

STATE OF WASHINGTON
DEPARTMENT OF NATURAL RESOURCES
PACIFIC CASCADE REGION

MCLANE 2008

ROAD PLAN

SECTION 36, TOWNSHIP 18 NORTH, RANGE 03 WEST, W.M.
THURSTON COUNTY

BLACK HILLS DISTRICT

AGREEMENT NO.: 30-081283

LEAD FORESTER: Jim LeJeune

DATE: 06/04/2007

STAFF ENGINEER: Lou Beck

DRAWN & COMPILED BY: Alicia Compton

SECTION 0 – SCOPE OF PROJECT

This project includes, but is not limited to construction including:

clearing;
grubbing;
right-of-way debris disposal;
excavation and/or embankment to subgrade;
landing construction;
acquisition and installation of drainage structures;
acquisition and application of rock;
road deactivation;
grass seeding.

This project also includes but is not limited to reconstruction including:

<u>Road</u>	<u>Station (s)</u>	<u>Requirements</u>
MC30	0+00 to 3+39	- Remove all tank traps and water bars; - Grub, clear and widen subgrade to dimensions shown on Typical Section Sheet; - Apply rock to the depth and width as specified by the Typical Section Sheet.

SECTION 1 - GENERAL CLAUSES

1.1-1

Clauses in this plan apply to all construction, reconstruction or deactivation including landings unless otherwise noted.

1.1-2

Construction or reconstruction of the following roads is required. All roads shall be constructed or reconstructed on the State's location and in accordance with this Road Plan.

<u>Road</u>	<u>Stations</u>	<u>Type</u>
MC30	0+00 to 3+39	Reconstruction
MC40	0+00 to 14+62	Construction

1.1-3

Construction of the following roads is not required. Roads used by the Purchaser shall be constructed on the State's location and in accordance with this Road Plan.

<u>Road</u>	<u>Stations</u>	<u>Type</u>
MC31	0+00 to 1+86	Construction

1.1-4

If the Purchaser desires a road location or design change, a revised Road Plan shall be submitted to the State for consideration.

1.1-5

On this plan quantities are minimum acceptable values. Additional quantities required by the State because of hidden conditions or Purchaser's choice of construction season or techniques shall be at the Purchaser's expense. Hidden conditions include, but are not limited to: solid subsurface rock, subsurface springs, saturated ground, and unstable soil.

1.1-7

Hauling of forest products or equipment may require a county road hauling permit. Purchaser is responsible for obtaining a permit, and any costs associated with extra maintenance or repair levied by a county.

1.1-9

Road construction, reconstruction or deactivation is in close proximity to buried utilities and elevated utilities. All work shall be done in accordance with RCW 19.122, Underground Utilities. Purchaser is responsible for all notification and liabilities associated with the buried utilities and its right-of-way.

1.1-10

Deactivation of the following roads is required. All roads shall be deactivated in accordance with this Road Plan.

<u>Road</u>	<u>Stations</u>
MC30	0+00 to 3+39
MC40	0+00 to 14+62
MC31	0+00 to 1+86

1.2-1

The construction, reconstruction or deactivation of any roads specified herein shall not be permitted between September 30 and May 1 unless authority to do so is granted, in writing, by the Contract Administrator.

1.2-2

Purchaser shall not use roads constructed or reconstructed under this Road Plan for hauling, other than timber cut on the right-of-way, without written approval from the Contract Administrator.

1.2-5

Operation of construction equipment will not be permitted from 7:00 PM to 7:00 AM, Monday through Friday. No operation of road construction equipment will be allowed on weekends or State recognized holidays unless authority to do so is granted in writing by the Contract Administrator.

1.2-6

Pioneering shall not extend past construction that will be completed during the current construction season. Drainage shall be provided on all uncompleted construction as approved, in writing, by the Contract Administrator.

Clearing and grubbing shall be completed prior to starting excavation and embankment.

Culverts shall be installed in completed subgrade as construction progresses.

Subgrade, ditches, and culvert installations shall be completed and are subject to written approval by the Contract Administrator prior to subgrade compaction, rock application and/or timber haul.

1.3-2

Roads are intended for dry weather use. Hauling shall be suspended when wheel track rutting exceeds 6 inches unless Purchaser elects to correct the situation at his/her own expense. Corrective measures and continued operations are subject to written approval by the Contract Administrator.

1.4-3

Reference points (R.P.'s) that are moved or damaged at any time during construction shall be reset in their original locations by the Purchaser. Excavation and embankment shall not proceed on road segments controlled by said R.P.'s until all moved or damaged R.P.'s are reset.

- 1.5-1
Maintenance on roads listed in Contract Clauses C-50 (Purchaser Road Maintenance and Repair) and C-60 (Designated Road Maintainer) shall be performed in accordance with Forest Access Road Maintenance Specifications.
- 1.5-2
Roads shall be maintained in a condition that will allow the passage of light administrative vehicles.
- 1.5-3
Snowplowing will be permitted only after execution of a "Snow Plowing Agreement", which is available from the Contract Administrator upon request.

SECTION 2 - CLEARING

- 2.1-1
Fell all vegetative material larger than 2 inches DBH or over 5 feet high between the marked right-of-way boundaries, or if not marked in the field, between clearing limits specified on TYPICAL SECTION SHEET, but not beyond the timber sale boundaries.
- 2.1-3
Right-of-way timber shall not be decked within the grubbing limits or in locations that interfere with the construction of the road prism or impede drainage.

SECTION 3 - GRUBBING

- 3-1
All stumps shall be removed that fall between grubbing limits shown on the TYPICAL SECTION SHEET. Those outside the grubbing limits but with undercut roots shall also be removed. Stumps over 22 inches diameter shall be split. Stumps over 40 inches shall be quartered.
- 3-2
Grubbing limits are defined as the entire area between the external limits shown on the TYPICAL SECTION SHEET.
- 3-5
Organic material shall be excluded from the road subgrade width as shown in TYPICAL SECTION SHEET.

SECTION 4 - DEBRIS DISPOSAL AND REMOVAL

- 4.1-1
Right-of-way debris is defined as all nonmerchantable vegetative material larger than one cubic foot in volume within the grubbing limits.
- 4.1-2
All right-of-way debris disposal shall be completed prior to the application of rock and/or timber haul.
- 4.2.3-1
Right-of-way debris shall be scattered outside the grubbing limits.
- 4.2.3-2
Right-of-way debris shall not be placed against standing timber.

