WASHINGTON STATE DEPARTMENT OF
NATURAL RESOURCES

TIMBER NOTICE OF SALE

***SALE NAME**: COUGAR VRH VDT* ***AGREEMENT NO**: 30-106246*

AUCTION: December 18, 2024 starting at 10:00 a.m., Northwest Region Office, Sedro Woolley, WA **COUNTY:** Snohomish

SALE LOCATION: Sale located approximately 8 miles southeast of Granite Falls, WA.

PRODUCTS SOLD AND SALE AREA:

All timber bounded by white timber sale boundary tags, adjacent young stands, and the LR-ML Road except cedar salvage (cedar snags, preexisting dead and down cedar trees and cedar logs), trees marked with blue paint on the bole and root collar, and forest products tagged out by yellow leave tree area tags in Unit #1.

All timber bounded by white timber sale boundary tags, adjacent young stands, and the LR-ML Road, except cedar salvage (cedar snags, preexisting dead and down cedar trees and cedar logs), trees marked with blue paint on the bole and root collar, forest products tagged out by blue special management tags (WMZs/RMZs), and forest products tagged out by yellow leave tree area tags in Units #2 and #5.

All timber bounded by white timber sale boundary tags and adjacent young stands, except cedar salvage (cedar snags, preexisting dead and down cedar trees and cedar logs), trees marked with blue paint on the bole and root collar, and forest products tagged out by yellow leave tree area tags in Unit #3.

All timber bounded by white timber sale boundary tags, adjacent young stands, road grade, LR-ML Road and property lines, except cedar salvage (cedar snags, preexisting dead and down cedar trees and cedar logs), trees marked with blue paint on the bole and root collar, forest products tagged out by blue special management tags (WMZs/RMZs), and forest products tagged out by yellow leave tree area tags in Unit #4.

All timber as described for removal in Schedule B located in the Variable Density Thinning areas -RMZ /WMZ thinning areas- (beyond the blue special management tags up to the white timber sale boundary tags) within Units #2, #4 and #5.

All timber bounded by adjacent young stands and blue special management tags, except cedar salvage (cedar snags, preexisting dead and down cedar trees and cedar logs), trees marked with blue paint on the bole and root collar, and forest products tagged out by yellow leave tree area tags in Unit #6.

All timber bounded by white timber sale boundary tags and Lake Roesiger Road, except cedar salvage (cedar snags, preexisting dead and down cedar trees and cedar logs), trees marked with blue paint on the bole and root collar, and forest products tagged out by yellow leave tree area tags in Unit #7.

All timber bounded by orange right-of-way tags and adjacent rock pit (Purdy Pit).

All forest products above located on part(s) of Sections 14, 15, 22, 23 and 24 all in Township 29 North, Range 7 East, W.M., containing 149 acres, more or less.

CERTIFICATION: This sale is certified under the Sustainable Forestry Initiative® program Standard (cert no: BVC-SFIFM-018227)

TIMBER NOTICE OF SALE

ESTIMATED SALE VOLUMES AND QUALITY:

Species	Avg DBH	Ring Count	Total MBF	MBF by Grade 1P	2P	3P	SM	1S	2S	3S	4S	UT
Douglas fir	17.4	10	3,891			9	35		1,635	1,952	243	17
Hemlock	19.7		545						340	174	21	10
Redcedar	20.9		27							25	2	
Cottonwood	18		7						7			
Maple	16.6		5							2	1	2
Red alder	15		5								5	
Sale Total			4,480									

MINIMUM BID: $1,212,000.00

BID METHOD: Sealed Bids

PERFORMANCE SECURITY: $100,000.00

SALE TYPE: Lump Sum

EXPIRATION DATE: March 31, 2027

ALLOCATION: Export Restricted

BID DEPOSIT: $121,200.00 or Bid Bond. Said deposit shall constitute an opening bid at the appraised price.

HARVEST METHOD: Cable; shovel or tracked skidder (with season restrictions, see below for restrictions) or "6-wheeled rubber tired skidders with over-the-tire tracks spanning both sets of rear tires" (See below for restrictions) on sustained slopes 35% or less; self-leveling equipment on sustained slopes 55% or less (See below for restrictions); tethered equipment may be utilized (See below for restrictions); also, a feller-buncher/harvester may be utilized on sustained slopes 35% or less for falling.

Falling and yarding in RMZ and WMZ thinning areas shall not be permitted during the bark slippage season unless the Purchaser provides a written plan outlining mitigation measures and the plan is pre-authorized in writing by the Contract Administrator. This season is estimated to run from April 1 to July 15 but may vary depending on weather conditions.

Purchaser must obtain prior written approval from the Contract Administrator for areas as to where to utilize tethered and/or self-leveling equipment prior to use. Trees may be felled and pre-bunched by the equipment but must be yarded by cable, if authorized by the Contract Administrator. If ground disturbance is causing excessive damage, as determined by the Contract Administrator, the equipment will no longer be authorized.

Purchaser must obtain prior written approval from the Contract Administrator for areas as to where to utilize "6 wheeled rubber-tired skidders with over-the-tire tracks spanning both sets of rear tires" equipment prior to use. A timing restriction will be enforced to only operate this piece of equipment between April 1 and October 31 with written approval from the Contract Administrator. If ground disturbance is causing excessive damage, as determined by the Contract Administrator, this equipment will no longer be authorized.

Falling and yarding by ground-based equipment within the Woods Creek WAU will not be allowed on the hillside of Unit 4 and the WMZ thinning area south of the pink flag line. (See logging plan map). This includes the use of tethered equipment. This section of

Unit 4 must be hand felled and cable harvested due to the Woods Creek WAU prescription. These restrictions do not apply to the north of the pink flag line and road construction through and adjacent to Unit 4 and WMZ thinning area. Falling and Yarding will not be permitted from November 1 to March 31 unless authorized in writing by the Contract Administrator (THIS PERTAINS TO GROUND-BASED EQUIPMENT ONLY) to reduce soil damage and erosion.

ROADS: 13.50 stations of required construction. 19.38 stations of required reconstruction. 5.64 stations of optional construction. 9.44 stations of optional reconstruction. 179.06 stations of required prehaul maintenance. 2.86 stations of abandonment. 5.17 stations of abandonment, if built.

Rock may be obtained from the following source(s) on State land at no charge to the Purchaser: Purdy Pit at station 8+82 of the PD-02 Road.

Development of an existing rock source will involve clearing, stripping, drilling, shooting, and processing rock to generate riprap and 3-inch-minus ballast rock.

An estimated total quantity of rock needed for this proposal: 95 cubic yards of riprap and 3,155 cubic yards of 3-inch minus ballast rock. Also, generation of 5,000 cubic yards of 3-inch minus to be stockpiled.

Road work and the hauling of rock will not be permitted from November 1 to March 31 unless authorized in writing by the Contract Administrator to reduce soil damage and siltation. The hauling of forest products will not be permitted from November 1 to March 31 unless authorized in writing by the Contract Administrator to reduce soil damage and siltation.

ACREAGE DETERMINATION

CRUISE METHOD: Acres determined by GPS traverse. Cruise was conducted via variable plot sample type, as well as 1/20-acre fixed plot for right-of-way (rock pit expansion). See Cruise Narrative for further details. Shapefiles of units are available upon request, and on the DNR website after the BNR meeting in which the sale is presented.

FEES: $76,160.00 is due on day of sale. $9.00 per MBF is due upon removal. These are in addition to the bid price.

SPECIAL REMARKS:
1. Trees marked with pink paint represent the last take tree along property line boundaries.
2. Outer boundary of harvest area in WMZ and RMZ thinning areas is demarcated with blue special management tags within the sale area.
3. HQ DF noted within the sale area. See cruise for further details.
4. Cedar salvage is NOT included in the products sold. This shall not be waived.
5. No timber harvest operations will be allowed before 7:00 AM Monday-Friday, weekends, and federal holidays for timber harvest Units 5, 6, and 7.
6. A portion of the proposal area was previously thinned in the early 2000's.
7. Snohomish County Right-of-Way Access Permit #24107917D1 has been acquired by the DNR for accesses off of South Lake Roesiger Road, for the CLR-28 Road. This permit is valid until October 1, 2025. The DNR will renew for one additional year, until October 2026, as allowed by the County. If the roadwork is not completed under the current permit, the Purchaser is responsible for acquiring a new permit.

Schedule B
Thinning Prescription

THINNING PRESCRIPTION: WMZ AND RMZ
Note: trees with blue management tags may be harvested if they meet the prescription EXCEPT those that mark the boundary of Unit 6 (trees with a blue tag facing into Unit 6 with also a white timber sale boundary tag on the opposite side of the tree facing toward the WMZ).

Thin based on the criteria below:

- Leaving a minimum of 90 trees per acre throughout the unit.
- Targeting an approximate 22 x 22 foot spacing.
- Only live trees 8 inches or greater in DBH shall be used to calculate trees per acre.

To accomplish this prescription, Purchaser shall remove trees in the following priority order:

1) Western Hemlock (all diameters)
2) Defective, or diseased, Douglas-fir
3) Smallest diameter Douglas-fir

All other tree species may only be cut to facilitate yarding. If felled, they shall be treated like all other harvested trees and be deducted from final standing trees per acre and residual basal area goals.

RIPARIAN FOREST RESTORATION STRATEGY TREES

There are 2.3 acres of RMZ thinning in Unit RMZ.

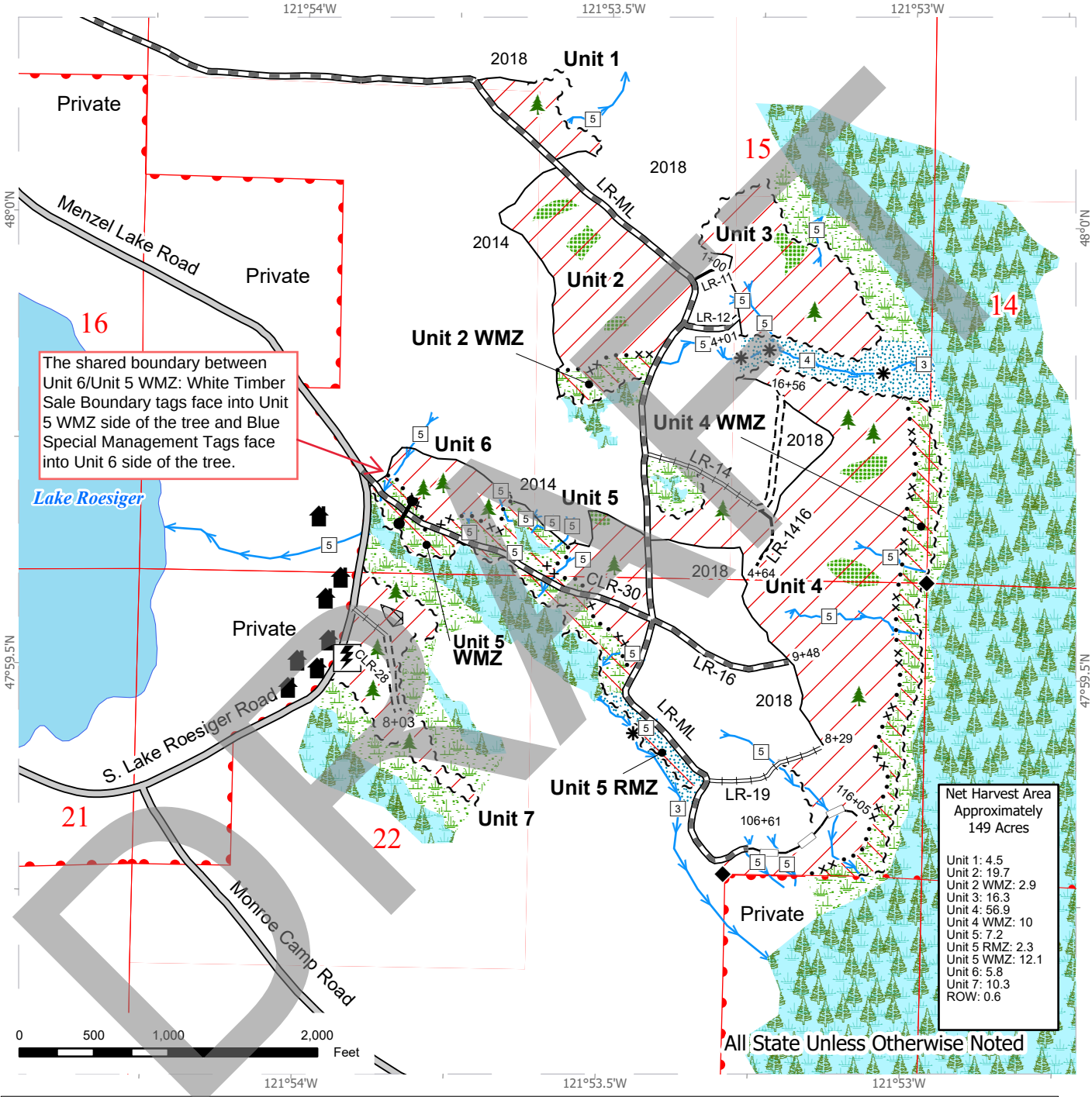
- Three conifer trees per acre of RMZ, from the largest thinned DBH class, shall be felled towards the stream where feasible to remain as down woody debris.
- Two conifer trees per acre of RMZ, from the largest thinned DBH class, shall be double girdled, or topped, for snag recruitment.
- The Purchaser shall mark and fell/girdle upon review and approval of the Contract Administrator. These trees shall be marked within 25 feet of the white “timber sale boundary” tags along type 3 streams.
- These enhancement trees are in addition to the residual stocking targets mentioned above and should be distributed evenly throughout the RMZs.

