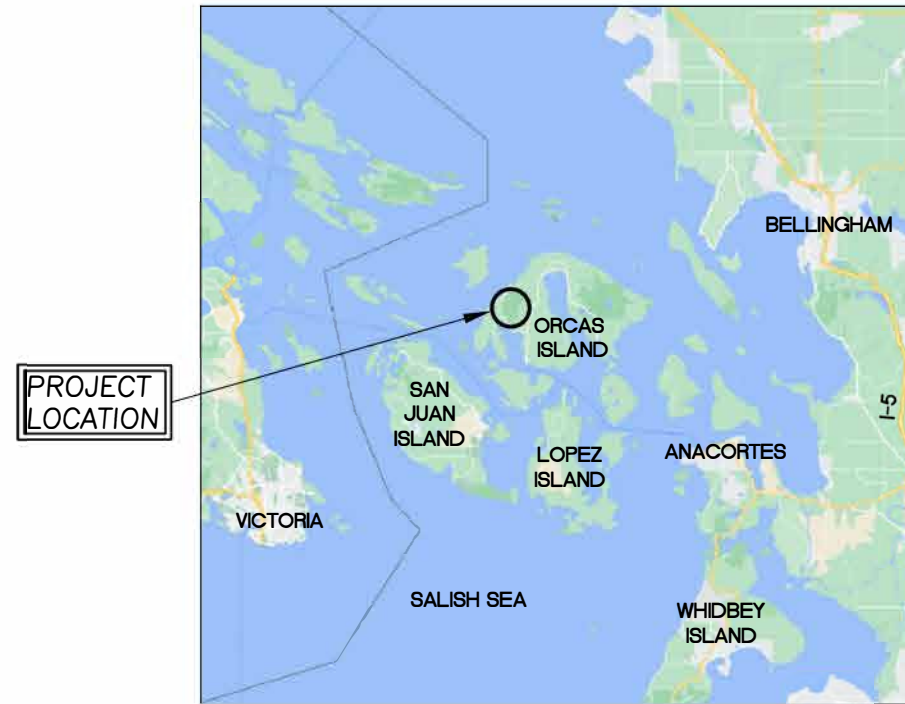


# TURTLEBACK MOUNTAIN PRESERVE FOREST ROADS IMPROVEMENT PROJECT

**NOTE: Not all culverts identified in this plan are being replaced in this project.**



VICINITY MAP  
N.T.S. (GOOGLE)



REGIONAL MAP  
N.T.S. (GOOGLE)

### GENERAL NOTES

- LIDAR TOPOGRAPHIC MAPPING WAS PERFORMED BY:  
QUANTUM SPATIAL, INC.  
1100 NE CIRCLE BLVD, SUITE 126  
CORVALLIS, OR 97330  
SURVEY DATES: MARCH 2-MARCH 21, 2019
- ELEVATION DATUM AND BASIS OF BEARINGS: LIDAR TIES TO NAD83 WASHINGTON STATE PLANE NORTH.
- CONTOUR INTERVAL IS FIVE FEET. ELEVATIONS AND DISTANCES SHOWN ARE IN DECIMAL FEET.
- TURTLEBACK MOUNTAIN PRESERVE BOUNDARY, ROADS, AND STREAMS ARE APPROXIMATE BASED ON LIDAR AND PUBLICLY AVAILABLE GIS DATA.
- THIS IS NOT A BOUNDARY SURVEY. PROPERTY LINES WERE COMPILED FROM RECORD INFORMATION.
- ALL CONSTRUCTION AND MATERIALS SHALL CONFORM TO THE 2020 EDITION OF THE STATE OF WASHINGTON STANDARD SPECIFICATIONS, ISSUED BY THE DEPARTMENT OF TRANSPORTATION (HEREAFTER REFERRED TO AS "STANDARD SPECIFICATIONS").
- THESE DESIGNS ARE INCOMPLETE WITHOUT THE FINAL STAMPED TECHNICAL SPECIFICATIONS PREPARED BY WATERWAYS CONSULTING, INC. REFER TO TECHNICAL SPECIFICATIONS FOR DETAILS NOT SHOWN HEREON.

### ABBREVIATIONS

AVG.	AVERAGE
CC	CONCRETE
CY	CUBIC YARDS
DIA.	DIAMETER
E	EXISTING
EG	EXISTING GROUND
ELEV.	ELEVATION
DI	DRAINAGE INLET
FG	FINISHED GRADE
FT	FEET
INV	INVERT
MIN	MINIMUM
N	NEW
NIC	NOT IN CONTRACT
N.T.S.	NOT TO SCALE
O.C.	ON CENTER
RC	RELATIVE COMPACTION
RSP	ROCK SLOPE PROTECTION
SPK	SPIKE
SQ.FT.	SQUARE FOOT
T	TREE
T.B.D.	TO BE DETERMINED
TYP	TYPICAL
UNK	UNKNOWN
WSE	WATER SURFACE ELEVATION
YR	YEAR

### WATER TYPE CLASSIFICATION

Np	NON-FISH YEAR-ROUND
Ns	NON-FISH SEASONAL
X	UNDEFINED WATER FEATURE

### PROJECT DESCRIPTION

THESE DRAWINGS PROVIDE DESIGN DETAILS FOR THE REPLACEMENT AND/OR INSTALLATION OF CULVERTS, DECOMMISSIONING OF ROADS, AND PLACEMENT OF WATER BARS TO IMPROVE DRAINAGE WITHIN THE TURTLEBACK MOUNTAIN PRESERVE IN SAN JUAN COUNTY, WASHINGTON.

WORK SHALL CONSIST OF REMOVAL AND DISPOSAL OF CERTAIN EXISTING CULVERTS, REPLACEMENT WITH NEW CULVERTS, INSTALLATION OF CROSS CULVERTS AND ROLLING DIPS, AND DECOMMISSIONING OF SECTIONS OF PRESERVE ROADS.

### SHEET INDEX

C1	COVER
C2	OVERVIEW MAP
C3	SITE PLAN
C4	SITE PLAN
C5	SITE PLAN
C6	SITE PLAN
C7	SITE PLAN
C8	SITE PLAN
C9	SITE PLAN
C10	DETAILS
C11	DETAILS
C12	DETAILS
C13	DETAILS
C14	EROSION AND SEDIMENT CONTROL

### SECTION AND DETAIL CONVENTION

SECTION OR DETAIL IDENTIFICATION  
(NUMBER OR LETTER)



SHEET REFERENCE

**\* CALL BEFORE YOU DIG \***  
CONTACT UNDERGROUND SERVICE ALERT (USA)  
PRIOR TO ANY CONSTRUCTION WORK 1-800-227-2600

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PREPARED AT THE REQUEST OF:  
SAN JUAN ISLANDS  
CONSERVATION LAND BANK

COVER

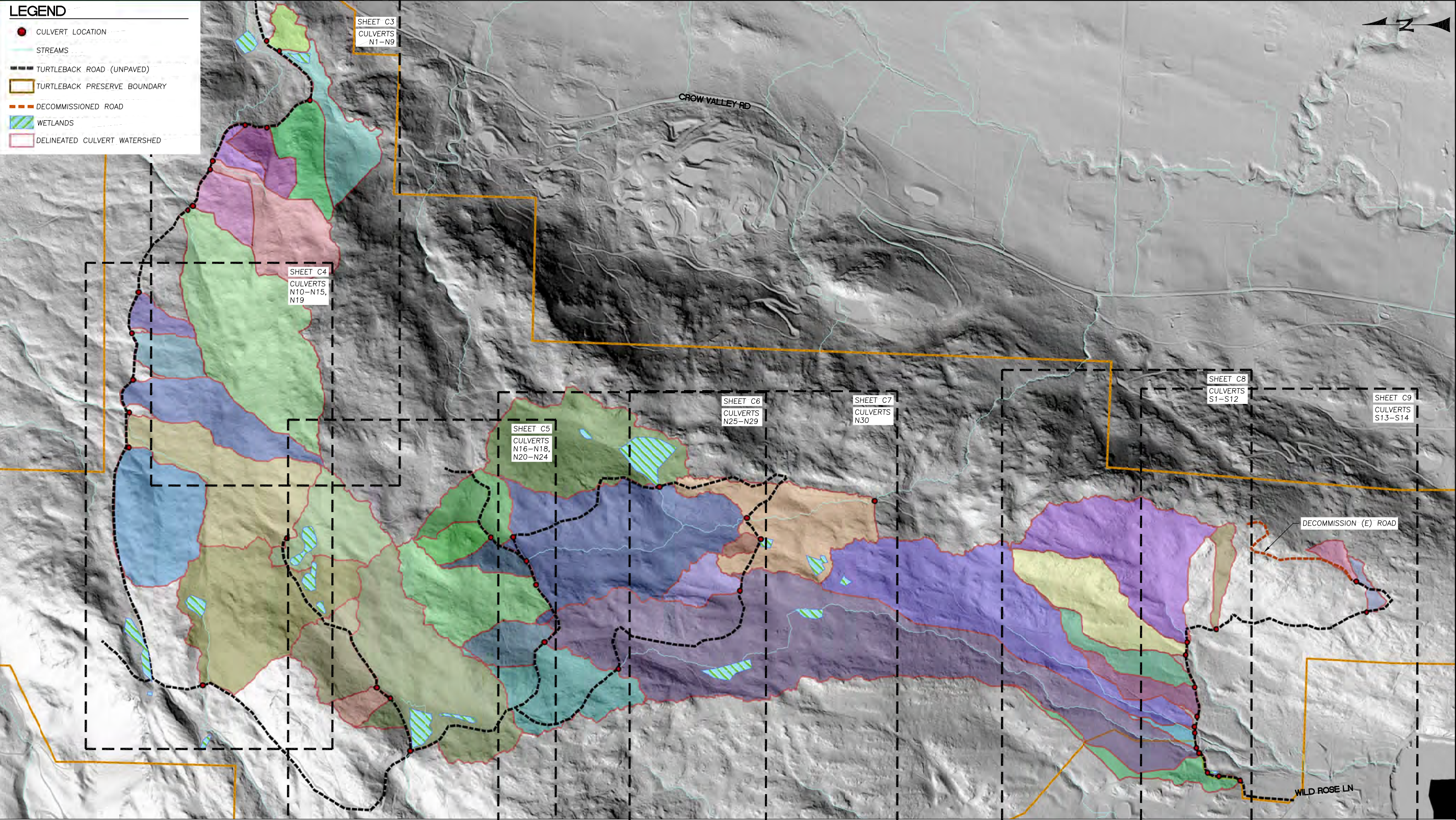
TURTLEBACK MOUNTAIN  
PRESERVE FOREST ROADS  
IMPROVEMENT PROJECT  
CULVERT ASSESSMENT

DESIGNED BY: JD./J.H.  
DRAWN BY: C.B.  
CHECKED BY: J.H.  
DATE: 8/18/2022  
JOB NO.: 21-081

BAR IS ONE INCH ON  
ORIGINAL DRAWING.  
ADJUST SCALES FOR  
REDUCED PLOTS  
0" = 1"

**LEGEND**

- CULVERT LOCATION
- STREAMS
- TURTLEBACK ROAD (UNPAVED)
- TURTLEBACK PRESERVE BOUNDARY
- DECOMMISSIONED ROAD
- WETLANDS
- DELINEATED CULVERT WATERSHED



**WATERWAYS CONSULTING INC.**

509A SWIFT ST.  
SANTA CRUZ, CA 95060  
PH: (831) 427-1252 FAX: (831) 919-6847  
WWW.WATERWAYS.COM

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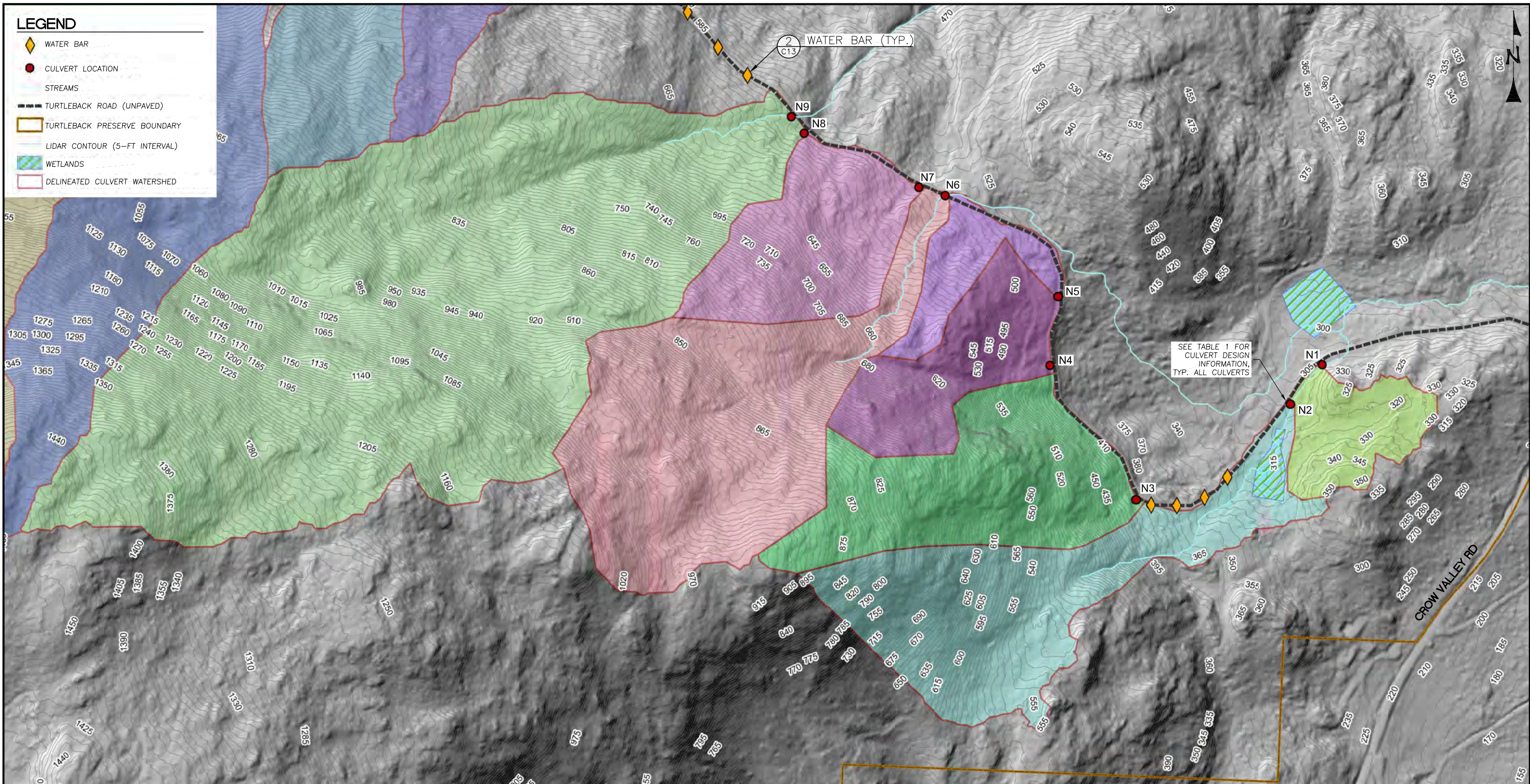
OVERVIEW MAP