SECTION 5 - EXCAVATION

- 5.1-1
Roads shall be constructed or reconstructed in accordance with dimensions shown on the TYPICAL SECTION SHEET.
- 5.1-2
Purchaser shall not bury merchantable material.

5.1-3

Road grade and alignment shall conform to the State's marked location. The reconstruction of existing road grades shall conform to the original location except where controlled by slope stakes. Grade and alignment shall have smooth continuity, without abrupt changes in direction.

Construction limitations are as follows:

<u>Favorable Grade</u>	<u>Adverse Road Grade</u>	<u>Minimum Curve Radius</u>
18%	12%	60 feet

Changes in road grade shall not exceed 6% within 100 feet. Adverse grades on curves shall not exceed 10% of the curve radius. Favorable grades through switchbacks shall not exceed 12%. Transition grades entering and leaving switchbacks shall not exceed a 5% grade change.

A switchback is defined as a curved segment of road between a beginning and end of the same curve, where the change of traffic travel direction is greater than 90 degrees.

Transition grades required to meet switchback grade limitations shall be constructed on the tangents preceding and departing from the switchbacks.

5.1-4

Minimum extra widening on the inside of curves shall be:

5 feet extra	80 to 100 foot radius curve
7 feet extra	60 to 80 foot radius curve

5.1-5

Curve widening, where required, shall be added to the inside of curves.

5.1-7

Roads shall be constructed or reconstructed to the dimensions shown on the TYPICAL SECTION SHEET, within the tolerance listed below. Tolerance classes for each road are listed on the TYPICAL SECTION SHEET.

<u>Tolerance Class</u>	<u>A</u>	<u>B</u>	<u>C</u>
Road Width (feet)	+1.5	+1.5	+2.0
Subgrade elevation (feet +/-)	0.5	1.0	2.0
Centerline alignment (feet lt./rt.)	1.0	1.5	3.0

5.1-8

Excavation slopes shall be constructed no steeper than shown on the following table:

<u>Material Type</u>	<u>Excavation Slope Ratio</u>
Common Earth (on side slopes of 55%)	1:1
Common Earth (55% to 70% sideslopes)	¾:1
Common Earth (on slopes over 70%)	½:1
Fractured or loose rock.....	½:1
Hardpan or solid rock.....	¼:1

5.1-9

Excavation and embankment slopes shall be constructed to a uniform line and left rough for easier revegetation.

5.1-10

Embankments shall be widened as follows:

<u>Height at Centerline</u>	<u>Subgrade Widening</u>
Less than 6 feet	2 feet
6 feet or over	4 feet

5.1-11

Embankment slopes shall be constructed no steeper than shown on the following table:

<u>Material Type</u>	<u>Embankment Slope Ratio</u>
Common Earth and Rounded Gravel.....	1½:1
Angular Rock.....	1¼:1
Sandy Soils	2:1

- 5.1-12
Organic material shall be excluded from road subgrade.
- 5.1-17
Turnouts shall be intervisible with a maximum of 1,000 feet between turnouts unless shown otherwise on drawings. Location shall be subject to written approval of the Contract Administrator.
- 5.1-18
Turnarounds shall be no larger than 30 feet long and 30 feet wide. Location shall be subject to written approval of the Contract Administrator.
- 5.1-21
Purchaser shall construct ditches. Ditch material shall be used to build up the subgrade as shown on the TYPICAL SECTION SHEET.
- 5.1.1-1
Waste material shall not be deposited within 50 feet of a cross drain culvert installation.
- 5.1.1-2
Waste material shall not be deposited within 100 feet of a live stream or within a riparian management zone.
- 5.1.1-3
Waste material may be deposited adjacent to the road prism.
- 5.1.1-5
When constructing landings, waste material and embankment shall not be placed on side slopes steeper than 45%.
- 5.1.1-8
The amount of material to be contained in a waste area shall be at the discretion of the Contract Administrator.
- 5.2-1
Road pioneering operations shall not undercut the final cut slope, deposit excavated material outside the clearing or right-of-way limits, or restrict drainage.
- 5.3-1
All embankment and waste material shall be compacted. The minimum acceptable compaction is achieved by placing embankments in 2 foot or shallower lifts and routing excavation equipment over entire width of the lifts. Side hill embankments too narrow to accommodate excavation equipment may be placed by end-dumping or side casting until sufficiently wide to support the equipment.
- 5.3-2
Embankment subgrades deeper than 5 feet at the road shoulder shall be compacted full width in 1 foot lifts by four coverages with a vibratory drum roller weighing at least 14,000 pounds at a maximum operating speed of 3 mph.
- 5.4-1
Silt-bearing runoff shall not be permitted to go into streams.
- 5.4-2
Accomplish sediment removal through silt traps, silt fences, settling ponds or other methods as approved, in writing, by the Contract Administrator.
- 5.4-3.1
On the following roads, Purchaser shall furnish and evenly spread the seed mixture listed below on all exposed soil inside the grubbing limits at a rate of 40 pounds per acre. The date of application is subject to approval by the Contract Administrator.

<u>Mixture Percent by Weight</u>	<u>Minimum Percent Germination</u>
50% Fescue, Red	90% Germination
25% Ryegrass, Perennial	90% Germination
15% Bentgrass	85% Germination
10% Clover, White and White Dutch (inoculated)	90% Germination

Weed seed shall not exceed 0.5% by weight.

5.4-3.1 continued

Seed shall be furnished in standard containers on which the following shall be shown:

1. Common name of seed
2. Net weight
3. Percent of purity
4. Percentage of germination
5. Percentage of weed seed and inert material

Required seed not spread by the termination of this contract shall become property of the State. The amount owed to the State shall be as follows, less the amount spread.

<u>Road</u>	<u>Stations</u>	<u>Seed Quantity (lbs)</u>
MC30	0+00 to 3+39	9
MC40	0+00 to 14+62	40
MC31	0+00 to 1+86	5

5.5-4

Constructed or reconstructed subgrades shall be compacted full width except ditch prior to rock application. Compaction shall be by a smooth-drum vibratory roller weighing at least 14,000 pounds. Four complete passes shall be made at a maximum operating speed of 3 mph.