RMZ Identifier-----Net RMZ acres-----No. of Felled Trees-----No. of Snag Creation Trees
RMZ----------2.3----------7----------5

TIMBER SALE MAP

SALE NAME: COUGAR VRH VDT
AGREEMENT#: 30-106246
TOWNSHIP(S): T29R7E
TRUST(S): Common School and Indemnity (3), Community College Forest Reserve (12), State Forest Transfer (1)

REGION: Northwest Region
COUNTY(S): Snohomish
ELEVATION RGE: 529-908



- Variable Retention Harvest
- Variable Density Thinning
- Public Land Survey Sections
- Leave Tree Area
- Non-Tradeable Leave Clump
- Wetland Mgt Zone
- Riparian Mgt Zone
- Forested Wetland
- Stream
- Stream Type
- Stream Break
- Leave Tree Area <1/4-Acre
- Survey Monument
- Gate (F1-3)
- Structure
- Utility Box
- Sale Boundary Tags
- Special Mgmt Area
- Timber Type Change
- Property Line
- County Road
- Required Pre-Haul Maintenance
- Required Construction
- Required Reconstruction
- Optional Construction
- Optional Reconstruction

N

Prepared By: bstz490
Accessed: 10/02/2024 11:12

Modification Date: bstz490 7/29/2024

TIMBER SALE MAP

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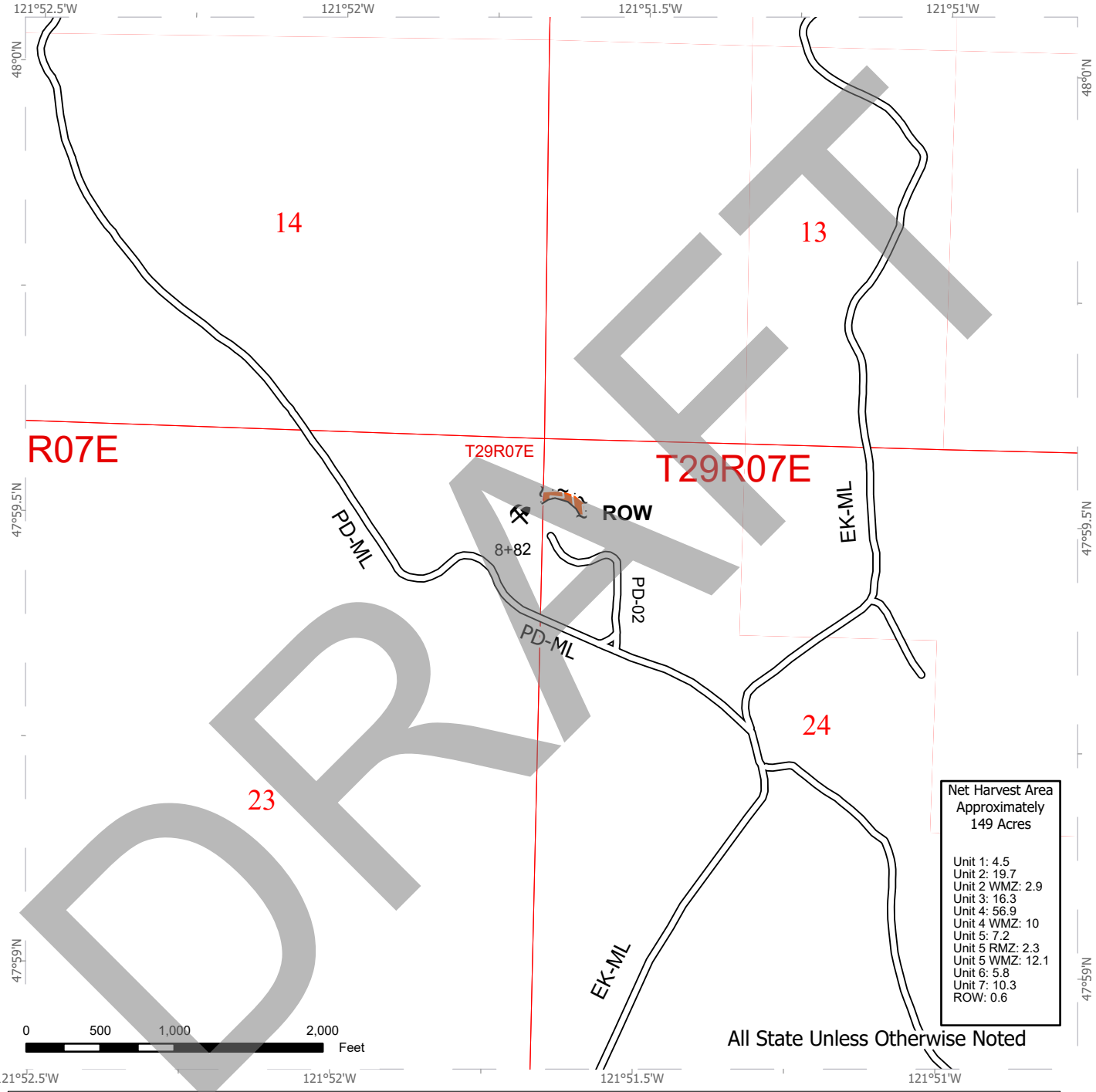


Rock Pit Expansion
Public Land Survey Sections
Right of Way Tags
Timber Type Change
Existing Roads
Purdy Rock Pit

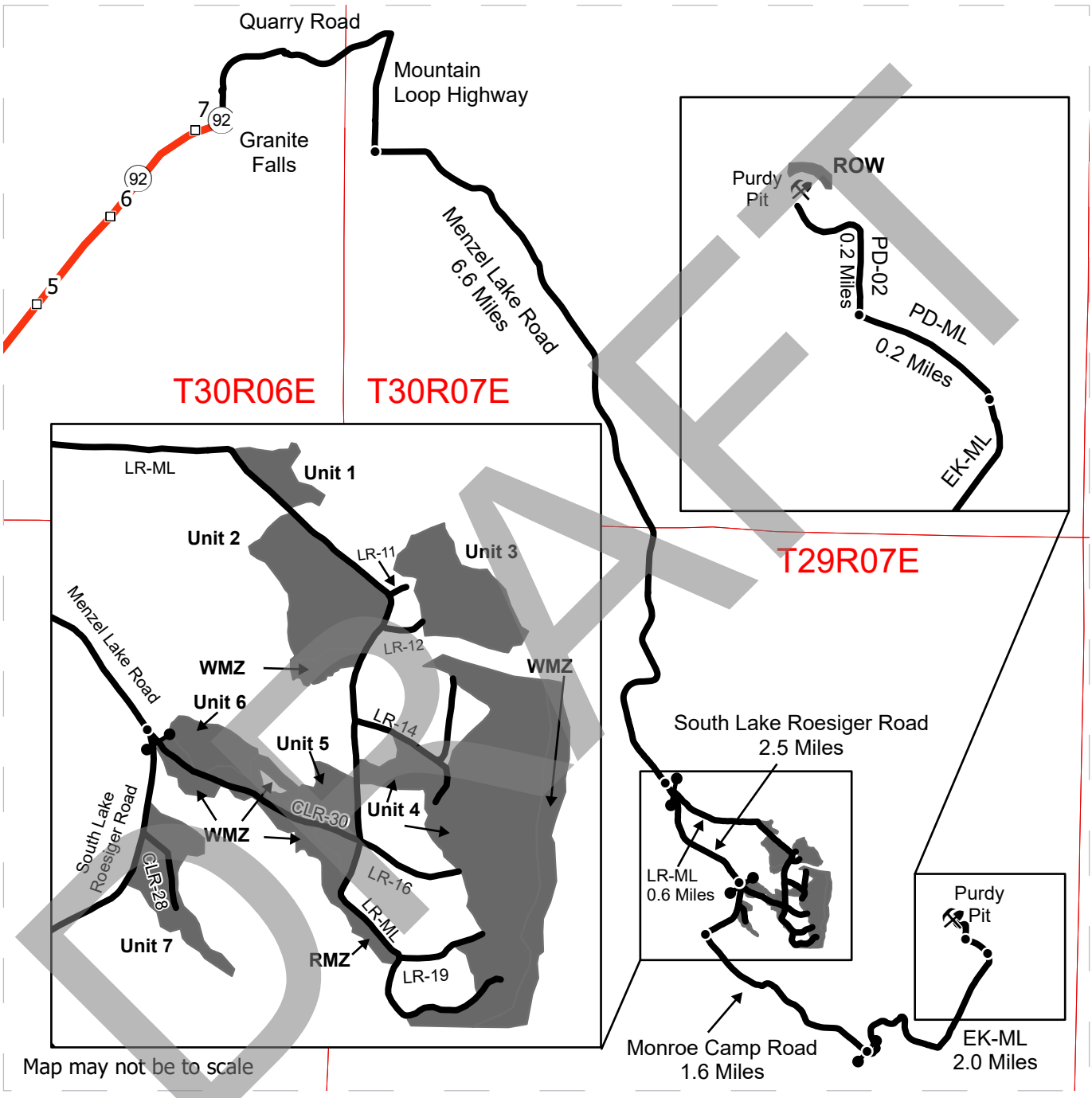
N

Prepared By: bstz490
Modification Date: bstz490 7/29/2024
Accessed: 10/02/2024 11:12

DRIVING MAP

SALE NAME: COUGAR VRH VDT
AGREEMENT#: 30-106246
TOWNSHIP(S): T29R7E
TRUST(S): Common School and Indemnity (3), Community College Forest Reserve (12), State Forest Transfer (1)

REGION: Northwest Region
COUNTY(S): Snohomish
ELEVATION RGE: 529-908



- Harvest Unit
- Highway
- Haul Route
- Other Route
- Milepost Marker
- Distance Indicator
- Gate (F1-3)
- Rock Pit

DRIVING DIRECTIONS:

From Granite Falls, travel south towards Lake Roesiger on Menzel Lake Road for approximately 6.6 miles.

Unit 1-7, WMZ 1, RMZ 1: Take a left onto the LR-ML and follow for 0.6 miles.

ROW 1/Rock pit expansion: Continue onto S. Lake Roesiger Road and follow for approximately 2.5 miles. Turn left onto Monroe Camp Road, continue for 1.6 miles to the EK-ML gate on the left. Follow the EK-ML for 2.0 miles, turn left onto the PD-ML. Follow for 0.2 miles, then take a right onto the PD-02 to the Purdy rock pit.

N

Prepared By: bstz490
Accessed: 10/02/2024 11:12

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Timber Sale Cruise Report
Cougar - NW

Sale Name: COUGAR
Sale Type: LUMP SUM
Region: NORTHWEST
District: CASCADE
Lead Cruiser: Bailey Vos
Other Cruisers: Matt Llobet

Cougar Timber Sale can be accessed by traveling south of Granite Falls for 6.6 miles, towards Lake Roseiger. Take a left onto the LR-ML to access Units 1-7.

Cougar TS is comprised of 7 Variable Retention Harvest (VRH) units, 1 Riparian Management Zone (RMZ), 1 wetland management Zone (WMZ), and 1 right-of-way (ROW). Topography throughout the sale consists of gentle gradient, making for productive operator ground. Cougar consists of 60% Ground Base harvest and 40% Up-Hill cable harvest. Forest roads provide drive access to all units.

The total net cruise volume for Cougar is 4,480 MBF. Overstory is an even-aged, “plantation-style” Douglas-fir and western hemlock timber type. The exception to this is Unit 7, where the timber is an older age class and contains a highly variable stocking throughout. For this cruise, units 1-6, WMZ, and RMZ were sampled using a 54.4 BAF. Unit 7 was sampled with a 62.5/40.0 BAF combination and the ROW unit was sampled with 1/20th acre fixed plots. Sample points were generated in GIS and located in the field using Aveza Maps. Bole height was measured with a laser/relaskop and taken to a 5” top or break point (40% of diameter at 16 feet). Trees were segmented into preferred west-side log lengths and defect was noted accordingly at each cruise plot. Common defects seen throughout the sale are spike knots, sway, crooks, and bear damage.