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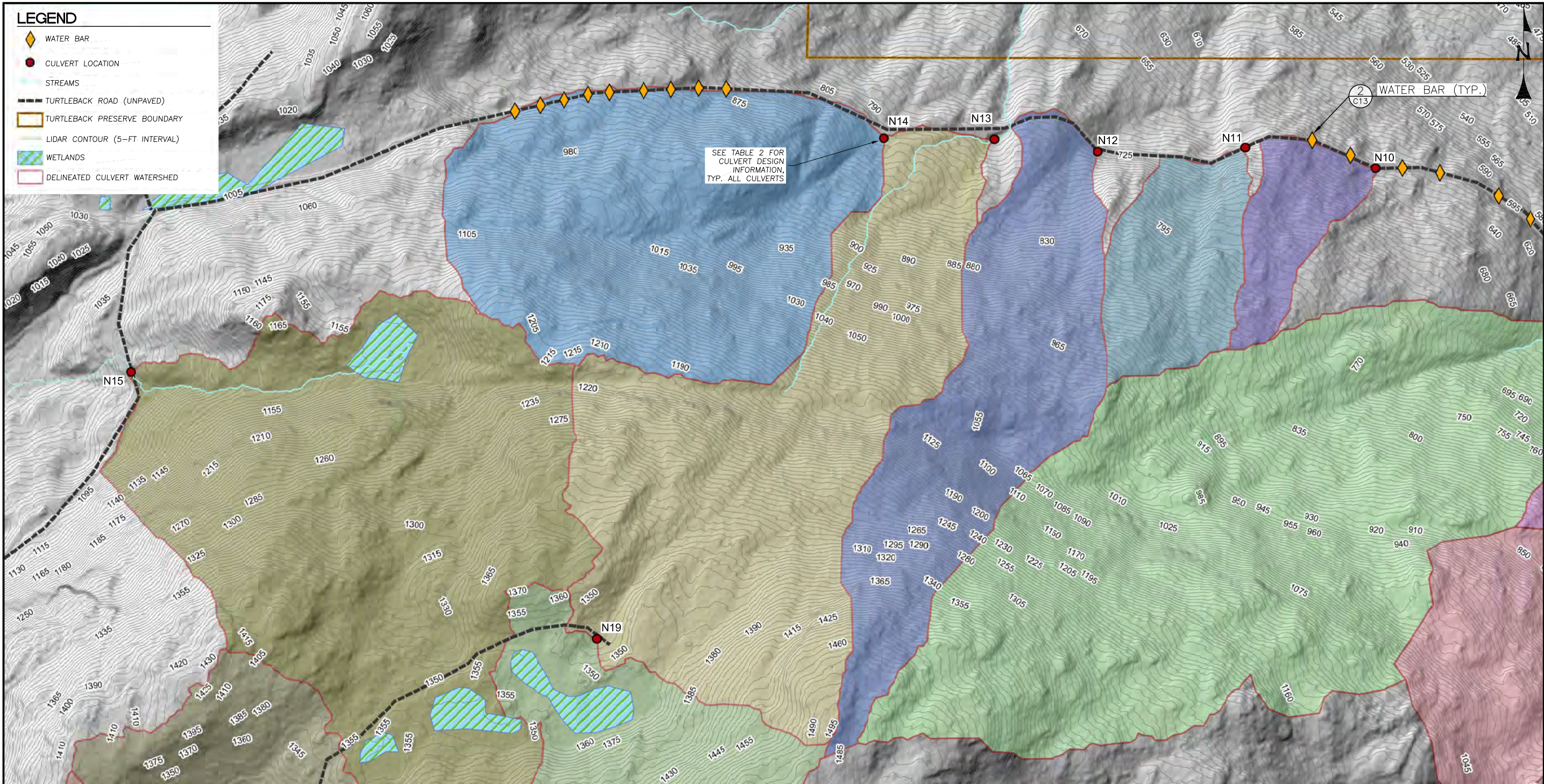
**OVERVIEW MAP**  
SCALE: 1" = 450'



**SITE PLAN**  
 SCALE: 1" = 150'

**TABLE 1: CULVERTS N1-N9**

CULVERT ID	DRAINAGE BASIN SIZE (AC)	100-YR, 24-HR PEAK RUNOFF (CFS)	EXISTING DIAMETER (IN)	EXISTING LENGTH (FT)	EXISTING MATERIAL	PROPOSED CULVERT DIAMETER (IN)	PROPOSED LENGTH (FT)	PROPOSED MATERIAL	TIER	WATER TYPE CLASSIFICATION	PROPOSED CULVERT TYPE	REFERENCE DETAIL	NOTES
N1	2.63	0.79	18	27.5	CORRUGATED PLASTIC	---	---	---	---	Ns	EXISTING	---	
N2	10.02	2.49	---	---	---	18	20	PLASTIC	3	Ns	TYPE 2	2/C10	
N3	7.93	2.34	---	---	---	18	20	PLASTIC	1	X	TYPE 1	1/C10	
N4	4.43	1.4	---	---	---	18	20	PLASTIC	1	X	TYPE 1	1/C10	
N5	1.99	0.57	---	---	---	18	20	PLASTIC	1	X	TYPE 1	1/C10	
N6	13.42	2.49	18	32	CORRUGATED PLASTIC	---	---	---	---	Ns	EXISTING	---	
N7	5.54	1.62	---	---	---	18	20	PLASTIC	2	X	TYPE 1	1/C10	
N8	39.80	8.73	---	---	---	24	30	PLASTIC	1	Ns	TYPE 2	2/C10	
N9	39.80	8.73	18	30	CORRUGATED PLASTIC	---	---	---	---	Ns	EXISTING	---	



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**SAN JUAN ISLANDS CONSERVATION LAND BANK**

**SITE PLAN**

**TURTLEBACK MOUNTAIN PRESERVE FOREST ROADS IMPROVEMENT PROJECT CULVERT ASSESSMENT**

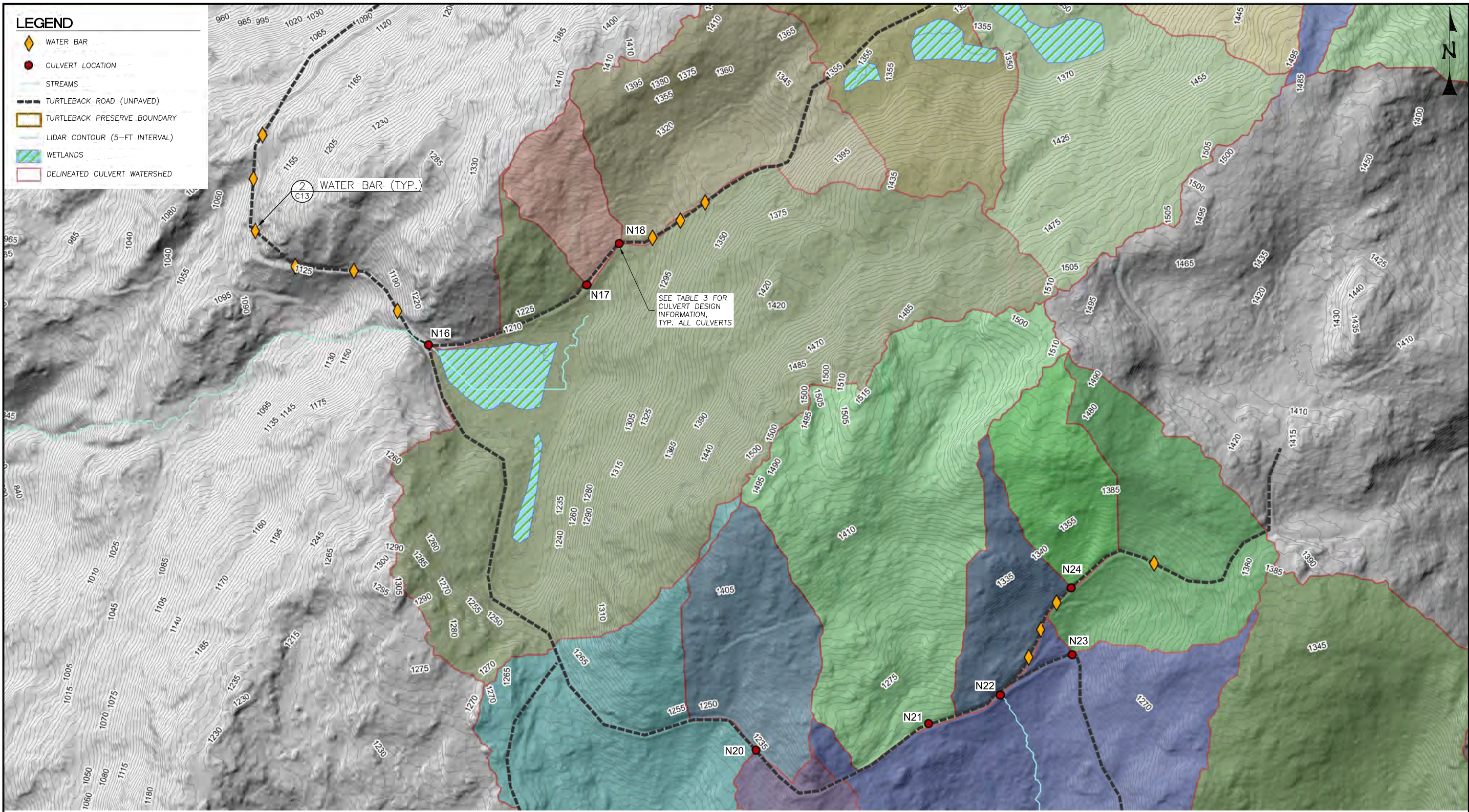
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BAR IS ONE INCH ON ORIGINAL DRAWING. ADJUST SCALES FOR REDUCED PLOTS

**SITE PLAN**  
 SCALE: 1" = 150'

**TABLE 2: CULVERTS N10-N15, N19**

CULVERT ID	DRAINAGE BASIN SIZE (AC)	100-YR. 24-HR PEAK RUNOFF (CFS)	EXISTING DIAMETER (IN)	EXISTING LENGTH (FT)	EXISTING MATERIAL	PROPOSED CULVERT DIAMETER (IN)	PROPOSED LENGTH (FT)	PROPOSED MATERIAL	TIER	WATER TYPE CLASSIFICATION	PROPOSED CULVERT TYPE	REFERENCE DETAIL	NOTES
N10	3.01	0.91	18	20	PLASTIC	---	---	---	---	Ns	EXISTING	---	
N11	5.09	1.55	---	---	---	18	30	PLASTIC	2	Ns	TYPE 2	2/C10	
N12	14.06	3.33	12	20	CORRUGATED PLASTIC	24	25	PLASTIC	1	Ns	TYPE 2	2/C10	NEW CULVERT TO BE INSTALLED APPROX. 30-FT UPHILL FROM EXISTING CULVERT
N13	36.89	8.91	---	---	---	30	60	PLASTIC	1/2	Ns	TYPE 3	1/C11	
N14	19.86	5	---	---	---	30	45	PLASTIC	1	Ns	TYPE 2	2/C10	
N15	32.59	5.9	---	---	---	30	60	PLASTIC	1	Ns	TYPE 3	1/C11	
N19	12.65	2.97	18	20	CORRUGATED PLASTIC	---	---	---	---	Ns	EXISTING	---	



