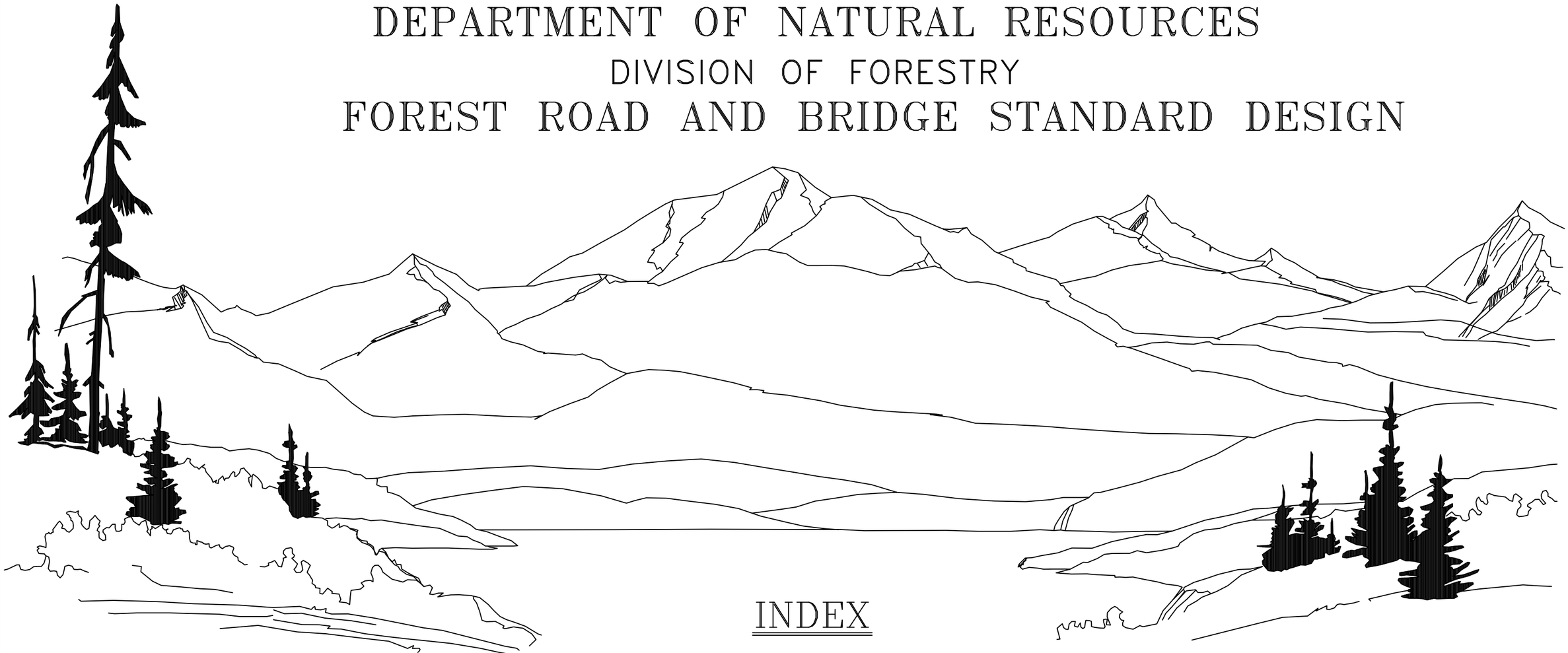
STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF FORESTRY
FOREST ROAD AND BRIDGE STANDARD DESIGN



INDEX

Revisions			
No.	Date	Description	By

STATE OF ALASKA
Department of Natural Resources
Division of Forestry

Approved:

Project Engineer or Forester _____ Date _____

Project or Contract No. _____

FOREST ROAD PERFORMANCE STANDARDS

1. ALL ROADS SHALL BE BUILT TO THE STANDARDS LISTED WITHIN THIS PERFORMANCE STANDARD UNLESS THE PROJECT ENGINEER HAS DETERMINED THAT A SITE SPECIFIC DESIGN IS PRUDENT. THE PERFORMANCE STANDARD FOR ADNR FOREST ROADS AND THE ADNR FOREST ROADS STANDARD DRAWINGS CONVEY THE DEPARTMENT'S INTENT. IN THE EVENT OF A CONFLICT BETWEEN DOCUMENTS, THE PROJECT ENGINEER WILL DETERMINE THE ORDER OF PRECEDENCE.

2. REFERENCE THE FOLLOWING RESOURCES FOR ADDITIONAL INFORMATION:
   A. ALASKA FOREST RESOURCES & PRACTICES REGULATIONS (FRPA), 11 AAC 95, OCTOBER 2013;
   B. ALASKA STATUTE 41.17, FOREST RESOURCES AND PRACTICES.

3. ROAD LOCATION AND CLASSIFICATION ARE IDENTIFIED IN THE TIMBER SALE CONTRACT OR THE BID DOCUMENTS. DEVIATION FROM THESE DOCUMENTS IS PERMITTED ONLY WITH THE WRITTEN PERMISSION OF THE PROJECT ENGINEER.