Douglas fir SL Sorts:

5-7” - 674 MBF
8-11" - 1,522 MBF
12-15” - 1,193 MBF
16-19” - 392 MBF
20” + - 96 MBF

Thinning Prescription: WMZ 1 and RMZ 1
Thin based on the criteria below:
• Leaving a minimum of 90 trees per acre throughout the unit
• Targeting a 22 x 22 foot spacing
• Only live trees 8 inches or greater in DBH shall be used to calculate trees per acre

To accomplish this prescription, fallers and operators shall remove trees in the following priority order and diameter ranges:
1) Western Hemlock (all diameters)
2) Defective, or diseased, Douglas-fir
3) Smallest diameter Douglas-fir

Timber Sale Notice Volume (MBF)

				MBF Volume by Grade						
Sp	DBH	Rings/In	Age	All	Peeler	Spec Mill	2 Saw	3 Saw	4 Saw	Utility
DF	17.4	9.5		3,891	9	35	1,635	1,952	243	16
WH	19.7			545			340	174	21	9
RC	20.9			27				25	2	
BC	18.0			7			7			
MA	16.6			6				2	1	2
RA	15.0			5					5	
ALL	17.4	9.5		4,480	9	35	1,983	2,154	273	27

Timber Sale Notice Weight (tons)

	Tons by Grade						
Sp	All	Peeler	Spec Mill	2 Saw	3 Saw	4 Saw	Utility
DF	28,573	49	192	11,253	14,950	2,034	95
WH	4,225			2,432	1,541	200	52
RC	246				226	20	
MA	68				24	18	25
BC	48			48			
RA	37					37	
ALL	33,197	49	192	13,733	16,741	2,309	172

Timber Sale Overall Cruise Statistics

BA (sq ft/acre)	BA SE (%)	V-BAR (bf/sq ft)	V-BAR SE (%)	Net Vol (bf/acre)	Vol SE (%)
223.6	3.4	153.1	1.5	34,239	3.7

Timber Sale Unit Cruise Design

Unit	Design	Cruise Acres	FMA Acres	N Plots	N Cruise Plots	N Void Plots
COUGAR U1	B1: VR, 1 BAF (54.44) Measure All, Sighting Ht = 4.5 ft	4.5	4.7	4	4	0
COUGAR U2	B1C: VR, 1 BAF (54.44) Measure/Count Plots, Sighting Ht = 4.5 ft	19.4	21.2	14	7	0
COUGAR U3	B1C: VR, 1 BAF (54.44) Measure/Count Plots, Sighting Ht = 4.5 ft	16.2	17.2	12	6	0
COUGAR U4	B1C: VR, 1 BAF (54.44) Measure/Count Plots, Sighting Ht = 4.5 ft	57.4	60.4	39	20	1

Unit	Design	Cruise Acres	FMA Acres	N Plots	N Cruise Plots	N Void Plots
COUGAR U5	B1: VR, 1 BAF (54.44) Measure All, Sighting Ht = 4.5 ft	7.4	8.1	9	9	0
COUGAR U6	B1C: VR, 1 BAF (54.44) Measure/Count Plots, Sighting Ht = 4.5 ft	5.9	6.2	7	4	0
COUGAR U7	B2: VR, 2 BAF (62.5, 40 for some species) Measure All, Sighting Ht = 4.5 ft	10.4	11.3	10	10	0
COUGAR WMZ	B1: VR, 1 BAF (54.44) Measure All, Sighting Ht = 4.5 ft	27.1	27.1	14	14	0
COUGAR RMZ	B1: VR, 1 BAF (54.44) Measure All, Sighting Ht = 4.5 ft	2.1	2.3	3	3	0
COUGAR ROW 1	FX: FR plots (20 tree / acre expansion)	0.5	0.6	2	2	0
All		150.9	159.1	114	79	1

Timber Sale Log Grade x Sort Summary

Sp	Status	Grade	Sort	Dia	Len	BF Gross	BF Net	Defect %	Tons	MBF Net
BC	LIVE	2 SAW	Domestic	9.6	40	45	45	0.0	47.8	6.8
DF	LIVE	2 SAW	Domestic	14.1	39	10,914	10,734	1.6	11,126.5	1,619.8
DF	LIVE	2 SAW	HQ-B	13.9	40	109	104	5.0	126.4	15.7
DF	LIVE	3 PEELER	HQ-A	28.4	34	62	62	0.0	49.3	9.3
DF	LIVE	3 SAW	Domestic	8.7	36	13,062	12,938	0.9	14,949.7	1,952.3
DF	LIVE	4 SAW	Domestic	6.0	25	1,629	1,612	1.0	2,034.1	243.2
DF	LIVE	CULL	Cull	16.8	10	206	0	100.0	0.0	0.0
DF	LIVE	SPECIAL MILL	HQ-A	20.7	40	229	229	0.0	191.8	34.6
DF	LIVE	UTILITY	Pulp	7.4	19	105	105	0.0	95.0	15.9
MA	LIVE	3 SAW	Domestic	10.8	28	15	15	0.0	24.3	2.3
MA	LIVE	4 SAW	Domestic	10.8	20	14	9	32.4	18.2	1.4
MA	LIVE	UTILITY	Pulp	9.3	30	14	14	0.0	25.3	2.1
RA	LIVE	4 SAW	Domestic	8.6	24	32	32	0.0	37.0	4.8
RC	LIVE	3 SAW	Domestic	11.2	37	176	164	7.1	226.0	24.7
RC	LIVE	4 SAW	Domestic	6.1	22	16	16	0.0	20.4	2.4
WH	LIVE	2 SAW	Domestic	15.1	37	2,302	2,255	2.0	2,431.9	340.3
WH	LIVE	3 SAW	Domestic	8.9	35	1,163	1,155	0.7	1,541.2	174.2
WH	LIVE	4 SAW	Domestic	6.3	26	141	141	0.0	199.7	21.3
WH	LIVE	CULL	Cull	16.4	8	105	0	100.0	0.0	0.0
WH	LIVE	UTILITY	Pulp	12.7	24	58	58	0.0	51.8	8.8

Timber Sale Log Sort x Diameter Bin Summary

Sp	Bin	Status	Sort	Dia	Len	BF Net	Defect %	Tons	MBF Net
BC	5+	LIVE	Domestic	9.6	40	45	0.0	47.8	6.8
DF	5 - 7	LIVE	Pulp	5.1	14	18	0.0	15.9	2.8
DF	5 - 7	LIVE	Domestic	6.4	31	4,465	0.5	5,578.1	673.8
DF	8 - 11	LIVE	Domestic	9.7	36	10,084	1.2	11,405.8	1,521.7
DF	8 - 11	LIVE	Pulp	10.1	24	87	0.0	79.1	13.1
DF	8 - 11	LIVE	Cull	11.2	8	0	100.0	0.0	0.0
DF	12 - 15	LIVE	Domestic	13.5	39	7,797	1.8	8,389.6	1,176.6
DF	12 - 15	LIVE	HQ-B	13.9	40	104	5.0	126.4	15.7
DF	12 - 15	LIVE	Cull	15.2	7	0	100.0	0.0	0.0
DF	16 - 19	LIVE	Domestic	17.1	39	2,549	1.5	2,427.4	384.6
DF	16 - 19	LIVE	HQ-A	17.7	40	46	0.0	38.6	7.0
DF	16 - 19	LIVE	Cull	18.4	12	0	100.0	0.0	0.0
DF	20+	LIVE	HQ-A	23.2	39	244	0.0	202.5	36.8
DF	20+	LIVE	Domestic	23.4	40	388	0.0	309.6	58.6
DF	20+	LIVE	Cull	24.1	10	0	100.0	0.0	0.0
MA	5+	LIVE	Pulp	9.3	30	14	0.0	25.3	2.1
MA	5+	LIVE	Domestic	10.8	24	25	15.4	42.5	3.8
RA	5 - 7	LIVE	Domestic	6.7	18	5	0.0	8.2	0.8
RA	8 - 11	LIVE	Domestic	10.5	30	26	0.0	28.8	4.0
RC	5+	LIVE	Domestic	9.4	31	180	6.5	246.4	27.1
WH	5 - 7	LIVE	Domestic	6.4	30	348	0.0	497.7	52.5
WH	5 - 7	LIVE	Pulp	7.1	24	7	0.0	9.9	1.0
WH	8 - 11	LIVE	Domestic	9.9	34	948	0.9	1,243.2	143.0
WH	12 - 15	LIVE	Domestic	13.7	37	1,151	1.4	1,326.5	173.8
WH	12 - 15	LIVE	Cull	15.3	8	0	100.0	0.0	0.0
WH	16 - 19	LIVE	Domestic	17.3	38	930	1.3	932.4	140.4
WH	16 - 19	LIVE	Cull	19.5	12	0	100.0	0.0	0.0
WH	20+	LIVE	Domestic	22.2	35	173	9.3	173.0	26.2
WH	20+	LIVE	Pulp	23.3	24	52	0.0	41.9	7.8
WH	20+	LIVE	Cull	24.0	6	0	100.0	0.0	0.0

Cruise Unit Report
COUGAR U1

Unit Sale Notice Volume (MBF): COUGAR U1

				MBF Volume by Grade			
Sp	DBH	Rings/In	Age	All	2 Saw	3 Saw	4 Saw
DF	15.3			115	70	36	9
WH	12.0			8		7	2
ALL	15.0			124	70	43	11

Unit Cruise Design: COUGAR U1

Design	Cruise Acres	FMA Acres	N Plots	N Cruise Plots	N Void Plots
B1: VR, 1 BAF (54.44) Measure All, Sighting Ht = 4.5 ft	4.5	4.7	4	4	0

Unit Cruise Summary: COUGAR U1

Sp	Cruised Trees	All Trees	Trees/Plot	Ring-Count Trees
DF	13	13	3.3	0
WH	1	1	0.3	0
ALL	14	14	3.5	0

Unit Cruise Statistics: COUGAR U1

Sp	BA (sq ft/acre)	BA CV (%)	BA SE (%)	V-BAR (bf/sq ft)	V-BAR CV (%)	V-BAR SE (%)	Net Vol (bf/acre)	Vol CV (%)	Vol SE (%)
DF	176.9	29.5	14.7	144.8	39.4	10.9	25,613	49.2	18.3
WH	13.6	200.0	100.0	137.5	0.0	0.0	1,872	200.0	100.0
ALL	190.5	28.6	14.3	144.2	38.0	10.2	27,484	47.6	17.5

Unit Summary: COUGAR U1

Sp	Status	Rx	N	D	DBH	BL	THT	BF Gross	BF Net	Defect %	TPA	BA	RD	MBF Net
DF	LIVE	CUT	13	ALL	15.3	68	98	27,762	25,613	7.7	138.6	176.9	45.2	115.3
WH	LIVE	CUT	1	ALL	12.0	63	85	1,872	1,872	0.0	17.3	13.6	3.9	8.4
ALL	LIVE	CUT	14	ALL	15.0	67	96	29,634	27,484	7.3	155.9	190.5	49.2	123.7
ALL	ALL	ALL	14	ALL	15.0	67	96	29,634	27,484	7.3	155.9	190.5	49.2	123.7

Cruise Unit Report
COUGAR U2

Unit Sale Notice Volume (MBF): COUGAR U2

				MBF Volume by Grade			
Sp	DBH	Rings/In	Age	All	2 Saw	3 Saw	4 Saw
DF	20.7			702	451	222	29
WH	21.1			127	88	35	4
ALL	20.7			829	539	257	33

Unit Cruise Design: COUGAR U2

Design	Cruise Acres	FMA Acres	N Plots	N Cruise Plots	N Void Plots
B1C: VR, 1 BAF (54.44) Measure/Count Plots, Sighting Ht = 4.5 ft	19.4	21.2	14	7	0

Unit Cruise Summary: COUGAR U2

Sp	Cruised Trees	All Trees	Trees/Plot	Ring-Count Trees
DF	30	52	3.7	0
WH	2	8	0.6	0
ALL	32	60	4.3	0

Unit Cruise Statistics: COUGAR U2

Sp	BA (sq ft/acre)	BA CV (%)	BA SE (%)	V-BAR (bf/sq ft)	V-BAR CV (%)	V-BAR SE (%)	Net Vol (bf/acre)	Vol CV (%)	Vol SE (%)
DF	202.2	41.5	11.1	178.9	18.8	3.4	36,174	45.5	11.6
WH	31.1	190.6	51.0	210.7	4.5	3.2	6,555	190.7	51.1
ALL	233.3	26.6	7.1	183.1	18.3	3.2	42,729	32.2	7.8

Unit Summary: COUGAR U2

Sp	Status	Rx	N	D	DBH	BL	THT	BF Gross	BF Net	Defect %	TPA	BA	RD	MBF Net
DF	LIVE	CUT	30	ALL	20.7	95	121	36,751	36,174	1.6	86.5	202.2	44.4	701.8
WH	LIVE	CUT	2	ALL	21.4	100	126	6,555	6,555	0.0	12.5	31.1	6.7	127.2
ALL	LIVE	CUT	32	ALL	20.8	95	122	43,306	42,729	1.3	99.0	233.3	51.2	828.9
ALL	ALL	ALL	32	ALL	20.8	95	122	43,306	42,729	1.3	99.0	233.3	51.2	828.9

Cruise Unit Report
COUGAR U3

Unit Sale Notice Volume (MBF): COUGAR U3

				MBF Volume by Grade			
Sp	DBH	Rings/In	Age	All	2 Saw	3 Saw	4 Saw
DF	14.2			520	49	422	49
ALL	14.2			520	49	422	49

Unit Cruise Design: COUGAR U3

Design	Cruise Acres	FMA Acres	N Plots	N Cruise Plots	N Void Plots
B1C: VR, 1 BAF (54.44) Measure/Count Plots, Sighting Ht = 4.5 ft	16.2	17.2	12	6	0

Unit Cruise Summary: COUGAR U3

Sp	Cruised Trees	All Trees	Trees/Plot	Ring-Count Trees
DF	25	50	4.2	0
ALL	25	50	4.2	0

Unit Cruise Statistics: COUGAR U3

Sp	BA (sq ft/acre)	BA CV (%)	BA SE (%)	V-BAR (bf/sq ft)	V-BAR CV (%)	V-BAR SE (%)	Net Vol (bf/acre)	Vol CV (%)	Vol SE (%)
DF	226.8	20.0	5.8	141.6	15.9	3.2	32,122	25.6	6.6
ALL	226.8	20.0	5.8	141.6	15.9	3.2	32,122	25.6	6.6

Unit Summary: COUGAR U3

Sp	Status	Rx	N	D	DBH	BL	THT	BF Gross	BF Net	Defect %	TPA	BA	RD	MBF Net
DF	LIVE	CUT	25	ALL	14.3	73	103	32,238	32,122	0.4	203.4	226.8	60.0	520.4
ALL	LIVE	CUT	25	ALL	14.3	73	103	32,238	32,122	0.4	203.4	226.8	60.0	520.4
ALL	ALL	ALL	25	ALL	14.3	73	103	32,238	32,122	0.4	203.4	226.8	60.0	520.4

Cruise Unit Report
COUGAR U4

Unit Sale Notice Volume (MBF): COUGAR U4

				MBF Volume by Grade				
Sp	DBH	Rings/In	Age	All	2 Saw	3 Saw	4 Saw	Utility
DF	16.4			1,796	735	921	125	16
WH	15.0			95	40	50	5	
ALL	16.3			1,891	774	970	131	16

Unit Cruise Design: COUGAR U4

Design	Cruise Acres	FMA Acres	N Plots	N Cruise Plots	N Void Plots
B1C: VR, 1 BAF (54.44) Measure/Count Plots, Sighting Ht = 4.5 ft	57.4	60.4	39	20	1