**TABLE 3: CULVERTS N16-N18, N20-N24**

CULVERT ID	DRAINAGE BASIN SIZE (AC)	100-YR, 24-HR PEAK RUNOFF (CFS)	EXISTING DIAMETER (IN)	EXISTING LENGTH (FT)	EXISTING MATERIAL	PROPOSED CULVERT DIAMETER (IN)	PROPOSED LENGTH (FT)	PROPOSED MATERIAL	TIER	WATER TYPE CLASSIFICATION	PROPOSED CULVERT TYPE	REFERENCE DETAIL	NOTES
N16	48.11	9.97	18	75	CORRUGATED PLASTIC	---	---	---	---	Np	EXISTING	---	
N17	2.45	0.77	18	20	CORRUGATED PLASTIC	---	---	---	---	X	EXISTING	---	
N18	9.66	2.51	---	---	---	18	35	PLASTIC	2	Ns	TYPE 2	2/C10	
N20	5.50	1.66	18	22	UNKNOWN	---	---	---	---	X	EXISTING	---	
N21	16.40	3.99	---	---	---	24	30	PLASTIC	2	Ns	TYPE 2	2/C10	
N22	6.93	2.01	18	20	CORRUGATED PLASTIC	---	---	---	---	X	EXISTING	---	
N23	7.74	2.11	18	20	CORRUGATED PLASTIC	24	20	PLASTIC	2	Ns	TYPE 2	2/C10	
N24	3.79	1.15	---	---	---	18	20	PLASTIC	2	X	TYPE 1	1/C10	

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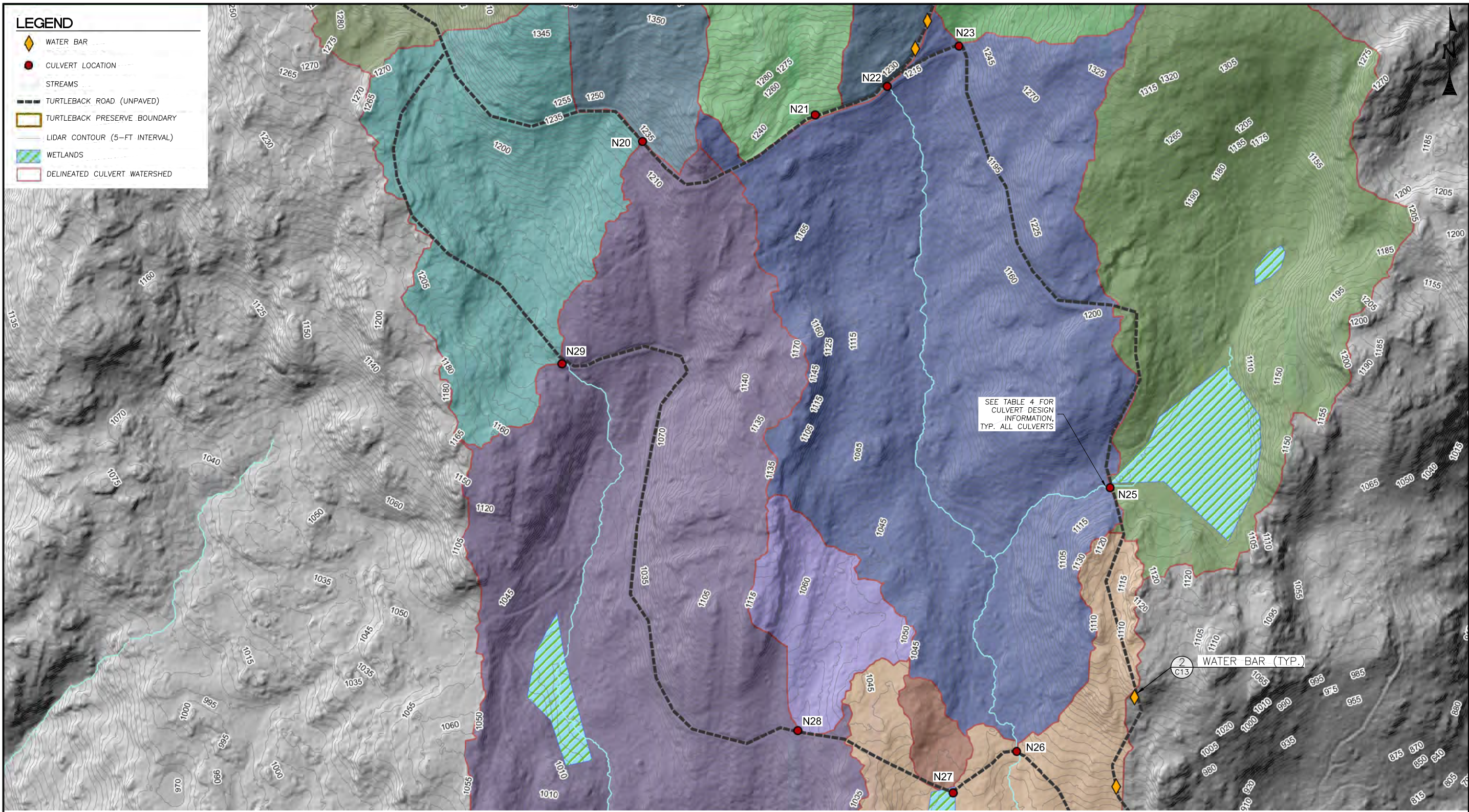
PREPARED AT THE REQUEST OF:  
**SAN JUAN ISLANDS CONSERVATION LAND BANK**

**SITE PLAN**

**TURTLEBACK MOUNTAIN PRESERVE FOREST ROADS IMPROVEMENT PROJECT CULVERT ASSESSMENT**

DESIGNED BY: J.D./J.H.  
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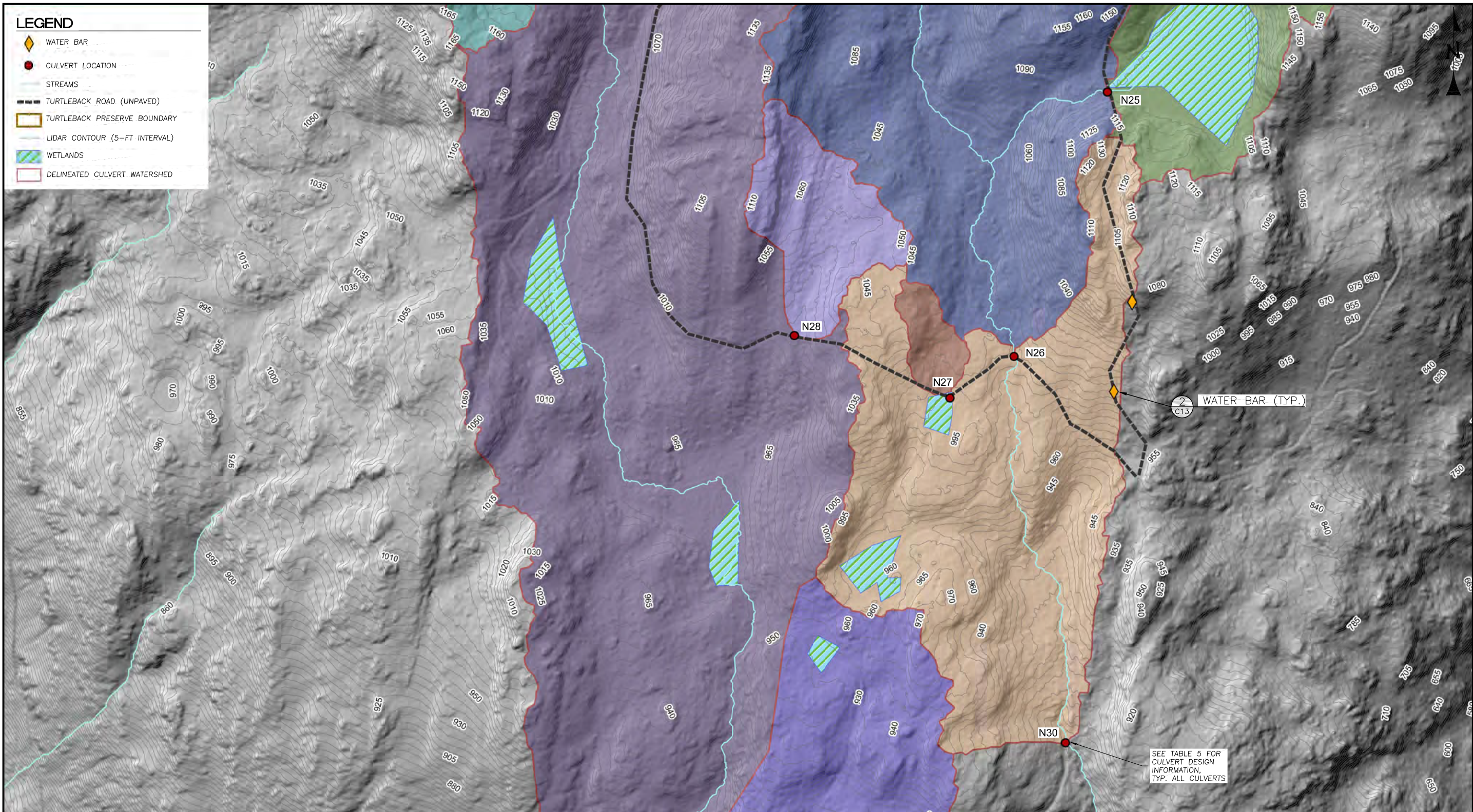
BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS



**SITE PLAN**  
SCALE: 1" = 150'

**TABLE 4: CULVERTS N25-29**

CULVERT ID	DRAINAGE BASIN SIZE (AC)	100-YR, 24-HR PEAK RUNOFF (CFS)	EXISTING DIAMETER (IN)	EXISTING LENGTH (FT)	EXISTING MATERIAL	PROPOSED CULVERT DIAMETER (IN)	PROPOSED LENGTH (FT)	PROPOSED MATERIAL	TIER	WATER TYPE CLASSIFICATION	PROPOSED CULVERT TYPE	REFERENCE DETAIL	NOTES
N25	28.50	5.72	8	20	CORRUGATED PLASTIC	18	20	PLASTIC	3	Ns	TYPE 2	2/C10	INSTALL CHECK DAM AT THE DIRECTION OF THE ENGINEER TO MAINTAIN WATER SURFACE ELEVATION IN WETLAND.
N26	76.36	20.95	24	20	CORRUGATED PLASTIC	36	20	PLASTIC	2	Ns	TYPE 3	1/C11	
N27	1.07	0.34	18	20	CORRUGATED PLASTIC	---	---	---	---	Ns	EXISTING	---	
N28	4.41	1.20	18	20	CORRUGATED PLASTIC	---	---	---	---	Ns	EXISTING	---	
N29	21.27	4.98	18	40	CORRUGATED PLASTIC	---	---	---	---	Ns	EXISTING	---	



**SITE PLAN**  
SCALE: 1" = 150'

**TABLE 5: CULVERT N30**

CULVERT ID	DRAINAGE BASIN SIZE (AC)	100-YR, 24-HR PEAK RUNOFF (CFS)	EXISTING DIAMETER (IN)	EXISTING LENGTH (FT)	EXISTING MATERIAL	PROPOSED CULVERT DIAMETER (IN)	PROPOSED LENGTH (FT)	PROPOSED MATERIAL	TIER	WATER TYPE CLASSIFICATION	PROPOSED CULVERT TYPE	REFERENCE DETAIL	NOTES
N30	99.87	25.97	18	22	CORRUGATED PLASTIC	---	---	---	3	Ns	DECOMMISSION	1/C13	TRAIL CROSSING: DECOMMISSION CULVERT AND RESTORE CHANNEL CROSS-SECTION AT DIRECTION OF OWNER'S REPRESENTATIVE.

**DRAFT**  
NOT FOR CONSTRUCTION

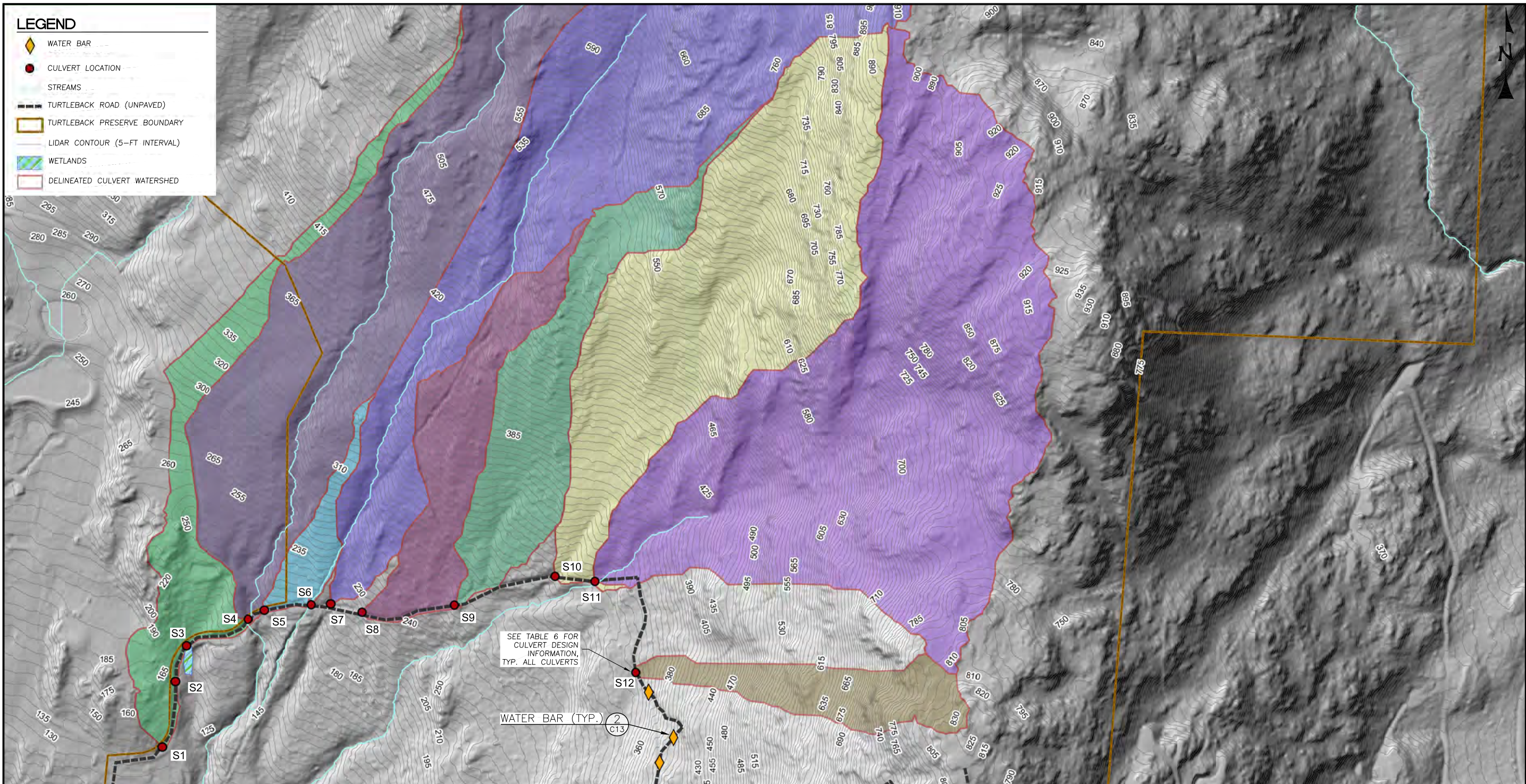
PREPARED AT THE REQUEST OF:  
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**SITE PLAN**