5.5-5

Finished subgrade shall be crowned as shown on the TYPICAL SECTION SHEET, and shall be uniform, firm, rut-free, and shaped to ensure surface runoff in an even, unconcentrated manner.

SECTION 6 - DRAINAGE

6.2.1-1

Purchaser shall furnish, install, and maintain corrugated polyethylene pipe (AASHTO specification No. M-294 Type S) as designated on the CULVERT LIST. Culvert and downspout lengths shall be varied to fit as-built conditions subject to written approval by the Contract Administrator.

6.2.1-2

Manufacturer's approved hinged split coupler bands shall be used on corrugated polyethylene pipe, bands shall have a minimum of 4 corrugations, 2 on each side of the pipe joint.

6.2.1-5

On required roads: culverts, bands, and gaskets as listed on the CULVERT LIST which are not installed shall become property of the State. Purchaser shall stockpile materials as directed by the contract administrator.

6.2.1-6

Metal, concrete, or plastic culverts and bands removed from the road bed shall be removed from State land prior to termination of this contract.

6.2.2.1-1

Culvert and energy dissipator installation shall be in accordance with CULVERT AND DRAINAGE SPECIFICATION DETAIL and the Culvert List.

6.2.2.3-1

Cross drains on road grades in excess of 3% shall be skewed at least 30 degrees from perpendicular to the road centerline, except that cross drain culverts at the low points of dips in roads shall not be skewed.

6.2.2.3-2

Cross drain culverts shall be installed at a slope steeper than the incoming ditch grade, but not less than 3% nor more than 10%.

6.2.2.5-1

Drainage structure outfalls shall not terminate directly on unprotected soil that will erode. Downspouts, flumes, and energy dissipators shall be installed to prevent erosion.

6.3-1

Ditches shall be constructed concurrently with construction of the subgrade. Ditches shall drain to culverts, ditchouts, and natural drainages.

6.3-2

Shaping and constructing the ditchline, culvert headwalls, and catch basins shall be completed prior to application of rock and/or timber haul and shall be done in accordance with the TYPICAL SECTION SHEET and the CULVERT AND DRAINAGE SPECIFICATION DETAIL.

6.4-1

Catch basins shall be constructed to resist erosion in accordance with CULVERT AND DRAINAGE SPECIFICATION DETAIL. Minimum dimensions: two feet wide and four feet long with backslopes consistent with Clause 5.1-8: Excavation Slopes.

6.5-1

Headwalls shall be constructed in accordance with CULVERT AND DRAINAGE SPECIFICATION DETAIL at all cross drain culverts except for temporary culverts.

SECTION 7 - ROCK

7.1-6

Rock for construction and reconstruction under this contract may be obtained from any commercial source as approved in writing by the Contract Administrator.

<u>Possible Source</u>	<u>Location</u>
Quality Rock Products	SW¼, Sec. 19, T18N R02W, W.M.

7.2.1-4

Crushed rock shall meet the following specifications for gradation when placed in hauling vehicles. The exact point of evaluation for conformance to specifications will be determined by the Contract Administrator.

7.2.1.1-6

3 INCH MINUS CRUSHED ROCK

% passing 3" square sieve.....	100%
% passing 2" square sieve.....	65 - 95%
% passing ¾" square sieve.....	28 - 70%
% passing #4 square sieve.....	10 - 35%
% passing U.S. #200 sieve.....	0 - 10%

All percentages are by weight.

7.2.1.1-11

QUARRY SPALLS

% passing 8" square sieve.....	100%
% passing 3" square sieve.....	40% Max.
% passing ¾" square sieve.....	10% Max.
% passing U.S. #40 sieve.....	16% Max.
% passing U.S. #200 sieve.....	5% Max.

All percentages are by weight.

The portion of ballast retained on ¼ inch sieve shall not contain more than 0.1 percent vegetative debris or trash.

7.2.1.2-1

A minimum of 50% by weight of coarse aggregate shall have at least one fractured face. Coarse aggregate is the material retained on each specification sieve size ¼ inch and above, if that sieve retains more than 5% of the total sample.

7.2.3-1

Measurement of the QUARRY SPALLS shall be on a cubic yard truck measure basis. Each truck box shall be measured by the Contract Administrator prior to rock hauling. The Contract Administrator shall periodically require that a load be flattened off and its volume calculated. An average of such volumes for each truck shall be used to tally the volume to be hauled. The Purchaser shall provide and maintain load tally sheets for each truck and shall give them to the Contract Administrator upon request.

7.4.2-1

Apply at least the minimum required rock depth as shown on the ROCK LIST. Required and optional rock shall meet the specifications on the ROCK LIST.

7.4.2-4

On the following roads, if hauling shall take place only from May 1 to September 30, Purchaser may not be required to place or provide the optional rock in the ROCK LIST. Purchaser shall then be required to submit a written plan for approval by the Contract Administrator describing how these roads shall be constructed, used, and deactivated in compliance with all other clauses in the ROAD PLAN.

<u>Road</u>	<u>Stations</u>
MC31	0+00 to 1+86

7.4.2-5

Subgrade shall be approved, in writing, by the Contract Administrator prior to application of rock.

7.4.2-6

A grader shall be used to shape the subgrade or existing surface prior to compaction or timber haul.

7.4.2-8

Apply 63 cubic yards of rock to each landing.

7.4.2-9

Turnarounds and turnouts shall have rock applied to the same depth and specifications as the traveled way.

7.4.2-10

Each lift of rock shall be crowned as shown on TYPICAL SECTION SHEET, and shall be uniform, firm, rut-free, and shaped to ensure surface runoff in an even, unconcentrated manner.

7.4.3-1

Rock shall be mixed, compacted, and graded in sections not to exceed 1/2 mile in length. Water shall be added in quantities to facilitate compaction. If directed by the Contract Administrator, a minimum of 6 gallons of water per cubic yard of rock shall be applied.

7.4.3-2

Rock shall be spread and compacted full width in one lift each not to exceed 12 inches uncompacted depth. Compaction shall be by steel-wheeled smooth drum vibratory roller weighing at least 14,000 pounds. Four complete passes at a maximum speed of 3 mph shall be made on each lift.