Unit Cruise Summary: COUGAR U4

Sp	Cruised Trees	All Trees	Trees/Plot	Ring-Count Trees
DF	81	155	4.0	0
WH	4	9	0.2	0
ALL	85	164	4.2	0

Unit Cruise Statistics: COUGAR U4

Sp	BA (sq ft/acre)	BA CV (%)	BA SE (%)	V-BAR (bf/sq ft)	V-BAR CV (%)	V-BAR SE (%)	Net Vol (bf/acre)	Vol CV (%)	Vol SE (%)
DF	216.4	43.4	6.9	144.6	22.7	2.5	31,296	49.0	7.4
WH	12.6	232.3	37.2	131.6	27.9	14.0	1,653	234.0	39.7
ALL	228.9	39.0	6.2	143.9	22.9	2.5	32,948	45.2	6.7

Unit Summary: COUGAR U4

Sp	Status	Rx	N	D	DBH	BL	THT	BF Gross	BF Net	Defect %	TPA	BA	RD	MBF Net
DF	LIVE	CUT	81	ALL	15.5	77	97	32,046	31,296	2.3	165.1	216.4	55.0	1,796.4
WH	LIVE	CUT	4	ALL	15.0	65	81	1,653	1,653	0.0	10.2	12.6	3.2	94.9
ALL	LIVE	CUT	85	ALL	15.5	76	96	33,699	32,948	2.2	175.3	228.9	58.2	1,891.2
ALL	ALL	ALL	85	ALL	15.5	76	96	33,699	32,948	2.2	175.3	228.9	58.2	1,891.2

Cruise Unit Report
COUGAR U5

Unit Sale Notice Volume (MBF): COUGAR U5

				MBF Volume by Grade			
Sp	DBH	Rings/In	Age	All	2 Saw	3 Saw	4 Saw
DF	17.3			229	109	111	9
BC	18.0			7	7		
ALL	17.3			236	115	111	9

Unit Cruise Design: COUGAR U5

Design	Cruise Acres	FMA Acres	N Plots	N Cruise Plots	N Void Plots
B1: VR, 1 BAF (54.44) Measure All, Sighting Ht = 4.5 ft	7.4	8.1	9	9	0

Unit Cruise Summary: COUGAR U5

Sp	Cruised Trees	All Trees	Trees/Plot	Ring-Count Trees
DF	32	33	3.7	0
BC	1	1	0.1	0
ALL	33	34	3.8	0

Unit Cruise Statistics: COUGAR U5

Sp	BA (sq ft/acre)	BA CV (%)	BA SE (%)	V-BAR (bf/sq ft)	V-BAR CV (%)	V-BAR SE (%)	Net Vol (bf/acre)	Vol CV (%)	Vol SE (%)
DF	199.6	49.2	16.4	155.0	20.7	3.7	30,949	53.3	16.8
BC	6.0	300.0	100.0	151.7	0.0	0.0	917	300.0	100.0
ALL	205.7	47.3	15.8	154.9	20.4	3.5	31,866	51.5	16.2

Unit Summary: COUGAR U5

Sp	Status	Rx	N	D	DBH	BL	THT	BF Gross	BF Net	Defect %	TPA	BA	RD	MBF Net
BC	LIVE	CUT	1	ALL	18.0	88	112	917	917	0.0	3.4	6.0	1.4	6.8
DF	LIVE	CUT	32	ALL	17.3	84	107	31,435	30,949	1.5	122.3	199.6	48.0	229.0
ALL	LIVE	CUT	33	ALL	17.3	84	108	32,352	31,866	1.5	125.7	205.7	49.4	235.8
ALL	ALL	ALL	33	ALL	17.3	84	108	32,352	31,866	1.5	125.7	205.7	49.4	235.8

Cruise Unit Report
COUGAR U6

Unit Sale Notice Volume (MBF): COUGAR U6

				MBF Volume by Grade			
Sp	DBH	Rings/In	Age	All	2 Saw	3 Saw	4 Saw
DF	17.7			185	97	80	8
RA	15.0			5			5
WH	8.0			4			4
ALL	15.3			194	97	80	18

Unit Cruise Design: COUGAR U6

Design	Cruise Acres	FMA Acres	N Plots	N Cruise Plots	N Void Plots
B1C: VR, 1 BAF (54.44) Measure/Count Plots, Sighting Ht = 4.5 ft	5.9	6.2	7	4	0

Unit Cruise Summary: COUGAR U6

Sp	Cruised Trees	All Trees	Trees/Plot	Ring-Count Trees
DF	11	24	3.4	0
RA	1	1	0.1	0
WH	1	1	0.1	0
ALL	13	26	3.7	0

Unit Cruise Statistics: COUGAR U6

Sp	BA (sq ft/acre)	BA CV (%)	BA SE (%)	V-BAR (bf/sq ft)	V-BAR CV (%)	V-BAR SE (%)	Net Vol (bf/acre)	Vol CV (%)	Vol SE (%)
DF	186.7	52.9	20.0	168.0	16.6	5.0	31,357	55.4	20.6
RA	7.8	264.6	100.0	104.3	0.0	0.0	811	264.6	100.0
WH	7.8	264.6	100.0	97.4	0.0	0.0	758	264.6	100.0
ALL	202.2	43.2	16.3	162.8	22.0	6.1	32,925	48.5	17.4

Unit Summary: COUGAR U6

Sp	Status	Rx	N	D	DBH	BL	THT	BF Gross	BF Net	Defect %	TPA	BA	RD	MBF Net
DF	LIVE	CUT	11	ALL	16.5	87	114	31,808	31,357	1.4	125.7	186.7	46.0	185.0
RA	LIVE	CUT	1	ALL	15.0	56	68	811	811	0.0	6.3	7.8	2.0	4.8

Sp	Status	Rx	N	D	DBH	BL	THT	BF Gross	BF Net	Defect %	TPA	BA	RD	MBF Net
WH	LIVE	CUT	1	ALL	8.0	46	55	758	758	0.0	22.3	7.8	2.7	4.5
ALL	LIVE	CUT	13	ALL	15.5	80	103	33,376	32,925	1.4	154.3	202.2	50.7	194.3
ALL	ALL	ALL	13	ALL	15.5	80	103	33,376	32,925	1.4	154.3	202.2	50.7	194.3

Cruise Unit Report
COUGAR U7

Unit Sale Notice Volume (MBF): COUGAR U7

				MBF Volume by Grade						
Sp	DBH	Rings/In	Age	All	Peeler	Spec Mill	2 Saw	3 Saw	4 Saw	Utility
WH	21.5			254			188	52	5	9
DF	34.6	9.5		108	9	35	57	7		
RC	20.9			27				25	2	
MA	16.6			6				2	1	2
ALL	22.4	9.5		395	9	35	245	86	9	11

Unit Cruise Design: COUGAR U7

Design	Cruise Acres	FMA Acres	N Plots	N Cruise Plots	N Void Plots
B2: VR, 2 BAF (62.5, 40 for some species) Measure All, Sighting Ht = 4.5 ft	10.4	11.3	10	10	0

Unit Cruise Summary: COUGAR U7

Sp	Cruised Trees	All Trees	Trees/Plot	Ring-Count Trees
WH	21	21	2.1	0
DF	7	7	0.7	2
RC	7	7	0.7	0
MA	3	3	0.3	0
ALL	38	38	3.8	2

Unit Cruise Statistics: COUGAR U7

Sp	BA (sq ft/acre)	BA CV (%)	BA SE (%)	V-BAR (bf/sq ft)	V-BAR CV (%)	V-BAR SE (%)	Net Vol (bf/acre)	Vol CV (%)	Vol SE (%)
WH	131.3	91.0	28.8	185.8	25.1	5.5	24,383	94.4	29.3
DF	43.8	151.3	47.9	237.7	20.2	7.6	10,400	152.7	48.5
RC	28.0	117.6	37.2	93.2	22.2	8.4	2,610	119.7	38.1
MA	12.0	316.2	100.0	47.3	24.2	13.9	568	317.1	101.0
ALL	215.0	61.6	19.5	176.6	39.9	6.5	37,962	73.4	20.5

Unit Summary: COUGAR U7

Sp	Status	Rx	N	D	DBH	BL	THT	BF Gross	BF Net	Defect %	TPA	BA	RD	MBF Net
DF	LIVE	CUT	7	ALL	34.6	119	153	11,057	10,400	5.9	6.7	43.8	7.4	108.2
MA	LIVE	CUT	3	ALL	16.6	50	60	634	568	10.4	8.0	12.0	2.9	5.9
RC	LIVE	CUT	7	ALL	20.9	70	88	2,792	2,610	6.5	11.8	28.0	6.1	27.1
WH	LIVE	CUT	21	ALL	21.5	90	113	25,873	24,383	5.8	52.1	131.3	28.3	253.6
ALL	LIVE	CUT	38	ALL	22.4	85	107	40,356	37,962	5.9	78.6	215.0	44.8	394.8
ALL	ALL	ALL	38	ALL	22.4	85	107	40,356	37,962	5.9	78.6	215.0	44.8	394.8

Cruise Unit Report
COUGAR WMZ

Unit Sale Notice Volume (MBF): COUGAR WMZ

				MBF Volume by Grade			
Sp	DBH	Rings/In	Age	All	2 Saw	3 Saw	4 Saw
DF	15.8			207	62	135	10
WH	18.9			56	25	30	1
ALL	16.4			263	87	165	11

Unit Cruise Design: COUGAR WMZ

Design	Cruise Acres	FMA Acres	N Plots	N Cruise Plots	N Void Plots
B1: VR, 1 BAF (54.44) Measure All, Sighting Ht = 4.5 ft	27.1	27.1	14	14	0

Unit Cruise Summary: COUGAR WMZ

Sp	Cruised Trees	All Trees	Trees/Plot	Ring-Count Trees
DF	13	53	3.8	0
WH	4	4	0.3	0
ALL	17	57	4.1	0

Unit Cruise Statistics: COUGAR WMZ

Sp	BA (sq ft/acre)	BA CV (%)	BA SE (%)	V-BAR (bf/sq ft)	V-BAR CV (%)	V-BAR SE (%)	Net Vol (bf/acre)	Vol CV (%)	Vol SE (%)
DF	206.1	31.4	8.4	151.1	16.0	4.4	31,140	35.2	9.5
WH	15.6	254.2	67.9	133.2	30.2	15.1	2,072	256.0	69.6
ALL	221.6	26.3	7.0	149.8	18.9	4.6	33,212	32.4	8.4

Unit Summary: COUGAR WMZ

Sp	Status	Rx	N	D	DBH	BL	THT	BF Gross	BF Net	Defect %	TPA	BA	RD	MBF Net
DF	LIVE	CUT	13	ALL	15.8	79	102	7,689	7,638	0.7	37.1	50.6	12.7	207.0
WH	LIVE	CUT	4	ALL	18.9	77	96	2,390	2,072	13.3	8.0	15.6	3.6	56.2
ALL	LIVE	CUT	17	ALL	16.4	79	101	10,079	9,710	3.7	45.1	66.1	16.3	263.1
ALL	ALL	ALL	17	ALL	16.4	79	101	10,079	9,710	3.7	45.1	66.1	16.3	263.1

Cruise Unit Report
COUGAR RMZ

Unit Sale Notice Volume (MBF): COUGAR RMZ

				MBF Volume by Grade			
Sp	DBH	Rings/In	Age	All	2 Saw	3 Saw	4 Saw
DF	15.2			20	3	15	1
ALL	15.2			20	3	15	1

Unit Cruise Design: COUGAR RMZ

Design	Cruise Acres	FMA Acres	N Plots	N Cruise Plots	N Void Plots
B1: VR, 1 BAF (54.44) Measure All, Sighting Ht = 4.5 ft	2.1	2.3	3	3	0

Unit Cruise Summary: COUGAR RMZ

Sp	Cruised Trees	All Trees	Trees/Plot	Ring-Count Trees
WH		1	0.3	0
DF	4	13	4.3	0
ALL	4	14	4.7	0

Unit Cruise Statistics: COUGAR RMZ

Sp	BA (sq ft/acre)	BA CV (%)	BA SE (%)	V-BAR (bf/sq ft)	V-BAR CV (%)	V-BAR SE (%)	Net Vol (bf/acre)	Vol CV (%)	Vol SE (%)
WH	18.1	173.2	100.0						
DF	235.9	53.3	30.8	130.6	9.3	4.6	30,814	54.1	31.1
ALL	254.1	44.6	25.8	130.6	9.3	4.6	33,185	45.6	26.2

Unit Summary: COUGAR RMZ

Sp	Status	Rx	N	D	DBH	BL	THT	BF Gross	BF Net	Defect %	TPA	BA	RD	MBF Net
DF	LIVE	CUT	4	ALL	15.2	73	91	9,481	9,481	0.0	57.6	72.6	18.6	19.9
ALL	LIVE	CUT	4	ALL	15.2	73	91	9,481	9,481	0.0	57.6	72.6	18.6	19.9
ALL	ALL	ALL	4	ALL	15.2	73	91	9,481	9,481	0.0	57.6	72.6	18.6	19.9

Cruise Unit Report
COUGAR ROW 1

Unit Sale Notice Volume (MBF): COUGAR ROW 1

				MBF Volume by Grade			
Sp	DBH	Rings/In	Age	All	2 Saw	3 Saw	4 Saw
DF	13.8			8	3	3	1
ALL	13.8			8	3	3	1

Unit Cruise Design: COUGAR ROW 1

Design	Cruise Acres	FMA Acres	N Plots	N Cruise Plots	N Void Plots
FX: FR plots (20 tree / acre expansion)	0.5	0.6	2	2	0