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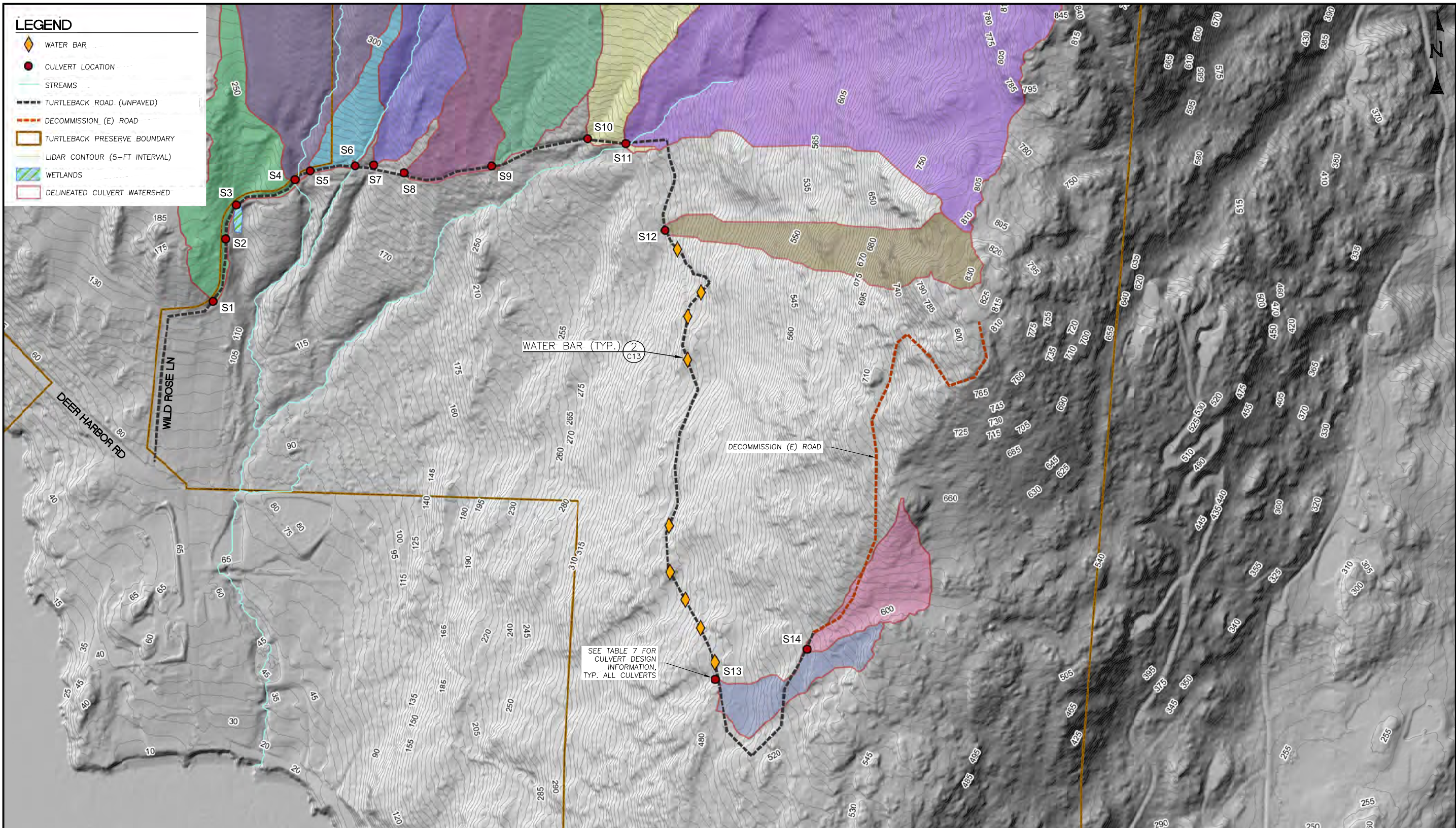


**SITE PLAN**  
SCALE: 1" = 150'

**TABLE 6: CULVERTS S1-S12**

CULVERT ID	DRAINAGE BASIN SIZE (AC)	100-YR, 24-HR PEAK RUNOFF (CFS)	EXISTING DIAMETER (IN)	EXISTING LENGTH (FT)	EXISTING MATERIAL	PROPOSED CULVERT DIAMETER (IN)	PROPOSED LENGTH (FT)	PROPOSED MATERIAL	TIER	WATER TYPE CLASSIFICATION	PROPOSED CULVERT TYPE	REFERENCE DETAIL	NOTES
S1	5.01	0.98	8	30	CMP	18	30	PLASTIC	2	X	TYPE 1	1/C10	
S2	5.01	0.98	12	20	CMP	---	---	---	---	Ns	EXISTING	---	
S3	5.01	0.98	---	---	---	18	25	PLASTIC	3	Ns	TYPE 2	2/C10	
S4	111.76	15.05	48	UNKNOWN	CORRUGATED PLASTIC	---	---	---	---	Ns	EXISTING	---	
S5	44.93	7.37	8	20	CMP	18	20	PLASTIC	2	X	TYPE 1	1/C10	
S6	44.93	7.37	---	---	---	24	20	PLASTIC	1	Ns	TYPE 2	2/C10	
S7	44.93	7.37	18	21	CORRUGATED PLASTIC	24	21	PLASTIC	1	Ns	TYPE 2	2/C10	
S8	44.93	7.37	---	---	---	24	20	PLASTIC	1	Ns	TYPE 2	2/C10	
S9	6.02	1.40	18	25	CMP	24	20	PLASTIC	1	Ns	TYPE 2	2/C10	
S10	15.28	3.58	---	---	---	24	20	PLASTIC	1	Ns	TYPE 2	2/C10	
S11	26.90	6.19	12	20	CMP	18	20	PLASTIC	2	Ns	TYPE 2	2/C10	
S12	2.87	0.87	8	20	CMP	---	---	---	---	Ns	EXISTING	---	

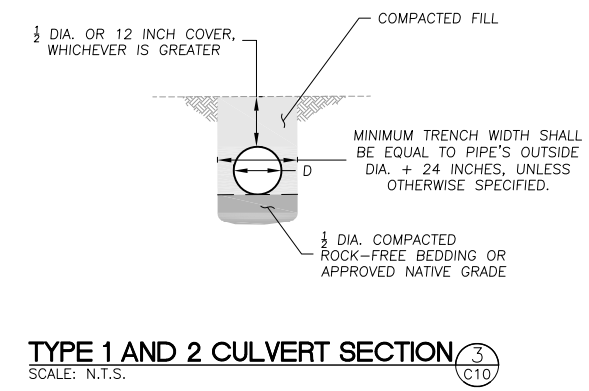
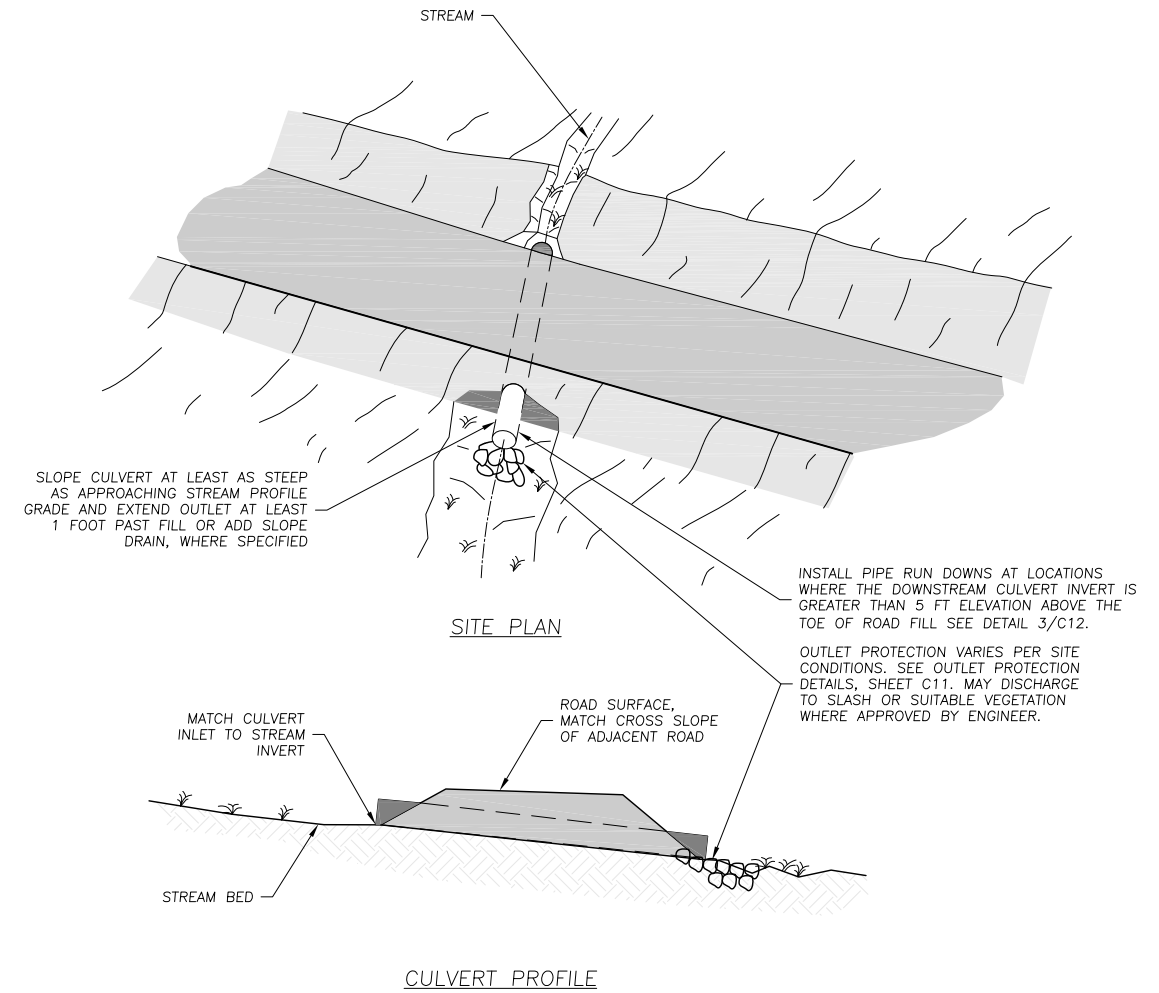
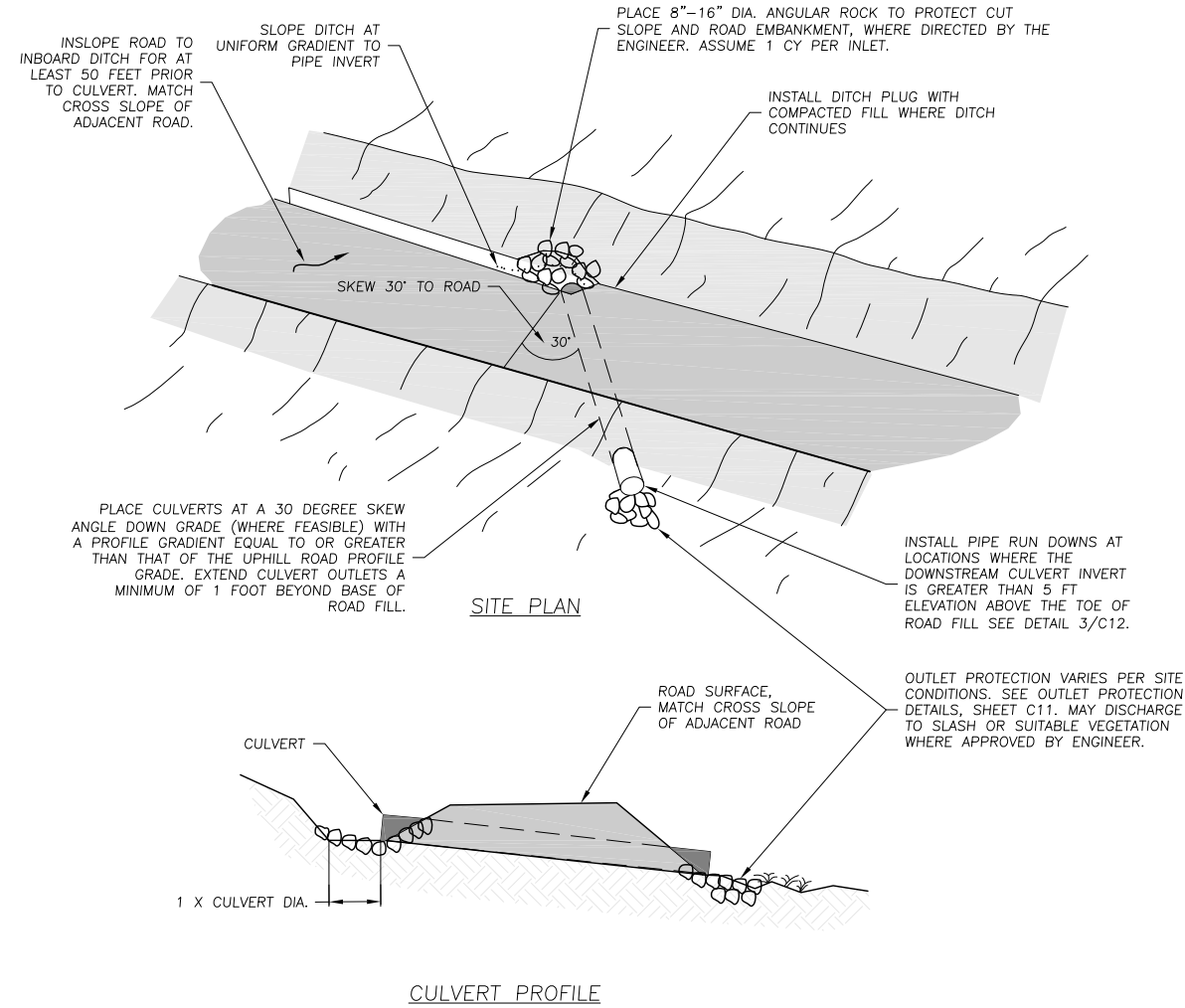




