EXHIBIT "B"

FOREST ROAD SPECIFICATIONS

SUBGRADE WIDTH	SURFACED WIDTH	POINT TO POINT	STATION TO STATION	DRAINAGE
14 feet	12 feet	A to B	0+00 to 1+45	Ditch Required
14 feet	12 feet	C to D	0+00 to 7+45	Ditch Required
14 feet	12 feet	E to F	0+00 to 3+20	Ditch Required
14 feet	12 feet	H to I	0+00 to 1+10	Ditch Required
14 feet	12 feet	J to K	0+00 to 6+75	Ditch Required
14 feet	12 feet	L to M	0+00 to 3+10	Ditch Required
16 feet	12 feet	N to O	0+00 to 31+70	Ditch Required
14 feet	12 feet	P to Q	0+00 to 30+60	Ditch Required
14 feet	12 feet	R to S	0+00 to 30+90	Ditch Required
14 feet	12 feet	T to U	0+00 to 24+85	Ditch Required
14 feet	12 feet	V to W	0+00 to 1+20	Ditch Required
14 feet	12 feet	X to Y	0+00 to 49+80	Ditch Required
14 feet	12 feet	X to Y	49+80 to 61+00	Outslope

CLEARING. This work shall consist of clearing, removing, and disposing of all trees, snags, down timber, brush, surface objects, and protruding obstructions within the clearing limits.

Where clearing limits have not been staked, the clearing limits shall extend 10 feet back of the top of the cutslope and 5 feet out from the toe of the fill slope, or as directed by STATE. Clearing debris shall not be placed or permitted to remain in or under any road embankment sections. Clearing debris shall not be left lodged against standing trees.

All danger trees, leaners, and snags outside the clearing limits which could fall and hit the road shall be felled.

GRUBBING. This work shall consist of the removal or digging out of stumps and protruding objects.

All stumps shall be completely removed within the limits of required grubbing. Stumps overhanging cutslopes shall be removed. Grubbing debris shall not be placed or permitted to remain in or under any road embankment sections. Grubbing debris shall not be left lodged against standing trees. Grubbing classifications are as follows:

New construction - From the top of the cutslope to the toe of the fill.

Improvements and reconstructions - 4 feet back from the shoulder of the subgrade or ditch, whichever is widest, or as marked in the field.

CLEARING AND GRUBBING DISPOSAL. Scatter through openings in the timber outside of the cleared right-of-way, except areas where end-haul is required.

EXHIBIT "B"

FOREST ROAD SPECIFICATIONS

EXCAVATION. Excavation and grading shall not be done when weather and/or ground conditions are such that damage will result to existing subgrade or cause excessive erosion.

Excavation shall conform to STATE-engineered lines, grades, dimensions, and plans when provided.

All suitable excavated material shall be used where possible for the formation of fills, shoulders, and drainage structure backfills. Embankment materials shall be free of woody debris, brush, muck, sod, frozen material, and other deleterious materials. All fills and drainage structure backfills shall be machine compacted according to the specifications in Exhibit C.

Unless road design plans show otherwise, all roads shall be on a balanced cross section, except when the slope is over 50 percent; the road shall be on full bench for the width specified.

Excess excavation shall not be sidecast where material will enter a stream course or where material will accumulate in areas deemed a high-risk site by STATE.

ROAD WIDTH LIMITATIONS. PURCHASER shall obtain advance written approval from STATE to construct the road to a greater width than specified. Extra subgrade width shall be required for:

Fill Widening. Add to each fill shoulder 1 foot for fills 3 feet to 6 feet high; 2 feet for fills over 6 feet high.

Curve Widening. Widen the inside shoulder of all curves as follows: 400 divided by the radius of the curve equals the amount of extra width.

DRAINAGE

Ditch. Construct "V" ditch 2 feet wide and to a depth of 1 foot below subgrade. Subgrade shall be crowned at 4 to 6 percent.

Outslope. Road subgrade shall be outsloped at 3 to 4 percent.

TURNOUTS. Increase roadbed width an additional 8 feet for both subgrade and surfacing. Length shall be at least 25 feet, or as staked on the ground, plus 25-foot approaches at each end.

Location: Intervisible but not greater than 750 feet.

GRADING	Back Slopes	Fill Slopes
Rock	Vertical to 1/4:1	Not steeper
Common - side slopes 50% and over	1/2:1	than 1½:1
Common - side slopes less than 50%	3/4:1	
Common - turnpike (level) section	2:1	

Top of cutslope shall be rounded.

LANDINGS. Landings shall be constructed no less than 50 feet wide and no more than 70 feet wide. Surface is to be crowned for drainage, with general grade no more than 3 percent. Surface as shown on Exhibit C, Page 1.

TURNAROUNDS. Increase subgrade width an additional 20 feet for a length of 20 feet at locations marked in the field.

