BIOLOGICAL ASSESSMENT

(continued)

APPENDIX O.1

Compensatory Wetland Mitigation Plan

(CONTINUED)

HABITAT FEATURES

- *HABITAT POOL*
- *COMPLEX LOG STRUCTURE*
- *SIMPLE LOG STRUCTURE (1-3 LOGS)*

ESTIMATED PLANT COMMUNITY AREAS (TIDAL AREA)

- *SALT MARSH (ELEV. 5.5'-8.5'): 44.58 AC*
- *TIDAL MUDFLAT (ELEV. < 5.5'): 34.75 AC*
- *WILLOW SCRUB-SHRUB WETLAND (ELEV. 8.5'-10.0'): 8.71 AC*
- *FORESTED WETLAND (ELEV. 9.5'-10'): 3.42 AC*

KENTUCK LEVEE, NEW LOCATION

KENTUCK WAY LANE

KENTUCK SLOUGH

EAST BAY DRIVE

PROPOSED BRIDGE

PP1

PP2

PP3

PP4

PP5

PP6

SM1

SM2

SM3

SM4

SM5

SM6

SM7

SM8

SM9

SM10

SM11

SM12

SM13

SM14

SM15

TSS1

TSS2

NEW TIDAL SALT MARSH AREA

PRIMARY TIDE CHANNEL

NEW TIDAL MUDFLAT AREA

SECONDARY TIDE CHANNEL

LIMITS OF PROPOSED GRADING, TYP.

GOLF COURSE LANE

APPROX. LOCATION OF HABITAT POOL

PRIVATE PROPERTY TO BE GRADED TO UPLAND CONDITIONS TO PROTECT SEPTIC FIELD (IMPACTS IDENTIFIED ON FIG. 8A

PROPOSED FISH PASSAGE CULVERT

AC

N

0 100 200 400

Monitoring Plan

Nomenclature and plot size:
SM = salt marsh plot (1m²)
TSS = Tidal, willow scrub-shrub
TFO = tidal, forested wetland
FSS = freshwater, willow scrub-shrub
FFO = freshwater, forested wetland
PP = photo point
Plot size for all scrub-shrub and forested plots = 10m x 10m, plus two nested 1m² herb plots)

- *= SM plots*
- *= TSS and FSS plots*
- *= FSS and FFO plots*
- *= photo point with directional arrow*

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1	8/10/18	BH		TS	Rev A - Issued for Review

NOTE:
ELEVATIONS BASED ON NAVD88 DATUM.
(MLLW Elev. 0.0 = NAVD88 Elev. -0.97)

DOC. CONTROL NO.: J1-600-CIV-PLN-DEA-00004-01 Rev B-ISSUED FOR REVIEW

DRAFT PLANS FOR REVIEW ONLY

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Jordan Cove LNG

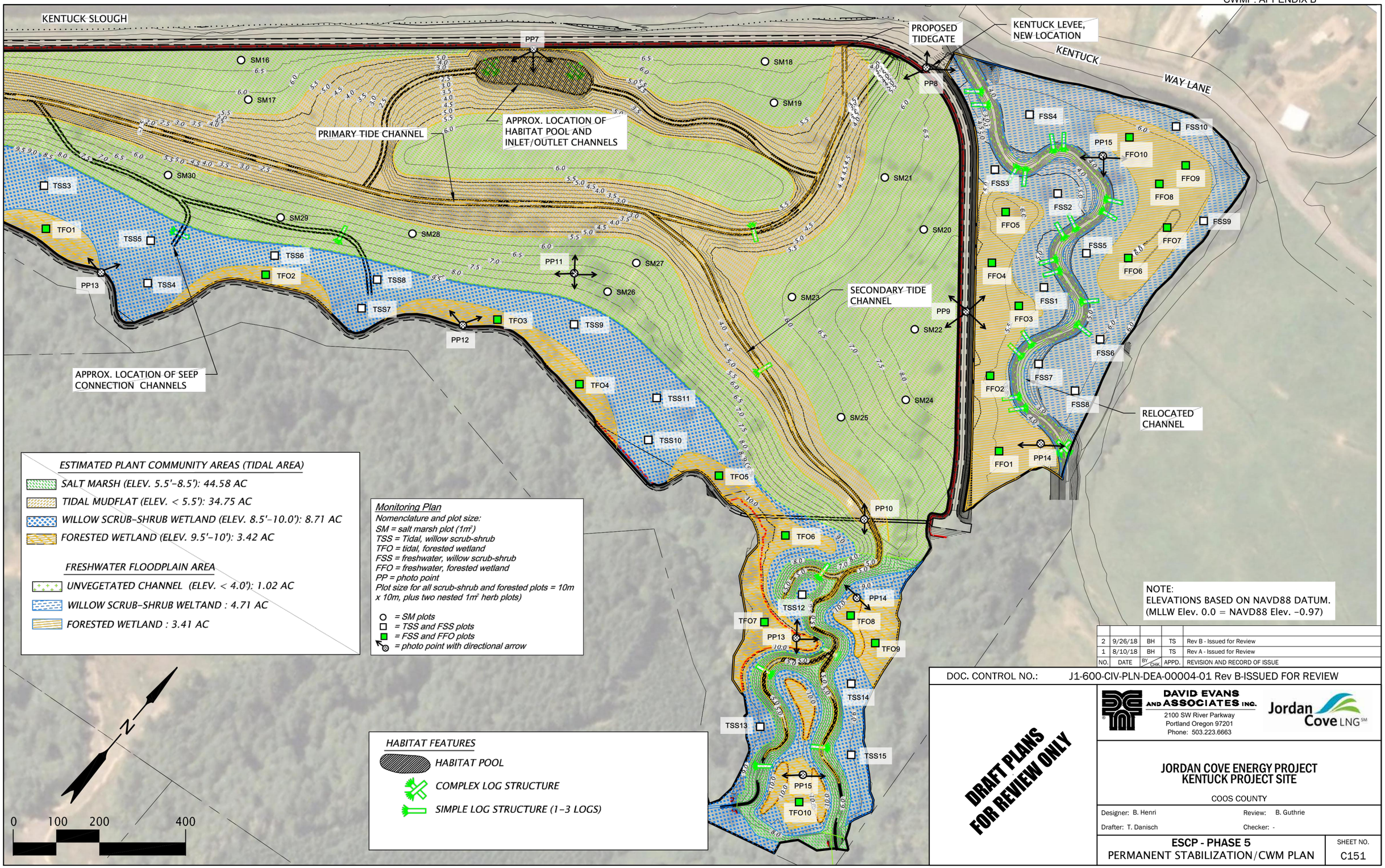
JORDAN COVE ENERGY PROJECT
KENTUCK PROJECT SITE

COOS COUNTY

Designer: B. Henri | Review: B. Guthrie
Drafter: T. Danisch | Checker: -

ESCP - PHASE 5
PERMANENT STABILIZATION/CWM PLAN

SHEET NO. C150



ESTIMATED PLANT COMMUNITY AREAS (TIDAL AREA)

- *SALT MARSH (ELEV. 5.5'–8.5'): 44.58 AC*
- *TIDAL MUDFLAT (ELEV. < 5.5'): 34.75 AC*
- *WILLOW SCRUB-SHRUB WETLAND (ELEV. 8.5'–10.0'): 8.71 AC*
- *FORESTED WETLAND (ELEV. 9.5'–10'): 3.42 AC*

FRESHWATER FLOODPLAIN AREA

- *UNVEGETATED CHANNEL (ELEV. < 4.0'): 1.02 AC*
- *WILLOW SCRUB-SHRUB WELTAND : 4.71 AC*
- *FORESTED WETLAND : 3.41 AC*

Monitoring Plan

Nomenclature and plot size:
SM = salt marsh plot (1m²)
TSS = Tidal, willow scrub-shrub
TFO = tidal, forested wetland
FSS = freshwater, willow scrub-shrub
FFO = freshwater, forested wetland
PP = photo point
Plot size for all scrub-shrub and forested plots = 10m x 10m, plus two nested 1m² herb plots)

- *= SM plots*
- *= TSS and FSS plots*
- *= FSS and FFO plots*
- *= photo point with directional arrow*

HABITAT FEATURES

- *HABITAT POOL*
- *COMPLEX LOG STRUCTURE*
- *SIMPLE LOG STRUCTURE (1–3 LOGS)*

NOTE:
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(MLLW Elev. 0.0 = NAVD88 Elev. -0.97)

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ESCP - PHASE 5
PERMANENT STABILIZATION/CWM PLAN

SHEET NO. C151

Kentuck Site Proposed Planting List

-species subject to change per design refinements and availability

Kentuck Site (Salt Marsh- Plantings and Estimated Volunteer Recruitment)				
Deschampsia cespitosa	*Tufted hairgrass*	*FACW*		
Hordeum brachyantherum	*Meadow barley*	*FACW*		
Carex lyngbei	*Lyngby's sedge*	*OBL*		
Grindelia integrifolia	*Gumweed*	*FACW*		
Argentina egedii	*Pacific silverweed*	*OBL*		
Distichlis spicata	*Saltgrass*	*FACW*		
Scirpus americanus	*American threesquare*	*OBL*		
Salicornia virginica	*Pickleweed*	*OBL*		
Schoenoplectus pungens	*Common threesquare*	*OBL*		
Kentuck Site (Freshwater Wetland Plantings)			**Forest Community**	**Willow Scrub-Shrub**
Alnus rubra	*Red alder*	*FAC*	*X*	
Picea sitchensis	*Sitka spruce*	*FAC*	*X*	*X (low density)*
Myrica californica	*California wax myrtle*	*FACW*	*X*	*X*
Malus fusca	*Oregon crab apple*	*FACW*	*X*	
Salix hookeriana	*Hooker's willow*	*FACW*	*X*	*X (high density)*
Lonicera involucrata	*twinberry*	*FAC*	*X*	*X*
Spiraea douglasii	*Douglas spirea*	*FACW*	*X*	*X*
Rubus spectabilis	*salmon berry*	*FAC*	*X*	
Carex obnupta	*slough sedge*	*OBL*	*X*	*X*
Juncus ensifolius	*daggerleaf rush*	*FACW*	*X*	*X*
Scirpus microcarpus	*small-fruited bulrush*	*OBL*	*X*	
Argentina egedii	*Pacific silverweed*	*OBL*	*X*	*X*
Distichlis spicata	*Salt grass*	*FACW*	*X*	*X*
Hordeum brachyantherum	*Meadow barley*	*FACW*	*X*	*X*
Deschampsia caespitosa	*tufted hairgrass*	*FACW*	*X*	*X*

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COOS COUNTY

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Drafter: T. Danisch | Checker: -

ESCP - PHASE 5
PERMANENT STABILIZATION/CWM PLAN

SHEET NO. C152

FOR FURTHER INFORMATION
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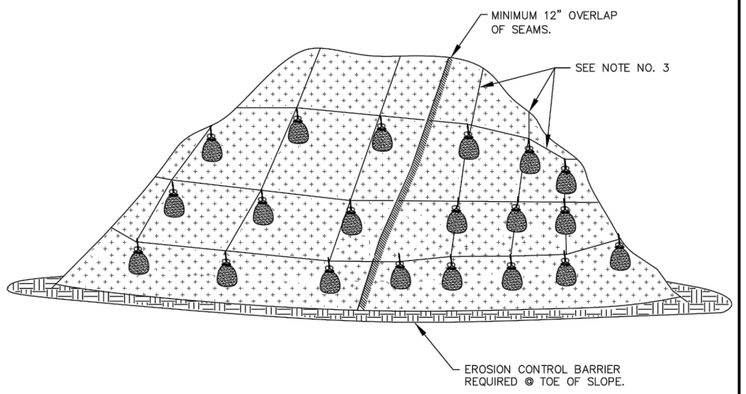
CHAPTER 4 OF CLEAN WATER
SERVICES EROSION PREVENTION
AND SEDIMENT CONTROL
PLANNING AND DESIGN MANUAL.