SECTION 9 - ROAD AND LANDING DEACTIVATION

9.1-1

The following roads shall be deactivated by the Purchaser prior to the termination of this contract.

<u>Road</u>	<u>Stations</u>
MC30	0+00 to 3+39
MC40	0+00 to 14+62
MC31	0+00 to 1+86

9.1-2

Deactivation shall consist of:

- placement of 40 cubic yards of stumps within five feet of the county right-of-way boundary on the Delphi road;
- Stumps shall be placed on state land and placement shall be subject to approval by the Contract Administrator;
- constructing drivable water bars in conformance with the attached WATER BAR DETAIL at a maximum spacing which will produce a vertical drop of no more than 10 feet between water bars or between natural drainage paths and with a maximum spacing of 100 feet;
- skewing water bars at least 30 degrees from perpendicular to the road centerline on roads in excess of 3% grade;
- keying water bars into ditchline;
- water bar immediately upslope of culvert.

9.2-1

Purchaser shall reduce or relocate landing debris, in a manner approved, in writing, by the Contract Administrator, to avoid landing failures and potential debris slides.

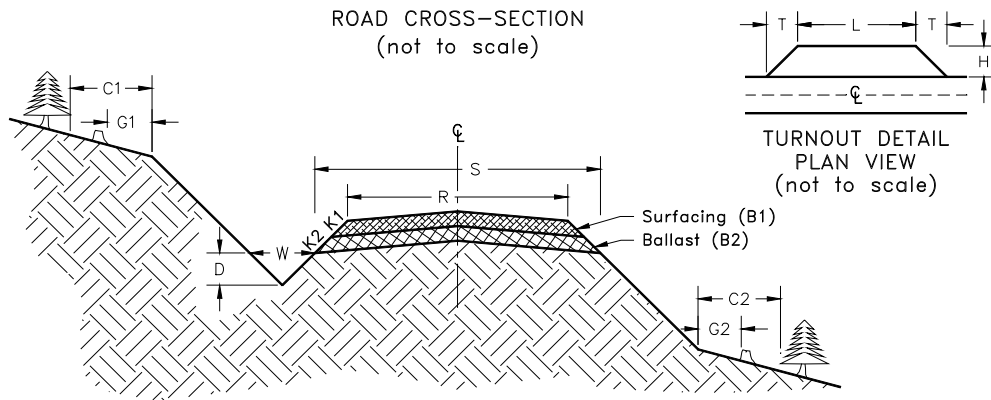
9.2-2

Purchaser shall provide for drainage of the landing surface as approved, in writing, by the Contract Administrator.

9.2-3

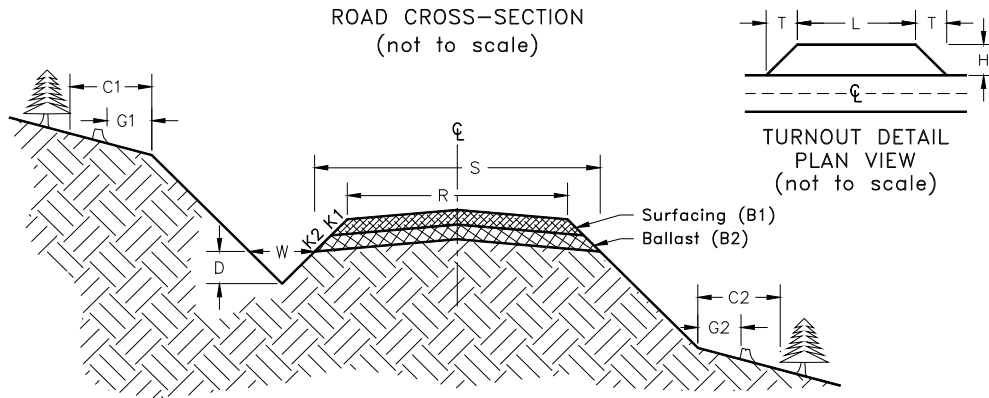
Landing embankments shall be sloped to original construction specifications.

TYPICAL SECTION SHEET



Road Number	From Station	To Station	Tolerance Class	Subgrade Width	Road Width		Ditch		Crown in. @ CL	Grubbing Limits		Clearing Limits	
					S	R	Width	Depth		G1	G2	C1	C2
MC30	0+00	3+39	A	15'	12'	3'	1'	4"	5'	5'	10'	10'	
MC31	0+00	1+86	C	15'	12'	3'	1'	4"	5'	5'	10'	10'	
MC40	0+00	14+62	A	15'	12'	3'	1'	4"	5'	5'	10'	10'	