EXHIBIT "B"

ROAD CONSTRUCTION AND IMPROVEMENT INSTRUCTIONS

Segment	Station	Work Description
A to B	0+00	Ditch water to existing ditch off and fill ditch on mainline. Construct two-way junction for rock haul from the north.
	1+45	Point B. Construct landing.
C to D	0+00	Install Culvert No. 1 (18" x 40'). Use excavated material for construction; do not sidecast.
	2+45	Install Culvert No. 2 (24" x 36'). Place 12 cy riprap at inlet and 12 cy at outlet.
	5+80	Install Culvert No. 3 (24" x 36'). Place 12 cy riprap at outlet.
	7+45	Point D. Construct landing.
E to F	0+00	Construct two-way junction for rock haul from the north.
	1+00	Install Culvert No. 4 (18" x 36').
	3+20	Point F. Construct landing.
Point G	0+00	Excavate approximately 500 cy from cutbank; place as fill and compact for landing.
H to I	0+00	Install Culvert No. 5 (18" x 60').
	1+10	Point I. Construct landing.
J to K	1+50	Ditch water off left side.
	4+00	Begin drift section; carry ahead and use to construct landing at Point K. Full containment specification applies.
	5+30	Install Culvert No. 6 (18" x 26' with 20' half round).
	6+75	Point K. Construct landing.
L to M	0+00	Construct two-way junction for rock haul from the north.
	3+10	Point M. Construct landing.
N to O	0+00	Install Culvert No. 7 (18" x 36').
	5+20	Install Culvert No. 8 (18" x 40' with 20’ half round).
	16+35	Install Culvert No. 9 (18" x 32').
	23+25	Install Culvert No. 10 (18" x 30').
	31+70	Point O. Install Culvert No. 11 (18" x 36').
P to Q	4+40	Install Culvert No. 12 (18” x 36”). Start end-haul to Waste Area No. 1.
	7+50	Stop end-haul.
	7+90	Install Culvert No. 13 (18” x 36’).
	9+25	Waste Area No. 1, construct truck turnaround.
	10+15	Construct landing.
	11+60	Install Culvert No. 14 (18” x 36’). Start end-haul to Waste Area No. 1.

EXHIBIT "B"

ROAD CONSTRUCTION AND IMPROVEMENT INSTRUCTIONS

Segment	Station	Work Description
P to Q	13+65	Install Culvert No. 15 (24" x 50').
(Cont.)	16+60	Install Culvert No. 16 (18" x 38').
	21+30	Stop end-haul. Fill dry draw and begin ridge top construction.
	30+60	Point Q. Construct landing.
R to S	0+65	Install Culvert No. 17 (18" x 36').
	2+35	Install Culvert No. 18 (18" x 38').
	7+65	Saddle. Ditch water off, left and right.
	10+90	Ditch water off left and right.
	14+90	Saddle. Ditch water off left and right, begin curve left around ridge.
	18+50	Resume ridge top construction.
	20+30	Saddle. Ditch water off left and right.
	30+90	Point S. Construct landing.
T to U	0+00	Construct one-way approach.
	1+00	Construct truck turnaround.
	3+70	Excavate for log puncheon. Install Culvert No. 19 (24" x 60').
	7+20	Junction – Point V. Install Culvert No. 20 (18" x 36').
	10+95	Ditch water off right side.
	12+10	Construct landing.
	15+55	Ditch water off right side, drift excavated material ahead to saddle at Station 18+60. Full containment specification applies.
	22+55	Ditch water off right side.
	24+85	Point U. Construct landing.
V to W	0+00	Construct one-way approach.
	1+20	Point W. Construct landing.
X to Y	0+00	Construct one-way approach. Install Culvert No. 21 (18" x 50').
	1+25	Install Culvert No. 22 (18" x 36').
	3+90	Remove old puncheon. Install Culvert No. 23 (36" x 50'). Use end-haul area ahead for fill. All excess material from this point ahead is to be used in fill construction or end hauled to the landing area at Station 61+00. Full containment specification applies.
	8+80	Install Culvert No. 24 (18" x 30' with 10' half round).
	11+00	Move centerline into cutbank around slump.
	14+00	Install Culvert No. 25 (18" x 30' with 30' half round).
	16+80	Ditch water off right side.

EXHIBIT "B"

ROAD CONSTRUCTION AND IMPROVEMENT INSTRUCTIONS

Segment	Station	Work Description
X to Y	20+30	Ditch water off right side.
(Cont.)	25+25	Ditch water off right side.
	27+40	Install Culvert No. 26 (24” x 36’).
	32+95	Install Culvert No. 27 (18” x 28’).
	37+00	Install Culvert No. 28 (24” x 36’).
	39+70	Remove old puncheon. Install Culvert No. 29 (30” x 60’). Place 50 CY of riprap at outlet and 20 CY at inlet.
	42+20	Remove old puncheon. Install Culvert No. 30 (48” x 70’).
	46+35	Install Culvert No. 31 (18” x 36’).
	49+80	Start end-haul around slump.
	59+45	Remove old puncheon. Install Culvert No. 32 (30” x 60’).
	61+00	Point Y. Construct landing.

EXHIBIT "B"

END-HAULING REQUIREMENTS

POINT TO POINT	STA. TO STA.	WASTE AREA LOCATION	WASTE AREA TREATMENT
J to K	4+00 to 6+75	Point K	3
P to Q	4+40 to 21+30	Waste Area 1	1, 2
T to U	15+55 to 18+60	Sta. 18+60 T to U	1, 2
X to Y	3+90 to 61+00	Landing Sta. 61+00	3

End-Haul Areas General Requirements

Material shall not be intentionally sidecast.