Unit Cruise Summary: COUGAR ROW 1

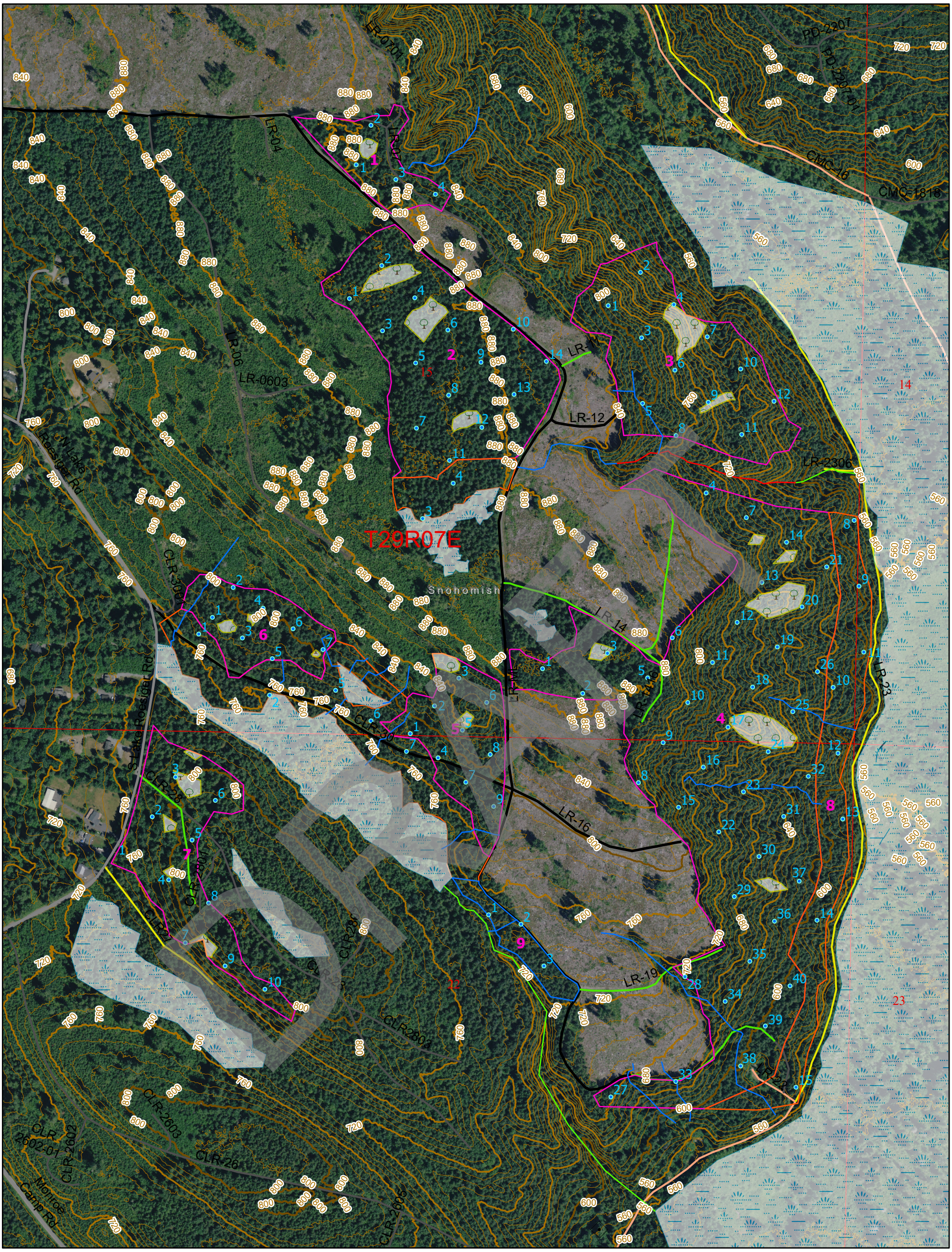
Sp	Cruised Trees	All Trees	Trees/Plot	Ring-Count Trees
DF	11	11	5.5	0
ALL	11	11	5.5	0

Unit Cruise Statistics: COUGAR ROW 1

Sp	BA (sq ft/acre)	BA CV (%)	BA SE (%)	V-BAR (bf/sq ft)	V-BAR CV (%)	V-BAR SE (%)	Net Vol (bf/acre)	Vol CV (%)	Vol SE (%)
DF	114.6	10.6	7.5	136.3	26.3	7.9	15,620	28.3	10.9
ALL	114.6	10.6	7.5	136.3	26.3	7.9	15,620	28.3	10.9

Unit Summary: COUGAR ROW 1

Sp	Status	Rx	N	D	DBH	BL	THT	BF Gross	BF Net	Defect %	TPA	BA	RD	MBF Net
DF	LIVE	CUT	11	ALL	13.8	63	85	15,620	15,620	0.0	110.3	114.6	30.8	7.8
ALL	LIVE	CUT	11	ALL	13.8	63	85	15,620	15,620	0.0	110.3	114.6	30.8	7.8
ALL	ALL	ALL	11	ALL	13.8	63	85	15,620	15,620	0.0	110.3	114.6	30.8	7.8



Final_Cougar_Units

HType

- RMZ Thin
- ROW
- VRH
- WMZ Thin
- Cougar Plots

Final_Cougar_Wetlands

FInal_Cougar_LTA

Final_Cougar_Streams

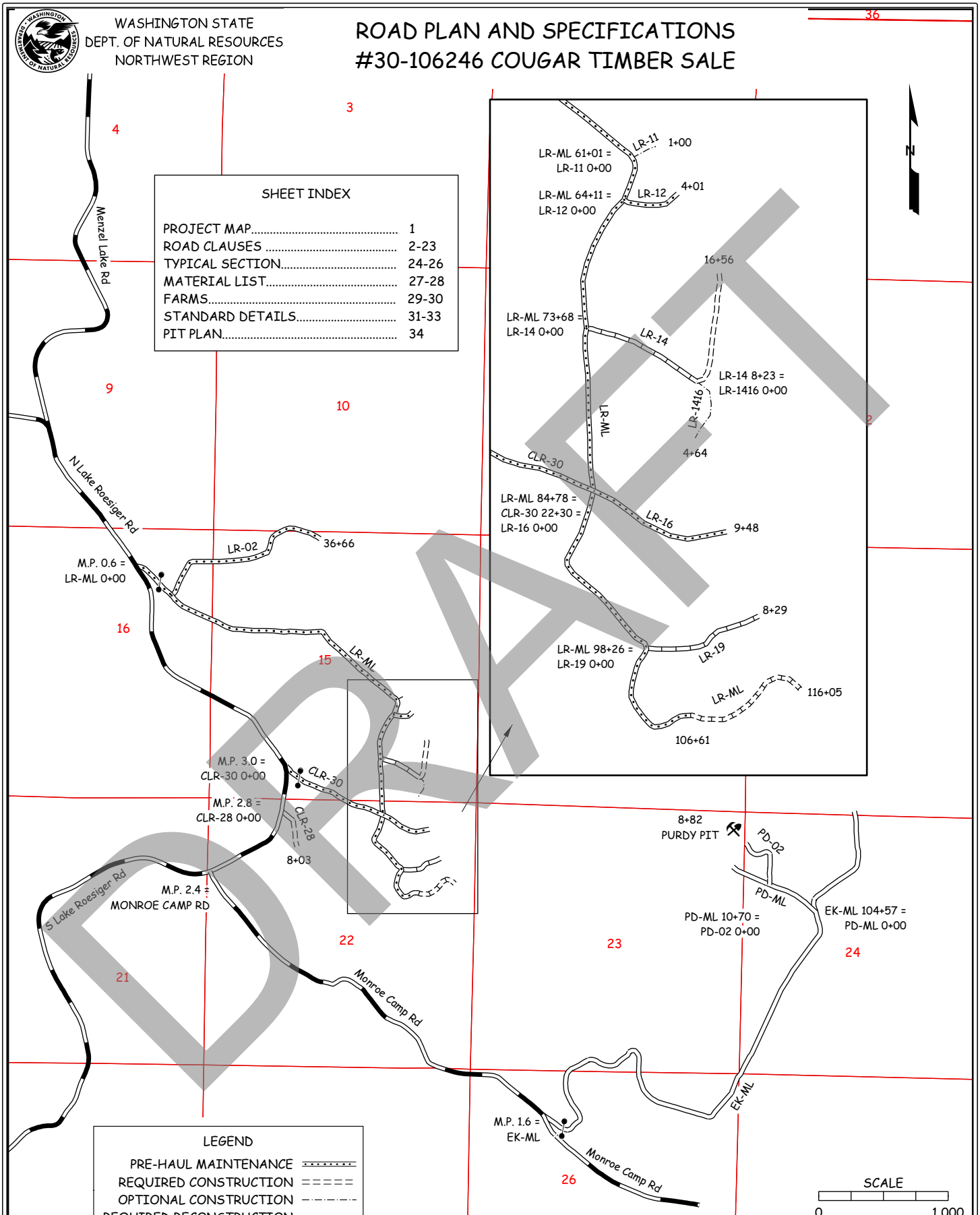
StreamType

- 3
- 4
- 5

Accessed: 10/02/2024 11:12

WASHINGTON STATE
DEPT. OF NATURAL RESOURCES
NORTHWEST REGION

ROAD PLAN AND SPECIFICATIONS
#30-106246 COUGAR TIMBER SALE



SHEET INDEX

LEGEND

- PRE-HAUL MAINTENANCE
- REQUIRED CONSTRUCTION
- OPTIONAL CONSTRUCTION
- REQUIRED RECONSTRUCTION
- OPTIONAL RECONSTRUCTION

SCALE
0 1,000

DESIGNED BY	REVIEWED BY	APPROVED BY	PLAN DATE	SHEET
J. WESTRA	ZYLSTRA 6/10/2024	ZYLSTRA 6/10/2024	5/7/2024	1 OF 34

STATE OF WASHINGTON
DEPARTMENT OF NATURAL RESOURCES

COUGAR TIMBER SALE ROAD PLAN
SNOHOMISH COUNTY
CASCADE DISTRICT
NORTHWEST REGION

AGREEMENT NO.: 30-106246 STAFF ENGINEER: J. WESTRA

DATE: MAY 7, 2024

SECTION 0 – SCOPE OF PROJECT

0-1 ROAD PLAN SCOPE

Clauses in this road plan apply to all road related work, including landings and rock source development, unless otherwise noted.

0-2 REQUIRED ROADS

The specified work on the following roads is required.

Road	Stations	Type
CLR-28	0+00 to 2+86	*RECONSTRUCTION
CLR-28	2+86 to 8+03	CONSTRUCTION
CLR-30	0+00 to 22+30	PREHAUL MAINTENANCE
LR-ML	0+00 to 106+61	PREHAUL MAINTENANCE
LR-02	0+00 to 36+66	PREHAUL MAINTENANCE
LR-12	0+00 to 4+01	PREHAUL MAINTENANCE
LR-14	0+00 to 8+23	*RECONSTRUCTION
LR-14	8+23 to 16+56	CONSTRUCTION
LR-16	0+00 to 9+48	PREHAUL MAINTENANCE
LR-19	0+00 to 8+29	*RECONSTRUCTION

*Reconstruction is on abandoned road grades.

0-3 OPTIONAL ROADS

The specified work on the following roads is not required. Any optional roads built by the Purchaser must meet all the specifications in the road plan.

Road	Stations	Type
LR-ML	106+61 to 116+05	*RECONSTRUCTION
LR-11	0+00 to 1+00	CONSTRUCTION
LR-1416	0+00 to 4+64	CONSTRUCTION

*Reconstruction is on abandoned road grades.

0-4 CONSTRUCTION

Construction may include, but is not limited to clearing, grubbing, excavation and embankment to subgrade, landing and turnout construction, culvert installation and application of 3-inch-minus ballast.

0-5 RECONSTRUCTION

Reconstruction includes, but is not limited to clearing, grubbing, excavation and embankment to subgrade, landing and turnout construction, culvert installation and application of 3-inch-minus ballast.

0-6 PRE-HAUL MAINTENANCE

This project includes, but is not limited to the following pre-haul maintenance requirements:

Road	Stations	Requirements
CLR-30	0+00 to 22+30	Brushing
LR-ML	0+00 to 106+61	Brushing
LR-02	0+00 to 36+66	Brushing
LR-12	0+00 to 4+01	Brushing, Shape with spreader cat, 6” Rock Lift of 3” Minus
LR-16	0+00 to 9+48	Brushing, Culvert Installation

0-7 POST-HAUL MAINTENANCE

This project includes post-haul road maintenance listed in Clause 9-5 POST-HAUL MAINTENANCE.

0-10 ABANDONMENT

This project includes abandonment listed in Clause 9-21 ROAD ABANDONMENT.

0-12 DEVELOP ROCK SOURCE

Purchaser shall develop an existing rock source. Rock source development will involve clearing, stripping, drilling, shooting and processing. Work for developing rock sources is listed in Section 6 ROCK AND SURFACING.

SECTION 1 – GENERAL

1-1 ROAD PLAN CHANGES

If the Purchaser desires a change from this road plan including, but not limited to, relocation, extension, change in design, or adding roads; a revised road plan must be submitted in writing to the Contract Administrator for consideration. Before work begins, Purchaser shall obtain approval from the State for the submitted plan.

1-2 UNFORESEEN CONDITIONS

Quantities established in this road plan are minimum acceptable values. Additional quantities required by the state due to unforeseen conditions, or Purchaser's choice of construction season or techniques will be at the Purchaser's expense. Unforeseen conditions include, but are not limited to, solid subsurface rock, subsurface springs, saturated ground, and unstable soils.

1-3 ROAD DIMENSIONS

Purchaser shall perform road work in accordance with the dimensions shown on the TYPICAL SECTION SHEET and the specifications within this road plan.