PLASTIC SHEETING

NOTES:

1. MINIMUM 12" OVERLAP OF ALL SEAMS REQUIRED.
2. BARRIER REQUIRED @ TOE OF STOCK PILE.
3. COVERING MAINTAINED TIGHTLY IN PLACE BY USING SANDBAGS OR APPROVED EQUAL ON ROPES WITH A MAXIMUM 10' GRID SPACING IN ALL DIRECTIONS.
4. PLASTIC TO EXTEND MINIMUM 1' BEYOND TOE OF SLOPE

PLASTIC SHEETING

DRAWING NO. 810 REVISED 12-16

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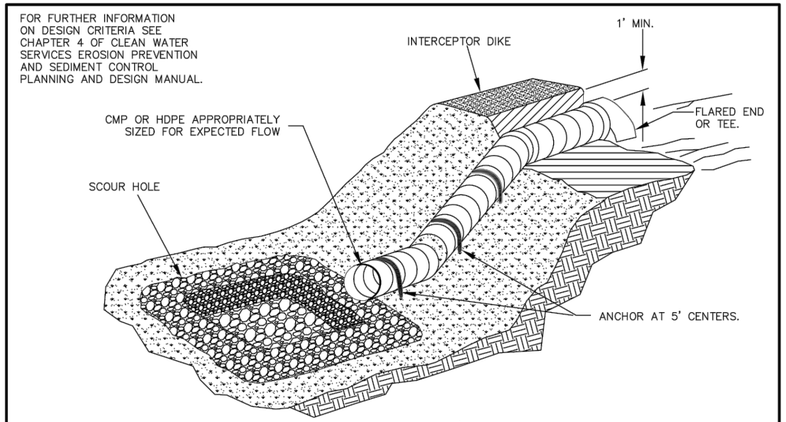

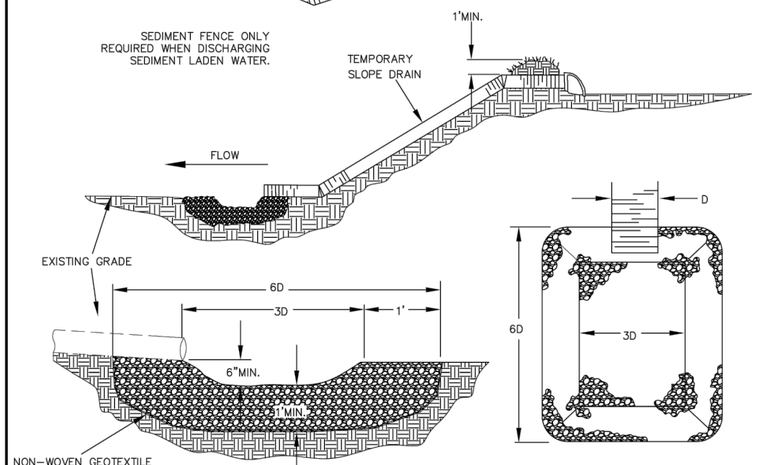

SCOUR HOLE DETAIL
FRONT VIEW

SCOUR HOLE DETAIL
TOP VIEW

PIPE SLOPE DRAIN

DRAWING NO. 815 REVISED 12-16

CleanWater Services

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ON DESIGN CRITERIA SEE
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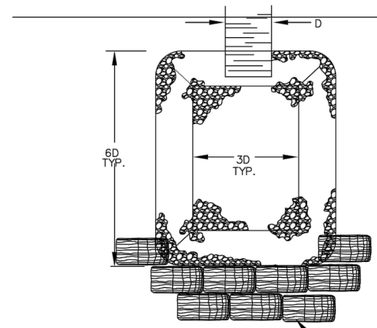
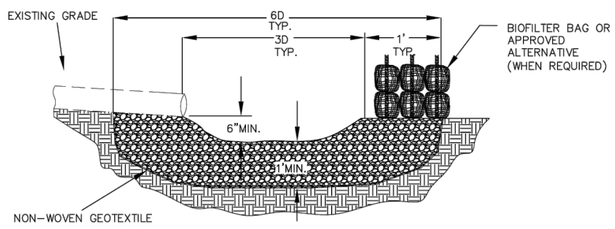


PLAN VIEW
NTS



PROFILE

NOTES:

1. BIO BAGS ONLY REQUIRED WHEN DISCHARGING SEDIMENT LADEN WATER.
2. STAKING OF BAGS REQUIRED WITH EITHER METHOD USING (2) 1"x 2" WOOD STAKES OR APPROVED EQUAL PER BAG.

OUTLET PROTECTION
RIP RAP

DRAWING NO. 820 REVISED 12-16

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Jordan Cove LNG

JORDAN COVE ENERGY PROJECT
KENTUCK PROJECT SITE

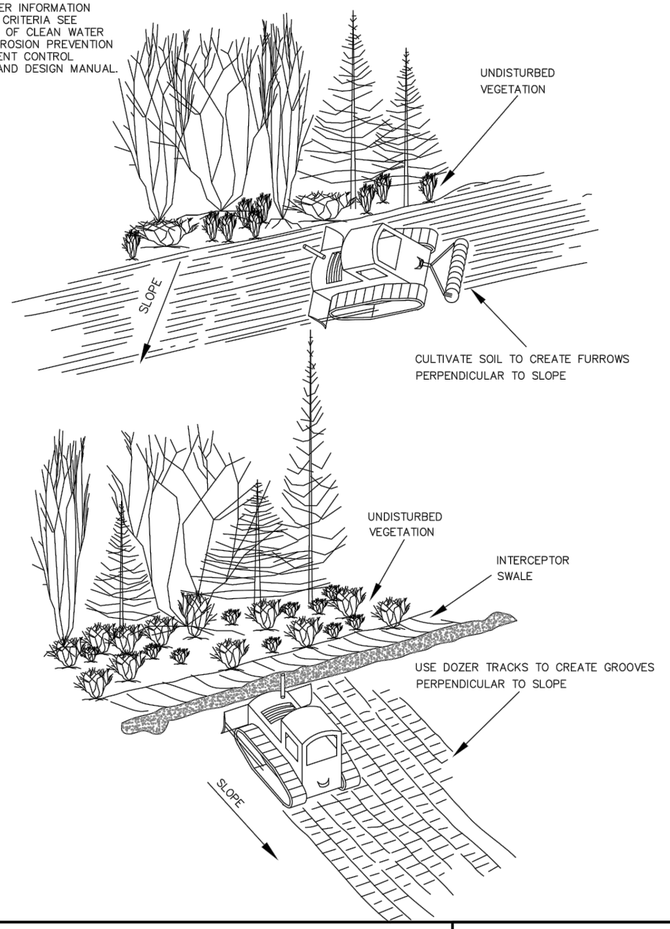
COOS COUNTY

Designer: B. Henri Review: B. Guthrie
Drafter: T. Danisch Checker: -

EROSION CONTROL DETAILS

SHEET NO.
C700

FOR FURTHER INFORMATION ON DESIGN CRITERIA SEE CHAPTER 4 OF CLEAN WATER SERVICES EROSION PREVENTION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL.

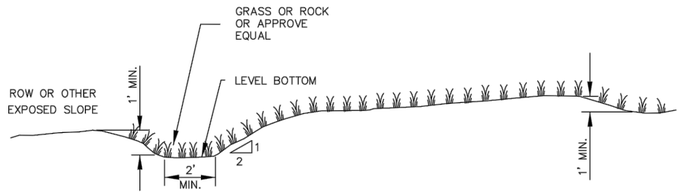


SURFACE ROUGHENING CAT TRACKING

DRAWING NO. 830 REVISED 12-16

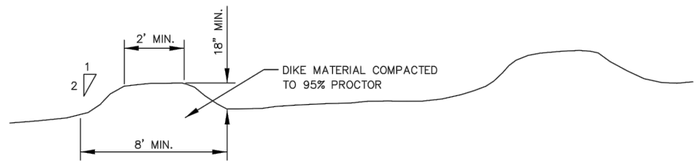
CleanWater Services

FOR FURTHER INFORMATION ON DESIGN CRITERIA SEE CHAPTER 4 OF CLEAN WATER SERVICES EROSION PREVENTION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL.



BOTTOM WIDTH	2 FEET MINIMUM; THE BOTTOM WIDTH SHALL BE LEVEL
DEPTH	1 FOOT MINIMUM
SIDE SLOPE	2H:1V OR FLATTER
GRADE	MAXIMUM 5 PERCENT, WITH POSITIVE DRAINAGE TO A SUITABLE OUTLET (SUCH AS SEDIMENTATION POND)

DIVERSION SWALE



TEMPORARY DIVERSION DIKE

SLOPE	SPACING
<5%	300 FEET
5-10%	200 FEET
10-40%	100 FEET

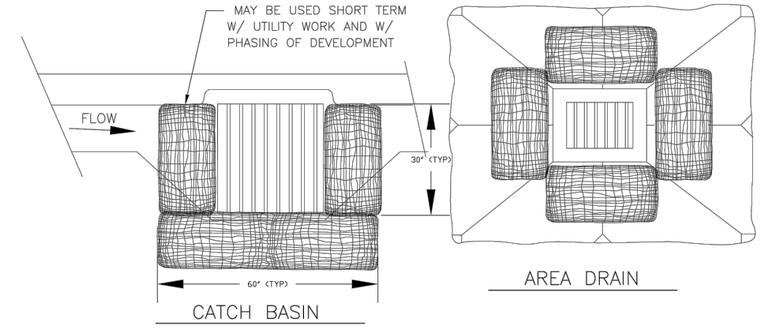
NOTES:

1. IMMEDIATELY UPON CONSTRUCTION, ESTABLISHED VEGETATION OR EROSION CONTROL BLANKETS ARE REQUIRED.

DIVERSION DIKE / SWALE

DRAWING NO. 850 REVISED 12-16

CleanWater Services



NOTES:

1. ADDITIONAL MEASURES MUST BE CONSIDERED DEPENDING ON SOIL TYPES.
2. BIO-FILTER BAGS SHOULD BE STAKED WHERE APPLICABLE USING (2) 1"x2" WOODEN STAKES OR APPROVED EQUAL PER BAG.
3. WHEN USING 30" BIO-BAGS TO PROTECT A CATCH BASIN YOU MUST HAVE 4 BAGS AND THEY SHALL BE OVERLAPPED BY 6".

FOR FURTHER INFORMATION ON DESIGN CRITERIA SEE CHAPTER 4 OF CLEAN WATER SERVICES EROSION PREVENTION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL.

INLET PROTECTION TYPE 4

DRAWING NO. 915 REVISED 12-16

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JORDAN COVE ENERGY PROJECT
KENTUCK PROJECT SITE

COOS COUNTY

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EROSION CONTROL DETAILS SHEET NO. C701

FOR FURTHER INFORMATION ON DESIGN CRITERIA SEE CHAPTER 4 OF CLEAN WATER SERVICES EROSION PREVENTION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL.

SPACING FOR CHECK DAMS

DITCH GRADE	6 INCH	12 INCH	18 INCH
6%	NOT ALLOWED	16 FT O.C.	26 FT O.C.
5%	NOT ALLOWED	20 FT	30 FT
4%	NOT ALLOWED	26 FT	40 FT
3%	15 FT	33 FT	50 FT
2%	25 FT	50 FT	80 FT

BARRIER SPACING FOR GENERAL APPLICATION

INSTALL PARALLEL ALONG CONTOURS AS FOLLOWS

% SLOPE	SLOPE	MAXIMUM SPACING ON SLOPE
10% OR FLATTER	10:1 OR FLATTER	300 FT
>10% OR <15%	>10:1 OR <7.5:1	150 FT
>15% OR <20%	>7.5:1 OR <5:1	100 FT
>20% OR <30%	>5:1 OR <3.5:1	50 FT
>30% OR <50%	>3.5:1 OR <2:1	25 FT

NOTES:

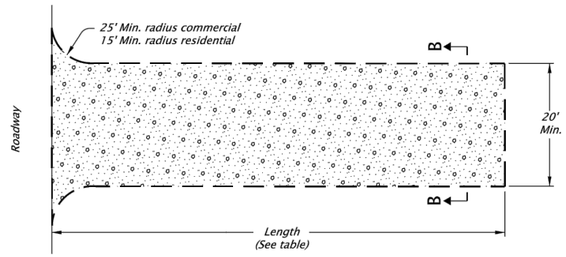
1. FOR MORE INFORMATION REGARDING THESE TABLES SEE CHAPTER 4 TABLES 4-3 AND 4-7 OF CLEAN WATER SERVICES EROSION PREVENTION AND SEDIMENT CONTROL DESIGN MANUAL.