Clearing and grubbing debris shall be end-hauled.

When blasting is required, it shall be accomplished using timing devices, delayed charges, low intensity shots, or other suitable means to contain as much material as possible within the road prism.

Containment

Full containment: The amount of material lost over the outside edge of the road shall not exceed 6 inches in depth measured perpendicular to the natural ground slope. Pioneer excavation shall be removed by digging, loading, and hauling rather than by pushing or scraping methods.

Trees and stumps may have up to 12 inches of material directly above them. Any amount of material exceeding the containment requirements shall be removed by whatever means necessary and end-hauled to a designated waste area.

Waste Area Location

As shown on Exhibit A and as marked in the field.

Waste Area Treatment

(1) Deposit at waste area, spread evenly, compact, and provide adequate drainage.

(2) Pile woody debris separate from other waste material.

(3) Use suitable material to construct subgrade.

EXHIBIT "C"

ROAD SURFACING

TYPE OF ROCK	SIZE OF ROCK	COMPACTED DEPTH	POINT TO POINT	STATION TO STATION	APPROX. TOTAL TRUCK MEASURE VOLUME
Pit-Run	6”-0”	12”	A to B	0+00 to 1+45	98 CY
Pit-Run	6”-0”	12”	C to D	0+00 to 7+45	500 CY
Pit-Run	6”-0”	12”	E to F	0+00 to 3+20	215 CY
Pit-Run	6”-0”	12”	H to I	0+00 to 1+10	74 CY
Pit-Run	6”-0”	12”	J to K	0+00 to 6+75	453 CY
Pit-Run	6”-0”	12”	L to M	0+00 to 3+10	208 CY
Crushed	1½”-0”	12”	N to O	Spot Rock	60 CY
Pit-Run	6”-0”	12”	P to Q	0+00 to 30+60	2,051 CY
Pit-Run	6”-0”	12”	R to S	0+00 to 30+90	2,071 CY
Pit-Run	6”-0”	12”	T to U	0+00 to 24+85	1,665 CY
Pit-Run	6”-0”	12”	V to W	0+00 to 1+20	81 CY
Pit-Run	6”-0”	12”	X to Y	0+00 to 61+00	4,087 CY
CURVE WIDENINGS:			**NO. OF CURVES**	**POINT TO POINT**	
Pit-Run	6”-0”	12”	3	C to D	45 CY
Pit-Run	6”-0”	12”	1	E to F	15 CY
Pit-Run	6”-0”	12”	2	J to K	30 CY
Pit-Run	6”-0”	12”	1	L to M	15 CY
Pit-Run	6”-0”	12”	11	P to Q	165 CY
Pit-Run	6”-0”	12”	9	R to S	135 CY
Pit-Run	6”-0”	12”	10	T to U	150 CY
Pit-Run	6”-0”	12”	16	X to Y	240 CY

EXHIBIT "C"

ROAD SURFACING

TYPE OF ROCK	SIZE OF ROCK	COMPACTED DEPTH	NO. OF T.O.	POINT TO POINT	APPROX. TOTAL TRUCK MEASURE VOLUME
TURNOUTS:					
Pit-Run	6”-0”	12”	1	A to B	33 CY
Pit-Run	6”-0”	12”	3	C to D	99 CY
Pit-Run	6”-0”	12”	2	E to F	66 CY
Pit-Run	6”-0”	12”	1	H to I	33 CY
Pit-Run	6”-0”	12”	3	J to K	99 CY
Pit-Run	6”-0”	12”	1	L to M	33 CY
Pit-Run	6”-0”	12”	11	P to Q	363 CY
Pit-Run	6”-0”	12”	7	R to S	231 CY
Pit-Run	6”-0”	12”	8	T to U	264 CY
Pit-Run	6”-0”	12”	16	X to Y	528 CY
LANDINGS:			**NO. OF LDGS.**	**LOCATION**	
Pit-Run	6”-0”	12”	1	Point B	100 CY
Pit-Run	6”-0”	12”	1	Point D	100 CY
Pit-Run	6”-0”	12”	1	Point F	100 CY
Pit-Run	6”-0”	12”	1	Point G	100 CY
Pit-Run	6”-0”	12”	1	Point I	100 CY
Pit-Run	6”-0”	12”	1	Point K	100 CY
Pit-Run	6”-0”	12”	1	Point M	100 CY
Pit-Run	6”-0”	12”	2	P to Q	200 CY
Pit-Run	6”-0”	12”	1	Point S	100 CY
Pit-Run	6”-0”	12”	2	T to U	200 CY
Pit-Run	6”-0”	12”	1	Point W	100 CY
Pit-Run	6”-0”	12”	1	Point Y	200 CY

EXHIBIT "C"