1-4 ROAD TOLERANCES

Purchaser shall perform road work within the tolerances listed below. The tolerance class for each road is listed on the TYPICAL SECTION SHEET.

Tolerance Class	A	B	C
Road and Subgrade 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

1-6 ORDER OF PRECEDENCE

Any conflict or inconsistency in the road plan will be resolved by giving the documents precedence in the following order:

1. Addenda.
2. Typical Section Sheet.
3. Standard Lists.
4. Standard Details.

In case of any ambiguity or dispute over interpreting the road plan, the Contract Administrator's or designee's decision will be final.

1-8 REPAIR OR REPLACEMENT OF DAMAGED MATERIALS

Purchaser shall repair or replace all materials, roadway infrastructure, and road components damaged during road work or operation activities. The Contract Administrator will direct repairs and replacements. Repairs to structural materials must be made in accordance with the manufacturer's recommendation.

1-9 DAMAGED METALLIC COATING

Any cut ends, or damaged galvanized or aluminized coating on existing or new bridge components, culverts, downspouts, and flumes must be cleaned and treated with a minimum of two coats of zinc rich paint or cold galvanizing compound.

1-15 ROAD MARKING

Purchaser shall perform road work in accordance with the state's marked location. All road work is marked as follows:

- Orange flagging and/or stakes for road centerline

1-18 REFERENCE POINT DAMAGE

Purchaser shall reset reference points (RPs) that were moved or damaged at any time during construction to their original locations. Excavation and embankment may not proceed on road segments controlled by said RPs until Purchaser resets all moved or damaged RPs.

1-21 HAUL APPROVAL

Purchaser shall not use roads under this road plan for any hauling other than timber cut on the right-of-way, without written approval from the Contract Administrator.

1-22 WORK NOTIFICATIONS

Purchaser shall notify the Contract Administrator a minimum of 3 business days before work begins.

1-23 ROAD WORK PHASE APPROVAL

Purchaser shall obtain written approval from the Contract Administrator upon completion of each of the following phases of road work:

- Subgrade construction and compaction
- Drainage installation
- Rock application and compaction

1-25 ACTIVITY TIMING RESTRICTION

The specified activities are not allowed during the listed closure period unless authorized in writing by the Contract Administrator.

Road	Activity	Closure Period
ALL ROADS	ALL ACTIVITIES	November 1 to March 31

1-26 OPERATING DURING CLOSURE PERIOD

If permission is granted to operate during a closure period listed in Clause 1-25 ACTIVITY TIMING RESTRICTION, Purchaser shall provide a maintenance plan to include further protection of state resources. Purchaser shall obtain written approval from the Contract Administrator for the maintenance plan, and shall put preventative measures in place before operating during the closure period. Purchaser is required to maintain all haul roads at their own expense including those listed in Contract Clause C-060 DESIGNATED ROAD MAINTAINER. If other operators are using, or desire to use these designated maintainer roads, a joint operating plan must be developed. All parties shall follow this plan.

Purchaser's maintenance plan must include a total volume of rock that will be provided at the Purchaser's expense in addition to what is specified in this road plan. This rock shall be available before permission is granted to operate during the closure period and will be used as necessary along the haul route. The Contract Administrator may direct the Purchaser where to apply this maintenance rock.

Rock from stockpiles may not be used for out of season maintenance.

1-29 SEDIMENT RESTRICTION

Purchaser shall not allow silt-bearing runoff to enter any streams.

1-30 CLOSURE TO PREVENT DAMAGE

In accordance with Contract Clause G-220 STATE SUSPENDS OPERATION, the Contract Administrator will suspend road work or hauling right-of-way timber, forest products, or rock under the following conditions:

- Wheel track rutting exceeds 4 inches on crushed rock roads.
- Surface or base stability problems persist.
- Weather is such that satisfactory results cannot be obtained in an area of operations.
- When, in the opinion of the Contract Administrator excessive road damage or rutting may occur.

Operations must stop unless authority to continue working or hauling is granted in writing by the Contract Administrator. In the event that surface or base stability problems persist, Purchaser shall cease operations, or perform corrective maintenance or repairs, subject to specifications within this road plan.

1-33 SNOW PLOWING RESTRICTION

Snowplowing will be allowed after the execution of a SNOW PLOWING AGREEMENT, which is available from the Contact Administrator upon request. If damage occurs while plowing, further permission to plow may be revoked by the Contract Administrator.

1-40 ROAD APPROACHES TO COUNTY ROADS AND STATE HIGHWAYS

Purchaser shall immediately remove any mud, dirt, rock, or other material tracked or spilled on to county roads and state highways.

If additional damage to the surface, signs, guardrails, etc. occurs then the damage will be repaired, at the Purchaser's expense, as directed by the Contract Administrator when authorized by the county or WSDOT.

1-41 REQUIREMENTS FOR PAVED ROAD APPROACHES

Requirements for the South Lake Roesiger road approaches:
Purchaser shall build up approaches to allow a smooth grade transition between the CLR-28 and South Lake Roesiger roads. The top of the CLR-28 road surfacing must be kept level with the surface of the South Lake Roesiger road at all times. The surface of the CLR-28 approach must slope up from the edge of the South Lake Roesiger road at the rate of 2 inches per foot for a distance of 15 feet, unless otherwise shown in the approach permit.

SECTION 2 – MAINTENANCE

2-1 GENERAL ROAD MAINTENANCE

Purchaser shall maintain all roads used under this contract in accordance with the FOREST ACCESS ROAD MAINTENANCE SPECIFICATIONS for the entire term of this contract. Maintenance is required even during periods of inactivity.

2-2 ROAD MAINTENANCE – PURCHASER MAINTENANCE

Purchaser shall perform maintenance on roads listed in Contract Clause C-050 PURCHASER ROAD MAINTENANCE AND REPAIR in accordance with FOREST ACCESS ROAD MAINTENANCE SPECIFICATIONS.

2-3 ROAD MAINTENANCE – DESIGNATED MAINTAINER

Purchaser may be required to perform maintenance on roads listed in Contract Clause C-060 DESIGNATED ROAD MAINTAINER as directed by the Contract Administrator. Purchaser shall maintain roads in accordance with FOREST ACCESS ROAD MAINTENANCE SPECIFICATIONS.

2-4 PASSAGE OF LIGHT VEHICLES

Purchaser shall maintain all roads in a condition that will allow the passage of light administrative vehicles.

SECTION 3 – CLEARING, GRUBBING, AND DISPOSAL

3-1 BRUSHING

On the prehaul maintenance roads, Purchaser shall cut vegetative material up to 6 inches in diameter, including limbs, as shown on the BRUSHING DETAIL. Brushing must be achieved by mechanical cutting of brush, trees, and branches. Root systems and stumps of cut vegetation may not be disturbed unless directed by the Contract Administrator. Purchaser shall remove brushing debris from the road surface, ditchlines, and culvert inlets and outlets.

3-5 CLEARING

Purchaser shall fall all vegetative material larger than 2 inches DBH or over 5 feet high between the marked right-of-way boundaries and within waste and debris areas, or if not marked in the field, between the clearing limits specified on the TYPICAL SECTION SHEET. Clearing must be completed before starting excavation and embankment.

3-8 PROHIBITED DECKING AREAS

Purchaser shall not deck right-of-way timber in the following areas:

- Within the grubbing limits.
- Within 50 feet of any stream.
- In locations that interfere with the construction of the road prism.
- In locations that impede drainage.
- On slopes greater than 50%.
- Against standing trees.

3-10 GRUBBING

Purchaser shall remove all stumps between the grubbing limits specified on the TYPICAL SECTION SHEET. Purchaser shall also remove stumps with undercut roots outside the grubbing limits. Grubbing must be completed before starting excavation and embankment.

3-20 ORGANIC DEBRIS DEFINITION

Organic debris is defined as all vegetative material not eligible for removal by Contract Clause G-010 PRODUCTS SOLD AND SALE AREA or G-011 RIGHT TO REMOVE FOREST PRODUCTS AND CONTRACT AREA, that is larger than one cubic foot in volume within the clearing limits as shown on the TYPICAL SECTION SHEET and BRUSHING DETAIL.

3-21 DISPOSAL COMPLETION

Purchaser shall remove organic debris from the road surface, ditchlines, and culvert inlets and outlets. Purchaser shall complete all disposal of organic debris before the application of rock.

3-23 PROHIBITED DISPOSAL AREAS

Purchaser shall not place organic debris in the following areas:

- Within 50 feet of a cross drain culvert.
- Within 100 feet of a live stream, or wetland
- On road subgrades, or excavation and embankment slopes.
- On slopes greater than 50%.
- Within the operational area for cable landings where debris may shift or roll.
- On locations where brush can fall into the ditch or onto the road surface.
- Against standing timber.

3-24 BURYING ORGANIC DEBRIS RESTRICTED

Purchaser shall not bury organic debris unless otherwise stated in this plan.

3-25 SCATTERING ORGANIC DEBRIS

Purchaser shall scatter organic debris outside of the clearing limits in natural openings unless otherwise detailed in this road plan.

SECTION 4 – EXCAVATION

4-2 PIONEERING

Pioneering may not extend past construction that will be completed during the current construction season. Pioneering may not extend more than 500 feet beyond completed construction unless approved in writing by the Contract Administrator. In addition, the following actions must be taken as pioneering progresses:

- Drainage must be provided on all uncompleted construction.
- Road pioneering operations may not undercut the final cut slope or restrict drainage.
- Culverts at live stream crossings must be installed during pioneering operations prior to embankment.

4-3 ROAD GRADE AND ALIGNMENT STANDARDS

Purchaser shall follow these standards for road grade and alignment:

- Grade and alignment must have smooth continuity, without abrupt changes in direction.
- Maximum grades may not exceed 18 percent favorable and 15 percent adverse.
- Minimum curve radius is 60 feet at centerline.
- Maximum grade change for sag vertical curves is 5% in 100 feet.
- Maximum grade change for crest vertical curves is 4% in 100 feet.

4-4 SWITCHBACK STANDARDS

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. Purchaser shall follow these standards for switchbacks:

- Maximum adverse grades for switchbacks is 10%.
- Maximum favorable grades for switchbacks is 12%.
- Maximum transition grades entering and leaving switchbacks is a 5% grade change.
- Transition grades required to meet switchback grade limitations must be constructed on the tangents preceding and departing from the switchbacks.

4-5 CUT SLOPE RATIO

Purchaser shall construct excavation slopes no steeper than shown on the following table:

Material Type	Excavation Slope Ratio	Excavation Slope Percent
Common Earth (on side slopes up to 55%)	1:1	100
Common Earth (on side slopes 56-70%)	¾:1	150
Fractured or loose rock	½:1	200
Hardpan or solid rock	¼:1	400

4-6 EMBANKMENT SLOPE RATIO

Purchaser shall construct embankment slopes no steeper than shown on the following table:

Material Type	Embankment Slope Ratio	Embankment Slope Percent
Sandy Soils	2:1	50
Common Earth and Rounded Gravel	1½:1	67
Angular Rock	1¼:1	80

4-7 SHAPING CUT AND FILL SLOPE

Purchaser shall construct excavation and embankment slopes to a uniform line and left rough for easier revegetation.

4-8 CURVE WIDENING

The minimum widening placed on the inside of curves is:

- 6 feet for curves of 50 to 79 feet radius.
- 4 feet for curves of 80 to 100 feet radius.

4-9 EMBANKMENT WIDENING

The minimum embankment widening is:

- 2 feet for embankment heights at centerline of 2 to 6 feet.
- 4 feet for embankment heights at centerline of greater than 6 feet.

Purchaser shall apply embankment widening equally to both sides of the road to achieve the required width.

4-21 TURNOUTS

Purchaser shall construct turnouts intervisible with a maximum distance of 1,000 feet between turnouts unless otherwise shown on drawings. Locations may be adjusted to fit the final subgrade alignment and sight distances. Locations are subject to written approval by the Contract Administrator. Minimum dimensions are shown on the TYPICAL SECTION SHEET.

4-22 TURNAROUNDS

Purchaser shall construct turnarounds in accordance with the TURNAROUND DETAIL on all roads. Turnarounds must be no larger than 30 feet long and 30 feet wide. Locations are subject to written approval by the Contract Administrator.

4-25 DITCH CONSTRUCTION AND RECONSTRUCTION

Purchaser shall construct or reconstruct ditches into the subgrade as specified on the TYPICAL SECTION SHEET. Ditches must be constructed concurrently with construction of the subgrade.

4-27 DITCH WORK – MATERIAL USE PROHIBITED

Purchaser shall not pull ditch material across the road or mix in with the road surface. Excavated material must be end hauled to the location specified in Clauses 4-36 through 4-38.

4-28 DITCH DRAINAGE

Ditches must drain to cross-drain culverts or ditchouts.

4-29 DITCHOUTS

Purchaser shall construct ditchouts as identified on the MATERIALS LIST and as needed and as directed by the Contract Administrator. Ditchouts must be constructed in a manner that diverts ditch water onto the forest floor and must have excavation backslopes no steeper than a 1:1 ratio.

4-35 WASTE MATERIAL DEFINITION

Waste material is defined as all dirt, rock, mud, or related material that is extraneous or unsuitable for construction material. Waste material, as used in Section 4 EXCAVATION, is not organic debris.

4-36 DISPOSAL OF WASTE MATERIAL

Purchaser may sidecast waste material on side slopes up to 55% if the waste material is compacted and free of organic debris. On side slopes greater than 55%, all waste material must be end hauled or pushed to the designated embankment sites identified by the Contract administrator.

4-38 PROHIBITED WASTE DISPOSAL AREAS

Purchaser shall not deposit waste material in the following areas:

- Within 50 feet of a cross drain culvert.
- Within 100 feet of a live stream or wetland.
- In locations that interfere with the construction of the road prism.
- In locations that impede drainage.
- Against standing timber.
- Outside the clearing limits.