SPACING TABLES

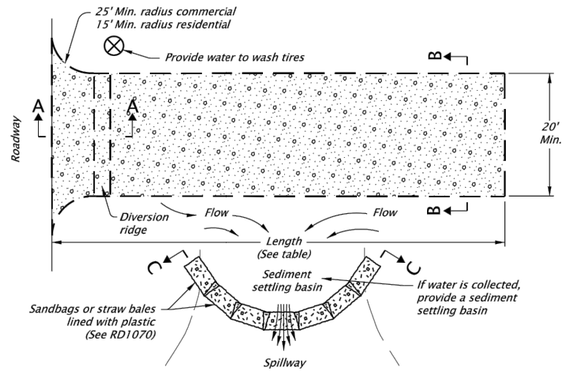
DRAWING NO. 940

REVISED 12-16

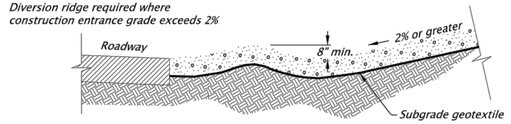
Clean Water Services



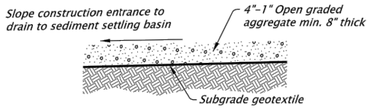
CONSTRUCTION ENTRANCE - TYPE 1



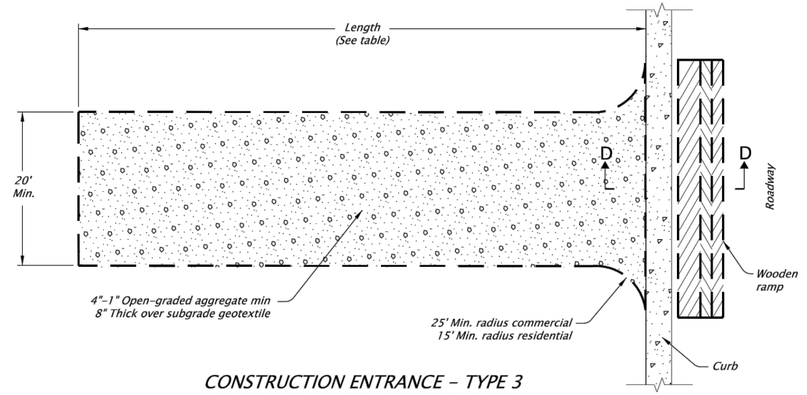
CONSTRUCTION ENTRANCE - TYPE 2



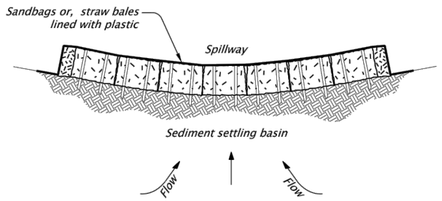
SECTION A-A



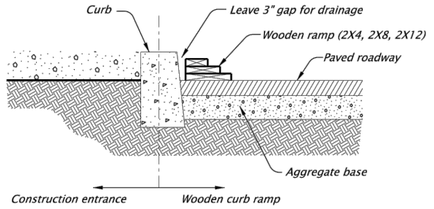
SECTION B-B



CONSTRUCTION ENTRANCE - TYPE 3
(TYPE 1 OR 2 WITH EXISTING CURB)



SECTION C-C



WOODEN CURB RAMP SECTION D-D

Notes:

1. The type 1 entrance is a simple entrance without a diversion ridge or settling basin.
2. The wooden ramp may be used on either type 1 or type 2 entrances in situations where there is curb and the curb is not removed for the construction entrance.

CONSTRUCTION ENTRANCE TABLE MINIMUM LENGTH	
Length (FT)	Area Of Exposed Soil (Acre)
20	0.25
50	0.25 < A < 1.0
100	A > 1.0

CALC. BOOK NO. 6408

BASELINE REPORT DATE July 2014

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

OREGON STANDARD DRAWINGS

CONSTRUCTION ENTRANCES

2018

DATE	REVISION DESCRIPTION

Effective Date: June 1, 2018 - November 30, 2018 RD1000

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JORDAN COVE ENERGY PROJECT
KENTUCK PROJECT SITE

COOS COUNTY

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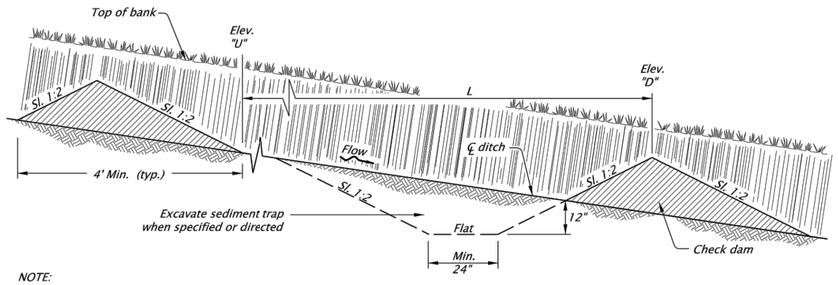
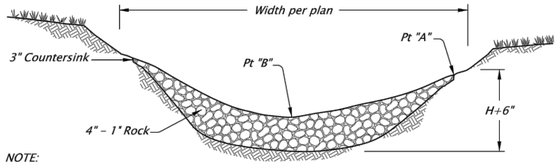
Drafter: T. Danisch Checker: -

EROSION CONTROL DETAILS SHEET NO. C702



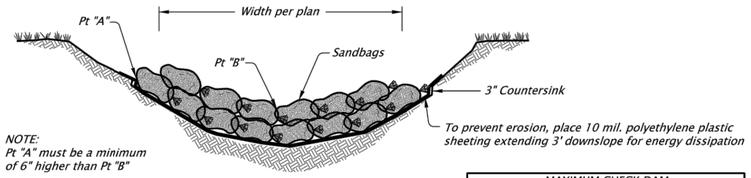
NOTE:
L = Spacing along swale or ditch so that Elevation "U" equals Elevation "D".

TYPICAL PROFILE SECTION CHECK DAMS (SHOWN WITH AGGREGATE)



NOTE:
Pt "A" must be a minimum of 6" higher than Pt "B"

AGGREGATE CHECK DAM – TYPE 1



NOTE:
Pt "A" must be a minimum of 6" higher than Pt "B"

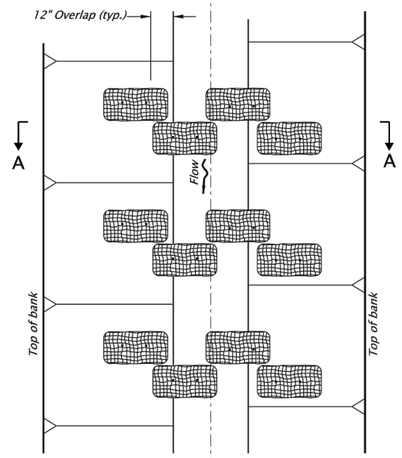
SANDBAG CHECK DAM – TYPE 4

MAXIMUM CHECK DAM SPACING "L"				
Ditch Grade	H=8"	H=12"	H=18"	H=24"
10%	* *	* *	15'	20'
9%	* *	* *	16'	22'
8%	* *	* *	18'	25'
7%	* *	* *	21'	28'
6%	* *	16'	25'	33'
5%	* *	20'	30'	40'
4%	16'	25'	37'	50'
3%	22'	33'	50'	66'
2%	33'	50'	75'	100'

* * Not Allowed H = Min. dam height

NOTES:

1. *Type 3 – stake biofilter bags with two 2" X 2" X 18" (min.) wood stakes per bag. Drive stakes a minimum of 6" into the ground and flush with the top of the bags. Omit stakes if placed over paved surfaces. Overlap bags 6" min at each joint.*
2. *Type 4 – Tightly abut or overlap ends of sandbags at each joint.*
3. *Spacing between check dams for all check dam types shall comply with the typical profile section shown above.*



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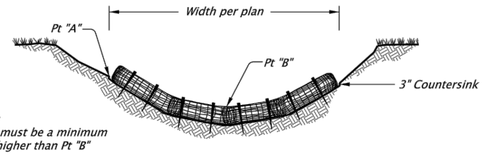

NOTE:
Pt "A" must be a minimum of 6" higher than Pt "B"

SECTION A–A

BIOFILTER BAG CHECK DAM – TYPE 3

CALC. BOOK NO. 6407

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BASELINE REPORT DATE November 2017

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

OREGON STANDARD DRAWINGS

CHECK DAMS TYPE 1, 3 AND 4

2018

DATE	REVISION DESCRIPTION

RD1005

Effective Date: June 1, 2018 - November 30, 2018

RD1005

rd1005.dgn 11-29-2017

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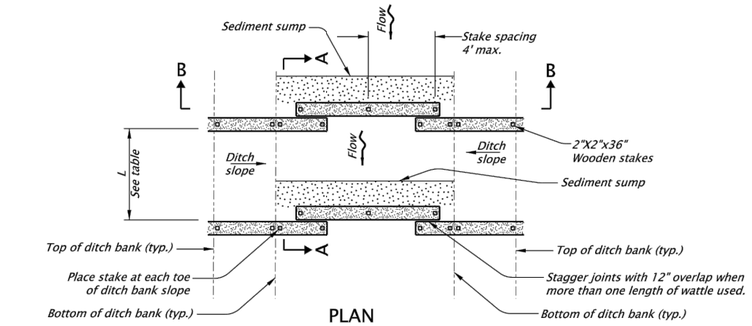
EROSION CONTROL DETAILS

SHEET NO. C703



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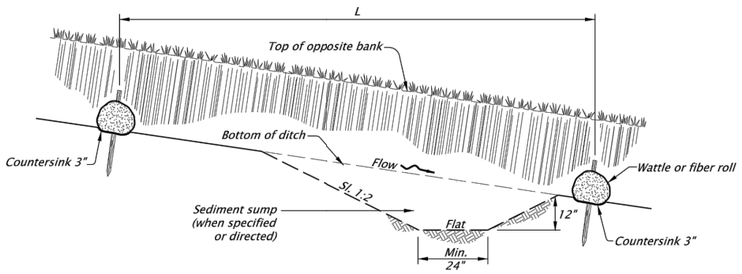
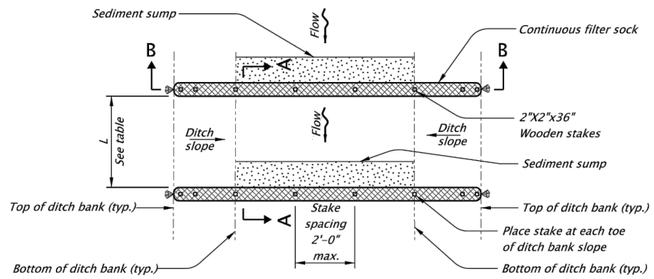


SECTION A–A

WATTLE / FIBER ROLL CHECK DAM – TYPE 2



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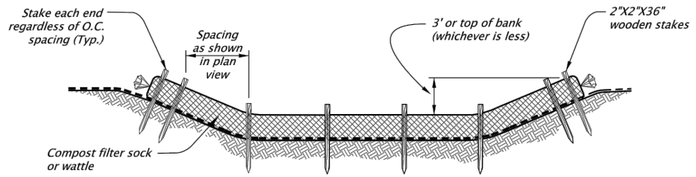
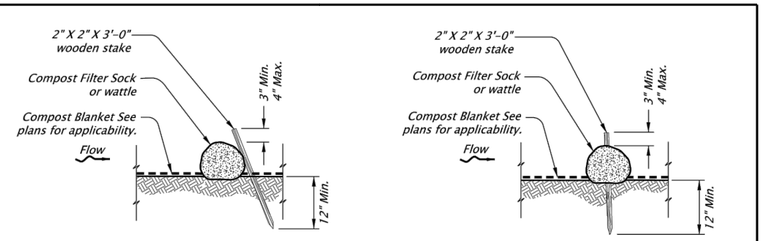


SECTION B–B

Note:
For stacking options refer to RD1032.