ROAD SURFACING

TYPE OF ROCK	SIZE OF ROCK	COMPACTED DEPTH	NO. OF JCTS.	LOCATION	APPROX. TOTAL TRUCK MEASURE VOLUME
JUNCTIONS:					
Pit-Run	6”-0”	12”	1	Point A	36 CY
Pit-Run	6”-0”	12”	1	Point C	36 CY
Pit-Run	6”-0”	12”	1	Point E	50 CY
Pit-Run	6”-0”	12”	1	Point H	36 CY
Pit-Run	6”-0”	12”	1	Point J	36 CY
Pit-Run	6”-0”	12”	1	Point L	36 CY
Pit-Run	6”-0”	12”	1	Point P	36 CY
Pit-Run	6”-0”	12”	1	Point R	36 CY
Pit-Run	6”-0”	12”	1	Point T	36 CY
Pit-Run	6”-0”	12”	1	Point V	36 CY
Pit-Run	6”-0”	12”	1	Point X	36 CY
MISCELLANEOUS:			**POINT TO POINT**	**LOCATION**	
Riprap	24”-12”	--	C to D	2+45	24 CY
Riprap	24”-12	--	C to D	5+80	12 CY
Riprap	24”-12”	--	X to Y	39+70	70 CY
Turnaround	6”-0”	12”	P to Q	9+25	50 CY
Turnaround	6”-0”	12”	T to U	1+00	50 CY

Additional rock for curve widening is required and has been included in the volume estimates.

Roads shall be uniformly graded and approved by STATE prior to rocking. For typical cross section, see Forestry Department Drawing Nos. 351-C and 351-D at the Forestry Department district office.

On road segments with multiple gradations of crushed rock, the coarser gradation shall be spread and processed prior to spreading the finer gradation rock.

EXHIBIT "C"

ROAD SURFACING

ROCK ACCOUNTABILITY

The rock shall meet the quality and size specifications in Exhibit C. A sample of the rock shall be supplied to STATE for testing and approval prior to rocking. PURCHASER shall obtain subgrade approval from STATE prior to rocking. Rocking shall be limited to when weather conditions are acceptable to STATE and when sediments will not enter streams.

Rock accountability shall be determined by depth measurement. STATE shall be given 24 hours' notice prior to rocking.

Depth Measurement. Rock shall be spread and compacted according to the depths specified in Exhibit C. Truck measure volumes are given, but shall not limit the amount of rock spread.

Depth shall be determined in the most compacted area of the surface cross section. If additional rock is required because of insufficient depth, it shall be added by truck measure to those areas that were slighted. The conversion from compacted yardage to truck yardage is 1.3 multiplied by the compacted yardage equals truck yardage.

The depth of compacted aggregates shall not vary more than 1 inch from the depth specified in Exhibit C. The average depth for each road segment shall be the specified depth or greater.

Junctions shall have a surfaced area of at least 20 square yards each at the compacted depths specified in Exhibit C.

Turnouts shall have a surfaced area of at least 70 square yards each at the depths shown in Exhibit C.

Landings shall have a surfaced area of at least 280 square yards each at the depths shown in Exhibit C.

Curve Surfacing. Extra surface width shall be required for the inside of all curves as follows: 400 divided by the radius of the curve equals the amount of extra width to be surfaced at the depths shown in Exhibit C.

EXHIBIT "C"

COMPACTION AND PROCESSING REQUIREMENTS

Subgrade. Subgrade surfaces of the road segments listed below shall be graded and compacted prior to rocking. Compaction shall be accomplished by traveling all surfaces from shoulder to shoulder until visible deformation ceases, or in the case of a sheepsfoot roller, the roller "walks out." At least 3 passes shall be made over the entire width and length of the road. A pass is defined as traveling a road section in one direction and then back over that same section again. Compaction shall be accomplished by using the approved equipment listed below or others approved by STATE:

ROAD SEGMENT	COMPACTION EQUIPMENT OPTIONS
A to B, C to D, E to F, Point G, H to I, J to K, L to M, P to Q, R to S, T to U, and X to Y	1

Fills. Embankments and fills shall be placed in (approximately) horizontal layers not more than 8 inches in depth. Each layer shall be separately, and thoroughly, compacted. Compaction equipment shall be operated over the entire width of each layer until visible deformation of the layers ceases or, in the case of a sheepsfoot roller, the roller "walks out." At least of 3 passes shall be made over the entire width and length of each layer. A pass is defined as traveling a fill layer in one direction and then back over that same layer again.

Placing individual rocks or boulders with more depth than the allowed layer thickness shall be permitted, provided the embankment will accommodate them. Such rocks and boulders shall be at least 6 inches below the subgrade. They shall be carefully distributed and the voids filled with finer material, forming a dense and compacted mass. Compaction shall be accomplished by using one or more of the approved equipment options listed below:

ROAD SEGMENT	COMPACTION EQUIPMENT OPTIONS
C to D, P to Q, and X to Y	2, 5

EXHIBIT "C"

COMPACTION AND PROCESSING REQUIREMENTS

Pit-Run Rock. Pit-run surfacing rock shall be spread on roads with a crawler tractor and continuously walked-in. Rock spreading shall begin at nearest point from the rock source and progress toward the end of the project, unless otherwise approved in writing by STATE. Compaction shall be accomplished by using one or more of the approved equipment options listed below:

ROAD SEGMENT	COMPACTION EQUIPMENT OPTIONS
A to B, C to D, E to F, Point G, H to I, J to K, L to M, P to Q, R to S, T to U, and X to Y	3, 4