ROCK LIST

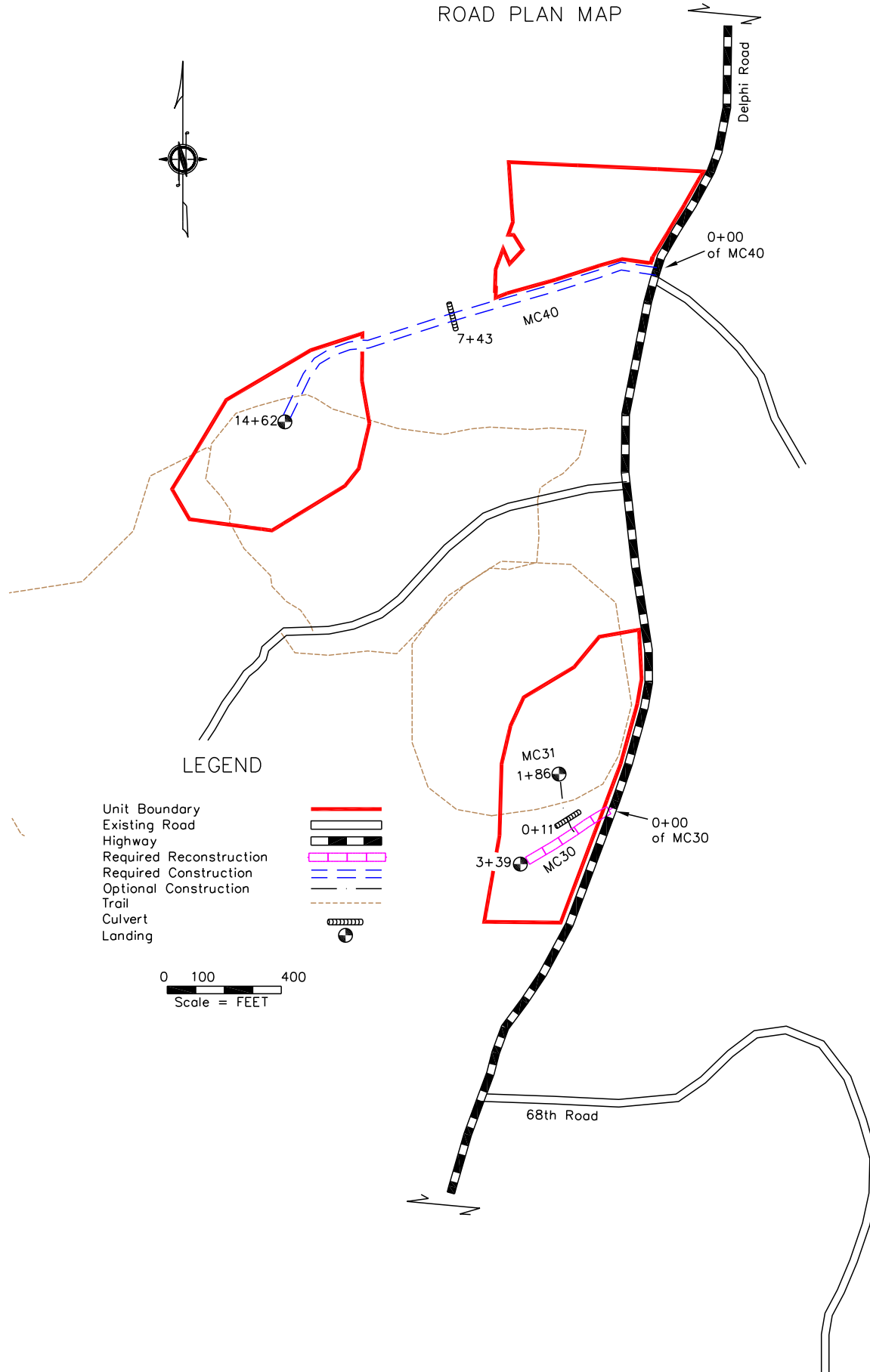


BALLAST

Road Number	From Station	To Station	Rock Slope	Compacted Rock Depth	C.Y./ Station	# of Stations	C.Y. Subtotal	Rock Source	Turnout		
									Length	Width	Taper
			K2	B2					L	H	T
					3 INCH MINUS CRUSHED			COMMERCIAL SOURCE	50'	12'	50'
MC30	0+00	3+39	1.5	12"	63	3.39	214				
MC31*	0+00	1+86	1.5	12"	63	1.86	117				
MC40	0+00	14+62	1.5	12"	63	14.62	921				
Landings (3)			1.5	12"	63	3	189				
Turnouts (1)			1.5	12"	63	1	63				
					QUARRY SPALLS						
HEADWALLS AND ENERGY DISSIPATORS			-	-	-	-	2				

3 INCH MINUS CRUSHED 1,504 Cubic Yards
 QUARRY SPALLS TOTAL 2 Cubic Yards
 BALLAST TOTAL 1,506 Cubic Yards

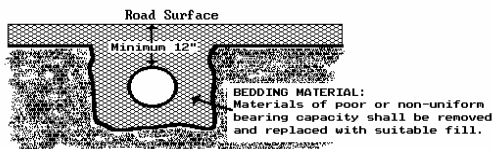
MCLANE 2008 ROAD PLAN MAP



CULVERT LIST

Road Number	Location	Culvert		Length (ft)			Quarry Spalls (C.Y.)			Backfill Material	Placement Method	Const. Staked	Remarks
		Dia.	Gauge	Culvert	Downspt	Flume	Inlet	Outlet	Type				
			if Steel										
MC31	0+11	18"	-	40	-	-	.5	.5	QS	Native	Machine	No	
MC40	7+43	18"	-	30	-	-	.5	.5	QS	Native	Machine	No	

CULVERT BACKFILL AND BASE PREPARATION
(For culverts less than 36')

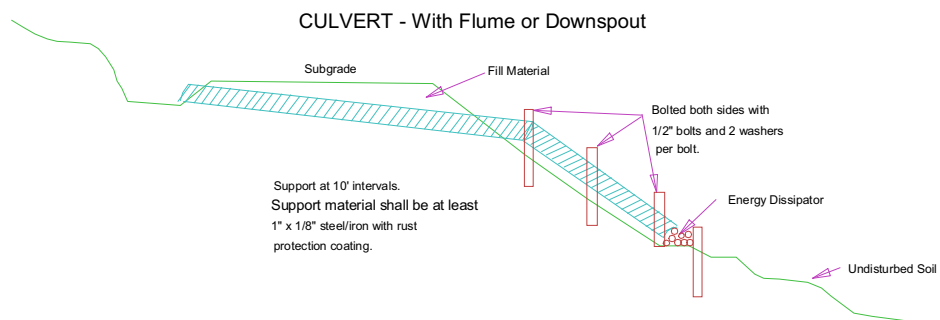
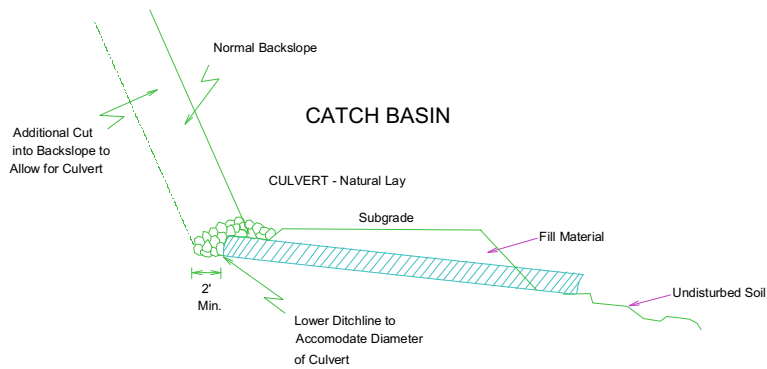


Key:

- QS - Quarry Spalls
- NT - Native (bank run)
- SL - Select Fill
- HL - Heavy Loose Riprap
- LL - Light Loose Riprap
- Flume - Half round pipe
- Downsput - Full round pipe