COMPOST FILTER SOCK CHECK DAM – TYPE 6



ALTERNATIVE 1 (Staking)

ALTERNATIVE 2 (Staking)

FIBER ROLL STAKING

MAXIMUM CHECK DAM SPACING "L"				
Ditch Grade	H=8"	H=12"	H=18"	H=24"
10%	* *	* *	15'	20'
9%	* *	* *	16'	22'
8%	* *	* *	18'	25'
7%	* *	* *	21'	28'
6%	* *	16'	25'	33'
5%	* *	20'	30'	40'
4%	16'	25'	37'	50'
3%	22'	33'	50'	66'
2%	33'	50'	75'	100'

* * Not Allowed H = Min dam height

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

CALC. BOOK NO. _ 6402, 6406, 6407 _

BASELINE REPORT DATE _ _ November 2017 _ _ _ _

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

OREGON STANDARD DRAWINGS

CHECK DAMS TYPE 2 AND 6

2018

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RD1006

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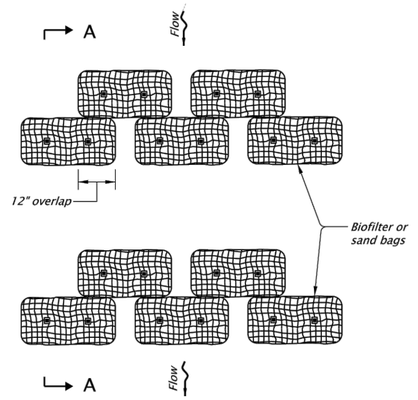
SHEET NO. C704

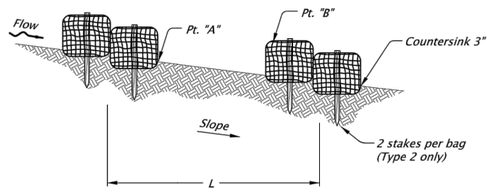
rd1006.dgn 11-29-2017

RD1006

rd1030.dgn 06-01-2017

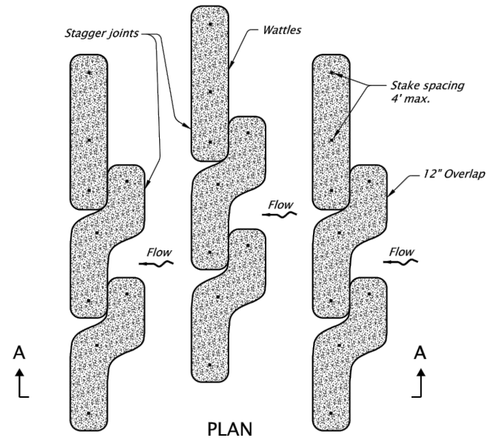


PLAN



SECTION A–A

BIOFILTER BAG / SAND BAG BARRIER – TYPE 2 AND 4



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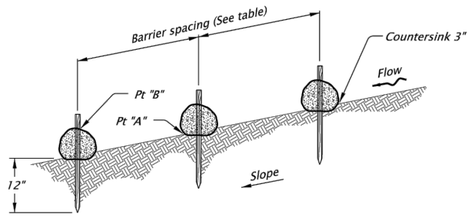

SECTION A–A

FIBER ROLL BARRIER – TYPE 3

Notes:

1. *For type 2 barrier, drive stakes flush with top of bag and into undisturbed ground a min. of 12". Omit stakes if bags are placed on paved surface.*
2. *For type 2 and 4 barrier, space bags (L) so that the elevation of point "A" is less than or equal to the elevation of point "B".*

Type 2 – Biofilter bags
Type 3 – Wattles
Type 4 – Sand bags

BARRIER SPACING

INSTALL PARALLEL ALONG CONTOURS AS FOLLOWS		
% SLOPE	% SLOPE	MAXIMUM SPACING ON SLOPE
10% Flatter	1:10 or Flatter	300'
10 > % ≥ 15	10 > X ≥ 7.5	150'
15 > % ≥ 20	7.5 > X ≥ 5	100'
20 > % ≥ 30	5 > X ≥ 3	50'
Steeper than 30%	Steeper than 1:3	25'

CALC. BOOK NO. _ 6402, 6406, 6407 _

BASELINE REPORT DATE _ _ January 2016 _ _ _ _ _

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

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OREGON STANDARD DRAWINGS

SEDIMENT BARRIER TYPE 2, 3 AND 4

2018

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RD1030

RD1030

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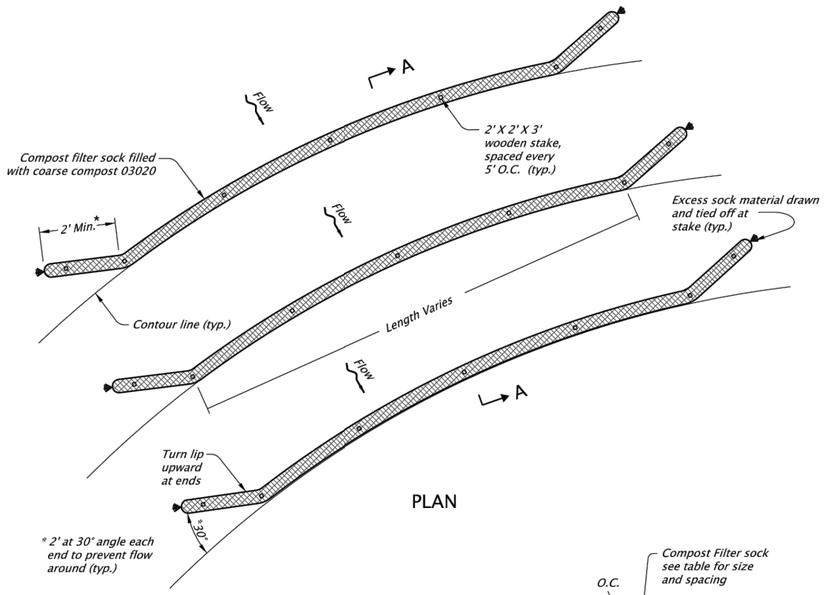
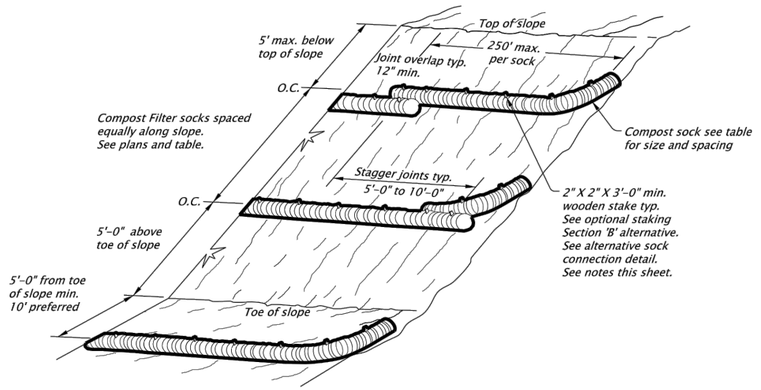
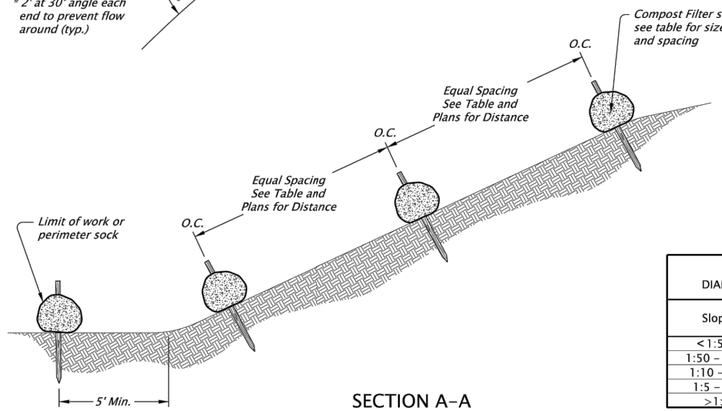


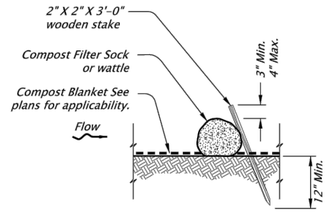
PLAN



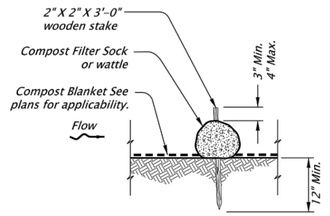
SLOPE APPLICATION – PERSPECTIVE VIEW



SECTION A–A



ALTERNATIVE 1 (Staking)



ALTERNATIVE 2 (Staking)

COMPOST FILTER SOCK DIAMETER AND SPACING BASED ON SLOPE		
Slope	Spacing (Ft)	Diameter (In)
< 1:50	250	8
1:50 – 1:10	125	12
1:10 – 1:5	100	12
1:5 – 1:2	50	18
>1:2	25	18

COMPOST FILTER SOCK

CALC. BOOK NO. _ 6403, 6404, 6405 _

BASELINE REPORT DATE _ _ July 2014 _ _ _ _ _ _ _ _

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

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OREGON STANDARD DRAWINGS

SEDIMENT BARRIER TYPE 8

2018

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RD1032

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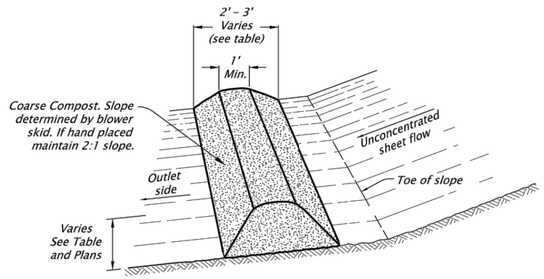
EROSION CONTROL DETAILS

SHEET NO. C706

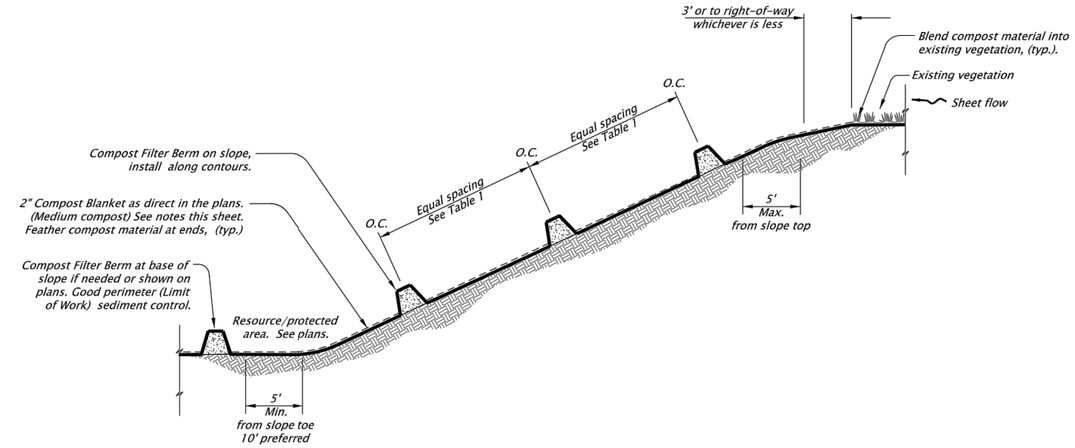


COMPOST FILTER BERM - TYPE 9

COMPOST FILTER BERM DIMENSIONS AND SPACING BASED ON SLOPE				
Slope	Berm Spacing	Berm Dimensions		
		Height	Bottom width	Top width
< 50:1	250 ft	1 ft	2 ft (min.)	1 ft
50:1 - 10:1	125 ft	1 ft	2 ft (min.)	1 ft
10:1 - 5:1	100 ft	1 ft	2 ft (min.)	1 ft
3:1 - 2:1	50 ft	1.3 ft	2.6 ft (min.)	1 ft
> 2:1		1.5 ft	3 ft (min.)	1 ft

Compost Filter Berm General Notes

1. *Compost filter berms are sediment control devices for areas where runoff occurs as sheet flow. See Section 00280, Oregon Standard Specifications.*
2. *The maximum drainage area for a continuous berm shall be 1/4 acre per 100 linear feet of filter berm.*
3. *Where possible, berms should be placed away from the toe of slopes a minimum of 5 feet (10 feet preferred) to allow for energy dissipation and sediment storage.*
4. *Direct the outlet side of filter berm, located at base of slope, onto a stabilized area, such as vegetation and/or aggregate.*
5. *Place filter berms along or on the ground contour with the ends of the filter berm turned up slope per details. Adequate area shall be provided behind berm for ponding.*
6. *Compost filter berms may be vegetated with temporary or permanent seeding after placement.*
7. *If placed in area with existing ground vegetation, cut vegetation to 2-4 inches above grade at berm footprint. Do not remove existing vegetation or cut back outside berm footprint unless directed by Agency.*
8. *If soils are exposed apply compost blanket per details and specifications.*