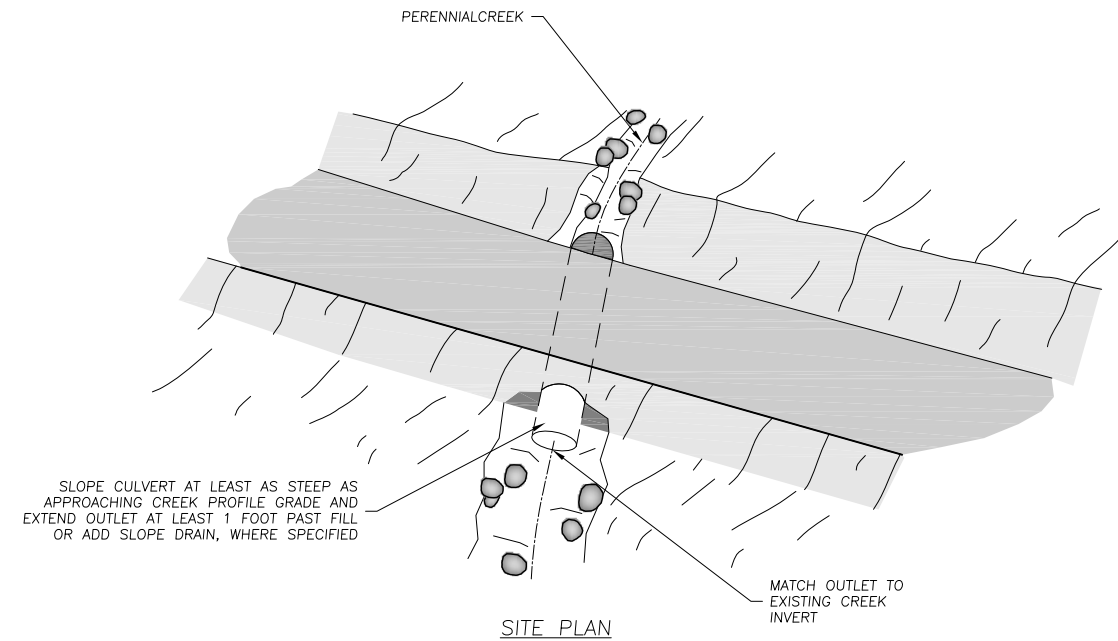
**SITE PLAN**  
SCALE: 1" = 150'

**TABLE 7: CULVERTS S13-S14**

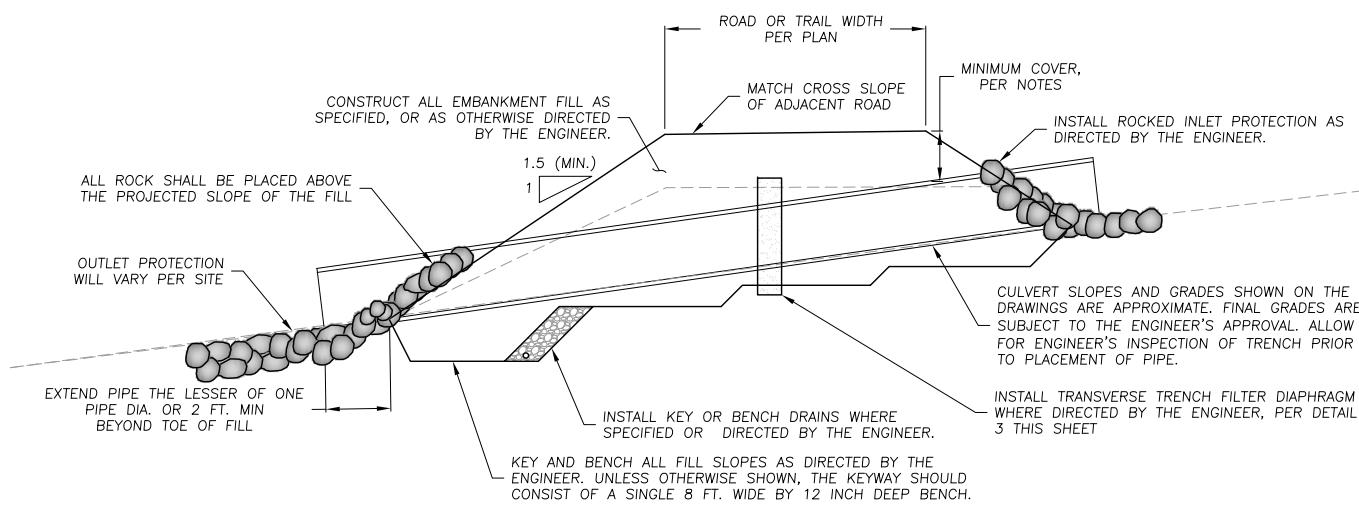
CULVERT ID	DRAINAGE BASIN SIZE (AC)	100-YR, 24-HR PEAK RUNOFF (CFS)	EXISTING DIAMETER (IN)	EXISTING LENGTH (FT)	EXISTING MATERIAL	PROPOSED CULVERT DIAMETER (IN)	PROPOSED LENGTH (FT)	PROPOSED MATERIAL	TIER	WATER TYPE CLASSIFICATION	PROPOSED CULVERT TYPE	REFERENCE DETAIL	NOTES
S13	2.87	0.87	12	20	CMP	18	20	PLASTIC	3	Ns	TYPE 2	2/C10	
S14	1.62	0.49	10	20	METAL	---	---	---	2	X	DECOMMISSION	1/C13	REMOVE CULVERT AND DECOMMISSION ROAD



- TYPE 1 AND 2 CULVERTS NOTES**
1. INSTALL CULVERT AT FLAGGED LOCATIONS IDENTIFIED ON PLANS AND DIRECTED BY THE OWNER'S REPRESENTATIVE IN THE FIELD.
  2. CULVERTS SHALL BE 18 INCH DIAMETER SMOOTH BORE, DOUBLE WALL HDPE (ASTM F2306) UNLESS OTHERWISE SPECIFIED. FITTINGS SHALL BE WATER-TIGHT, CONFORMING TO ASTM D3212, WITH GASKETS CONFORMING TO ASTM F477. "ADS N-12 WT IB" PIPE MEETS THIS SPECIFICATION.
  3. PLACE CULVERTS AT A 30 DEGREE SKEW ANGLE DOWN GRADE (WHERE FEASIBLE) WITH A PROFILE GRADIENT EQUAL TO OR GREATER THAN THAT OF THE UPHILL ROAD PROFILE GRADE. EXTEND CULVERT OUTLETS A MINIMUM OF 1 FOOT BEYOND BASE OF ROAD FILL.
  4. WHERE NECESSARY OR DIRECTED BY THE ENGINEER, WORK INCLUDES CONSTRUCTION OF OUTLET DITCH TO DAYLIGHT DRAINAGE. CONSTRUCT DITCH AT A STEEPER GRADIENT THAN THE CULVERT, AT LEAST ONE PIPE DIAMETER IN WIDTH, AND WITH BANK TAPERED BACK TO A 1:1 OR FLATTER SLOPE.
  5. UNLESS OTHERWISE DIRECTED BY THE ENGINEER, THE BACKFILL SHALL CONSIST OF APPROVED NATIVE SOIL, WITH NO ROCKS GREATER THAN 3 INCHES IN ANY DIMENSION PLACED CLOSER THAN 1 FOOT TO THE CULVERT. BACKFILL SHALL BE ADEQUATELY COMPACTED THROUGHOUT THE ENTIRE PROCESS TO 95 PERCENT ASTM 1557 UNLESS OTHERWISE SPECIFIED. DURING PLACEMENT AND COMPACTION OF FILL, THE MOISTURE CONTENT OF THE MATERIALS BEING PLACED SHALL BE MAINTAINED AS DIRECTED BY THE ENGINEER. MINIMUM COVER SHALL BE THE GREATER OF 12" OR HALF THE PIPE DIAMETER.
  6. PLACE A DITCH BLOCK IMMEDIATELY DOWNSLOPE OF THE CULVERT INTAKE TO PREVENT DITCH FLOW FROM BYPASSING THE PIPE INLET.

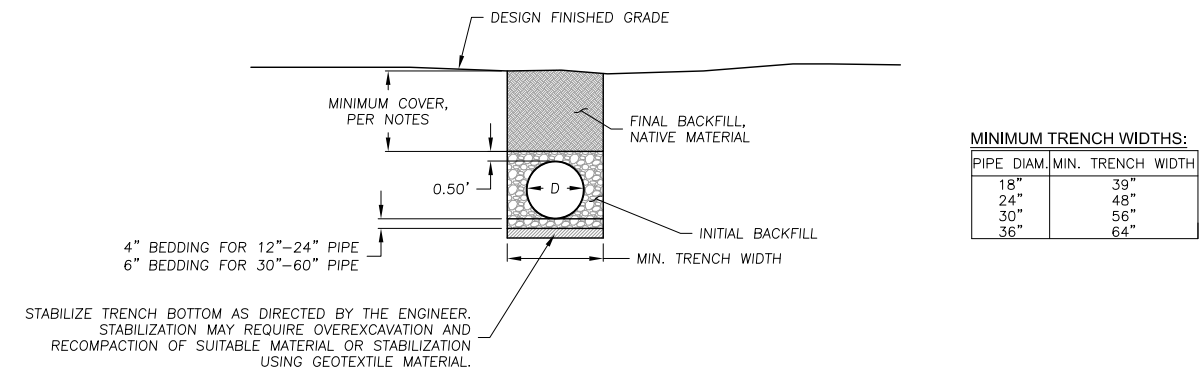


SITE PLAN



CULVERT PROFILE

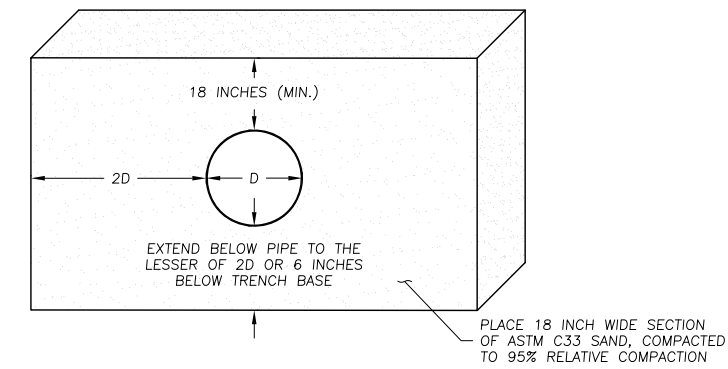
**TYPE 3 CULVERT**  
SCALE: N.T.S. 1  
C11



STABILIZE TRENCH BOTTOM AS DIRECTED BY THE ENGINEER. STABILIZATION MAY REQUIRE OVEREXCAVATION AND RECOMPACTION OF SUITABLE MATERIAL OR STABILIZATION USING GEOTEXTILE MATERIAL.