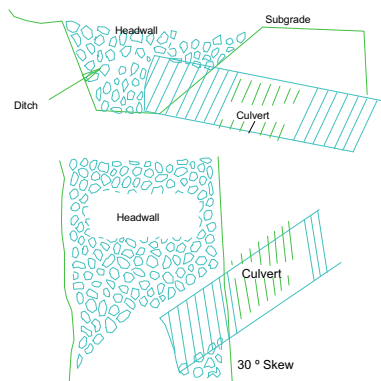
CULVERT AND DRAINAGE SPECIFICATION DETAIL

(Page 1 of 2)



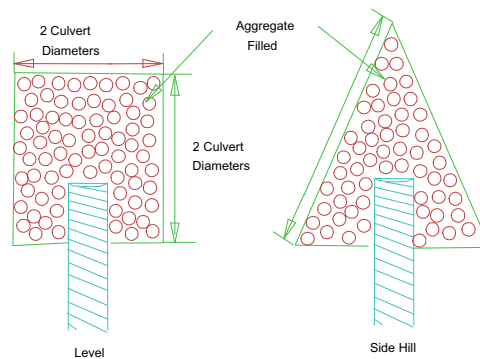
Proper preparation of foundation and placement of bedding material shall precede the installation of all culvert pipe. This includes necessary leveling of the native trench bottom and compaction of required bedding material to form a uniform dense unyielding base. The backfill material shall be placed so that the pipe is uniformly supported along the barrel.

HEADWALLS



Headwalls to be constructed of material that will resist erosion.

ENERGY



Dissipator Specifications:
 Depth: 1 culvert diameter
 Aggregate: as specified in the CULVERT LIST.

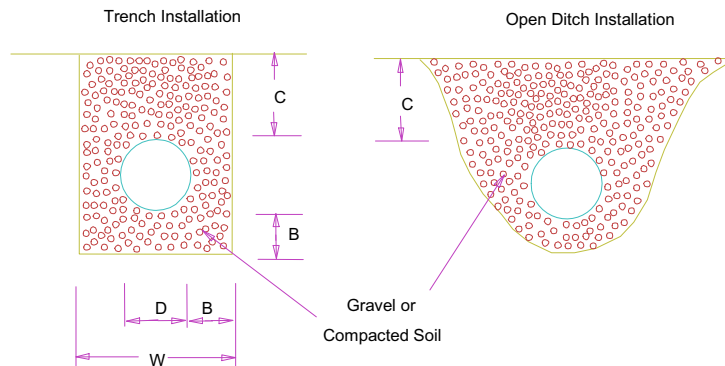
CULVERT AND DRAINAGE SPECIFICATION DETAIL

(Page 2 of 2)

POLYETHYLENE PIPE INSTALLATION

INSTALLATION REQUIREMENTS:

1. Crushed stone, gravel, or compacted soil backfill material shall be used as the bedding and envelope material around the culvert. The aggregate size shall not exceed 1/6 pipe diameter or 4" diameter, whichever is smaller.
2. The corrugated pipe shall be laid on grade, on a layer of bedding material as shown for the two types of installations. If native soil is used as the bedding and backfill material, it shall be well compacted in six inch layers under the haunches, around the sides and above the pipe to the recommended minimum height of cover.
3. Either crushed aggregate or flexible (asphalt) pavement may be laid as part of the minimum cover requirements.
4. Site conditions and availability of bedding materials often dictate the type of installation method used.
5. The load bearing capability of flexible conduits is dependent on the type of backfill material used and the degree of compaction achieved. Crushed stone and gravel backfill materials typically reach a compaction level of 90-95% AASHTO standard density without compaction. When native soils are used as backfill material, a compaction level of 85% of that material is required. This minimum compaction can be achieved by either hand or mechanical tamping. Purchaser shall test the compaction level and bare all associated costs.



MINIMUM DIMENSIONS Trench or Open Ditch Installation

Nominal Diameter	Minimum Thickness	Minimum Cover	Min. Trench Width
D	B	C	W
18"	6"	12"	36"
24"	6"	12"	42"
30"	6"	12"	48"
36"	6"	12"	54"

STATE OF WASHINGTON
DEPARTMENT OF NATURAL RESOURCES

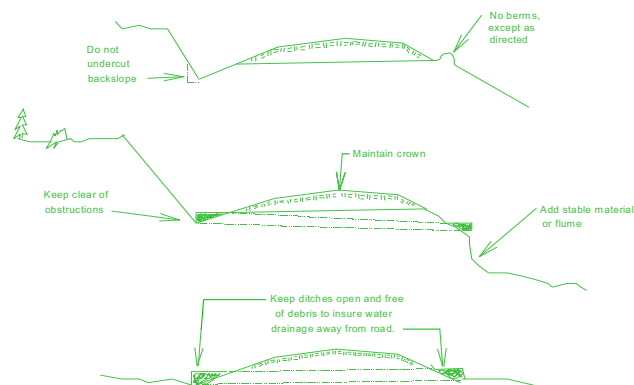
FOREST ACCESS ROAD
MAINTENANCE SPECIFICATIONS

1. CONSTRUCTION AND RECONSTRUCTION (Prior to acceptance to the contract or acceptance on a timber sale).
 - A. Cuts and Fills
 1. Maintain slope lines as constructed. Remove slides from the ditches and roadway. Replace fills to 1/2:1 slopes with selected material or as directed. Remove overhanging material from the cut slopes.
 2. Material from slides or other sources requiring removal shall not be deposited in streams or at locations where it will erode into streams or water courses.
 3. Undesirable slide materials and debris shall not be mixed into the surface material.
 - B. Surface
 1. Grade and shape the road surface, turnouts, and shoulders to the original crown, inslope or outslope as directed to provide suitable traveled surface and surface water runoff in an even, unconcentrated manner.
 2. Blading must not undercut the backslope at the bottom of the ditchline or cut geotextile at centerline.
 3. Watering may be required to control dust and to retain fine surface rock.
 4. Desirable surface material shall not be bladed off the roadway.
 5. Replace surface material lost or worn away.
 6. Remove berms except as directed by the State.
 7. Barrel spread soft spots to prevent degradation of geotextile.
 - C. Drainage
 1. Keep ditches and drainage channels at outlets and inlets of culverts clear of obstructions and functioning as intended.
 2. Inspect and clean culverts at least monthly, with additional inspections during storms and periods of high runoff. This must be done even during periods of inactivity.
 3. Add stable material at the outlet end of the culvert as needed to stabilize the stream bed.
 4. Headwalls: maintain to the road shoulder level with material that will resist erosion.
 5. Keep silt bearing surface runoff from getting into live streams.
 - D. Structures