COMPOST FILTER BERM SERIES

CALC. BOOK NO. _ 6403, 6404, 6405 _	BASELINE REPORT DATE _ _ July 2014 _ _ _ _ _ _ _
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	OREGON STANDARD DRAWINGS **SEDIMENT BARRIER TYPE 9** 2018
	DATE / REVISION DESCRIPTION

Effective Date: June 1, 2018 - November 30, 2018 RD1033

RD1033

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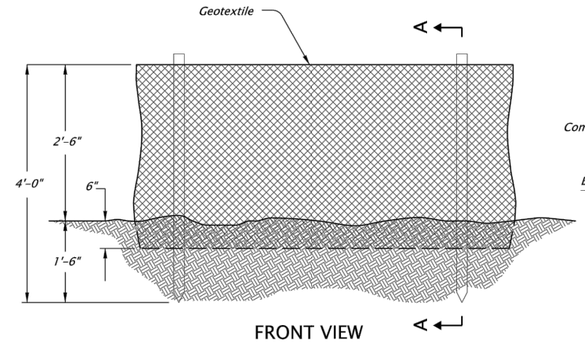
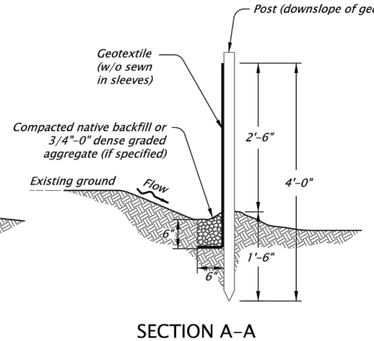
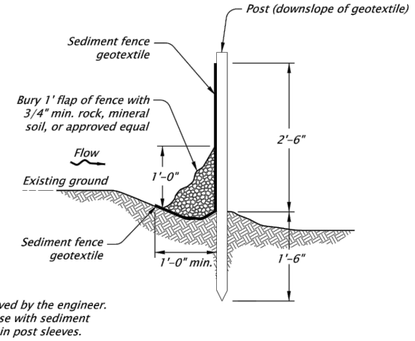


FRONT VIEW



SECTION A-A

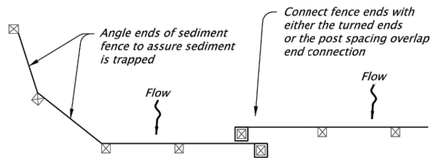
SEDIMENT FENCE AND GEOTEXTILE BURY DETAIL - TYPE 1



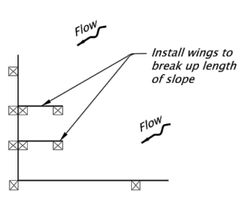
NOTES:

1. *Use must be approved by the engineer.*
2. *Not approved for use with sediment fencing with sewn-in post sleeves.*

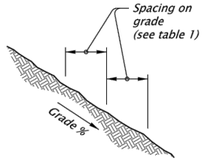
ALTERNATE SEDIMENT FENCE W/O TRENCHING - TYPE 2



PLAN VIEW



TERMINATION AT CORNER OR PROPERTY LINE



NOTES:

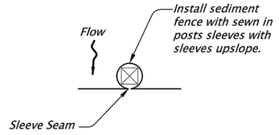
1. *Use 2" X 2" wood fence posts.*
2. *Posts to be installed on downhill side of sediment fence geotextile. Position posts to prevent separation from geotextile.*
3. *Compact filter fabric trench backfill and soil on uphill side of fence.*
4. *Locate fence no closer than three feet to the toe of a slope.*
5. *Wing spacing shall comply with table 1.*

TABLE 1
FENCE SPACING
FOR GENERAL APPLICATION

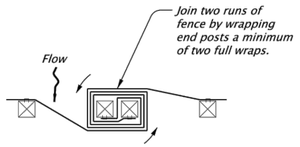
INSTALL PARALLEL ALONG CONTOURS AS FOLLOWS	
GRADE	MAXIMUM SPACING ON GRADE
Grade <10%	300'
10% ≤ Grade <15%	150'
15% ≤ Grade <20%	100'
20% ≤ Grade <30%	50'
30% ≤ Grade	25'

TABLE 2

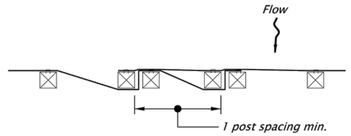
POST SPACING	
6'	Sediment Fence with Geotextile elongation less than 50%
4'	Sediment Fence with Geotextile elongation 50% or more



GEOTEXTILE WITH POST SLEEVES



TURNED ENDS CONNECTION



POST SPACING OVERLAP CONNECTION

GEOTEXTILE END CONNECTIONS

RD1040

CALC. BOOK NO. 6403, 6404, 6405

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BASELINE REPORT DATE November 2017

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

OREGON STANDARD DRAWINGS

SEDIMENT FENCE

2018

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SHEET NO. C708

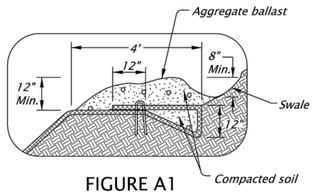


FIGURE A1

TOP OF BANK ANCHOR TRENCH, H>3' AND TERMINAL SLOPE

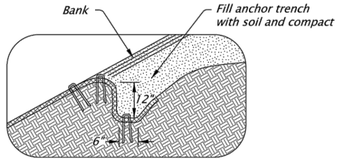


FIGURE A2

TOP OF BANK ANCHOR TRENCH, H<3'

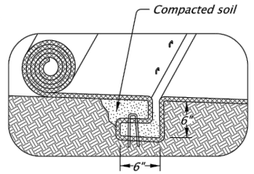


FIGURE A3

CHANNEL CHECK SLOT

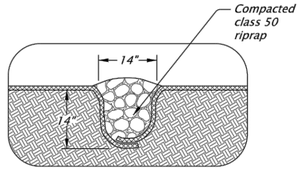


FIGURE A4

CHANNEL CHECK SLOT WITH ROCK BACKFILL

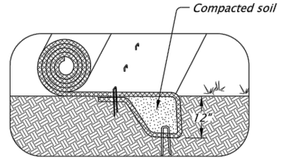
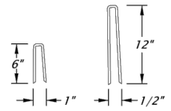
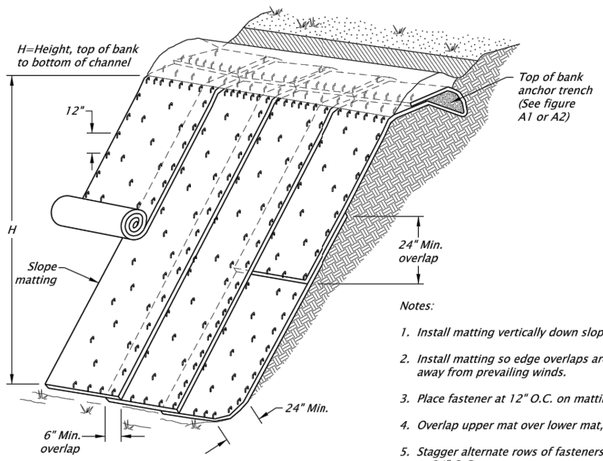


FIGURE A5

INITIAL CHANNEL ANCHOR TRENCH



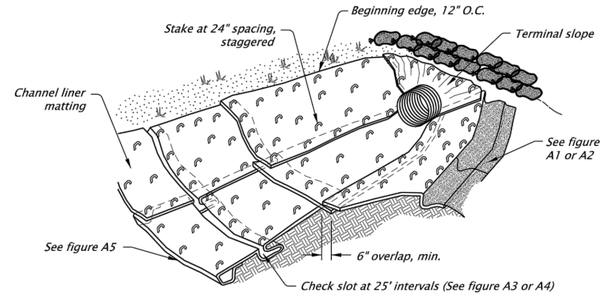
STAPLES



SLOPE ISOMETRIC VIEW

Notes:

1. *Install matting vertically down slope.*
2. *Install matting so edge overlaps are shingled away from prevailing winds.*
3. *Place fastener at 12" O.C. on matting edges*
4. *Overlap upper mat over lower mat, and fasten.*
5. *Stagger alternate rows of fasteners placed at 24" O.C.*
6. *Extend mat 24" beyond toe of slope; fold mat back under 4" and fasten.*



CHANNEL ISOMETRIC VIEW

Notes:

1. *Install channel liner matting, in the direction of water flow. Anchor upstream end of mat with check slot for culvert outfalls, place mat under pipe 12" minimum upstream from pipe outlet.*
2. *Construct check slots across channel bottom at 25' spacing and at the end of each mat (Fig. A3 or A4).*
3. *Overlap side channel liner matting edges 6" over the center channel liner matting and fasten edges 12" O.C. Continue overlap and stapling pattern for each additional side channel liner mat.*
4. *Lap upstream matting end 12" over beginning edge of downstream matting. Fasten 12" O.C.*
5. *Anchor top edge of side channel matting in trench and fasten 12" O.C. (Fig. A2).*
6. *Fasten matting interior at 24" O.C. with staggered spacing.*
7. *Construct initial anchor trench at downstream end of matting and terminal slope anchor at upstream end.*

CALC. BOOK NO. 6403, 6404, 6405

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

BASELINE REPORT DATE July 2014

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

OREGON STANDARD DRAWINGS

SLOPE AND CHANNEL MATTING

2018

DATE	REVISION DESCRIPTION

Effective Date: June 1, 2018 - November 30, 2018

RD1055

rd1055.dgn 06-01-2017

RD1055

NO.	DATE	BY	CHK	APPD.	REVISION AND RECORD OF ISSUE
2	9/26/18	BH		TS	Rev B - Issued for Review
1	8/10/18	BH		TS	Rev A - Issued for Review

DOC. CONTROL NO.: J1-600-CIV-DTL-DEA-00010-01 Rev B-ISSUED FOR REVIEW

DRAFT PLANS FOR REVIEW ONLY

DAVID EVANS AND ASSOCIATES INC.
2100 SW River Parkway
Portland Oregon 97201
Phone: 503.223.6663

Jordan Cove LNG

JORDAN COVE ENERGY PROJECT
KENTUCK PROJECT SITE

COOS COUNTY

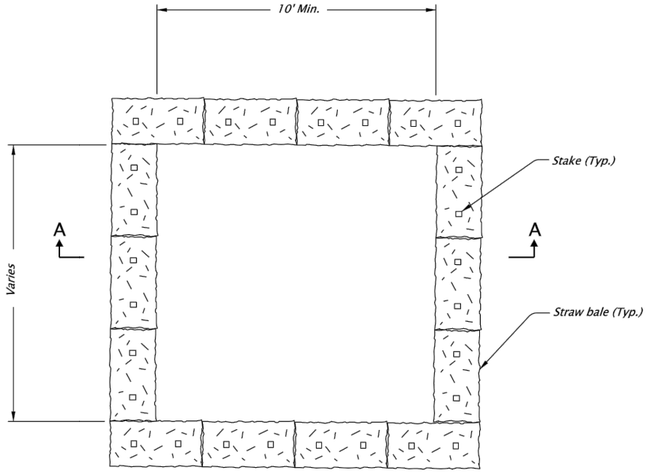
Designer: B. Henri Review: B. Guthrie

Drafter: T. Danisch Checker: -

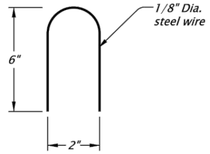
EROSION CONTROL DETAILS

SHEET NO. C709

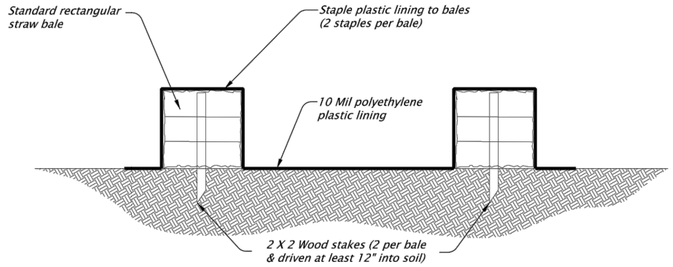
rd1070.dgn 06-01-2017



PLAN



STAPLE DETAIL



SECTION A–A

CONCRETE TRUCK WASH OUT FACILITY

RD1070

CALC. BOOK NO. 6403, 6404, 6405	BASELINE REPORT DATE July 2014
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DATE	REVISION DESCRIPTION

Effective Date: June 1, 2018 - November 30, 2018

RD1070

NO.	DATE	BY / CHK	APPD.	REVISION AND RECORD OF ISSUE
2	9/26/18	BH	TS	Rev B - Issued for Review
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Jordan Cove LNG℠

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KENTUCK PROJECT SITE

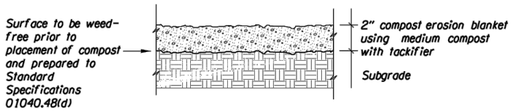
COOS COUNTY

Designer: B. Henri Review: B. Guthrie

Drafter: T. Danisch Checker: -

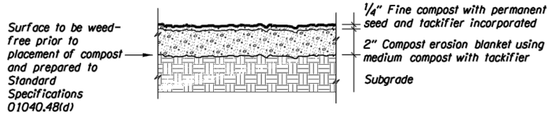
EROSION CONTROL DETAILS SHEET NO. C710

COMPOST BLANKET



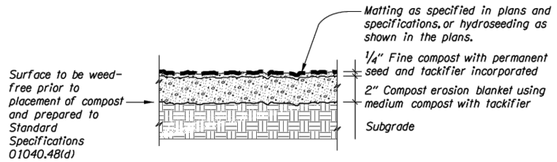
Note: See Standard Specifications 03020 for compost specifications.