Crushed Rock. The rock shall be uniformly mixed and spread in layers on the approved roadbed. Each layer of crushed rock shall be moistened or dried to a uniform moisture content suitable for maximum compaction and compacted in layers not to exceed 6 inches in depth. When more than 1 layer is required, each shall be shaped and compacted before the succeeding layer is placed. Any irregularities or depressions that develop during compaction of the top layer shall be corrected by loosening the material at these places and adding or removing material until the surface is smooth and uniform. Each layer shall be compacted with a minimum of 3 passes over the entire width and length of the road. A pass is defined as traveling a road section in one direction and then back over that same section again. Compaction shall be accomplished by using the approved equipment listed below or others approved by STATE:

Rock shall be crowned at 4 to 6 percent unless otherwise specified.

ROAD SEGMENT	COMPACTION EQUIPMENT OPTIONS
N to O	1

EXHIBIT "C"

COMPACTION EQUIPMENT OPTIONS

(a) Vibratory Rollers. The drum shall have a smooth surface, a diameter not less than 48 inches, a width not less than 58 inches, and a turning radius of 15 feet or less. Vibration frequency shall be regulated in steps to 1400, 1500, and 1600 VPM, corresponding to engine speeds of 1575, 1690, and 1800 RPM. The centrifugal force developed shall be 7 tons at 1600 VPM. It shall be activated by a power unit of not less than 25 horsepower. The vibratory roller shall be self-propelled and operated at speeds ranging from 0.9 miles to 1.8 miles per hour, as directed by STATE.

(b) Tampingfoot Compactors. Tampingfoot or sheepsfoot compactors shall exert a minimum pressure of 250 pounds per square inch on the ground area in contact with the tamping feet. The compactor shall cover a minimum width of 60 inches per pass and weigh a minimum of 16,000 pounds.

(c) Grid Rollers. Pit-run rock shall be processed by grid rolling with a Hyster Grid Roller Model D or equivalent, fully equipped with 32,000 pounds or more of ballast weights. Twenty passes shall be made with a grid roller over the entire length and width of the road, unless STATE requires fewer passes. A grader weighing at least 20,000 pounds shall work the pit-run surface during grid rolling so that all pit-run rock comes in contact with the grid roller. Grid rolling shall be performed when the subgrade is dry and firm. Road surface shall be uniformly shaped and graded prior to and during grid rolling.

(d) Vibratory Grid Compactors. The roller shall have a grid surface and have an operating weight of 32,000 pounds or more. The rock shall be worked with a grader weighing at least 20,000 pounds during the grid rolling process.

All rock shall come in contact with the vibratory grid compactor. A minimum of 10 passes shall be made with the grader and vibratory grid compactor over the entire length of the road, unless STATE requires fewer passes.

(e) Rubber-Tired Skidders. A rubber-tired skidder weighing a minimum of 20,000 pounds shall be operated over the fill layers so that the entire layered surface comes in contact with the tires. Skidders with oversized tires (high flotation) are not acceptable for compaction.

State Timber Sale Contract
No. 341-02-37
Ought to Thin

EXHIBIT "D"

ROCK PIT DEVELOPMENT AND USE

(1) PURCHASER shall conduct the operations relative to the disposal of waste material in such manner that silt, rock, debris, dirt, or clay shall not be washed, conveyed, or otherwise deposited in any stream. All waste shall be deposited at an approved "waste disposal site."

(2) Where overburden removal limits have not been staked, they shall extend for a distance of at least 20 feet beyond the developed rock source. Overburden and woody debris shall be hauled to a designated waste area. Overburden shall be spread evenly, grass seeded, and compacted at the waste area and woody debris stacked separately. Prior to drilling or rock removal, completion of overburden removal shall be approved in writing by STATE.

(3) The rock pit floor shall be developed to provide drainage away from the rock pit. Rock pit drainage ditches shall be developed and maintained. Benches shall be constructed at intervals of 40 feet or less in height and shall be a minimum of 20 feet in width. Any gravel or talus slopes shall be left with a working face at an angle of 60 degrees or less. There shall be a minimum of 1 bench with an access road to it. Said bench shall be easily accessible with tractors.

(4) Blasting shall be accomplished using timing devices, delay charges, low intensity shots, or other suitable means to contain as much material as possible in the rock pit prism.

(5) Pit face shall be developed in a uniform manner.

(6) Oversized material that is produced shall be piled in a designated area adjacent to the pit. It shall not be wasted.

(7) PURCHASER shall prepare a written development plan for the pit area. The plan shall be submitted to STATE for approval prior to conducting any operation in the pit area.

The plan shall include, but not be limited to:

(a) Location of benches and roads to benches.

(b) Disposal site for debris and overburden.

(8) Upon completion of use, the pit site and access roads shall be left in a condition free from overburden and debris. Rock pit roads shall be waterbarred to provide drainage and be blocked as directed by STATE.