4. REGARDLESS OF REGION, ROADS WILL BE CLASSIFIED AS PRIMARY, SECONDARY, OR SPUR.
   A. A PRIMARY ROAD IS A HIGH USE PERMANENT ROAD WITH THE FOLLOWING CHARACTERISTICS:
      I. MINIMUM 16 FOOT WIDE RUNNING SURFACE;
      II. TYPICALLY SINGLE LANE;
      III. VERTICAL GRADE: MAXIMUM FAVORABLE GRADE IS 10%, MAXIMUM ADVERSE GRADE IS 6%;
      IV. MINIMUM HORIZONTAL CURVE RADIUS OF 360 FEET; AND
      V. DESIGN SPEED OF 40 MPH.
   B. A SECONDARY ROAD IS A MODERATE TO LOW USE, YEAR ROUND, PERMANENT ROAD WITH THE FOLLOWING CHARACTERISTICS:
      I. MINIMUM 14 FOOT WIDE RUNNING SURFACE;
      II. SINGLE LANE;
      III. VERTICAL GRADE: MAXIMUM FAVORABLE GRADE IS 10%, MAXIMUM ADVERSE GRADE IS 8%;
      IV. MINIMUM HORIZONTAL CURVE RADIUS OF 140 FEET; AND
      V. DESIGN SPEED OF 25 MPH.
   C. A SPUR ROAD IS A TEMPORARY, LOW USE ROAD WITH THE FOLLOWING CHARACTERISTICS:
      I. MINIMUM 14 FOOT WIDE RUNNING SURFACE;
      II. SINGLE LANE;
      III. VERTICAL GRADE: MAXIMUM FAVORABLE GRADE IS 20%, MAXIMUM ADVERSE GRADE IS 12%;
      IV. MINIMUM HORIZONTAL CURVE RADIUS OF 50 FEET; AND
      V. DESIGN SPEED OF 15 MPH.
   D. A WINTER ROAD SUPPORTS VEHICLE TRAFFIC DURING WINTER MONTHS ONLY. IT IS CONSTRUCTED USING FROST, SNOW, AND/OR ICE. WINTER ROADS HAVE THE FOLLOWING CHARACTERISTICS:
      I. MINIMUM 14 FOOT WIDE RUNNING SURFACE;
      II. SINGLE LANE;
      III. VERTICAL GRADE: MAXIMUM FAVORABLE GRADE IS 10%, MAXIMUM ADVERSE GRADE IS 10%;
      IV. MINIMUM HORIZONTAL CURVE RADIUS OF 75 FEET; AND
      V. DESIGN SPEED OF 20 MPH.

5. CROWN or SLOPE TRAVELED WAY OR ROADBED 3–5% FOR ALL SECTIONS.

6. ALL FILL SLOPES SHALL BE 2:1 (OR FLATTER) AND ALL CUT SLOPES SHALL BE 1:1 (OR FLATTER) IN COMMON MATERIAL OR 1/4:1 (OR FLATTER) IN BEDROCK. TERRACED SLOPES ARE PERMITTED IF THEY FIT WITHIN THE RIGHT–OF–WAY.

7. UTILIZE APPROVED MATERIAL LOCATED WITHIN THE RIGHT–OF–WAY TO CONSTRUCT THE ROAD. IF SUFFICIENT MATERIAL IS NOT AVAILABLE OR OF SUITABLE QUALITY, THE PROJECT ENGINEER MAY AUTHORIZE THE IMPORT OF BORROW. IN GENERAL,ALL ROADS EXCEPT WINTER ROADS ARE TYPICALLY CONSTRUCTED AS FOLLOWS:
   A. REGION I ROADS HAVE A 12 –24" SUBGRADE CONSISTING WELL–GRADED ANGULAR STONE WITH A D50 OF 3 INCHES OR GREATER (SHOT ROCK) OR A POORLY GRADED NATURAL SAND AND GRAVEL MIX WITH A MAX GRAIN SIZE OF 12" (PIT RUN GRAVEL). IF AUTHORIZED BY THE PROJECT ENGINEER, THAT MATERIAL MAY ALSO BE USED AS THE RUNNING SURFACE.
   B. REGION II AND III ROADS HAVE A 12–24" SUBGRADE CONSISTING OF SAND, GRAVEL ROCK, OR COMBINATIONS THEREOF CONTAINING NO MUCK, PEAT, FROZEN MATERIAL, ROOTS, SOD, OR OTHER DELETERIOUS MATTER (DOT&PF TYPE "C" MATERIAL). THE PROJECT ENGINEER MAY AUTHORIZE THE USE OF NATIVE MATERIAL FROM DITCHES. A SURFACING MATERIAL MEETING THE REQUIREMENTS OF DOT&PF TYPE E–1 MATERIAL MAY BE REQUIRED.

8. CLEARING LIMITS WILL VARY WITH GROUND CONDITIONS. CLEAR AS NECESSARY TO MEET ROAD TYPICAL CROSS SECTIONS AND SAFE SIGHT DISTANCE AS DIRECTED BY THE PROJECT ENGINEER AND SUBJECT TO THE CONDITIONS IN THE CONTRACT DOCUMENTS.

9. DURING ROAD CLEARING OPERATIONS, ALL MERCHANTABLE TIMBER WITHIN THE CLEARING LIMITS SHALL BE FELLED, LIMBED AND DECKED. MERCHANTABLE TIMBER SHALL BE DECKED ALONG THE ROAD IN A MANNER THAT DOES NOT CREATE A HAZARD TO THE PUBLIC. LOGS SHALL BE DECKED IN AN ORDERLY MANNER AND NOT OBSTRUCT SURFACE WATERS. LOG DECKS SHALL BE CONFIGURED TO EFFICIENTLY AND SAFELY LOAD LOG TRUCKS; LOG DECKS GENERALLY SHALL BE CONSOLIDATED IN A MANNER THAT FACILITATES THE LOADING OF FULL LOADS WITHOUT LOG TRUCK MOVEMENT. UNMERCHANTABLE TIMBER AND DEBRIS SHALL BE TREATED AS APPROVED IN THE OPERATING PLAN UNLESS DIRECTED OTHERWISE IN WRITING BY THE PROJECT ENGINEER.

10. PRIOR TO BURNING CONSTRUCTION DEBRIS, CONTACT DOF AND THE LOCAL WILDLAND FIRE JURISDICTIONAL AGENCY FOR WRITTEN APPROVAL.

11. DITCHES SHALL BE 2' WIDE MINIMUM OR AS REQUIRED FOR ADEQUATE DRAINAGE AND SNOW STORAGE AS DETERMINED BY THE PROJECT ENGINEER.

12. PRELIMINARY LOCATION OF DRAINAGE STRUCTURES ARE IDENTIFIED IN THE BID DOCUMENTS. ADDITIONAL DRAINAGE STRUCTURES MAY BE REQUIRED.
   A. FORDING OF ANY STREAM BY ROADS SHALL BE IN ACCORDANCE WITH 11 AAC 95.295 (C) AND 95.305.
   B. MINIMUM CULVERT DIAMETER IS 18".
   C. CULVERTS MUST EXTEND A MINIMUM OF 36" BEYOND THE TOE OF FILL ON BOTH SIDES OF THE ROAD.
   D. CULVERT ENDS SHALL BE CONSTRUCTED TO PREVENT SCOUR OF THE ROAD BED.