APPLICATION - TEMPORARY/PERMANENT MULCHING
N.T.S.



Note: See Standard Specifications 03020 for compost specifications.

APPLICATION - TEMPORARY/PERMANENT VEGETATIVE COVER
N.T.S.



Note: See Standard Specifications 03020 for compost specifications.
See plans and specifications for matting when required.

APPLICATION - STEEP SLOPES, SHALLOW DITCHES & BIO-SWALES
N.T.S.

det6017.dgn 03-Nov-2015

DET6017

The selection and use of this detail, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

OREGON DEPARTMENT OF TRANSPORTATION
TECHNICAL SERVICES
DETAILS

COMPOST BLANKET

DETAIL NO. DET6017

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KENTUCK PROJECT SITE

COOS COUNTY

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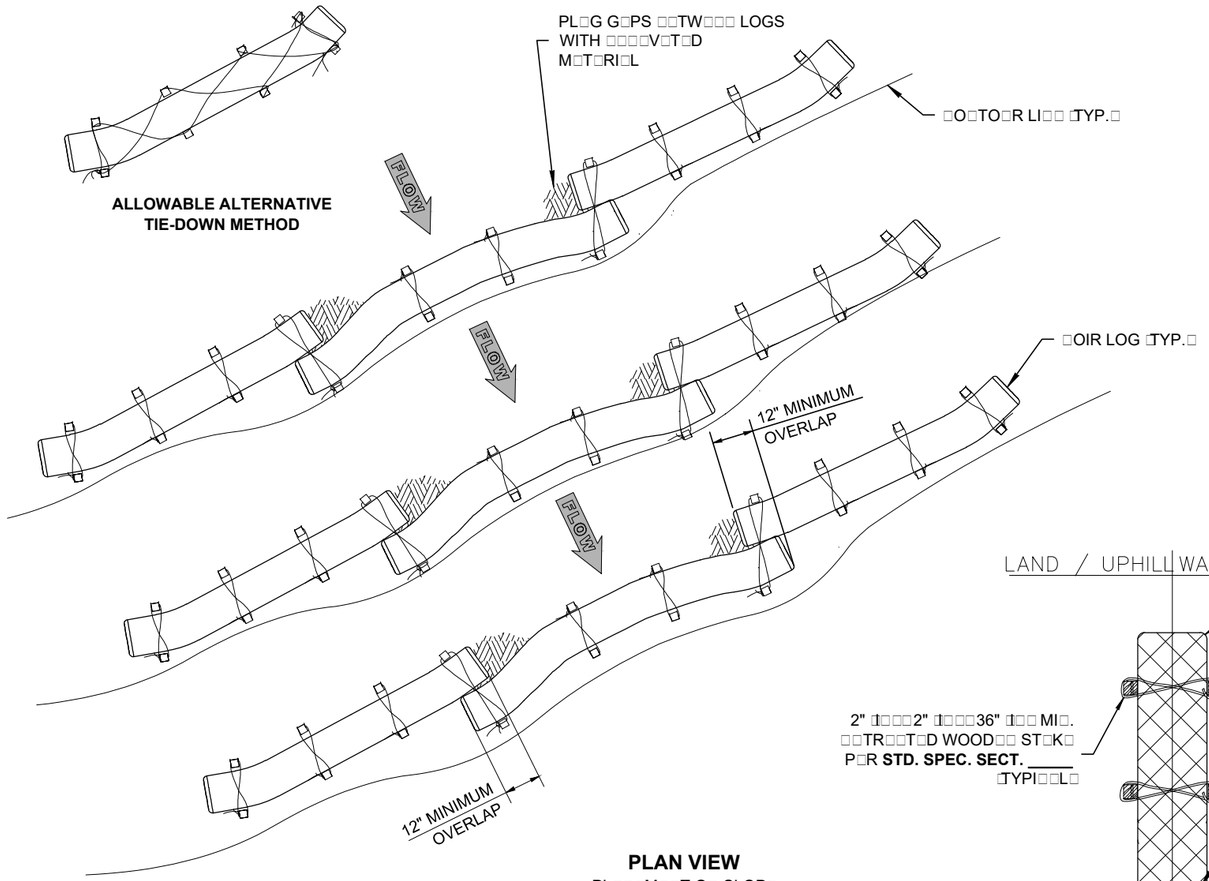
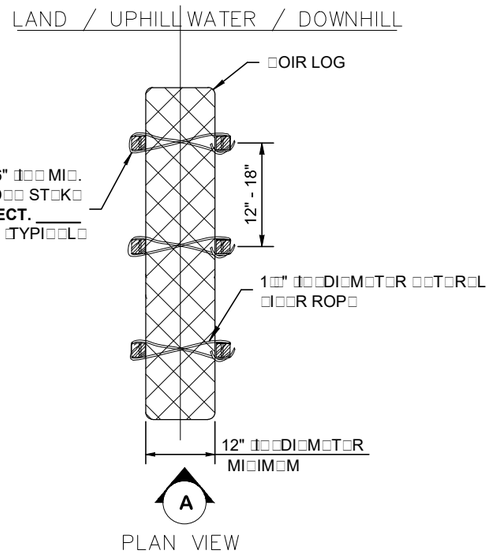
Drafter: T. Danisch
Review: B. Guthrie
Checker: -

EROSION CONTROL DETAILS

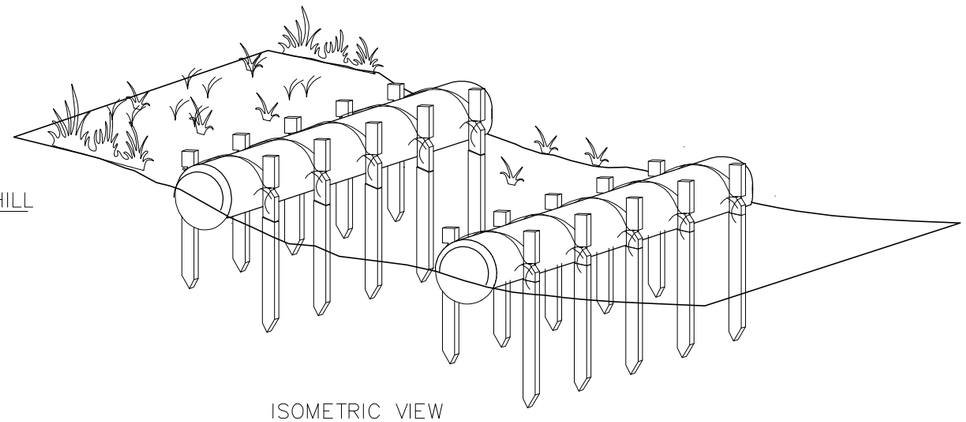
SHEET NO. C711





PLAN VIEW

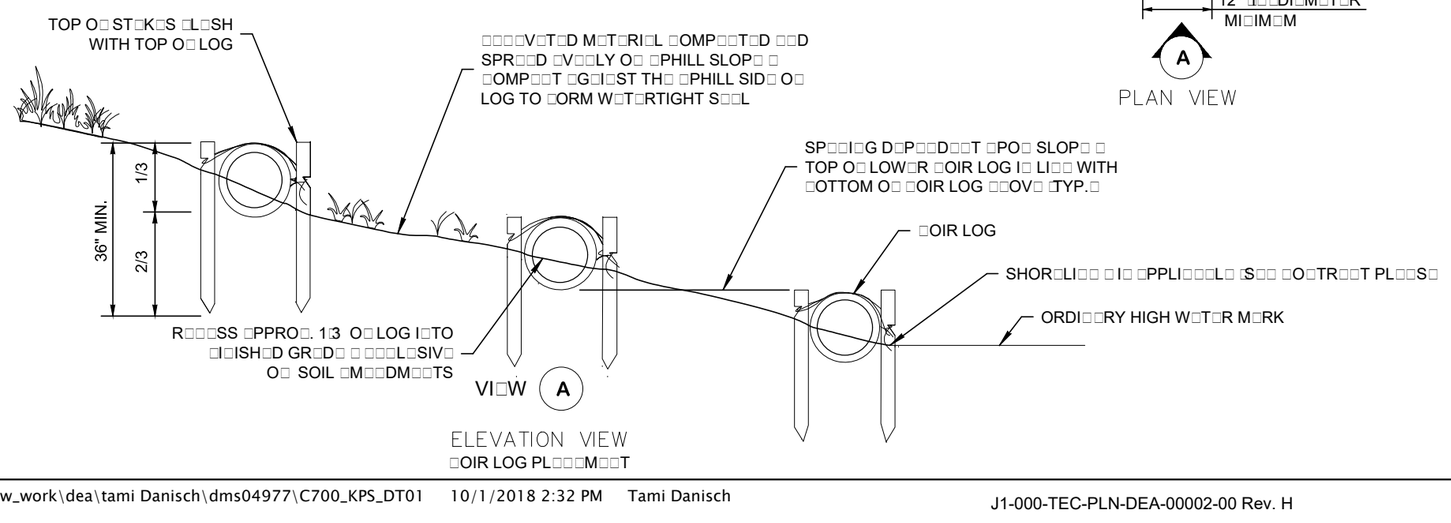
PL□□□M□□T O□ SLOP□



ISOMETRIC VIEW

NOTES

1. □oir log□ □hall □e in□talled □tarting at the □otto□ o□the □lo□e and working □□hill.
2. □□□avated □aterial □hall □e □□read evenly along the □□hill □lo□e and □o□ □a□ted □y hand ta□ □ing or other □ethod□a□□roved □y the □ngineer.
3. Overla□ □oir log end□ □y 12" □in□to □revent water □ro□ □oving □etween log□.
4. □lway□in□tall □oir log □er□endi□□lar to □lo□e along □onto□r line□. □nd□ □hall angle □□hill to □revent □ow aro□nd the □oir log.
5. □□e an ade□□ate n□□ □er o□□take□to en□□re log□are □e□□re.
6. □oir log□ □hall □e in a□□ordan□e with **Standard Specification Section _____**□ and □e in□talled in a□□ordan□e with **Standard Specification Section _____.**
7. Per□or□ □aintenan□e in a□□ordan□e with **Standard Specification Section _____.**



ELEVATION VIEW

□OIR LOG PL□□□M□□T

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1	8/10/18	BH	TS	Rev A - Issued for Review