**TYPICAL SECTION - TYPE 3 CULVERT** 2  
SCALE: N.T.S. C11

MINIMUM TRENCH WIDTHS:	
PIPE DIAM.	MIN. TRENCH WIDTH
18"	39"
24"	48"
30"	56"
36"	64"



**TRANSVERSE TRENCH CUTOFF** 3  
SCALE: N.T.S. C11

**TYPE 3 CULVERT NOTES:**

- CULVERT MATERIAL TYPE VARIES BY SITE. WHERE PLASTIC PIPE IS SPECIFIED, CULVERT AND SLOPE DRAINS SHALL BE "ADS N-12 WT" DUAL-WALLED HDPE PIPE WITH WATER-TIGHT BELL AND SOCKET FITTINGS WITH RUBBER GASKETS. WHERE METAL PIPE IS SPECIFIED, CULVERT SHALL BE "CONTECH HEL-COR" ALUMINIZED STEEL TYPE 2 PIPE WITH H-12 HUGGER BANDS AND O-RING GASKETS.
- ALL PIPE INSTALLATION SHALL COMPLY WITH THE MANUFACTURER'S SPECIFICATIONS, THE TECHNICAL SPECIFICATIONS, AND THESE DRAWINGS.
- FOUNDATION: WHERE THE TRENCH BOTTOM IS UNSTABLE, EXCAVATE TO THE DEPTH REQUIRED BY THE ENGINEER AND REPLACE WITH SUITABLE MATERIAL AS SPECIFIED BY THE ENGINEER.
- BEDDING: SUITABLE MATERIAL SHALL BE CLASS 1, 2, OR 3 (ASTM D2321). NATIVE SOILS MAY BE USED, SUBJECT TO APPROVAL OF THE ENGINEER. THE CONTRACTOR SHALL PROVIDE DOCUMENTATION FOR MATERIAL SPECIFICATION TO ENGINEER. UNLESS OTHERWISE NOTED BY THE ENGINEER, MINIMUM BEDDING THICKNESS SHALL BE 4" FOR 4"-24"; 6" FOR 30"-60".
- INITIAL BACKFILL: INITIAL BACKFILL SHALL BE CLASS 1 OR 2, IN ACCORDANCE WITH ASTM D2321. NATIVE SOILS MAY BE USED, SUBJECT TO APPROVAL OF THE ENGINEER.
- FINAL BACKFILL: SUITABLE MATERIAL SHALL BE LOCAL CLEAN MINERAL SOILS WITH NO ROCK LARGER THAN 3 INCHES.
- MINIMUM COVER: MINIMUM COVER, H, IN NON-TRAFFIC APPLICATIONS (GRASS OR LANDSCAPE AREAS) IS 12" FROM THE TOP OF PIPE TO GROUND SURFACE. ADDITIONAL COVER MAY BE REQUIRED TO PREVENT FLOATATION. MINIMUM COVER, H, IS 18" UP TO 36" DIAMETER PIPE AND 24" OF COVER FOR PIPES OVER 36" DIAMETER PIPE, MEASURED FROM TOP OF PIPE TO FINISHED GRADE.

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**DETAILS**

**TURTLEBACK MOUNTAIN PRESERVE FOREST ROADS IMPROVEMENT PROJECT CULVERT ASSESSMENT**

DESIGNED BY: JD./J.H.  
DRAWN BY: C.B.  
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BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS  
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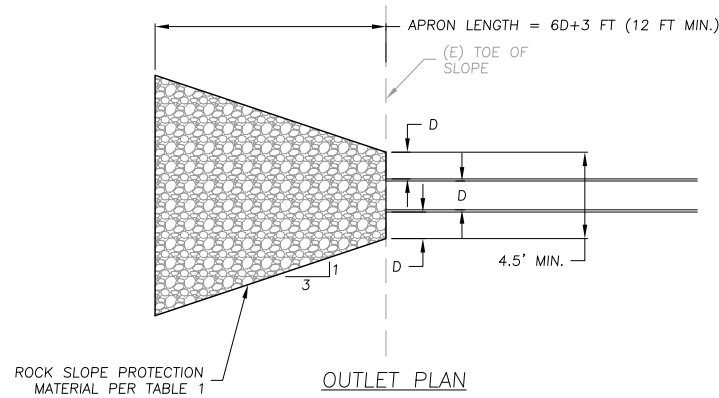
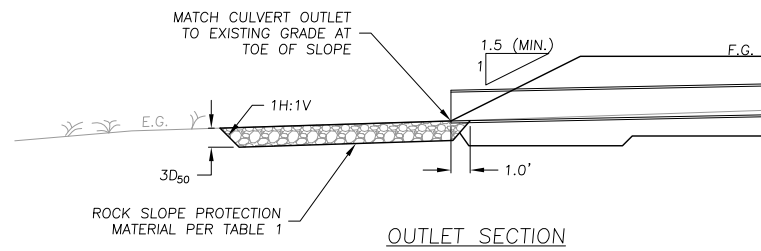


TABLE 1: OUTLET PROTECTION MATERIAL SIZE

CULVERT DIAMETER (IN)	MATERIAL
18-24	ROCK EROSION AND SCOUR PROTECTION CLASS A
30-48	ROCK EROSION AND SCOUR PROTECTION CLASS B

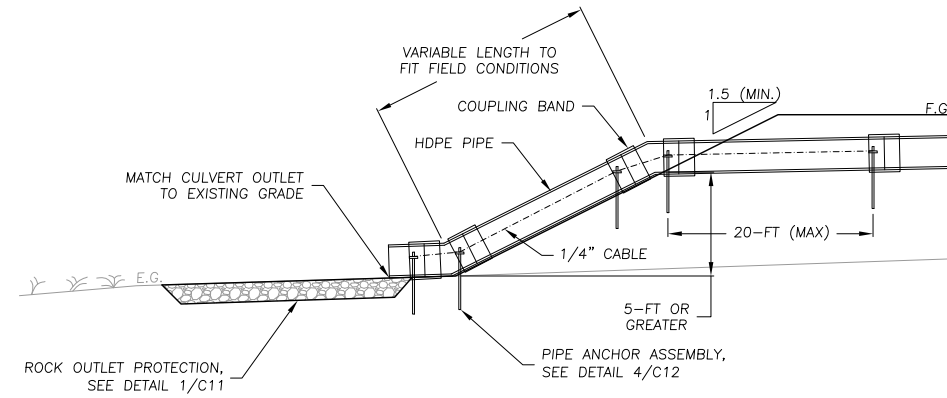
**NOTES**

1. "D" MEASURES INNER PIPE DIAMETER IN DECIMAL FEET.
2. REFER TO THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION HYDRAULICS MANUAL, CHAPTER 3 FOR MORE INFORMATION.
3. PROVIDE GEOTEXTILE OR FILTER MATERIAL BETWEEN OUTLET AND THE EXISTING GROUND FOR SOIL STABILIZATION.



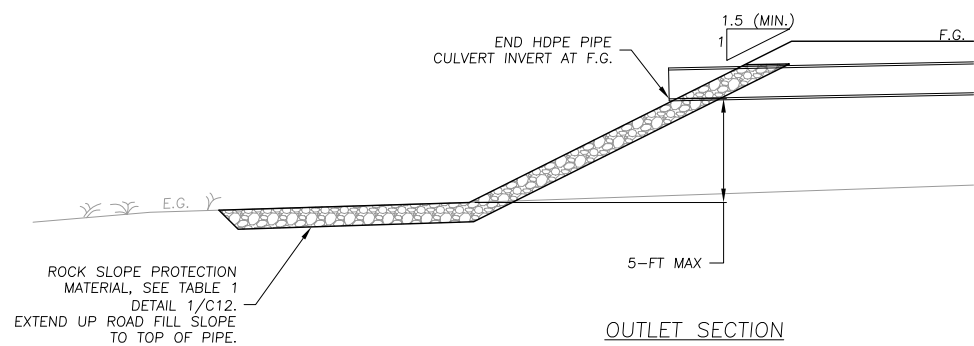
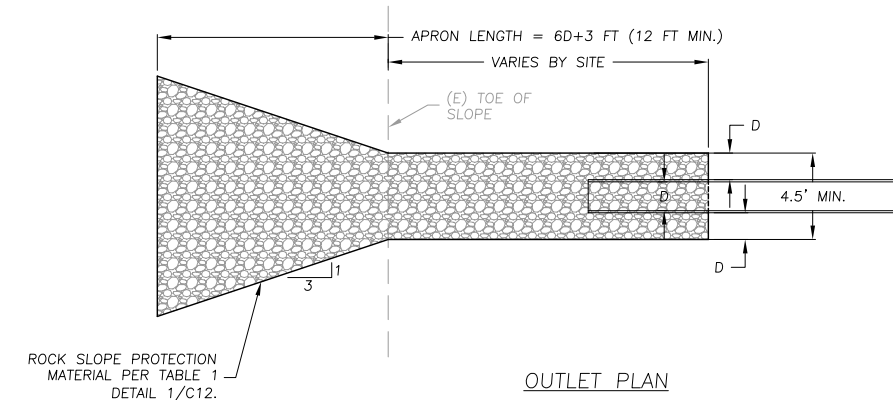
**ROCK OUTLET PROTECTION - TYPE A**  
SCALE: N.T.S.

2  
C12



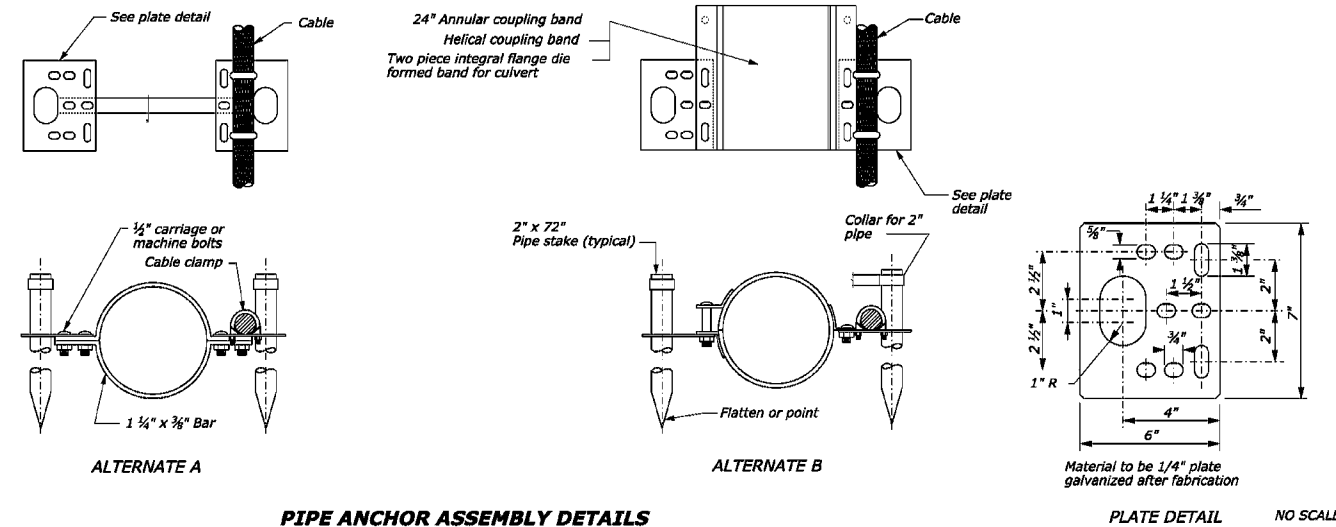
**OUTLET PIPE RUN DOWN**  
SCALE: N.T.S.