13. FISH PASSAGE LOCATIONS ARE IDENTIFIED IN THE BID DOCUMENTS.
   A. FISH PASSAGE DESIGN AND CONSTRUCTION SHALL BE IN ACCORDANCE WITH ALASKA DEPARTMENT OF FISH AND GAME PERMIT AND GUIDELINES.
   B. CHANGES TO THE COURSE OF AN ANADROMOUS FISH BEARING WATERWAY MUST BE APPROVED, IN WRITING, BY THE ALASKA DEPARTMENT OF FISH AND GAME.
   C. OBTAIN WRITTEN PERMISSION FROM ALASKA DEPARTMENT OF FISH AND GAME PRIOR TO FORDING ANADROMOUS FISH WATERS.
   D. THE INLET AND OUTLET OF FISH PASSAGES SHALL MATCH THE NATURAL COURSE OF THE STREAM CHANNEL.
   E. DO NOT PERCH CULVERT ENDS.

14. CONTROL OR PREVENT EROSION, SILTATION, WATER DEGRADATION AND POLLUTION PER AS 41.17 AND 11 AAC95 (FRPA) AND AS SPECIFIED IN THE DRAWINGS FOR SITE SPECIFIC CONCERNS or AS DIRECTED BY THE ENGINEER. AT A MINIMUM, FRPA BMP'S SHALL BE USED FOR EROSION CONTROL AND MAINTENANCE AND ARE A REQUIREMENT OF ALL CONTRACTS.

15. TURNOUTS SHALL BE PLACED ON PRIMARY ROADS AT INTER–VISIBLE LOCATIONS OR AS DETERMINED BY THE PROJECT ENGINEER. TURNAROUNDS SHALL BE PLACED ON SECONDARY AND SPUR ROADS AT LOCATIONS DETERMINED BY THE PROJECT ENGINEER. SEE SHEET E–02.00 FOR TURNOUT AND TURNAROUND DETAIL.

16. INSTALL SIGNAGE AS DIRECTED BY THE PROJECT ENGINEER.
   A. AT A MINIMUM, SIGNS WILL BE INSTALLED AT THE FOLLOWING LOCATIONS:
      I. R1–1 SIGNS AT ALL STOP CONTROLLED INTERSECTIONS;
      II. D–10 SERIES SIGNS AT FULL MILE INTERVALS ALONG PRIMARY AND SECONDARY ROADS;
      III. OM–3 SERIES OBJECT MARKERS AT ALL OBSTACLES AND HAZARDS E.G. BRIDGE ENDS; AND
      IV. "ACTIVE LOGGING ROAD..." SIGN AT ENTRANCE TO THE ROAD.

17. YEAR ROUND ROADS ARE NOT TO BE USED FOR HAULING OPERATIONS WHEN ROADS ARE NOT SAFE, SUSCEPTIBLE TO EXCESSIVE DAMAGE OR UNREASONABLE WEAR, AS DETERMINED BY THE PROJECT ENGINEER.
LAYER IS TOO THIN TO PREVENT SURFACE DEFORMATION.

GEOMETRIC STANDARDS		
ROAD CLASSIFICATION	DESIGN SPEED (MPH)	MIN. HORIZONTAL CURVE RADIUS
PRIMARY OR MAIN HAUL ROADS	35	360'
SECONDARY ROAD	20	140'
SPUR ROAD	10	50'
WINTER ROAD	15 OR BY CLASSIFICATION	75'

MINIMUM HORIZONTAL CURVE RADIUS TAKEN FROM EXHIBIT 16 OF THE AASHTO *GUIDELINES FOR GEOMETRIC DESIGN OF VERY LOW VOLUME LOCAL ROADS (ADT<400)*_ USING A TRACTION COEFFICIENT OF 0.5 FOR NON–WINTER ROADS AND 0.4 FOR WINTER ROADS.

Revisions			
No.	Date	Description	By
1	11/5/2015		GS

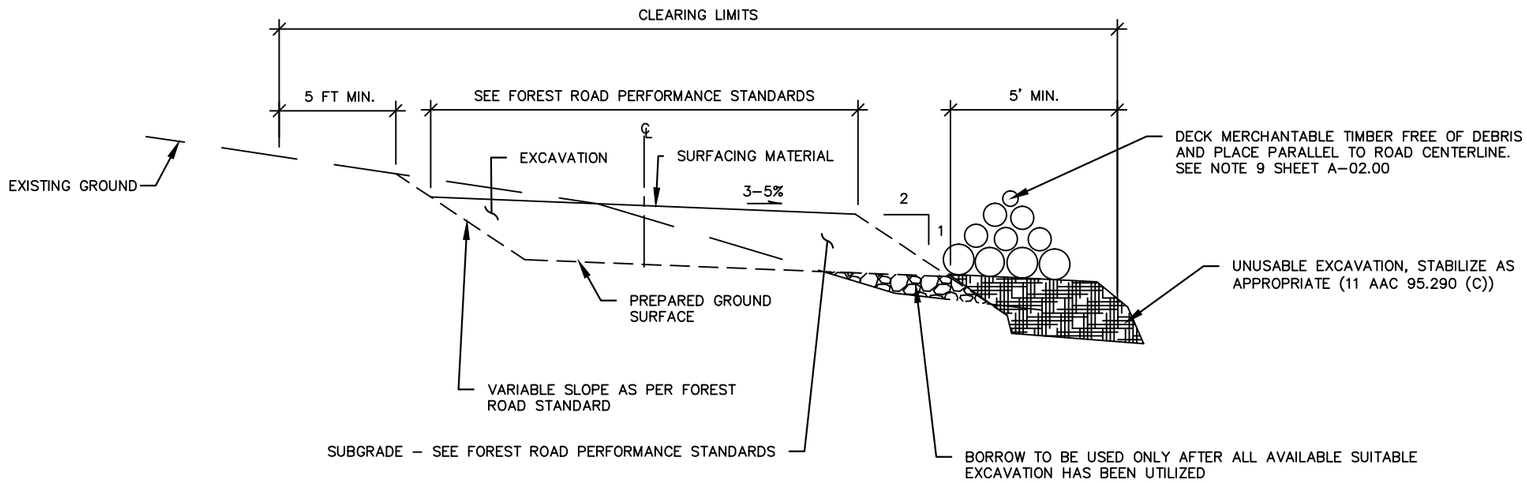
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF FORESTRY — STATE OF ALASKA