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JORDAN COVE ENERGY PROJECT
KENTUCK PROJECT SITE

COOS COUNTY

Designer: B. Henri | Review: B. Guthrie
Drafter: T. Danisch | Checker: -

EROSION CONTROL DETAILS

SHEET NO. C712

APPENDIX C: PIPELINE PERMANENT WETLAND IMPACTS BY WATERSHED

Pacific Connector Gas Pipeline Project Permanent Wetland Type Conversion Impacts

County	Watershed (HUC 10)	Wetland Name	Milepost	Cowardin Classification	CL Crossing Length (Feet)	Permanent Wetland Type Conversion (Acres)
Coos	Coos Bay-Frontal Pacific Ocean (1710030403)	APC-C2	1.16	PSS1R	15.0	< 0.01
		EE-WW-9902	1.22	PSSC	53.9	0.01
		W1-02	6.47	PFO	98.1	0.07
					Watershed Total	**0.08**
	North Fork Coquille River (1710030504)	W-T02-003A-1	22.50	PSSS1C	246.16	0.06
		WW-222-009 (CW-10)	23.38	PFOC	173.7	0.12
					Watershed Total	**0.18**
					Coos County Total	**0.26**
Douglas	Middle Fork Coquille River (1710030501)	W3-01 (BW-38 (MOD))	46.56	PFO1	39.4	0.03
					Watershed Total	**0.03**
	Olalla Creek-Lookingglass Creek (1710030212)	DA-15	56.69	PFO	415.8	0.29
		BW-160	56.75	PFOC	86.6	0.06
		BW-162	56.83	PFO/PEMC	28.2	0.02
					Watershed Total	**0.37**
	Upper Cow Creek (1710030206)	WW-111-001	109.17	PSS	11.0	<0.01
		WW-111-001 (GW-14 (FS-HF-C))	109.15		36.2	0.01
					Watershed Total	**0.01**
					Douglas County Total	**0.41**
Jackson	Big Butte Creek (1710030704)	AW-244	130.83	PSSC	125.5	0.03
		R5-02 (AW-264 (MOD))	132.77	PFO	15.9	0.01
					18.3	0.01
		R5-05 (AW-239)	133.92	PSSC	159.2	0.04

County	Watershed (HUC 10)	Wetland Name	Milepost	Cowardin Classification	CL Crossing Length (Feet)	Permanent Wetland Type Conversion (Acres)
					Watershed Total	0.09
	Little Butte Creek (1710030708)	EW-63	145.55	PEMC/PSSC	1.7	<0.01
					Watershed Total	<0.01
					Jackson County Total	**0.09**
Klamath	Spencer Creek (1801020601)	WW-001-013 (EW-85)	171.06	PFO/PSS	63.9	0.04
					83.4	0.06
		WW-201-004	171.60	PFO1A	30.93	0.02
		WW-502-EW-103 (EW-103 (MOD))	177.76	PEMC/PSSC	115.7	0.03
					Watershed Total	**0.15**
					Klamath County Total	**0.15**
					PCGP Project Total	**0.91**

APPENDIX D: EELGRASS SITE GEOMORPHIC HISTORY AND ANALYSIS

(J1-000-MAR-TNT-DEA-00001-00 Rev. A Septmber 28, 2018)

Jordan Cove LNG	Eelgrass Site Geomorphic History and Analysis	moffatt & nichol
	Document Number: J1-740-TEC-TNT-DEA-00002-00	
	Rev.: A / September 20, 2018	

TECHNICAL MEMORANDUM

DATE:	September 20, 2018
ATTENTION:	Derik Vowels, Drew Jackson, P.E.
COMPANY:	Jordan Cove LNG, LLC (JCLNG)
ADDRESS:	5615 Kirby Drive, Suite 500, Houston, TX 77005
FROM:	Kyle Landon, P.E., William Gerken, P.E. – Moffatt & Nichol
SUBJECT:	Eelgrass Site Geomorphic History and Analysis
DEA PROJECT NAME:	Regulatory Permitting Services
DEA PROJECT NO:	JLNG0000-0003
DOCUMENT #	J1-740-TEC-TNT-DEA-00002-00
COPIES TO:	Jim Starkes, Sean Sullivan, Suzanne Cary, Ethan Rosenthal

1. INTRODUCTION

Jordan Cove Energy Project, LP (JCEP) is seeking authorization from the Federal Energy Regulatory Commission (FERC) under Section 3 of the Natural Gas Act (NGA) to site, construct, and operate a natural gas liquefaction and liquefied natural gas (LNG) export facility (LNG Terminal), located on the bay side of the North Spit of Coos Bay, Oregon. The LNG Terminal, related facilities, temporary construction sites, and other sites/actions associated with LNG Terminal construction are collectively referred to as the "JCEP Project Area" as shown on Figure 1-1.

One component of the JCEP Project is the construction of an Eelgrass Mitigation Site. The intent of the Eelgrass Mitigation Site is to lower the existing bottom grade of an elevated shoal and plant it with eelgrass as compensatory mitigation for the proposed construction of an Access Channel at the LNG Terminal. The shoal currently does not support eelgrass because of elevations that are too high for optimal growth. Most of this area is currently between elevations +1.0' and +2.7' MLLW (+0.0 ft and +2.0 ft NAVD88 based on a conversion factor of -0.72 ft and would be lowered to an elevation of -1.3 ft MLLW (-2.0 ft NAVD88; Figure 1-2).

In support of the permitting efforts for the JCEP, Moffatt & Nichol (M&N) has prepared this technical memorandum to describe the historic and anticipated geomorphic changes at the proposed Eelgrass Mitigation Site. Specifically, the purpose of this memorandum is to determine whether the forces that created the shoal at the existing site would also cause the deepened mitigation site to fill with sediment. The US Army Corps of Engineers expressed this concern in comments provided on the Compensatory Wetland Mitigation Plan. The memorandum consists of two main sections and a summary. The historic analysis section examines aerial photographs, charts, and construction drawings to document how the proposed mitigation site and surrounding areas have changed over time. The hydrodynamic modeling section summarizes the findings from previous modeling studies that are relevant to the proposed mitigation site. Lastly, the summary synthesizes the findings from the prior two sections.

Jordan Cove LNG	**Eelgrass Site Geomorphic History and Analysis**	moffatt & nichol
	Document Number: J1-740-TEC-TNT-DEA-00002-00	
	Rev.: A | **September 20, 2018**	

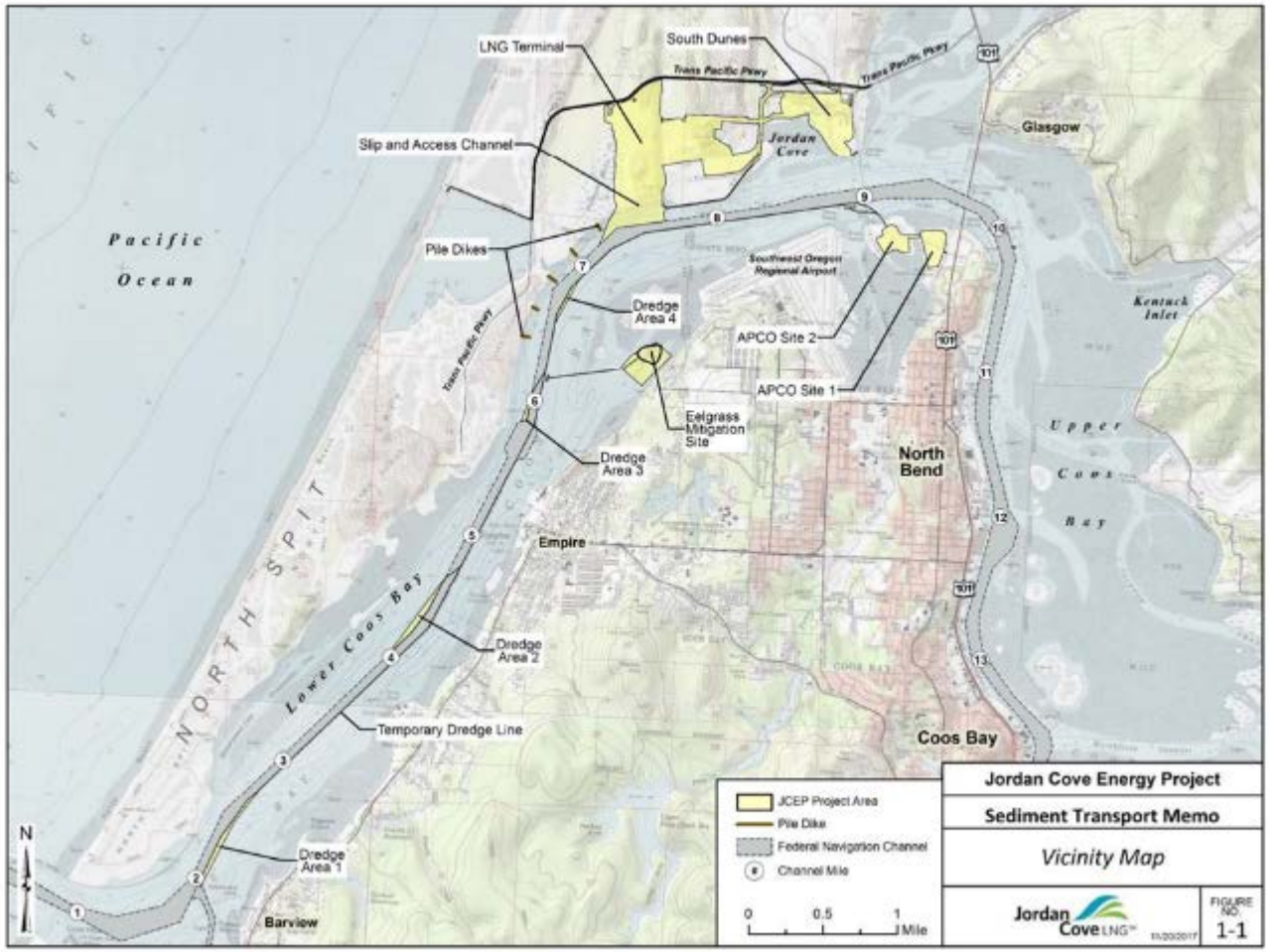

Figure 1-1. JCEP Project Area

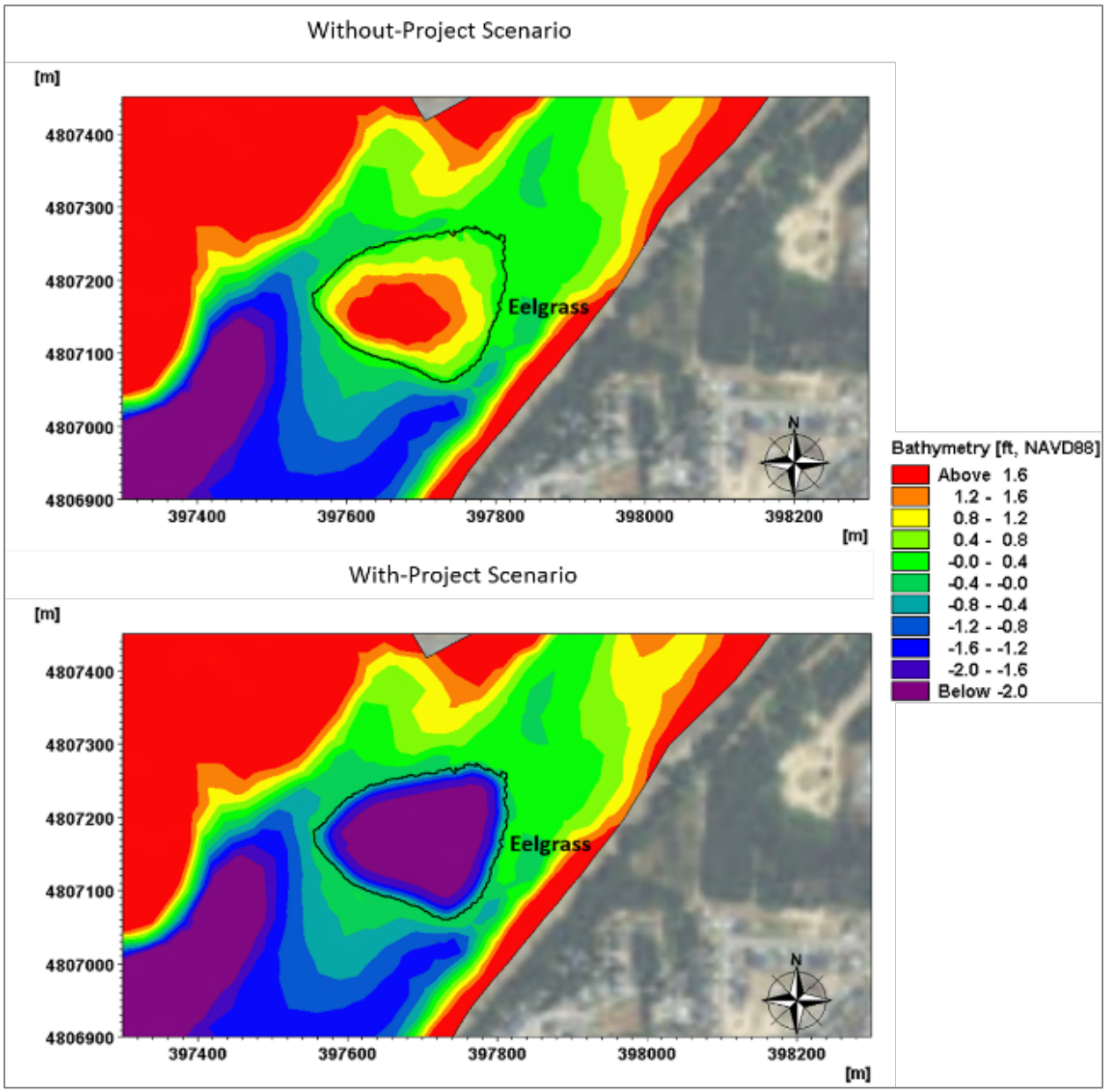

Figure 1-2. Bathymetry near the Proposed Eelgrass Mitigation Site *(Without-Project is shown in upper panel and With-Project is shown in lower panel)*

2. HISTORIC ANALYSIS

The Coos Bay estuary is a dynamic environment subjected to many changes as the population, water-dependent commerce, and level of development have increased over time. By examining the timing and the extent of localized changes in the vicinity of the Eelgrass Mitigation Site, the processes and stability of the proposed Eelgrass Mitigation Site can be understood better.