4-55 ROAD SHAPING

Purchaser shall shape the subgrade and surface as shown on the TYPICAL SECTION SHEET. The subgrade and surface shape must ensure runoff in an even, un-concentrated manner, and must be uniform, firm, and rut-free.

4-60 FILL COMPACTION

Purchaser shall compact all embankment and waste material by routing equipment over the entire width of each lift.

4-61 SUBGRADE COMPACTION

Purchaser shall compact constructed and reconstructed subgrades by routing equipment over the entire width.

5-5 CULVERTS

Purchaser shall install culverts as part of this contract. Culverts must be installed concurrently with subgrade work and must be installed before subgrade compaction and rock application. Culvert locations and the minimum requirements for culvert length and diameter are designated on MATERIALS LIST. Culvert, downspout, and flume lengths may be adjusted to fit as-built conditions and may not terminate directly on unprotected soil. Culverts must be new material and must meet the specifications in Clauses 10-15 through 10-24.

5-12 UNUSED MATERIALS STATE PROPERTY

On required roads, any materials listed on the MATERIALS LIST that are not installed will become the property of the state. Purchaser shall stockpile materials as directed by the Contract Administrator.

5-15 CULVERT INSTALLATION

Culvert installation must be in accordance with the CULVERT AND DRAINAGE SPECIFICATION DETAIL and the National Corrugated Metal Pipe Association's "Installation Manual for Corrugated Steel Drainage Structures" and the Corrugated Polyethylene Pipe Association's "Recommended Installation Practices for Corrugated Polyethylene Pipe and Fittings".

5-17 CROSS DRAIN SKEW AND SLOPE

Cross drains, on road grades in excess of 3%, must be skewed at least 30 degrees from perpendicular to the road centerline, except where the cross drain is at the low point in the road culverts will not be skewed. Cross drain culverts must be installed at a slope steeper than the incoming ditch grade, but not less than 3% or more than 10%.

5-18 CULVERT DEPTH OF COVER

Cross drain culverts must be installed with a depth of cover of not less than 1 foot of compacted subgrade over the top of the culvert at the shallowest point. Stream crossing culverts must be installed with a depth of cover recommended by the culvert manufacturer for the type and size of the pipe.

5-20 ENERGY DISSIPATERS

Purchaser shall install energy dissipaters in accordance with the CULVERT AND DRAINAGE SPECIFICATION DETAIL. Energy dissipater installation is subject to approval by the Contract Administrator.

The type of energy dissipater and the amount of material must be consistent with the specifications listed on the CULVERT AND DRAINAGE SPECIFICATION DETAIL.

5-25 CATCH BASINS

Purchaser shall construct catch basins in accordance with CULVERT AND DRAINAGE SPECIFICATION DETAIL. Minimum dimensions of catch basins are 2 feet wide and 4 feet long.

5-26 HEADWALLS FOR CROSS DRAIN CULVERTS

Purchaser shall construct headwalls in accordance with the CULVERT AND DRAINAGE SPECIFICATION DETAIL at all cross drain culverts. Rock used for headwalls must weigh at least 50 pounds. Rock must be placed on shoulders, slopes, and around culvert inlets and outlets. Rock may not restrict the flow of water into culvert inlets or catch basins. No placement by end dumping or dropping of rock is allowed.

5-27 ARMORING FOR CULVERTS

At stream crossing culverts, Purchaser shall place riprap in conjunction with construction of the embankment. Rock must be placed on shoulders, slopes, and around culvert inlets and outlets as designated on the MATERIALS LIST or as directed by the Contract Administrator. Rock may not restrict the flow of water into culvert inlets or catch basins. Placement must be by zero-drop-height method only. No placement by end dumping or dropping of rock is allowed.

6-2 ROCK SOURCE ON STATE LAND

Rock used in accordance with the quantities on the TYPICAL SECTION and MATERIALS LIST may be obtained from the following source on state land at no charge to the Purchaser. Purchaser shall obtain written approval from the Contract Administrator for the use of material from any other source. If other operators are using, or desire to use the rock source, a joint operating plan must be developed. All parties shall follow this plan.

Source	Location	Rock Type
PURDY PIT	8+82 of the PD-02	3-INCH MINUS BALLAST, RIPRAP

6-5 ROCK FROM COMMERCIAL SOURCE

Rock used in accordance with the quantities on the TYPICAL SECTION and MATERIALS LIST may be obtained from any commercial source at the Purchaser's expense.

6-10 ROCK SOURCE DEVELOPMENT PLAN BY STATE

Purchaser shall conduct rock source development and use at the following sources, in accordance with the written ROCK SOURCE DEVELOPMENT PLAN prepared by the state and included in this road plan. Upon completion of operations, the rock source must be left in the condition specified in the ROCK SOURCE DEVELOPMENT PLAN, and approved in writing by the Contract Administrator.

Source	Rock Type
PURDY PIT	3-INCH MINUS BALLAST, RIPRAP

6-12 ROCK SOURCE SPECIFICATIONS

Rock sources must be in accordance with the following specifications:

- Pit walls may not be undermined or over steepened. The maximum slope of the walls must be consistent with recognized engineering standards for the type of material being excavated in accordance with the following table:

Material	Maximum Slope Ratio (Horiz. :Vert.)	Maximum Slope Percent
Sand	2:1	50
Gravel	1.5:1	67
Common Earth	1:1	100
Fractured Rock	0.5:1	200
Solid Rock	0:1	vertical

- Pit walls must be maintained in a condition to minimize the possibility of the walls sliding or failing.
- The width of pit benches must be a minimum of 1.5 times the maximum length of the largest machine used.
- The surface of pit floors and benches must be uniform and free-draining at a minimum 2% outslope gradient.
- All operations must be carried out in compliance with all regulations of the Regulations and Standards Applicable to Metal and Nonmetal Mining and Milling Operations (30 CFR) U.S. Department of Labor, Mine Safety and Health Administration and Safety Standards for Construction Work (296-155 WAC), Washington Department of Labor and Industries.
- All vehicle access to the top of the pit faces must be blocked.

6-14 DRILL AND SHOOT

Rock drilling and shooting must meet the following specifications:

- Oversize material remaining in the rock source at the conclusion of the timber sale may not exceed 5% of the total volume mined in that source.
- Oversize material is defined as rock fragments too large to be converted by the Purchaser to a size that will meet specifications used for the roads in this sale.
- All operations must be carried out in compliance with the Regulations and Standards Applicable to Metal and Nonmetal Mining and Milling Operations (30 CFR) U.S. Department of Labor, Mine Safety and Health Administration and the Safety Standards for Construction Work (296-155 WAC), Washington Department of Labor and Industries.
- Purchaser shall block access roads before blasting operations.

6-23 ROCK GRADATION TYPES

Purchaser shall provide rock in accordance with the types and amounts listed in the TYPICAL SECTION and MATERIALS LIST. Rock must meet the following specifications for gradation and uniform quality when placed in hauling vehicles or during manufacture and placement into a stockpile.

6-34 3-INCH MINUS BALLAST ROCK

Ballast rock must be 100% equal to, or smaller than, 3 inches in at least one dimension.

Rock may contain no more than 5 percent organic debris, dirt, and trash.

6-50 LIGHT LOOSE RIP RAP

Light loose rip rap must consist of angular, hard, sound, and durable stone. It must be free from segregation, seams, cracks, and other defects tending to destroy its resistance to weather. Light loose rip rap must be free of rock fines, soil, organic debris or other extraneous material, and must meet the following requirements:

Quantity	Approximate Size Range
20% to 90%	500 lbs. to 1 ton (18”- 28”)
15% to 80%	50 lbs. to 500 lbs. (8”- 18”)
10% to 20%	3 inch to 50 lbs. (3”- 8”)

6-55 ROCK APPLICATION MEASURED BY COMPACTED DEPTH

Measurement of specified rock depths, are defined as the compacted depths using the compaction methods required in this road plan. Estimated quantities specified in the TYPICAL SECTION are loose yards. Purchaser shall apply adequate amounts of rock to meet the specified rock depths. Specified rock depths are minimum requirements, and are not subject to reduction.

6-65 ROCK STOCKPILE LOCATION

Purchaser shall stockpile rock as listed below. Clause 6-67 ROCK STOCKPILE SPECIFICATIONS.

Rock Source	Rock Type	Quantity (c.y.)	Stockpile Location
PURDY PIT	3-INCH MINUS	5,000	PURDY PIT

6-67 ROCK STOCKPILE SPECIFICATIONS

Rock stockpiles listed in Clause 6-65 ROCK STOCKPILE LOCATION must meet the following specifications:

Before placing aggregates upon the stockpile site, the site must be cleared of vegetation, trees, stumps, brush, rocks, or other debris and the ground leveled to a smooth, firm, uniform surface.

When completed, the stockpile must be neat and regular in shape. The stockpile height is limited to a maximum of 35 feet. Stockpiles in excess of 200 cubic yards must be built up in layers of not more than 4 feet deep. Stockpile layers must be constructed by trucks, clamshells, or other methods approved in writing by the Contract Administrator. Each layer must be completed over the entire area of the pile before depositing aggregates in the next layer. The aggregates may not be dumped so that they run down and over the lower layers in the stockpile.

Stockpiles of different types or sizes of aggregate must be spaced far enough apart, or separated by suitable walls or partitions, to prevent the mixing of the aggregates.

6-70 APPROVAL BEFORE ROCK APPLICATION

Purchaser shall obtain written approval from the Contract Administrator for culvert installation, ditch construction, ditch reconstruction, headwall construction, and headwall reconstruction before rock application.

6-71 ROCK APPLICATION

Purchaser shall apply rock in accordance with the specifications and quantities shown on the TYPICAL SECTION. Rock must be spread, shaped, and compacted full width concurrent with rock hauling operations. The Contract Administrator will direct locations for rock that is to be applied as spot patching. Road surfaces must be compacted in accordance with the TYPICAL SECTION by routing equipment over the entire width.

6-73 ROCK FOR WIDENED PORTIONS

Purchaser shall apply rock to turnarounds, turnouts, and areas with curve widening to the same depth and specifications as the traveled way.

8-2 PROTECTION FOR EXPOSED SOIL

Purchaser shall provide and evenly spread a 3-inch layer of straw to all exposed soils at culvert installations. Soils must be covered before the first anticipated storm event. Soils may not sit exposed during any rain event.

8-15 REVEGETATION

Purchaser shall spread seed and fertilizer on all exposed soils within the grubbing limits resulting from road work activities. Cover all exposed soils using manual dispersal of grass seed and fertilizer. Other methods of covering must be approved in writing by the Contract Administrator.

8-16 REVEGETATION SUPPLY

The Purchaser shall provide the seed and fertilizer.

8-17 REVEGETATION TIMING

Purchaser shall revegetate during the first available opportunity after road work is completed. Soils may not be allowed to sit exposed for longer than one month without receiving revegetation treatment unless otherwise approved in writing by the Contract Administrator.

8-18 PROTECTION FOR SEED

Purchaser shall provide a protective cover for seed if revegetation occurs between July 1 and March 31. The protective cover may consist of dispersed straw, jute matting, or clear plastic sheets. The protective cover requirement may be waived in writing by the Contract Administrator if Purchaser is able to demonstrate a revegetation plan that will result in the establishment of a uniform dense crop (at least 50% coverage) of 3-inch tall grass by October 31.

8-19 ASSURANCE FOR SEEDED AREA

Purchaser shall ensure the growth of a uniform and dense crop (at least 50% coverage) of 3-inch tall grass. Purchaser shall reapply the grass seed and fertilizer in areas that have failed to germinate or have been damaged through any cause. Restore eroded or disturbed areas, clean up and properly dispose of eroded materials, and reapply the seed and fertilizer at no addition cost to the state.

8-25 GRASS SEED

Purchaser shall evenly spread the seed mixture listed below on all exposed soil inside the grubbing limits at a rate of 50 pounds per acre of exposed soil. Grass seed must meet the following specifications:

1. Weed seed may not exceed 0.5% by weight.
2. All seed species must have a minimum 90% germination rate, unless otherwise specified.
3. Seed must be certified.
4. Seed must be furnished in standard containers showing the following information:
    a. Common name of seed
    b. Net weight
    c. Percent of purity
    d. Percentage of germination
    e. Percentage of weed seed and inert material
5. Seed must conform to the following mixture.

Kind and Variety of Seed in Mixture	% by Weight
Creeping Red Fescue	50
Elf Perennial Rye Grass	25
Highland Colonial Bentgrass	15
White Clover	10
Inert and Other Crop	0.5

8-28 FERTILIZER: LAKE ROESIGER WATERSHED

Purchaser shall evenly spread fertilizer on all exposed soil inside the grubbing limits at a rate of 200 pounds per acre of exposed soil. Fertilizer mix is a special phosphorous free "Whatcom Waters" mix designed for use within the Lake Whatcom watershed. This fertilizer is available at Whatcom Farmers' Cooperative in Lynden (360-354-2418) and must meet the following specifications:

Chemical Component	% by Weight
Nitrogen*	16
Phosphorous	0
Potassium	8
Sulphur	8
Inerts	68

* 4.67% Ammonical Nitrogen + 11.33% Urea Nitrogen

9-3 CULVERT MATERIAL REMOVED FROM STATE LAND

Culverts removed from roads become the property of the Purchaser and must be removed from state land.

9-5 POST-HAUL MAINTENANCE

Purchaser shall perform post-haul maintenance in accordance with the FOREST ACCESS ROAD MAINTENANCE SPECIFICATIONS.

9-10 LANDING DRAINAGE

Purchaser shall provide for drainage of the landing surface.

9-11 LANDING EMBANKMENT

Purchaser shall slope landing embankments to the original construction specifications.

9-21 ROAD ABANDONMENT

Purchaser shall abandon the following roads before the termination of this contract.