ROADS,INFRASTRUCTURE AND BRIDGES SECTION

FOREST ROAD PERFORMANCE STANDARDS

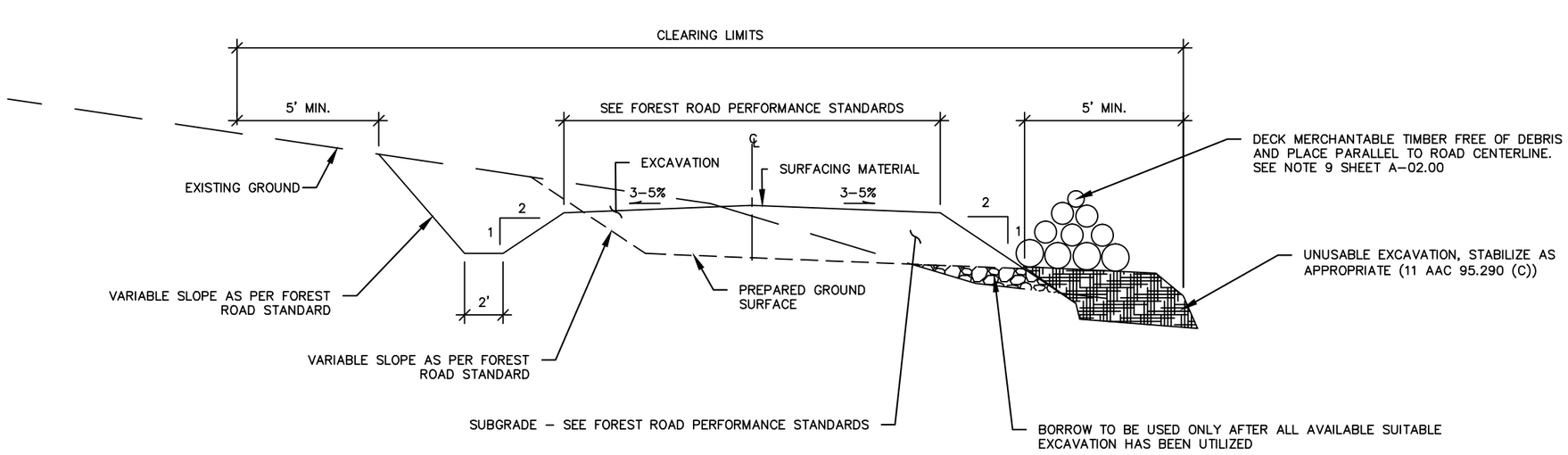
PREPARED: JDM
DRAWN: JDM
REVIEWED: SRA
DATE: 03/04/15

SHEET
A–02.00



TYPICAL SIDEHILL SECTION – NO DITCH

NOT TO SCALE



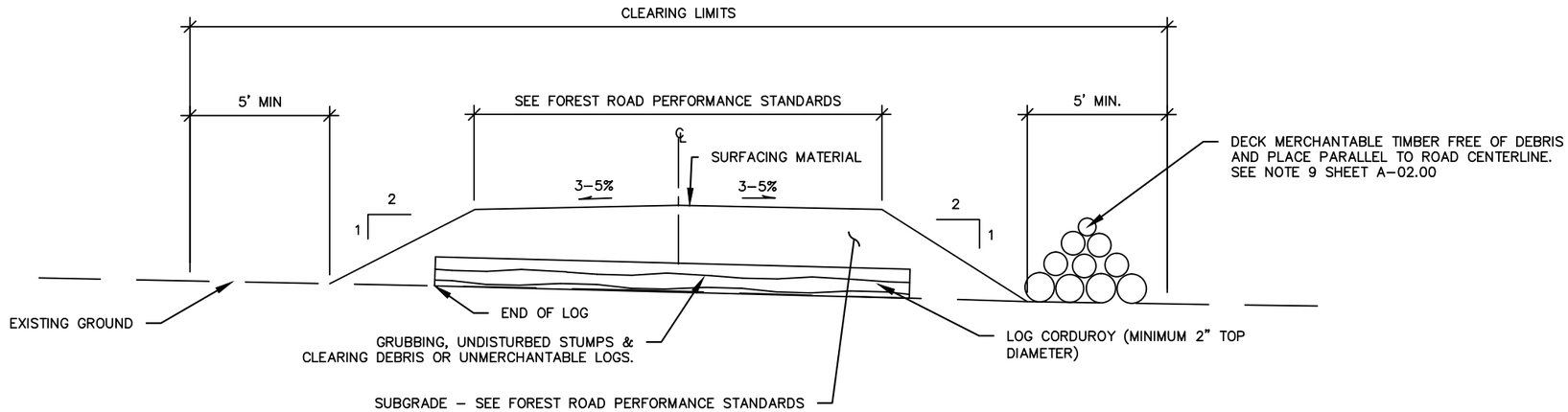
TYPICAL SIDEHILL SECTION – WITH DITCH

NOT TO SCALE

Revisions			
No.	Date	Description	By
1	11/6/2015		GS

DEPARTMENT OF NATURAL RESOURCES DIVISION OF FORESTRY STATE OF ALASKA	ROADS, INFRASTRUCTURE AND BRIDGES SECTION		TYPICAL SECTIONS	PREPARED: JDM DRAWN: JDM REVIEWED: SRA DATE: 03/04/15