EXHIBIT "E"

CULVERT SPECIFICATIONS

All culvert materials shall be furnished and installed by PURCHASER, unless otherwise specified in the contract. Culverts shall be constructed of corrugated galvanized iron or steel, aluminized steel, or polyethylene and shall conform to the material and fabricating requirements of Sections 2410 and 2420 of the "Standard Specifications for Highway Construction" prepared by the Highway Division of the Oregon State Department of Transportation. Corrugation types and shapes other than those meeting the above minimum Highway requirements, shall be approved in writing by STATE.

Culverts shall be located according to the alignment and grade as shown on the Plan and Profile, and/or as staked in the field, or as stipulated in special instructions.

Culvert grade shall slope away from ditch grade at least 2 percent unless otherwise specified.

Culverts less than 36 inches in diameter shall be installed with the lock seam on the inlet end placed within 45 degrees of the bottom of the trench.

The foundation and trench walls for all culverts shall be free from logs, stumps, limbs, stones, and other objects which would dent or damage the pipe. The culvert trench shall be excavated 3 pipe diameters wide to permit compaction and working on each side of pipe. Tamping shall be done in 6-inch lifts, 1 pipe diameter each side of the pipe to 95 percent density or over. Bedrock shall be excavated as required to provide a uniform foundation for the full length of the culvert.

Backfill shall consist of granulated material, crushed rock, or job-excavated soil free of stumps, limbs, rocks, or other objects which would damage the pipe.

Transporting of the pipe shall be done carefully. Dragging or allowing free fall from trucks or into trenches shall not be permitted.

Joining shall be done with bands of like material and corrugations. Manufacturers' instructions shall be followed for prefabricated pipe assembly.

Polyethylene joints shall be made with split couplings, corrugated to engage the pipe corrugations, and shall engage a minimum of 4 corrugations, 2 on each side of the pipe joint.

A manufacturer's certification that the product was manufactured, tested, and supplied in accordance with this specification shall be furnished to the Project Engineer upon request.

EXHIBIT "E"

CULVERT SPECIFICATIONS

Minimum height of cover over top of culvert to subgrade when road is to be rocked shall be as follows: 12" for galvanized or aluminized steel culverts 18” to 36”, 18” for galvanized or aluminized steel culverts 42” to 96”, and 12" for polyethylene culverts (add 6" for roads which will not be rocked). Minimum vertical cover for other steel designs shall be as specified by STATE.

Lengths of individual culvert sections shall be not less than 10 feet, unless otherwise provided for in special instructions.

The ends of each culvert shall be free of logs and debris which would restrict the free flow of water. The intake end of relief culverts shall be provided with a sediment catching basin 3 feet in diameter at the bottom. The outlet end of any culvert which would allow water to erode embankment soil shall be provided with a half round or other approved slope protection device. Construct lead off ditch away from the culvert outlet where slope gradient restricts the free flow of water.

Following are the minimum standard gauges for pipe and coupling bands. Some culverts may require different gauges and may be found in the culvert listing.

	Steel Pipe Gauge		Band Widths (")			Hugger Band Widths (")	
Dia.	Galvanized or Aluminized	Band Gauges	Annular	Helical	Dimpled	Annular	Helical
12-15	16	16	7	12	12	13 1/8	10 1/2
18-24	16	16	12	12	12	13 1/8	10 1/2
30-36	16	16	12	12	*12	13 1/8	10 1/2
42	14	16	12	12	NA	13 1/8	10 1/2
48	14	16	24	24	NA	13 1/8	10 1/2
54	14	16	24	24	NA	13 1/8	10 1/2
60	12	16	24	24	NA	13 1/8	10 1/2
66-72	12	16	24	24	NA	13 1/8	10 1/2
78	12	16	24	24	NA	13 1/8	10 1/2
84	12	16	24	24	NA	14 3/4	10 1/2
90-120	12	16	26	26	NA	NA	NA

Galvanized or aluminized steel culverts larger than 60” in diameter shall have 3” x 1” corrugations.

Polyethylene culverts shall be double walled and meet the requirements of AASHTO M-294-901, Type S.

EXHIBIT "E"

CULVERT LIST

CULVERT NO.	DIAMETER (Inches)	LENGTH (Feet)	ROAD SEGMENT POINT TO POINT	STATION
1	18	40	C to D	0+00
2	24	36	C to D	2+45
3	24	36	C to D	5+80
4	18	36	E to F	1+00
5	18	60	H to I	0+00
6	18	26	J to K	5+30
Half Round	21	20	J to K	5+30
7	18	36	N to O	0+00
8	18	40	N to O	5+20
Half Round	21	20	N to O	5+20
9	18	32	N to O	16+35
10	18	30	N to O	23+25
11	18	36	N to O	31+70
12	18	36	P to Q	4+40
13	18	36	P to Q	7+90
14	18	36	P to Q	11+60
15	24	50	P to Q	13+65
16	18	38	P to Q	16+60
17	18	36	R to S	0+65
18	18	38	R to S	2+35
19	24	60	T to U	3+70
20	18	36	T to U	7+20
21	18	50	X to Y	0+00
22	18	36	X to Y	1+25
23	36	50	X to Y	3+90
24	18	30	X to Y	8+80
Half Round	21	10	X to Y	8+80

EXHIBIT "E"

CULVERT LIST

CULVERT NO.	DIAMETER (Inches)	LENGTH (Feet)	ROAD SEGMENT POINT TO POINT	STATION
25	18	30	X to Y	14+00
Half Round	21	30	X to Y	14+00
26	24	36	X to Y	27+40
27	18	28	X to Y	32+95
28	24	36	X to Y	37+00
29	30	60	X to Y	39+70
30	48	70	X to Y	42+20
31	18	36	X to Y	46+35
32	30	60	X to Y	59+45

The intake ends of 15-inch diameter culverts shall be marked by driving or placing steel posts within 6 inches of the downgrade side. Posts shall be painted with a rust-resistant paint and be a minimum of 5 feet long, with the spade driven 2 feet into the ground.