3  
C12



**ROCK OUTLET PROTECTION - TYPE B**  
SCALE: N.T.S.

3  
C12



**PIPE ANCHOR ASSEMBLY DETAILS**

**PIPE ANCHOR ASSEMBLY**  
SCALE: N.T.S.

4  
C12

**DRAFT**  
NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:  
**SAN JUAN ISLANDS CONSERVATION LAND BANK**

**DETAILS**

**TURTLEBACK MOUNTAIN PRESERVE FOREST ROADS IMPROVEMENT PROJECT CULVERT ASSESSMENT**

DESIGNED BY: JD./J.H.  
DRAWN BY: C.B.  
CHECKED BY: J.H.  
DATE: 8/18/2022  
JOB NO.: 21-081

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

**DRAFT**  
NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:  
**SAN JUAN ISLANDS**  
CONSERVATION LAND BANK

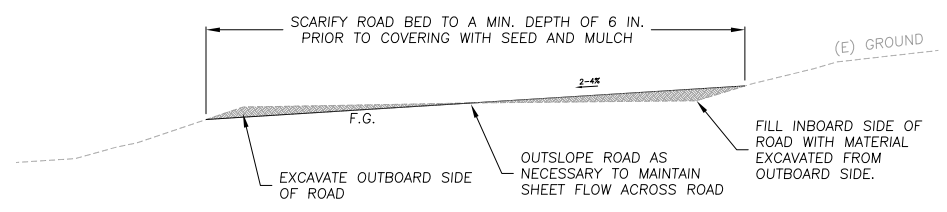
DETAILS

**TURTLEBACK MOUNTAIN**  
PRESERVE FOREST ROADS  
IMPROVEMENT PROJECT  
CULVERT ASSESSMENT

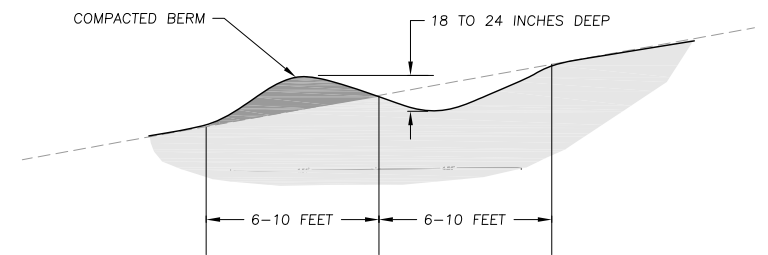
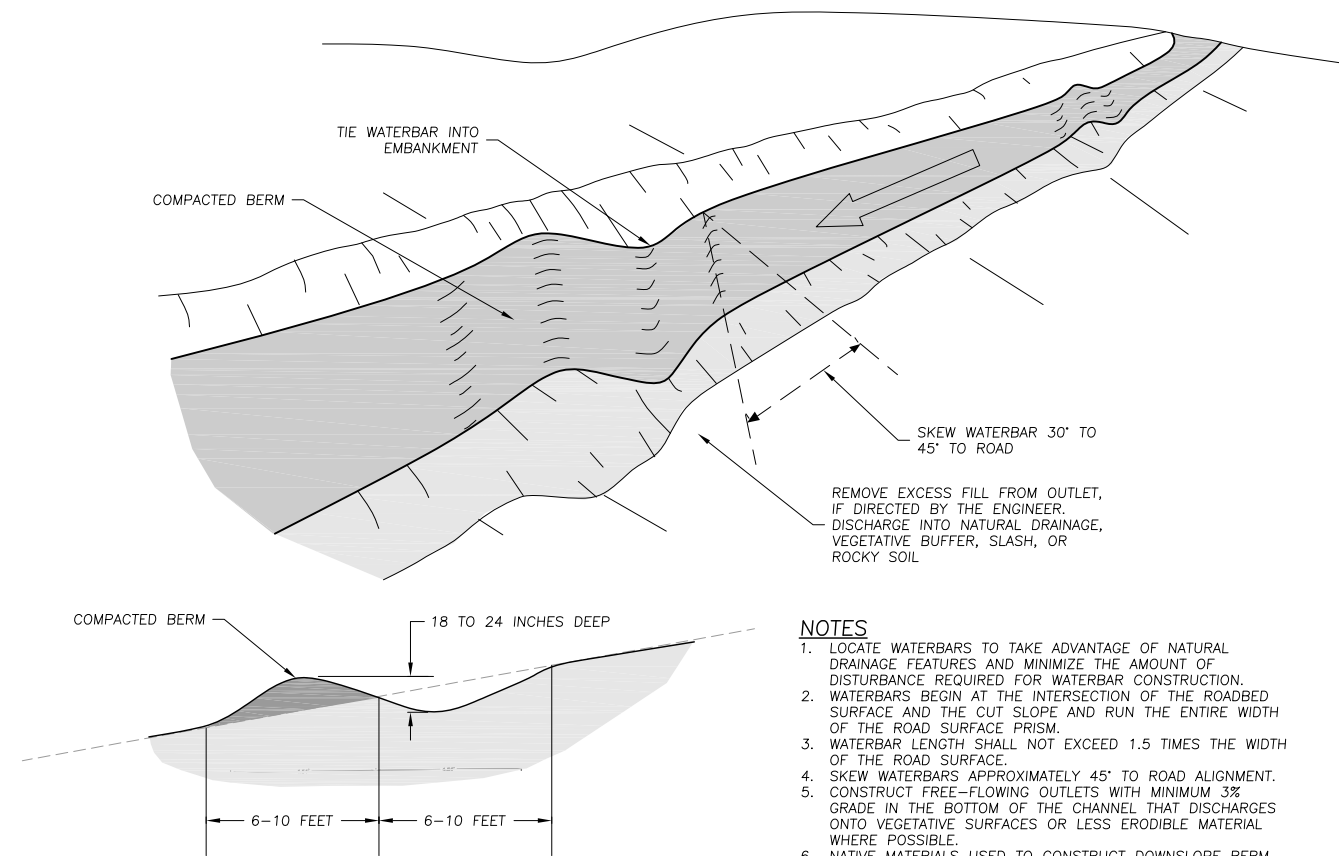
DESIGNED BY: JD./J.H.  
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CHECKED BY: J.H.  
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JOB NO.: 21-081

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

C13 13 OF 14



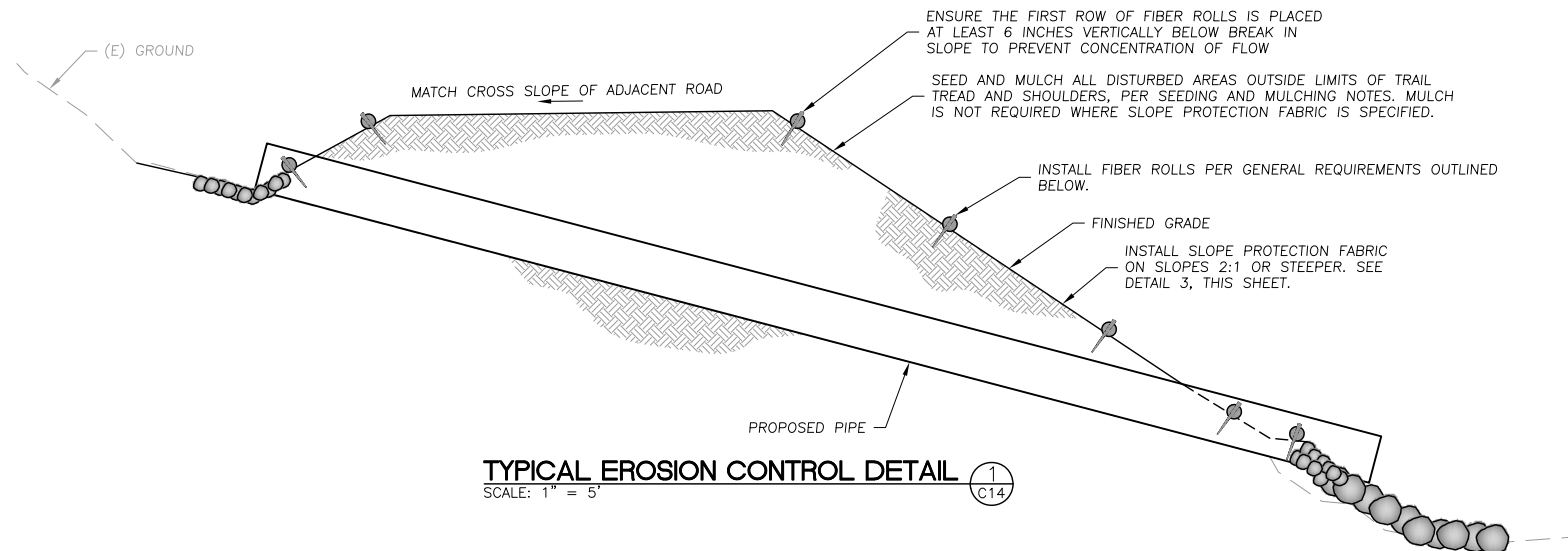
**ROAD DECOMMISSION** ①  
SCALE: N.T.S. C13



**ROAD PROFILE**

- NOTES**
1. LOCATE WATERBARS TO TAKE ADVANTAGE OF NATURAL DRAINAGE FEATURES AND MINIMIZE THE AMOUNT OF DISTURBANCE REQUIRED FOR WATERBAR CONSTRUCTION.
  2. WATERBARS BEGIN AT THE INTERSECTION OF THE ROADBED SURFACE AND THE CUT SLOPE AND RUN THE ENTIRE WIDTH OF THE ROAD SURFACE PRISM.
  3. WATERBAR LENGTH SHALL NOT EXCEED 1.5 TIMES THE WIDTH OF THE ROAD SURFACE.
  4. SKEW WATERBARS APPROXIMATELY 45° TO ROAD ALIGNMENT.
  5. CONSTRUCT FREE-FLOWING OUTLETS WITH MINIMUM 3% GRADE IN THE BOTTOM OF THE CHANNEL THAT DISCHARGES ONTO VEGETATIVE SURFACES OR LESS ERODIBLE MATERIAL WHERE POSSIBLE.
  6. NATIVE MATERIALS USED TO CONSTRUCT DOWNSLOPE BERM SHALL BE COMPACTED WITH EQUIPMENT TO MINIMIZE WEAR RESULTING FROM TRESPASS AND/OR ADMINISTRATIVE USE.
  7. CONSTRUCT WATERBAR DEPTH (MEASURED FROM THE BOTTOM OF THE WATERBAR CHANNEL TO THE TOP OF THE COMPACTED BERM) TO BETWEEN 18 AND 24 INCHES.

**WATER BAR** ②  
SCALE: N.T.S. C13



**SEEDING AND MULCHING NOTES**

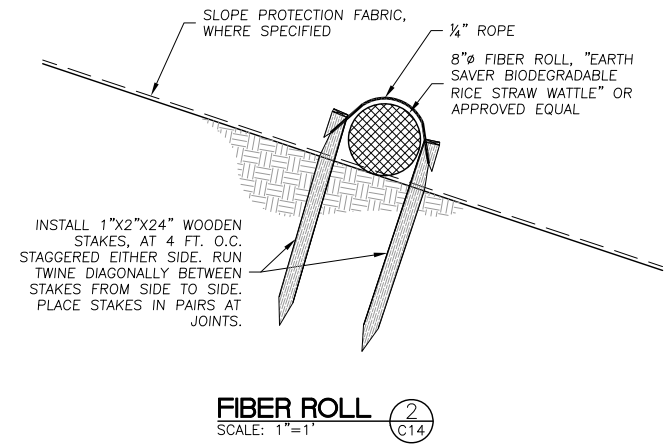
1. **GENERAL**
  - A. SEED ALL AREAS THAT ARE DISTURBED BY CONSTRUCTION EXCEPT WITHIN ROCKED PORTIONS OF THE PROPOSED ROAD OR TRAIL WIDTH. SEEDING INCLUDES PREPARATION OF THE SEEDBED, AND HAND BROADCASTING SEED AS SPECIFIED IN THESE NOTES.
2. **MATERIALS**
  - A. SEED: SEED SHALL CONSIST OF A MIXTURE OF NATIVE MIX DETERMINED BY THE OWNER'S REPRESENTATIVE.
  - B. MULCH SHALL CONSIST OF 3000 LBS. PER ACRE "WEED FREE" STRAW, OR A 1" DEPTH OF LOCALLY DERIVED WOOD CHIPS. MULCH IS NOT REQUIRED WHERE SLOPE PROTECTION FABRIC IS SPECIFIED.
3. **INSTALLATION**
  - A. PREPARE THE SEEDBED PRIOR TO SEED APPLICATION. SEEDBED PREPARATION INCLUDES LOOSENING OF COMPACTED SOILS TO A DEPTH OF 3 TO 5 INCHES, BREAKING DOWN SOIL CLUMPS LARGER THAN 2 INCHES IN DIAMETER, AND DETAIL GRADING OF THE SURFACE TO CONFORM TO GRADING SPECIFICATIONS.
  - B. COMMENCE SEED APPLICATION FOLLOWING PREPARATION OF THE SEEDBED. SEED APPLICATION INCLUDES UNIFORMLY BROADCASTING SEED OVER PREPARED AREAS, AT THE SPECIFIED RATES.
  - C. LIGHTLY RAKE SEED TO A DEPTH OF 1/4 INCH TO 1/2 INCH. DO NOT LEAVE SEED UNCOVERED FOR MORE THAN 24 HOURS BEFORE APPLYING MULCH OR FABRIC.
  - D. BROADCAST MULCH OVER ALL SEEDED AREAS NOT SPECIFIED TO RECEIVE FABRIC.

**STREAM CONSTRUCTION BEST MANAGEMENT PRACTICES**

1. ALL WORK WITHIN THE WETTED CHANNEL SHALL BE COMPLETED WITHIN THE IN-WATER WORK WINDOW AS LISTED IN THE PERMITS.
2. DEWATERING/BYPASS FLOWS
  - 2.1. PUMPS: WHENEVER A PUMP IS USED TO DEWATER THE ISOLATION AREA AND ESA-LISTED FISH MAY BE PRESENT, A FISH SCREEN WILL BE USED THAT MEETS THE MOST CURRENT VERSION OF NMFS'S FISH SCREEN CRITERIA (NMFS 2011A). NMFS APPROVAL IS REQUIRED FOR PUMPING AT A RATE THAT EXCEEDS 3 CFS.
  - 2.2. TREAT ALL DISCHARGE WATER FROM DEWATERING ACTIVITIES WITHIN THE CONSTRUCTION AREA USING BEST MANAGEMENT PRACTICES TO REMOVE DEBRIS, SEDIMENT, PETROLEUM PRODUCTS, AND ANY OTHER POLLUTANTS LIKELY TO BE PRESENT. DEWATER THE SHORTEST LINEAR EXTENT OF WORK AREA PRACTICABLE.
  - 2.3. FLOW BYPASS SHALL BE AS DIRECTED BY THE ENGINEER IN THE FIELD.
3. TEMPORARY STREAM CROSSINGS
  - 3.1. MINIMIZE THE NUMBER OF STREAM CROSSINGS TO MAXIMUM EXTENT PRACTICABLE.
  - 3.2. CONSTRUCTION EQUIPMENT AND VEHICLES SHALL CROSS STREAMS AT RIGHT ANGLES TO THE MAIN CHANNEL.
  - 3.3. CONSTRUCTION EQUIPMENT AND VEHICLES SHALL ONLY BE ALLOWED TO CROSS STREAMS IN THE WET WHERE THE STREAMBED IS BEDROCK, OR WHERE MATS OR OFF-SITE LOGS ARE PLACED IN THE STREAM AND USED AS A CROSSING.
  - 3.4. DECOMMISSION ALL TEMPORARY STREAM CROSSINGS IMMEDIATELY FOLLOWING CONSTRUCTION AND RETURN AREA TO PRECONSTRUCTION CONDITIONS.