SHEET
B–01.00

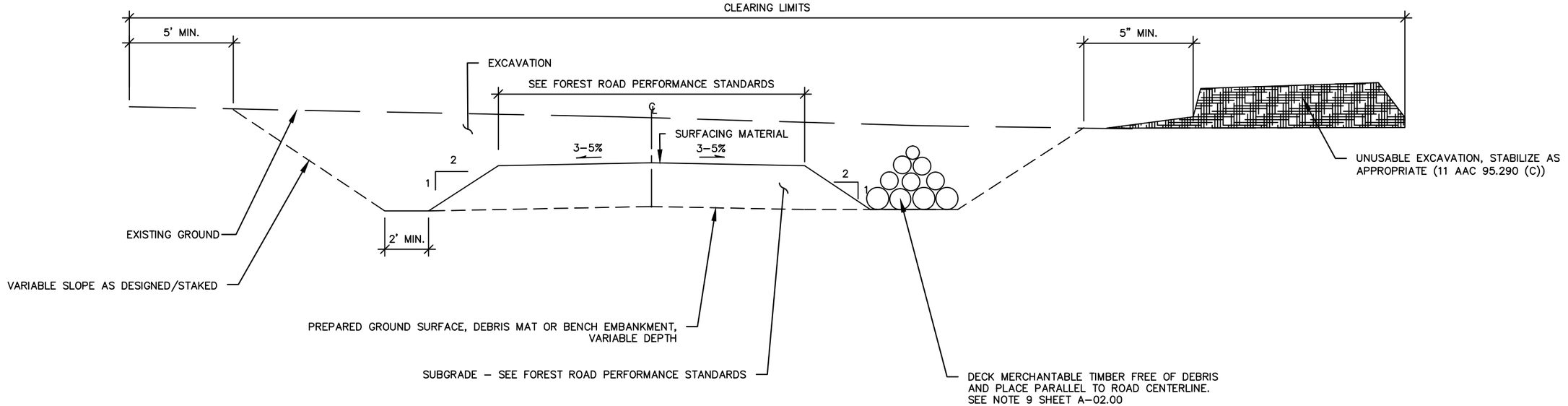


NOTES:

1. IF CROSS DRAINAGE IS A CONCERN PLACE A LAYER OF GEOTEXTILE FABRIC ON TOP OF LOGS.

TYPICAL OVERLAY SECTION

NOT TO SCALE



TYPICAL THRU–CUT SECTION

NOT TO SCALE

Revisions			
No.	Date	Description	By

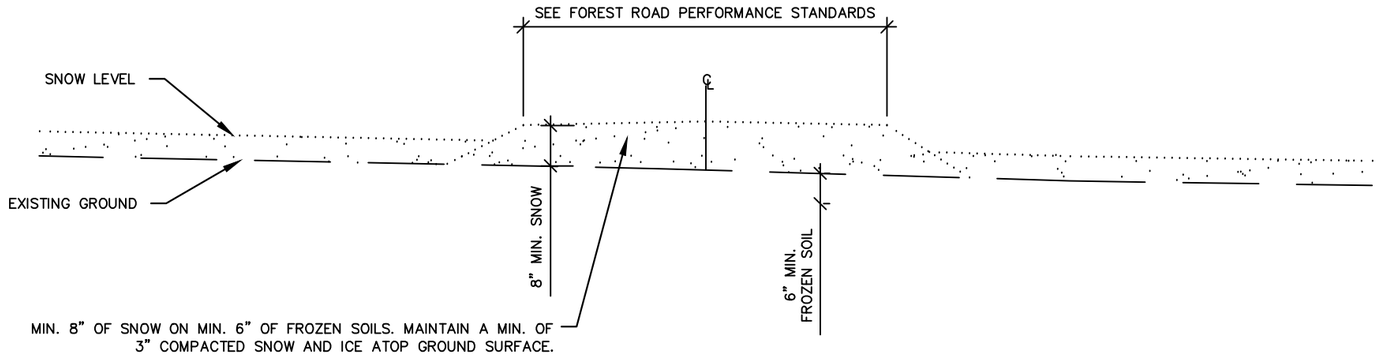
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF FORESTRY — STATE OF ALASKA

ROADS, INFRASTRUCTURE AND BRIDGES SECTION

TYPICAL SECTIONS

PREPARED: JDM
DRAWN: JDM
REVIEWED: SRA
DATE: 03/04/15

SHEET
B–02.00



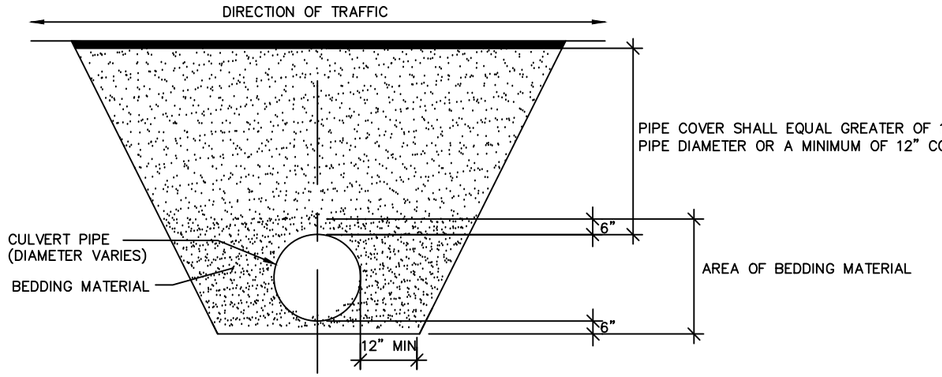
WINTER ROAD

NOT TO SCALE

Revisions			
No.	Date	Description	By
1	11/24/2015		GS

DEPARTMENT OF NATURAL RESOURCES DIVISION OF FORESTRY STATE OF ALASKA	ROADS,INFRASTRUCTURE AND BRIDGES SECTION		WINTER ROAD SECTION	PREPARED: JDM DRAWN: JDM REVIEWED: SRA DATE: 03/04/15