Culverts 36 inches in diameter or larger shall have 1:1 beveled inlets.

Tamping is required.

EXHIBIT "E"

TYPICAL HALF ROUND CULVERT INSTALLATION

(no scale)

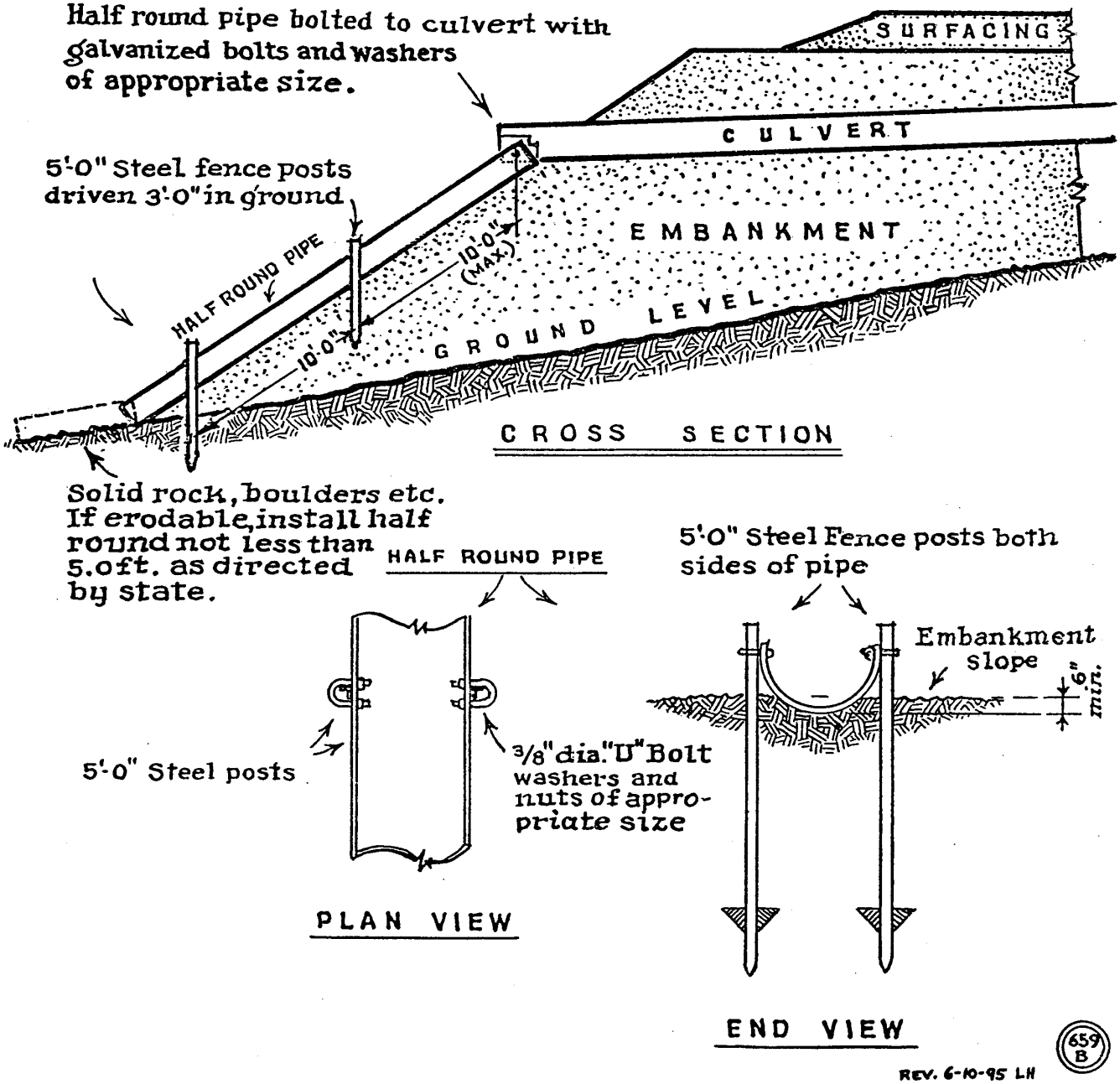
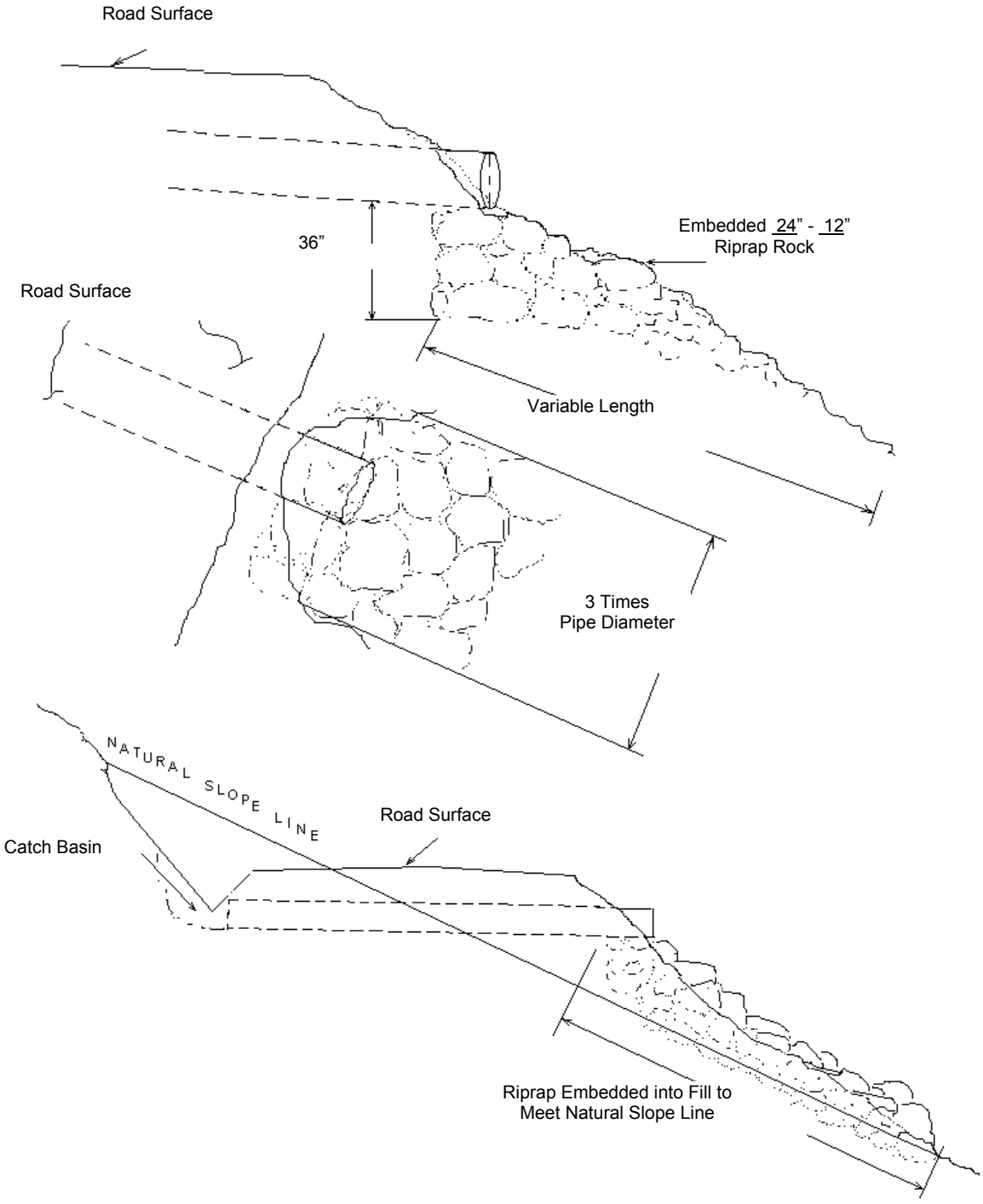