Repair bridges, culverts, cattleguards, fences, and other road structures to the condition required by the construction specifications.
 - E. Termination of Use or End of Season

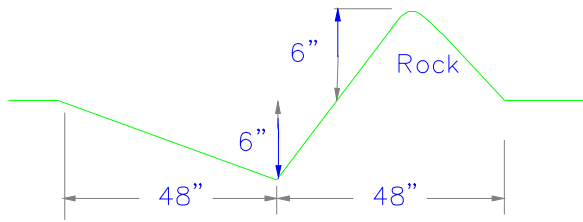
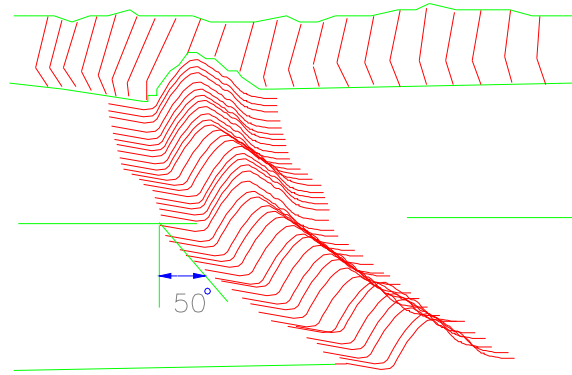
Do maintenance work to minimize damage from the elements such as blading to insure correct runoff, ditch, and culvert cleaning and water bars.
 - F. Debris

Remove fallen timber, limbs, and stumps from the slopes or roadway.



WATER BAR DETAILS

DRIVABLE WATER BAR



DEPARTMENT OF NATURAL RESOURCES - PACIFIC CASCADE REGION

FORM 9-87(Rev. 05-03)

SUMMARY - Road Development Costs

REGION: Pacific Cascade
DISTRICT: Black Hills

SALE/PROJECT NAME: Melane 2008

CONTRACT NUMBER: 30-081283

LEGAL DESCRIPTION: Sect. 36, T18N R03W

ROAD NUMBER:	MC31, MC40	MC30, MC40	MC30, MC31, MC40
ROAD STANDARD:	Construction	Reconstruction	Deactivation
NUMBER OF STATIONS:	16.48	3.39	19.87
SIDESLOPE:	5	6	6
CLEARING AND GRUBBING:	\$1,608	\$331	-
EXCAVATION AND FILL:	\$1,511	\$424	-
MISC. MAINTENANCE:			\$1,046
ROCK TOTALS (Cu. Yds.):			
Ballast: 1504	\$17,820	\$4,016	\$0
Surface: 0	\$0	\$0	\$0
Riprap: 2	\$37	\$0	\$0
CULVERTS AND FLUMES:	\$490	\$370	\$0
STRUCTURES:	\$0	\$0	\$0
GENERAL EXPENSES:	\$1,932	\$565	\$125
MOBILIZATION:	\$1,450	\$1,450	\$450
TOTAL COSTS:	\$24,848	\$7,156	\$1,621
COST PER STATION:	\$1,508	\$2,111	\$82
NOTE: This appraisal has no allowance for profit and risk.		TOTAL (All Roads) =	\$33,625
		SALE VOLUME MBF =	713
		TOTAL COST PER MBF =	\$47.16

Plans to be furnished by:

Compiled by:

Lou Beck

Date: 06/04/07

PACIFIC CASCADE REGION - ROAD COST ESTIMATE - CONSTRUCTION

SALE NAME: Melane 2008

CONTRACT NUMBER: 30-081283

I. CLEARING AND GRUBBING:

Flat Rate -	% Side Slope	MBF/ac	Disposal Factor	Production Factor	Cost/ Station	Width Factor	Total Stations	Sub Total
MC31	6	30	1.00	2.44	\$40	1.00	1.86	\$182
MC40	3	30	1.00	2.44	\$40	1.00	14.62	\$1,427
			1.00	1.00	\$32	0.80		\$0
Clear and Grub TOTAL =								\$1,608

II. EXCAVATION:

Flat Rate -	% Side Slope	Exc. Type Fact.	Production Factor	Cost/ Station	Width Factor	Total Stations	Sub Total	
MC31	6	1.0	1.25	\$88	1.00	1.86	\$205	
MC40	3	1.0	1.00	\$88	1.00	14.62	\$1,287	
		1.0	1.00	\$66	0.50		\$0	
				Grass Seed	lbs.	\$/lb		
				MC40	10.00	\$1.30	\$13	
				MC31	5.00	\$1.30	\$7	
Excavation TOTAL =								\$1,511

III. BALLAST AND SURFACING :

Description	cu.yds/sta x stations =	cubic yards	UNIT COSTS	Ballast	Surfacing	Riprap
Ballast source:	Quality Rock		1.4 tons = 1 Cubic Yard			
Surface source:	-					
Riprap source:	-					
Ballast (3"-)	63	16.48		\$9.45		\$10.50
Surfacing (1 1/2"-)				\$3.14		\$3.14
Quarry Spalls				\$1.20		\$5.00
				\$0.65		
				\$0.08		\$0.08
TOTAL (\$/cy)				\$14.52	\$0.00	\$18.72

* Haul Formula: (R.T.Miles/MPH+Delay)/(\$/hr / Cy/load)

R.T. Miles =	6.2	Ballast (3"-)	1227 Cu. yds @	\$14.52 /cu. yd =	\$17,820
Ave. Speed =	30	Surfacing (1 1/2"-)	0 Cu. yds @	\$0.00 /cu. yd =	\$0
Delay (Hrs.) =	0.2	Quarry Spalls	2 Cu. yds @	\$18.72 /cu. yd =	\$37
Cost / Hour =	\$77.00				
CY / Load =	10				

Rock total = \$17,857

IV. CULVERTS AND FLUMES:

Description	Qty.	Gauge	Diameter	No/Length	Installed Cost/ft	Sub-total
	1	-	18"	40	\$12.00	\$480
Bands & Gaskets	1				\$10.00	\$10