SHEET B-03.00

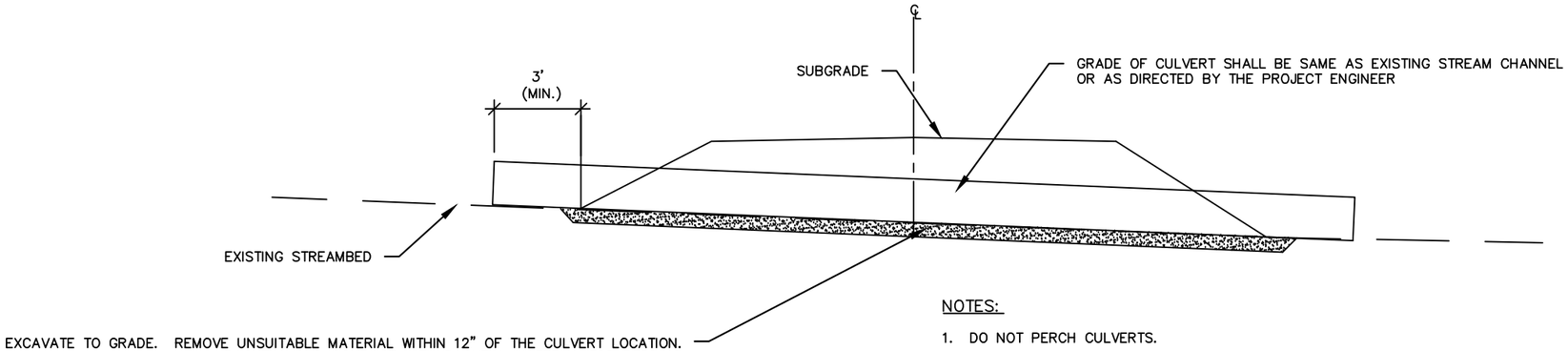


TYPICAL CULVERT TRENCH SECTION

NOT TO SCALE

NOTES:

1. CULVERT JOINTS SHALL HAVE WATERTIGHT GASKETS AND SHALL NOT LEAK.
2. CULVERT PLACEMENT SHALL BE APPROVED BY THE PROJECT ENGINEER BEFORE BACKFILLING.
3. ALL USABLE MATERIAL (COMMON EXCAVATION) SHALL BE USED AS BACKFILL FOR EMBANKMENT CONSTRUCTION.
4. SIDE SLOPES SHALL BE EXCAVATED AT 0.5H:1V OR FLATTER IN ACCORDANCE WITH ALL APPLICABLE SAFETY REQUIREMENTS.
5. BEDDING MATERIAL SHALL AT A MINIMUM MEET THE SAME REQUIREMENTS AS THE SUBGRADE MATERIAL. DO NOT PLACE ROCKS LARGER THAN 6 INCHES IN DIAMETER AGAINST CULVERT. PLACE AND COMPACT BEDDING IN LIFTS TO ADEQUATELY SUPPORT THE PIPE.
6. FOLLOW MANUFACTURE'S REQUIREMENTS FOR INSTALLATION UNLESS DIRECTED OTHERWISE BY THE PROJECT ENGINEER.
7. WHEN JOINING TWO PIPES TOGETHER, THE MINIMUM LENGTH OF PIPE TO BE JOINED SHALL BE SIX FEET.



MINIMUM CULVERT SPACING 11 AAC 95.295 (B)		
PERCENT OF LONGITUDINAL GRADE	REGION I	REGION II & REGION III
0 TO 2	SEE NOTE #7	SEE NOTE #7
2 TO 7	1,000	1,500
8 TO 15	800	1,000
OVER 15	600	800

NOTES:

1. DO NOT PERCH CULVERTS.
2. PLACE CULVERT IN ALIGNMENT WITH THE NATURAL STREAM CHANNEL. WHERE NO CHANNEL IS APPARENT, INSTALL CULVERTS AT SKEW AND SLOPE TO DRAIN OR AS DIRECTED BY THE PROJECT ENGINEER.
3. MINIMUM CULVERT GRADES SHALL BE 5% OR 1/2 OF THE TRIBUTARY DITCH GRADE.
4. CAMBER WILL DEPEND ON SITE CONDITIONS. MAXIMUM CAMBER IS 2% (STEEL OR ALUMINUM CULVERTS) OR 1% (POLYETHYLENE CULVERTS) OF CULVERT LENGTH BY NO MORE THAN 2.5 INCHES AT CENTER.
5. MINIMUM CULVERT DIAMETER IS 18".
6. CULVERT INLETS AND OUTLETS SHALL EXTEND 36 INCHES BEYOND THE TOE OF THE FILL UNLESS OTHERWISE AGREED TO BY THE PROJECT ENGINEER.
7. CULVERTS MUST BE SPACED TO PREVENT POOLING OF WATER CAUSED BY THE PRESENCE OF THE ROADBED.
8. PROVIDE ENERGY DISSAPATORS AT OUTLETS OF STORM DRAIN CULVERTS (FRPA 11 AAC 95.305 (C)).
9. RELIEF CULVERT SPACING WILL DEPEND ON SITE CONDITIONS. PROJECT ENGINEER TO ADVISE.

TYPICAL CULVERT INSTALLATION

NOT TO SCALE

Revisions			
No.	Date	Description	By
0	11/9/2015		GS

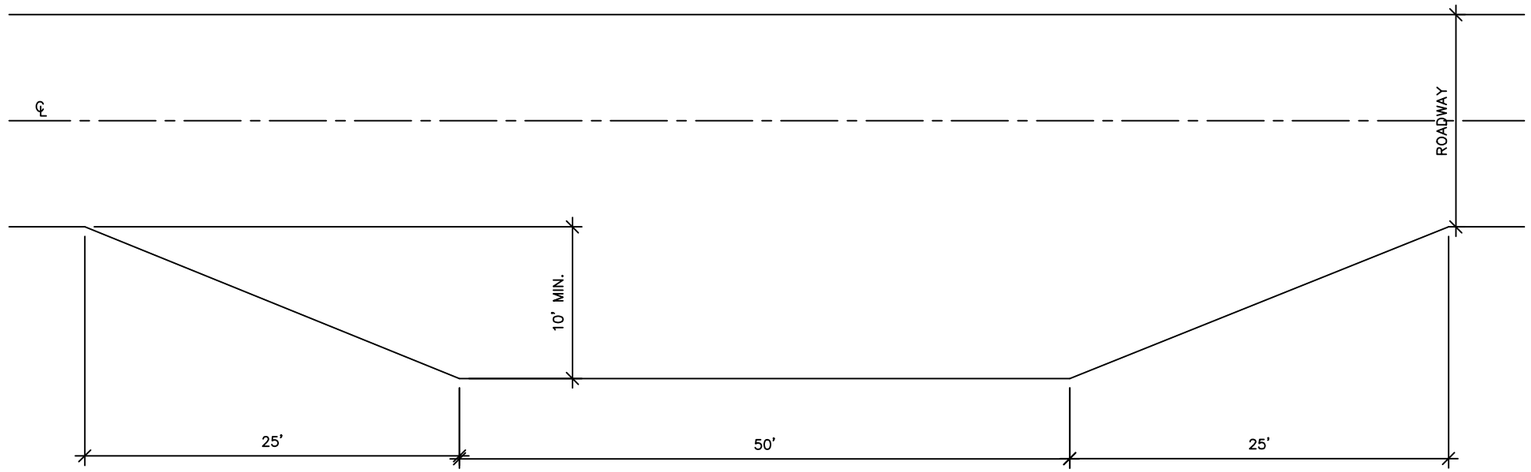
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF FORESTRY — STATE OF ALASKA