EXHIBIT "E"

TYPICAL EMBEDDED ENERGY DISSIPATOR



State Timber Sale Contract
No. 341-02-37
Ought to Thin

EXHIBIT "F"

SEEDING AND FERTILIZING

This work shall consist of preparing seedbeds and furnishing and placing required seed and fertilizer.

Seeding Seasons. Seeding shall be performed only from March 1 through June 15 and August 15 through October 31. Seeding materials shall not be applied during windy weather or when the ground is excessively wet or frozen. Areas of disturbed soil shall be seeded by the end of the project period in which work was started. PURCHASER shall notify STATE 24 hours prior to seeding.

Soil Preparation. Areas to be seeded that have been damaged by erosion or other causes shall be restored prior to seeding. All areas to be seeded shall be finished and then cultivated to provide a reasonably firm, but friable seedbed. A minimum of 1/2 inch of surface soil shall be in a loose condition.

Application Methods for Seed and Fertilizer

Dry Method. Mechanical seeders, seed drills, landscape seeders, cultipacker seeders, fertilizer spreaders, or other approved mechanical seeding equipment shall be used to apply the seed and fertilizer in the amounts and mixtures specified. Hand-operated seeding devices may be used when seed and fertilizer are applied in dry form.

Application Rates for Seed and Fertilizer

Seed listed below shall be applied at the following rates per acre:

SPECIES	LB./ACRE	MIXTURE	PURE LIVE SEED	POISON AND/OR REPELLENT
Highland Bentgrass	12	40%	98%	0
Annual Ryegrass	9	30%	98%	0
Perennial Ryegrass	9	30%	98%	0

Fertilizer: Chemical analysis shall be 16-20-0 and shall be applied at the rate of 300 pounds per acre.