Culvert total = \$490

Sub-TOTAL = \$21,466

VI. GENERAL EXPENSES:

Overhead & General Exp. Add 9% \$1,932

VII. MOBILIZATION:

Description	\$ per Move	# of Moves	Sub-total
Dump Trucks	100	4	\$400
Grader	400	1	\$400
Compactor	400	2	\$800
Excavator	450	2	\$900
Dozer D8)	400	1	\$400
Front end loader	400		\$0
Rock crusher	\$1,500		\$0
Drill	\$400		\$0
Dozer (D5)	\$240		\$0
Total Mobilization =			\$2,900
Mobilization sub-total =			1450

Road No. MC31, MC40
Standard: Construction
Stations: 16.48

SHEET TOTAL = \$24,848

By: Lou Beck

Sheet 2 of 4

Date: 06/04/07

PACIFIC CASCADE REGION - ROAD COST ESTIMATE - RECONSTRUCTION

SALE NAME: McLane 2008

CONTRACT NUMBER: 30-081283

I. CLEARING AND GRUBBING:

Flat Rate -	% Side Slope	MBF/ac	Disposal Factor	Production Factor	Cost/Station	Width Factor	Total Stations	Sub Total
MC30	5	30	1.00	2.44	\$40	1	3.39	\$331
			1.00	1.00	\$40	1		\$0
			1.00	1.00	\$40	1		
			1.00					

Clear and Grub TOTAL = \$331

II. EXCAVATION:

Flat Rate -	% Side Slope	Exc. Type Fact.	Production Factor	Cost/Station	Width Factor	Total Stations	Sub Total
MC30	5	1.0	1.25	\$88	1.00	3.39	\$373
0	7	1.0	1.25	\$88	1.00	0.00	\$0
		4.0	1.00	\$88	1.00		

Grass Seed	lbs	\$/lb	Sub Total
MC40	30	\$1.30	\$39
MC30	9	\$1.30	\$12
			\$0

Excavation TOTAL = \$424

III. BALLAST AND SURFACING :

Ballast source: COMMERCIAL SOURCE
 Surface source: -
 Riprap source: -

Description	cu.yds/sta x stations =	cubic yards
Ballast (3"-)	63 3.39	277
Surfacing (1 1/2"-)		0
Riprap		0

* Haul Formula: (R.T.Miles/MPH+Delay)/(\$/hr / Cy/load)

R.T. Miles =	6.2
Ave. Speed =	30
Delay (Hrs.) =	0.2
Cost / Hour =	\$77.00
CY / Load =	10

Ballast (3"-)	277 Cu. yds @	\$14.52 /cu. yd =	\$4,016
Surfacing (1 l.)	0 Cu. yds @	\$3.35 /cu. yd =	\$0
Riprap	0 Cu. yds @	\$18.64 /cu. yd =	\$0

UNIT COSTS	Ballast	Surfacing	Riprap
Drill & Shoot	-	-	-
Dig and load	-	-	-
Crushing	-	-	-
Purchase	\$9.45	-	\$10.50
Haul *	\$3.14	\$3.14	\$3.14
Spread	\$1.20	-	\$5.00
Compact	\$0.65	-	-
Strip	-	-	-
Reclamation	-	-	-
Use tax	\$0.08	\$0.21	\$0.08
TOTAL (\$/cy)	\$14.52	\$3.35	\$18.64

Rock total = \$4,016

IV. CULVERTS AND FLUMES:

Description	Qty.	Gauge	Diameter (in.)	No/Length (ft)	Installed Cost/ft	Sub-total
	1	-	18"	30	\$12.00	\$360
						\$0
						\$0
Bands & Gaskets	1				\$10.00	\$10

Culvert total = \$370

Sub-TOTAL = \$5,140

VI. GENERAL EXPENSES:

Overhead & General Exp. Add 11% \$565

VII. MOBILIZATION:

Description	\$ per Move	# of Moves	Sub-total
Dump Trucks	\$100	4	\$400
Grader	\$400	1	\$400
Compactor	\$400	2	\$800
Excavator	\$450	2	\$900
Dozer D8)	\$400	1	\$400
Front end loader	\$400	0	\$0
Rock crusher	\$1,500	0	\$0
Dozer (D5)	\$240	0	\$0

Total Mobilization = \$2,900 Mobilization sub-total = \$1,450

Road No. MC30, MC40
 Standard: Reconstruction
 Stations: 3.39

SHEET TOTAL = \$7,156

By: Lou Beck

Sheet 3 of 4

Date: 06/04/07

PACIFIC CASCADE REGION - ROAD COST ESTIMATE - PRE-HAUL MAINTENANCE

SALE NAME: Melane 2008

CONTRACT NUMBER: 30-081283

Total stations Road Closure = 19.87

I. MISC. ROAD CLOSURE COSTS:

Costs:	\$/Waterbar	\$32.50
	\$/40cy stumps	\$200.00
	\$/culvert removal	\$40.00
	\$/pile culvert removal from state land	\$250.00
	\$/sta of woody debris scattered	\$20.00
	\$/sta. of sidecast pullback	80

Road #	Stations	# of WB's	Est. # of Culverts	WB Cost	Culvert Cost	Woody Scatter Costs	Other Costs	Total Cost
MC30	3.39	3.39	-	\$110	-	-	\$200	\$310
MC31	1.86	1.86	-	\$60	-	-	-	\$60
MC40	14.62	14.62	-	\$475	-	-	\$200	\$675

Misc TOTAL = \$1,046

VI. GENERAL EXPENSES:

Overhead & General Exp. Add 12%\$125.49

VII. MOBILIZATION:

Description	\$ per Move	# of Moves	Sub-total
Dump Trucks	100		\$0
Grader	400		\$0
Compactor	400		\$0
Excavator	450	1	\$450
Dozer D8)	400		\$0
Front end loader	400		\$0
Rock crusher	\$1,500		\$0
Dozer (D5)	\$240		\$0

Total Mobilization =\$450

Road No. MC30, MC40
Standard: Road Closure
Stations: 19.87

SHEET TOTAL = \$1,621

By: Lou Beck

Sheet 4 of 4

Date: 06/04/07