWN BY: JPT
CHECKED BY: JPT
DATE: 10/6/2024
PROJECT #: 222321.10

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STATE OF ALASKA 49th
JOEL P. TEUNE
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REGISTERED PROFESSIONAL ENGINEER

SHEET DESCRIPTION:
ESCP DETAILS

P5

SHEET:
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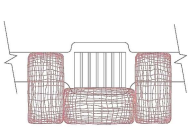
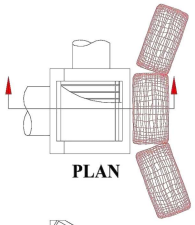
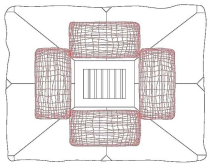
BMP A1 – CURB INLET CATCH BASIN BIO BAG INLET PROTECTION



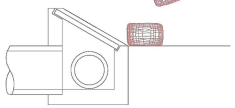
CATCH BASIN



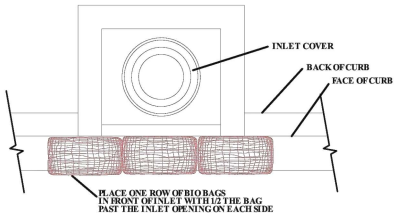
PLAN



AREA DRAIN



DITCH INLET



STORM DRAIN INLET SEDIMENT PROTECTION GENERAL NOTES

INSTALLATION

1. IF PREFABRICATED BARRIERS ARE USED, INSTALL AS SPECIFIED BY THE VENDOR OR MANUFACTURER.

INSPECTION

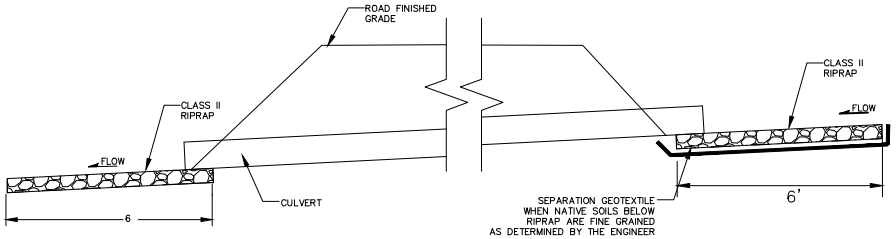
1. CHECK FOR SEDIMENT DEPTH. CLEANING IS REQUIRED WHEN SEDIMENT HAS ACCUMULATED TO ONE–THIRD THE DESIGN DEPTH (OR LESS WHEN SPECIFIED BY THE MANUFACTURER OF PREFABRICATED BARRIERS).
2. CHECK FOR UNDERMINING OR BYPASSING, SUCH AS EVIDENCE THAT SEDIMENT IS ENTERING THE INLET OR THAT RUN–OFF IS BYPASSING THE BARRIER AND ENTERING THE INLET UNTREATED.

MAINTENANCE

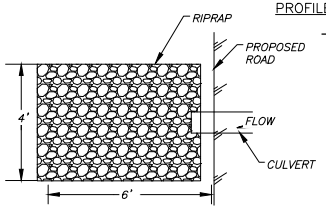
1. IF PREFABRICATED BARRIERS ARE USED, MAINTAIN THEM AS SPECIFIED BY THE VENDOR OR MANUFACTURER.
2. CORRECT UNDERMINING OR BYPASSING FAILURES.
3. REMOVE ACCUMULATED SEDIMENT BEFORE IT REACHES ONE–THIRD OF THE AVAILABLE STORAGE OF THE SEDIMENT PROTECTION DEVICE OR LESS WHEN SPECIFIED BY THE MANUFACTURER.
4. REMOVE AND DISPOSE OF ANY ROCK OR DEBRIS THAT HAS ACCUMULATED BEHIND THE SEDIMENT BARRIER TO PREVENT FURTHER CLOGGING.
5. REPLACE FRAYED OR TORN FABRIC OR MATERIALS AND REPAIR ANY STRUCTURAL DAMAGE AS SOON AS PRACTICABLE.

REMOVAL

1. LEAVE INLET SEDIMENT PROTECTION DEVICES IN PLACE AND OPERATIONAL UNTIL THE DRAINAGE AREA IS PERMANENTLY STABILIZED.
2. REMOVE AND DISPOSE OF TRAPPED OR REMAINING SEDIMENT.
3. STABILIZE DISTURBED SOIL AREAS RESULTING FROM REMOVAL OF BARRIERS OR SEDIMENT.



PROFILE



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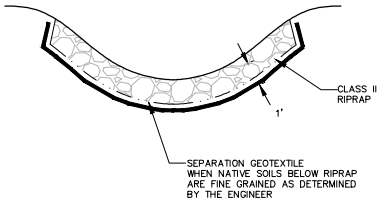

SECTION

BMP A2 – CULVERT INLET/OUTLET PROTECTION

REVISIONS:

SEET KANAX DUTEEN
STREET AND UTILITY DESIGN

STATUS:
30% DD

DRAWN BY: JPT
CHECKED BY: JPT
DATE: 10/6/2024
PROJECT #: 222321.10

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SHEET DESCRIPTION:
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33 of 46