ROADS, INFRASTRUCTURE AND BRIDGES SECTION

CULVERT DETAILS

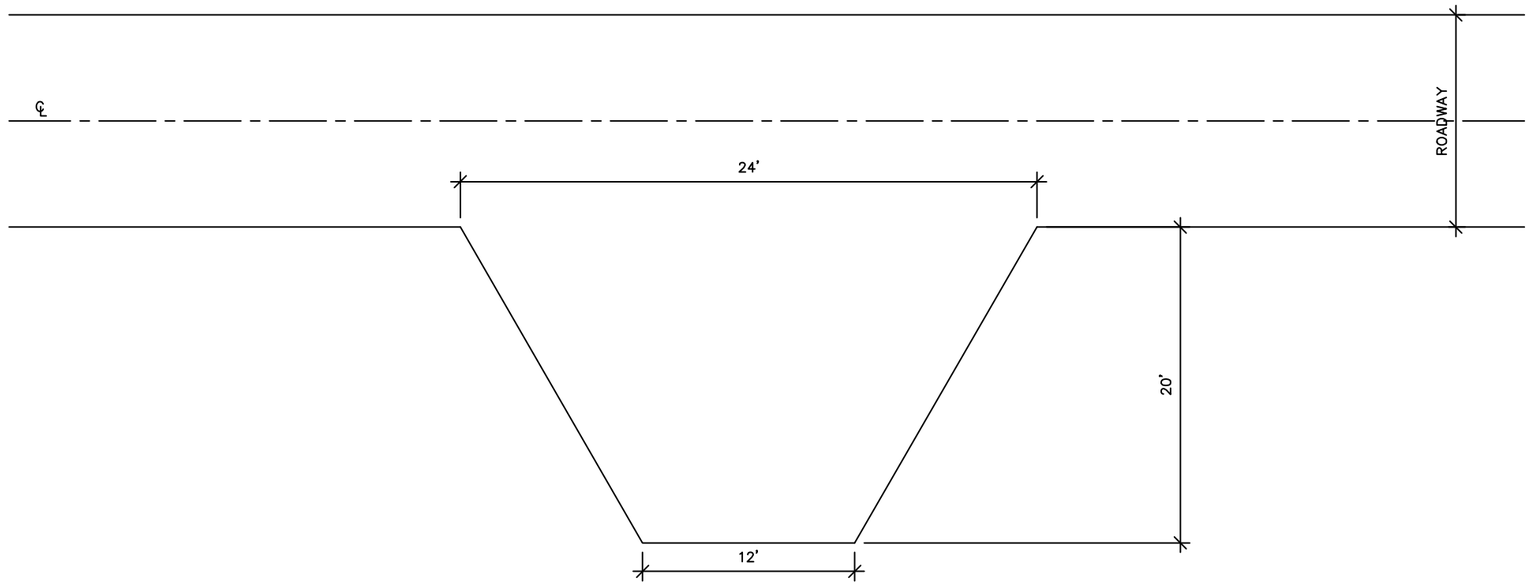
PREPARED: JDM
DRAWN: JDM
REVIEWED: SRA
DATE: 03/04/15

SHEET
E-01.00



TURNOUT DETAIL

NOT TO SCALE



TURNAROUND DETAIL

NOT TO SCALE

Revisions			
No.	Date	Description	By

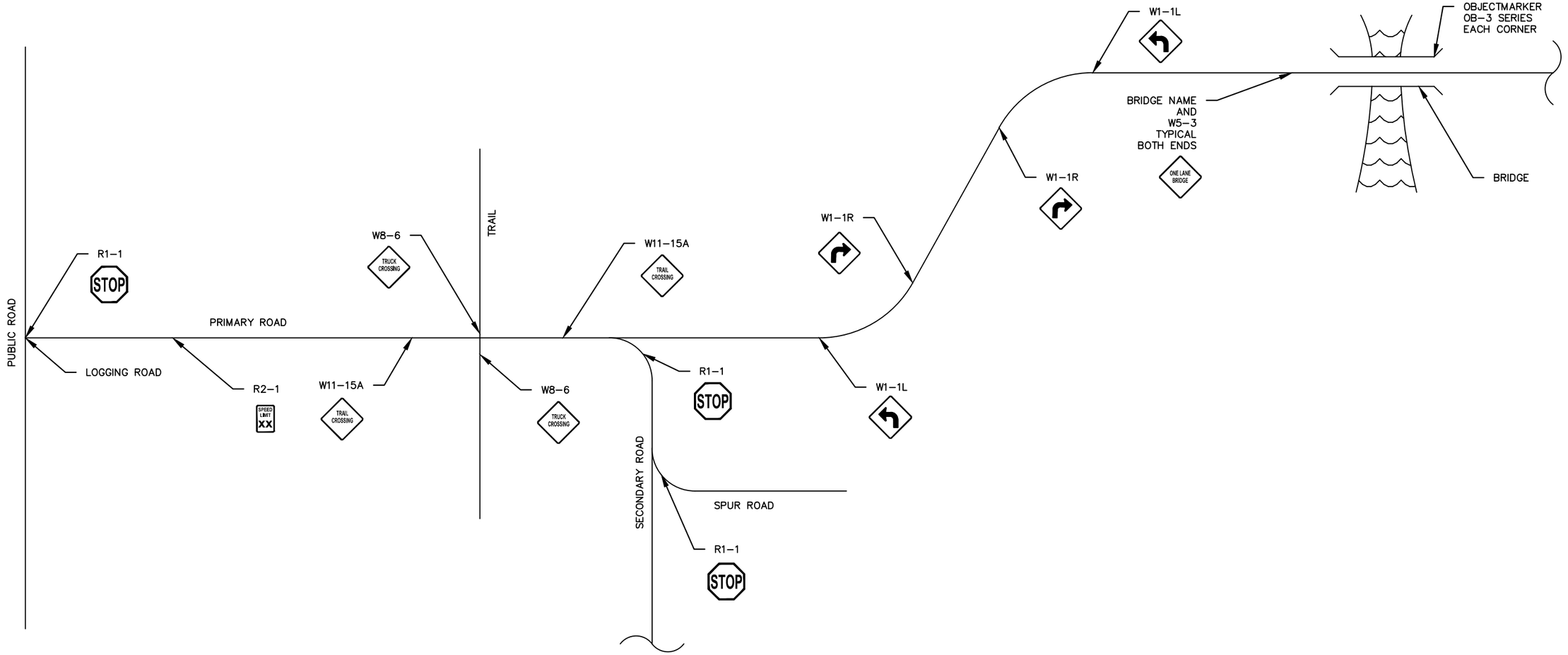
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF FORESTRY — STATE OF ALASKA