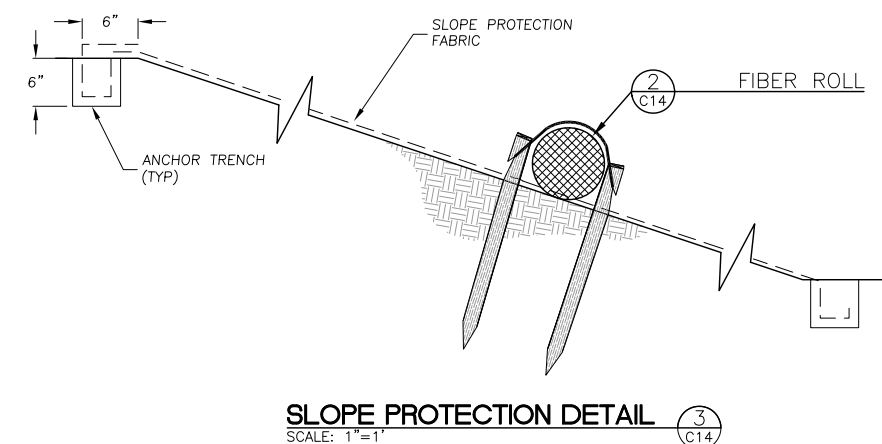
**EROSION CONTROL NOTES**

1. THE TEMPORARY EROSION AND SEDIMENT CONTROL (TESC) MEASURES SHOWN ON THIS PLAN ARE MINIMUM REQUIREMENTS FOR ANTICIPATED SITE CONDITIONS. DURING THE CONSTRUCTION PERIOD, UPGRADE THESE MEASURES AS NEEDED TO COMPLY WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL EROSION AND SEDIMENT CONTROL REGULATIONS.
  2. PHASE CLEARING AND GRADING TO THE MAXIMUM EXTENT PRACTICAL TO PREVENT EXPOSED INACTIVE AREAS FROM BECOMING A SOURCE OF EROSION.
  3. IDENTIFY, MARK, AND PROTECT (BY FENCING OFF OR OTHER MEANS) CRITICAL RIPARIAN AREAS AND VEGETATION INCLUDING IMPORTANT TREES AND ASSOCIATED ROOTING ZONES, AND VEGETATION AREAS TO BE PRESERVED. IDENTIFY VEGETATIVE BUFFER ZONES BETWEEN THE SITE AND SENSITIVE AREAS (E.G., WETLANDS), AND OTHER AREAS TO BE PRESERVED, ESPECIALLY IN PERIMETER AREAS.
  4. PRESERVE EXISTING VEGETATION WHEN PRACTICAL AND RE-VEGETATE OPEN AREAS. RE-VEGETATE OPEN AREAS WHEN PRACTICABLE BEFORE AND AFTER GRADING OR CONSTRUCTION. IDENTIFY THE TYPE OF VEGETATIVE SEED MIX USED.
  5. TESC MEASURES INCLUDING PERIMETER SEDIMENT CONTROL MUST BE IN PLACE BEFORE VEGETATION IS DISTURBED AND MUST REMAIN IN PLACE AND BE MAINTAINED, REPAIRED, AND PROMPTLY IMPLEMENTED FOLLOWING PROCEDURES ESTABLISHED FOR THE DURATION OF CONSTRUCTION, INCLUDING PROTECTION FOR ACTIVE STORM DRAIN INLETS AND CATCH BASINS AND APPROPRIATE NON-STORMWATER POLLUTION CONTROLS.
  6. APPLY TEMPORARY AND/OR PERMANENT SOIL STABILIZATION MEASURES IMMEDIATELY ON ALL DISTURBED AREAS AS GRADING PROGRESSES AND FOR ALL ROADWAYS INCLUDING GRAVEL ROADWAYS.
  7. ESTABLISH MATERIAL AND WASTE STORAGE AREAS, AND OTHER NON-STORMWATER CONTROLS.
  8. WHEN TRUCKING SATURATED SOILS FROM THE SITE, EITHER USE WATER-TIGHT TRUCKS OR DRAIN LOADS ON SITE.
  9. USE BMPS TO PREVENT OR MINIMIZE STORMWATER EXPOSURE TO POLLUTANTS FROM SPILLS; VEHICLE AND EQUIPMENT FUELING, MAINTENANCE, AND STORAGE; OTHER CLEANING AND MAINTENANCE ACTIVITIES; AND WASTE HANDLING ACTIVITIES. THESE POLLUTANTS INCLUDE FUEL, HYDRAULIC FLUID, AND OTHER OILS FROM VEHICLES AND MACHINERY, AS WELL AS DEBRIS, LEFTOVER PAINTS, SOLVENTS, AND GLUES FROM CONSTRUCTION OPERATIONS.
  10. FUELING ACTIVITIES MUST BE LOCATED A MINIMUM OF 150 FEET FROM ORDINARY HIGH WATER AND SENSITIVE WATERS, INCLUDING WETLANDS.
  11. IMPLEMENT THE FOLLOWING BMPS WHEN APPLICABLE: WRITTEN SPILL PREVENTION AND RESPONSE PROCEDURES, EMPLOYEE TRAINING ON SPILL PREVENTION AND PROPER DISPOSAL PROCEDURES, SPILL KITS
- IN ALL VEHICLES, REGULAR MAINTENANCE SCHEDULE FOR VEHICLES AND MACHINERY, MATERIAL DELIVERY AND STORAGE CONTROLS, TRAINING AND SIGNAGE, AND COVERED STORAGE AREAS FOR WASTE AND SUPPLIES.
12. USE WATER, SOIL-BINDING AGENT OR OTHER DUST CONTROL TECHNIQUE AS NEEDED TO AVOID WIND-BLOWN SOIL.
  13. TEMPORARILY STABILIZE SOILS AT THE END OF THE SHIFT BEFORE HOLIDAYS AND WEEKENDS, IF NEEDED. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT SOILS ARE STABLE DURING RAIN EVENTS AT ALL TIMES OF THE YEAR.
  14. AT THE END OF EACH WORKDAY SOIL STOCKPILES MUST BE STABILIZED OR COVERED, OR OTHER BMPS MUST BE IMPLEMENTED TO PREVENT DISCHARGES TO SURFACE WATERS OR CONVEYANCE SYSTEMS LEADING TO SURFACE WATERS.
  15. CONSTRUCTION ACTIVITIES MUST AVOID OR MINIMIZE EXCAVATION AND CREATION OF BARE GROUND DURING WET WEATHER.
  16. SEDIMENT BARRIERS: REMOVE TRAPPED SEDIMENT BEFORE IT REACHES ONE THIRD OF THE ABOVE GROUND BARRIER HEIGHT AND BEFORE BARRIER REMOVAL.
  17. WITHIN 24 HOURS, SIGNIFICANT SEDIMENT THAT HAS LEFT THE CONSTRUCTION SITE, MUST BE REMEDIATED. INVESTIGATE THE CAUSE OF THE SEDIMENT RELEASE AND IMPLEMENT STEPS TO PREVENT A RECURRENCE OF THE DISCHARGE WITHIN THE SAME 24 HOURS. ANY IN-STREAM CLEAN UP OF SEDIMENT SHALL BE PERFORMED ACCORDING TO THE OREGON DIVISION OF STATE LANDS REQUIRED TIMEFRAME.
  18. THE ENTIRE SITE MUST BE TEMPORARILY STABILIZED USING VEGETATION OR A HEAVY MULCH LAYER, TEMPORARY SEEDING, OR OTHER METHOD SHOULD ALL CONSTRUCTION ACTIVITIES CEASE FOR 30 DAYS OR MORE.
  19. PROVIDE TEMPORARY STABILIZATION FOR THAT PORTION OF THE SITE WHERE CONSTRUCTION ACTIVITIES CEASE FOR 14 DAYS OR MORE WITH A COVERING OF BLOWN STRAW AND A TACKIFIER, LOOSE STRAW, OR AN ADEQUATE COVERING OF COMPOST MULCH UNTIL WORK RESUMES ON THAT PORTION OF THE SITE.
  20. PROVIDE PERMANENT EROSION CONTROL MEASURES ON ALL EXPOSED AREAS AS THEY ARE COMPLETED. DO NOT REMOVE TEMPORARY SEDIMENT CONTROL PRACTICES UNTIL PERMANENT VEGETATION OR OTHER COVER OF EXPOSED AREAS IS ESTABLISHED. HOWEVER, DO REMOVE ALL TEMPORARY EROSION CONTROL MEASURES AS EXPOSED AREAS BECOME STABILIZED, UNLESS DOING SO CONFLICTS WITH LOCAL REQUIREMENTS. PROPERLY DISPOSE OF CONSTRUCTION MATERIALS AND WASTE, INCLUDING SEDIMENT RETAINED BY TEMPORARY BMPS.



**FIBER ROLL NOTES**

1. CLEAR THE BEDDING AREA FOR THE FIBER ROLL OF OBSTRUCTIONS INCLUDING ROCKS, CLODS, AND DEBRIS GREATER THAN ONE INCH IN DIAMETER BEFORE INSTALLATION.
2. CONSTRUCT FURROWS TO THE DEPTH SHOWN, AND TO A SUFFICIENT WIDTH TO HOLD THE FIBER ROLL. INSTALL STAKES AT THE ON-CENTER SPACING SHOWN ALONG THE LENGTH OF THE FIBER ROLL AND STOPPED AT 12 INCHES FROM EACH END OF THE ROLLS. DRIVE STAKES TO BETWEEN TWO AND THREE INCHES ABOVE THE TOP OF THE ROLL.
3. PLACE FIBER ROLLS 10 FEET APART ALONG THE SLOPE FOR SLOPE INCLINATION OF 2H:1V AND STEEPER, AND 15 FEET APART ALONG THE SLOPE FOR SLOPE INCLINATION BETWEEN 2H:1V AND 4H:1V.
4. INSTALL FIBER ROLLS APPROXIMATELY PARALLEL TO THE SLOPE CONTOUR. ANGLE THE TERMINUS OF ROWS UP-SLOPE AT 45 DEGREES FOR A DISTANCE OF THREE FEET. WHERE FIBER ROLLS MEET, PROVIDE AN OVERLAP OF 18 INCHES, WITH ADJACENT ROLLS TIGHTLY ABUTTING EACH OTHER.
5. INSTALL FIBER ROLLS PRIOR TO SEEDING, WHERE USED WITHOUT SLOPE PROTECTION FABRIC.
6. INSTALL FIBER ROLLS OVER FABRIC (AFTER SEEDING) WHERE SLOPE PROTECTION FABRIC IS SPECIFIED.



**SLOPE PROTECTION FABRIC NOTES**

1. SLOPE PROTECTION FABRIC SHALL BE "NORTH AMERICAN GREEN ROLLMAX BIONET C700BN", OR APPROVED EQUAL.
2. STAKES SHALL BE SHAPED HARDWOOD PINS DESIGNED TO SAFELY AND EFFECTIVELY SECURE THE SLOPE STABILIZATION FABRIC. THE WOOD STAKE MUST EXHIBIT AMPLE RIGIDITY TO ENABLE BEING DRIVEN INTO HARD GROUND, WITH SUFFICIENT FLEXIBILITY TO RESIST BREAKAGE. THE WOOD STAKE SHALL BE THE NORTH AMERICAN GREEN ECO-STAKE OR APPROVED EQUAL, WITH THE FOLLOWING DIMENSIONS:
  - LEG LENGTH: 11.00 IN.
  - HEAD WIDTH: 1.25 IN.
  - HEAD THICKNESS: 0.40 IN.
  - LEG WIDTH: 0.60 IN. (TAPERED TO A POINT)
  - LEG THICKNESS: 0.40 IN.
  - TOTAL LENGTH: 12.00 IN.
3. SECURE UPSLOPE EDGE OF SLOPE PROTECTION FABRIC INTO A 6" X 6" TRENCH WITH A ROW OF GROUND ANCHORING DEVICES SPACED APPROXIMATELY 12" APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" PORTION OF SLOPE PROTECTION FABRIC'S BACK OVER SEED AND COMPACTED SOIL. SECURE SLOPE PROTECTION FABRIC OVER COMPACTED SOIL WITH A ROW OF GROUND ANCHORING DEVICES SPACED APPROXIMATELY 12" APART ACROSS THE WIDTH OF THE SLOPE PROTECTION FABRIC.
4. UNROLL SLOPE PROTECTION FABRIC DOWNSLOPE. CONSECUTIVE ROLLS SPLICED DOWN THE SLOPE MUST BE PLACED END OVER END (SHINGLE STYLE) WITH AN 18" OVERLAP. WHEN MORE THAN ONE ROLL WIDTH IS REQUIRED, CONSECUTIVE ROLLS SHALL BE SPLICED END OVER END IN THE DOWNSTREAM DIRECTION WITH AN 18" OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" APART ACROSS ENTIRE SLOPE PROTECTION FABRIC'S LENGTH.
5. SECURE SLOPE PROTECTION FABRIC TO SLOPE WITH GROUND ANCHORING DEVICES PER MANUFACTURER'S RECOMMENDED STAPLE PATTERN GUIDE, WHICH VARIES PER SLOPE INCLINATION. ADDITIONAL STAPLES SHALL BE INSTALLED, AS NECESSARY, TO ENSURE CONSISTENT CONTACT WITH THE GROUND SURFACE.
6. ALL SLOPE PROTECTION FABRIC EDGES SHALL BE INSTALLED IN A 6" X 6" TRENCH WITH A ROW OF GROUND ANCHORING DEVICES SPACED APPROXIMATELY 12" APART AS DESCRIBED ABOVE.