Prior to 1939, a small tidal channel wrapped along the bluffs of Pony Point, connecting Pony Slough to the main channel (Figure 2-1). Construction of the airfield on Pony Point began in 1939 and continued through 1946 (Figure 2-2). The first two runways (Runways 13/31 and 16/34) were built on fill placed in Pony Slough, followed by constructing the initial portion of runway roughly oriented in the east-west direction and alongside the navigation channel (Runway 4/22). This land reclamation project cut off the secondary channel to Pony Slough. Despite the construction of the airport, the secondary channel reformed across the western edge of Runway 4/22.

Between 1948 and 1951, the Coos Bay Federal Navigation Channel was deepened from 24 feet-MLLW to 30 feet-MLLW and much of the spoils were placed in shallow or intertidal areas of the bay. Construction drawings indicate that dredge spoils were placed in the intertidal zone of the inner bend of Jarvis Turn and alongside Runway 4/22 between River Miles 6 and 8 (Figure 2-3). Two islands formed on the inner bend of the Jarvis Turn as a result of the dredge spoil disposal operations. A 1957 aerial taken at a low tide shows the two spoil islands; however the spoil disposal area shown in Figure 2-3 farther east alongside Runway 4/22 is not apparent (Figure 2-4).

The spoil islands constricted the secondary channel altering the flow and sediment transport in the area. The increased flow velocity scoured the channel to an approximate depth of -8 feet MLLW, transporting suspended sediment from the main channel (Gonor et al. 1979). A delta-shaped shoal can be observed on the ebb-side of the constriction in the 1957 aerial (Figure 2-4). The shoal is fed by sediment that falls out of the water column after being carried through the constriction. By 1977, the shoal had grown and moved westward, toward the limits of the proposed Eelgrass Mitigation Site (Figure 2-5). Over the next decade, the shoal continued expanding and moving west. It is likely that dredge spoils blown from the unvegetated islands also contributed to the deposition in the tidal flats south east of the islands.

Between 1987 and 1988, Runway 4/22 was extended approximately 2,000 feet to the west (Figure 2-6). During this time, spoil material from the largest island was used as a source of fill for extending the runway footprint, and portions of the site were used for intertidal and eelgrass mitigation (CH2M Hill 1990; Figure 2-7). The expanded runway footprint obstructed the secondary channel, and reduced flow and sediment transport near the proposed Eelgrass Mitigation Site (Figure 2-8). The shoal has remained unchanged after the runway extension since the processes driving the shoal creation were eliminated. Sediment transport in the area is presently driven by significant, episodic events such as large wind storms from the west.

Jordan Cove LNG	Eelgrass Site Geomorphic History and Analysis		moffatt & nichol
	Document Number: J1-740-TEC-TNT-DEA-00002-00		
	Rev.: A	September 20, 2018	

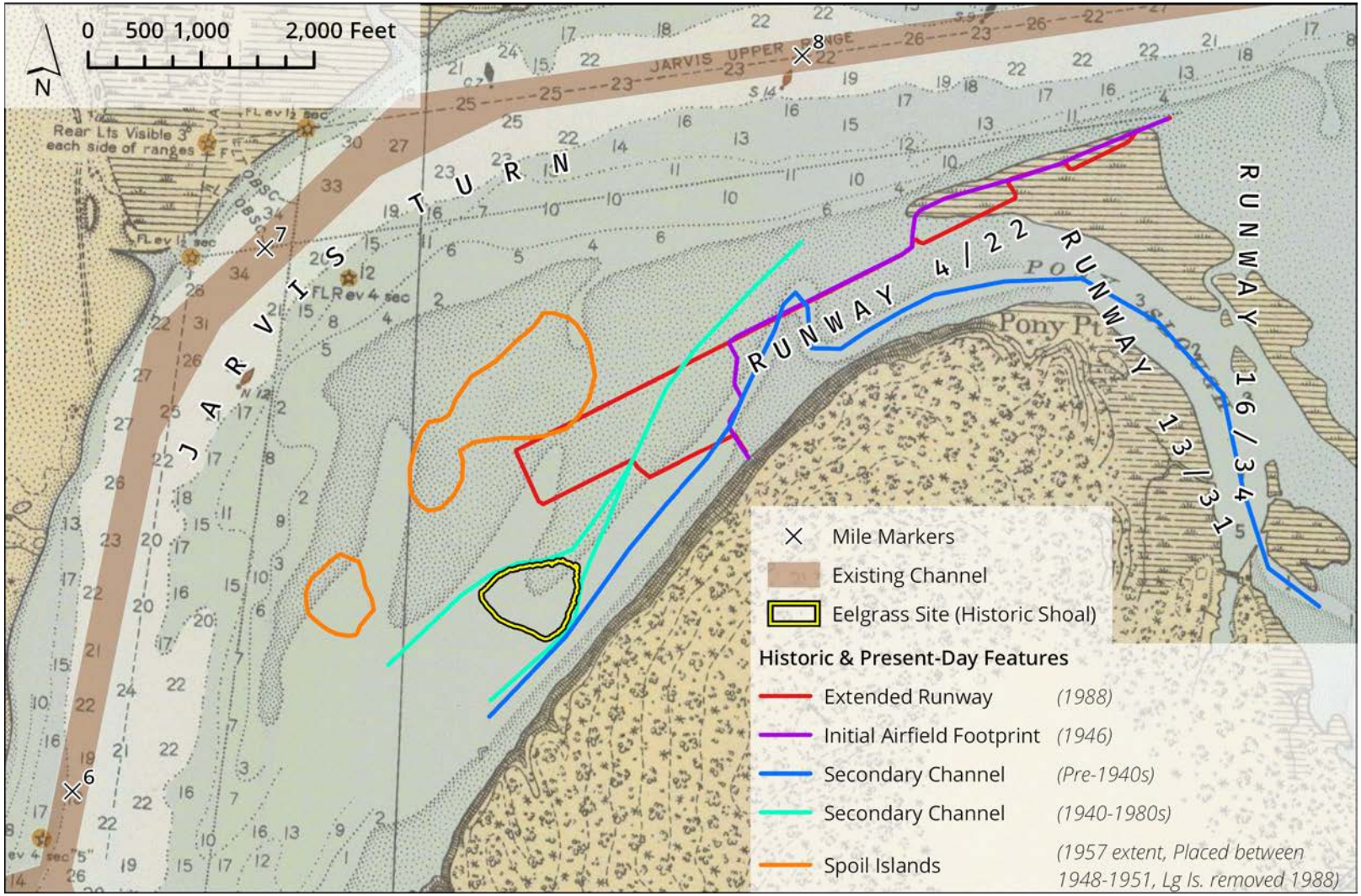

Figure 2-1. 1936 NOAA Navigation Chart

Jordan Cove LNG	Eelgrass Site Geomorphic History and Analysis		moffatt & nichol
	Document Number: J1-740-TEC-TNT-DEA-00002-00		
	Rev.: A	September 20, 2018	

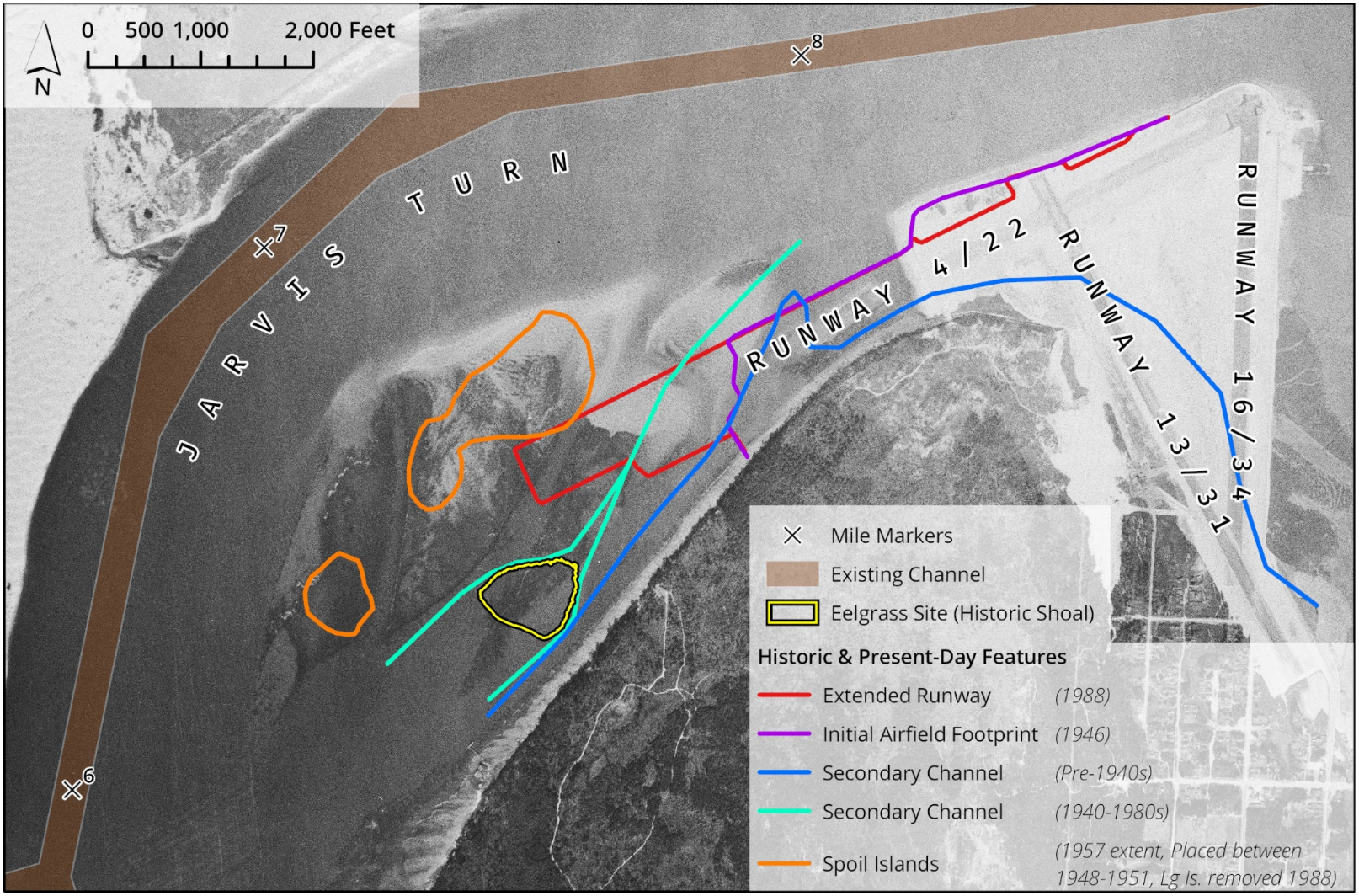

Figure 2-2. 1942 Aerial