ROADS,INFRASTRUCTURE AND BRIDGES SECTION

ROADWAY DETAILS

PREPARED: JDM
DRAWN: JDM
REVIEWED: SRA
DATE: 03/04/15

SHEET
E-02.00



NOTES:

1. PLACE D10–1 MILE MARKERS EVERY MILE.
2. DIAGRAM ABOVE SHOWS APPROXIMATE PLACEMENT OF SIGNS. PROJECT ENGINEER TO DETERMINE FINAL PLACEMENT BASED ON SITE CONDITIONS.
3. SEE SHEET S–01.00 FOR ADDITIONAL BRIDGE SIGNS.

Revisions			
No.	Date	Description	By
1	11/8/2015		GS

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF FORESTRY
STATE OF ALASKA

ROADS, INFRASTRUCTURE AND BRIDGES SECTION

TYPICAL SIGN PLACEMENT

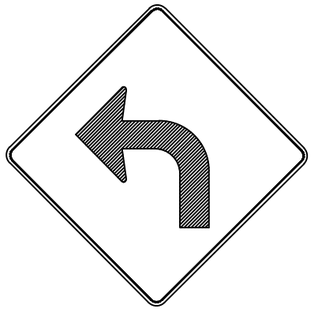
PREPARED: JDM
DRAWN: JDM
REVIEWED: SRA
DATE: 03/04/15

SHEET
H–01.00

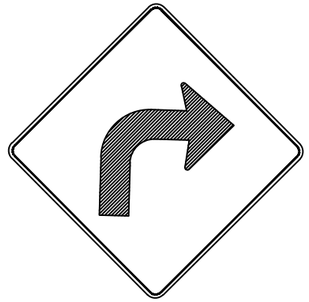
R1–1 (MUTCD)
24" X 24"
18"X18"

R2–1 (MUTCD)
18"W X 24"H

D10–1 (MUTCD)
10" X 18"



W1–1L (MUTCD)
24" X 24"
18"X18"



W1–1R (MUTCD)
24" X 24"
18"X18"

W5–3 (MUTCD)
24" X 24"

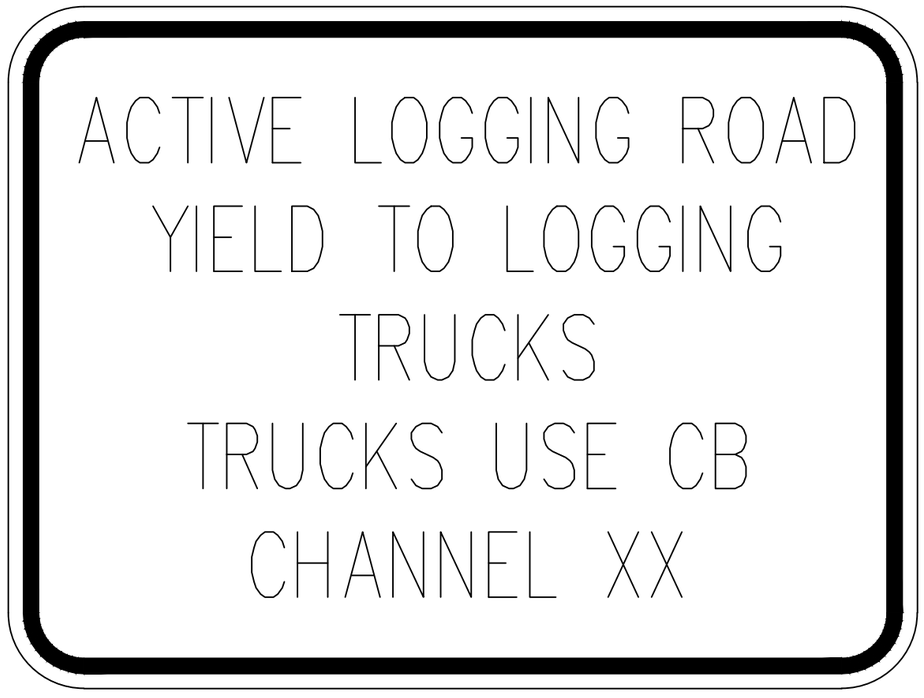
W16–9P (MUTCD)
24" X 18"

W11–15A (MUTCD)
24" X 24"

W8–6 (MUTCD)
24" X 24"

OM–3L (MUTCD)
12" X 36"

OM–3L (MUTCD)
12" X 36"



72"X54" BLACK MESSAGE AND BORDER ON WHITE BACKGROUND (CUSTOM)

Revisions			
No.	Date	Description	By

NOTE: FOR SIGN FRAMING AND POST SPACING SEE ALASKA DEPARTMENT OF TRANSPORTATION STANDARD DETAIL S–00.11

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF FORESTRY
STATE OF ALASKA

ROADS,INFRASTRUCTURE
AND BRIDGES SECTION

SIGN DETAILS

PREPARED: JDM
DRAWN: JDM
REVIEWED: SRA
DATE: 03/04/15

SHEET
H–02.00