Road	Stations
CLR-28	0+00 to 8+03

9-22 ABANDONMENT

- Remove all ditch relief culverts. The resulting slopes must be 1:1 or flatter. Place and compact the removed fill material in a location that will not erode into any Type 1 through 5 waters or wetlands.
- Remove all culverts in natural drainages. The resulting slopes must be 1.5:1 or flatter. Strive to match the existing native stream bank gradient. The natural streambed width must be re-established. Place and compact the removed fill material in a location that will not erode into any Type 1 through 5 waters or wetlands.
- Transport all removed culverts off site. All removed culverts are the property of the Purchaser.
- Construct non-drivable waterbars at natural drainage points and at a spacing that will produce a vertical drop of no more than 20 feet between waterbars and with a maximum horizontal spacing of 400 feet.
- Skew waterbars at least 30 degrees from perpendicular to the road centerline on roads in excess of 3 percent grade.
- Key waterbars into the cut-slope to intercept the ditch. Waterbars must be outsloped to provide positive drainage. Outlets must be on stable locations.
- Inslope or outslope the road as appropriate.
- Remove bridges and other structures.
- Pull back unstable fill that has potential of failing and entering any Type 1 through 5 waters or wetlands. Place and compact removed material in a stable location.
- Remove berms except as designed.
- Block the road by constructing an aggressive barrier of dense interlocked large woody debris (logs, stumps, root wads, etc.) so that four wheel highway vehicles cannot pass the point of abandonment. Typical barrier dimensions are 10 feet high by 20 feet deep, spanning the entire road prism from top of cutslope to toe of fillslope. Long term effectiveness is the primary objective. If necessary construct a vehicular turn-around near the point of abandonment.
- Apply grass seed to all exposed soils resulting from the abandonment work and in accordance with Section 8 EROSION CONTROL.

10-15 CORRUGATED STEEL CULVERT

Metallic coated steel culverts must meet AASHTO M-36 (ASTM A-760) specifications. Culverts must be galvanized (zinc coated meeting AASHTO M-218).

10-17 CORRUGATED PLASTIC CULVERT

Polyethylene culverts must meet AASHTO M-294 specifications, or ASTM F-2648 specifications for recycled polyethylene. Culverts must be Type S – double walled with a corrugated exterior and smooth interior.

10-21 METAL BAND

Metal coupling and end bands must meet the AASHTO specification designated for the culvert and must have matching corrugations. Culverts 24 inches and smaller must have bands with a minimum width of 12 inches. Culverts over 24 inches must have bands with a minimum width of 24 inches.

10-22 PLASTIC BAND

Plastic coupling and end bands must meet the AASHTO specification designated for the culvert. Only fittings supplied or recommended by the culvert manufacturer may be used.

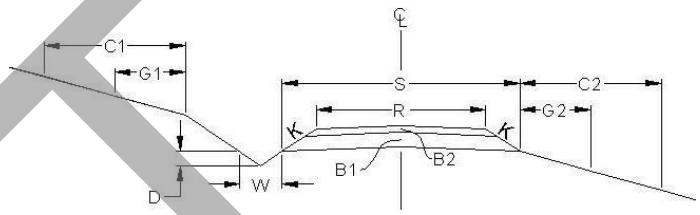
10-24 GAUGE AND CORRUGATION

Metal culverts must conform to the following specifications for gage and corrugation as a function of diameter.

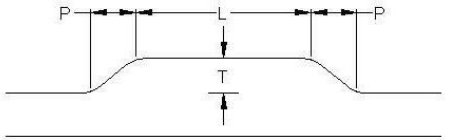
Diameter	Gage	Corrugation
18"	16 (0.064”)	$2\ ^{2}/_{3}$" X $^{1}/_{2}$"
24" to 48"	14 (0.079”)	$2\ ^{2}/_{3}$" X $^{1}/_{2}$"
54" to 96"	14 (0.079”)	3" X 1"

ROAD #		CLR-28	CLR-28	CLR-30	LR-ML
REQUIRED / OPTIONAL		REQUIRED	REQUIRED	REQUIRED	REQUIRED
CONSTRUCT / RECONSTRUCT		RECONSTRUCT	CONSTRUCT	PREHAUL	PREHAUL
TOLERANCE CLASS (A/B/C)		C	C	C	C
STATION / MP TO		0+00	2+86	0+00	0+00
STATION / MP		2+86	8+03	22+30	106+61
ROAD WIDTH	R	12	12	--	--
CROWN (INCHES @ C/L)		3	3	--	--
DITCH WIDTH	W	2	2	--	--
DITCH DEPTH	D	1	1	--	--
TURNOUT LENGTH	L	--	25	--	--
TURNOUT WIDTH	T	--	10	--	--
TURNOUT TAPER	P	--	25	--	--
GRUBBING	G1	5	5	--	--
	G2	5	5	--	--
CLEARING	C1	10	10	--	--
	C2	10	10	--	--
ROCK FILLSLOPE	K:1	1 ½ : 1	1 ½ : 1	--	--
❖ BALLAST DEPTH	B1	12	18	--	--
CUBIC YARDS / STATION		72	114	--	--
➢ TOTAL CY BALLAST		205	590	--	--
❖ SURFACING DEPTH	B2	--	--	--	--
CUBIC YARDS / STATION		--	--	--	--
➢ TOTAL CY SURFACING		--	--	--	--
➢ TOTAL CUBIC YARDS		205	590	--	--
SUBGRADE WIDTH	S	14	16.5	--	12
BRUSHCUT (Y/N)		N	N	Y	Y
BLADE, SHAPE, & DITCH (Y/N)		N	N	N	N

TYPICAL SECTION



TURNOUT DETAIL (PLAN VIEW)



SYMBOL NOTES

- ❖ Specified Rock Depth is FINISHED COMPACTED DEPTH in inches.
- ➢ Specified Rock Quantity is LOOSE MEASURE (Truck Cubic Yards) needed to accomplish specified FINISHED COMPACTED DEPTH. Rock quantities include volume for turnouts, curve widening and landings.

Rock Totals Summary

Type	Quantity (Cubic Yards)
3-Inch Minus Ballast	3,155
3-Inch Minus Stockpile	5,000
Rip Rap	95

ROAD #		LR-ML	LR-02	LR-11	LR-12	LR-14	LR-14	LR-1416
REQUIRED / OPTIONAL		OPTIONAL	REQUIRED	OPTIONAL	REQUIRED	REQUIRED	REQUIRED	OPTIONAL
CONSTRUCT / RECONSTRUCT		RECONSTRUCT	PREHAUL	CONSTRUCT	PREHAUL	RECONSTRUCT	CONSTRUCT	CONSTRUCT
TOLERANCE CLASS (A/B/C)		C	C	C	C	C	C	C
STATION / MP TO		106+61	0+00	0+00	0+00	0+00	8+23	0+00
STATION / MP		116+05	36+66	1+00	4+01	8+23	16+56	4+64
ROAD WIDTH	**R**	12	--	12	--	12	12	12
CROWN (INCHES @ C/L)		3	--	3	--	3	3	3
DITCH WIDTH	**W**	3	--	3	--	3	3	3
DITCH DEPTH	**D**	1	--	1	--	1	1	1
TURNOUT LENGTH	**L**	50	--	--	--	50	50	--
TURNOUT WIDTH	**T**	10	--	--	--	10	10	--
TURNOUT TAPER	**P**	25	--	--	--	25	25	--
GRUBBING	**G1**	5	--	5	--	5	5	5
	G2	5	--	5	--	5	5	5
CLEARING	**C1**	10	--	10	--	10	10	10
	C2	10	--	10	--	10	10	10
ROCK FILLSLOPE	**K:1**	1 ½ : 1	--	1 ½ : 1	--	--	1 ½ : 1	1 ½ : 1
❖ **BALLAST DEPTH**	**B1**	6	--	18	6	--	18	18
CUBIC YARDS / STATION		34	--	114	34	--	114	114
➢ **TOTAL CY BALLAST**		320	--	115	135	20	950	530
❖ **SURFACING DEPTH**	**B2**	--	--	--	--	--	--	--
CUBIC YARDS / STATION		--	--	--	--	--	--	--
➢ **TOTAL CY SURFACING**		--	--	--	--	--	--	--
➢ **TOTAL CUBIC YARDS**		320	--	115	135	20	950	530
SUBGRADE WIDTH	**S**	13	12	16.5	13	12	16.5	16.5
BRUSHCUT (Y/N)		N	Y	N	Y	N	N	N
BLADE, SHAPE, & DITCH (Y/N)		N	N	N	N	N	N	N

ROAD #		LR-16	LR-19					
REQUIRED / OPTIONAL		REQUIRED	REQUIRED					
CONSTRUCT / RECONSTRUCT		PREHAUL	RECONSTRUCT					
TOLERANCE CLASS (A/B/C)		C	C					
STATION / MP TO		0+00	0+00					
STATION / MP		9+48	8+29					
ROAD WIDTH	**R**	--	12					
CROWN (INCHES @ C/L)		--	3					
DITCH WIDTH	**W**	--	3					
DITCH DEPTH	**D**	--	1					
TURNOUT LENGTH	**L**	--	--					
TURNOUT WIDTH	**T**	--	--					
TURNOUT TAPER	**P**	--	--					
GRUBBING	**G1**	--	5					
	G2	--	5					
CLEARING	**C1**	--	10					
	C2	--	10					
ROCK FILLSLOPE	**K:1**	--	1 ½ : 1					
❖ **BALLAST DEPTH**	**B1**	--	6					
CUBIC YARDS / STATION		--	34					
➢ **TOTAL CY BALLAST**		10	280					
❖ **SURFACING DEPTH**	**B2**	--	--					
CUBIC YARDS / STATION		--	--					
➢ **TOTAL CY SURFACING**		--	--					
➢ **TOTAL CUBIC YARDS**		10	280					
SUBGRADE WIDTH	**S**	--	13					
BRUSHCUT (Y/N)		Y	N					
BLADE, SHAPE, & DITCH (Y/N)		N	N					

MATERIALS LIST

LOCATION		CULVERT			DWNSPT		RIPRAP			FILL TYPE	TOLERANCE	REMARKS
ROAD #	STATION	DIAMETER	LENGTH	TYPE	LENGTH	TYPE	INLET	OUTLET	TYPE			Note: Galvanized metal culverts shall conform to the following specifications for gage and corrugation as a function of the diameter: Diameter / Gage / Corrugation 18" / 16 / 2 2/3" x 1/2" 24" – 48" / 14 / 2 2/3" x 1/2" 54" – 96" / 14 / 3" x 1"
LR-ML	106+81	24	30	PD	--	--	2	3	L	NT	C	TYPE 5 STREAM
LR-ML	109+33	24	30	PD	--	--	2	3	L	NT	C	TYPE 5 STREAM
LR-ML	111+63	18	30	PD	--	--	2	3	L	NT	C	
LR-ML	113+81	24	30	PD	--	--	2	3	L	NT	C	TYPE 5 STREAM
LR-11	1+39	18	30	PD	--	--	2	3	L	NT	C	
LR-14	0+74	18	30	PD	--	--	2	3	L	NT	C	
LR-14	4+12	18	30	PD	--	--	2	3	L	NT	C	
LR-14	13+08	18	30	PD	--	--	2	3	L	NT	C	
LR-14	15+66	18	30	PD	--	--	2	3	L	NT	C	
LR-1416	1+13	18	30	PD	--	--	2	3	L	NT	C	
LR-1416	3+43	18	30	PD	--	--	2	3	L	NT	C	
LR-16	2+72	18	30	PD	--	--	2	3	L	NT	C	RECONSTRUCT DITCH FROM 2+22 to 3+22. COVER WITH 10 CUBIC YARDS 3-INCH MINUS
LR-19	0+15	18	30	PD	--	--	2	3	L	NT	C	
LR-19	1+83	18	30	PD	--	--	2	3	L	NT	C	
LR-19	5+08	--	--	--	--	--	--	--	--	--	--	CLEAN INLET OF EXISTING CULVERT
LR-19	6+93	18	30	PD	--	--	2	3	L	NT	C	

GM – Galvanized Metal PS – Polyethylene Pipe Single Wall PD – Polyethylene Pipe Dual Wall AM – Aluminized Metal C – Concrete XX – PD or GM
H – Heavy Loose Riprap L – Light Loose Riprap SR – Shot Rock NT – Native (Bank Run) QS – Quarry Spalls

MATERIALS LIST

LOCATION		CULVERT			DWNSPT		RIPRAP			FILL TYPE	TOLERANCE	REMARKS
ROAD #	STATION	DIAMETER	LENGTH	TYPE	LENGTH	TYPE	INLET	OUTLET	TYPE			Note: Galvanized metal culverts shall conform to the following specifications for gage and corrugation as a function of the diameter: Diameter / Gage / Corrugation 18" / 16 / 2 2/3" x 1/2" 24" – 48" / 14 / 2 2/3" x 1/2" 54" – 96" / 14 / 3" x 1"
CLR-28	0+15	18	50	PD	--	--	2	3	L	NT	C	PER SNOHOMISH COUNTY ACCESS PERMIT
CLR-28	1+22	18	30	PD	--	--	2	3	L	NT	C	OUTLET ON SOUTH SIDE OF ROAD. TRENCH OUTLET TO DAYLIGHT
CLR-28	1+79	18	30	PD	--	--	2	3	L	NT	C	
CLR-28	3+31	18	30	PD	--	--	2	3	L	NT	C	

GM – Galvanized Metal PS – Polyethylene Pipe Single Wall PD – Polyethylene Pipe Dual Wall AM – Aluminized Metal C – Concrete XX – PD or GM
H – Heavy Loose Riprap L – Light Loose Riprap SR – Shot Rock NT – Native (Bank Run) QS – Quarry Spalls

FOREST ACCESS ROAD MAINTENANCE SPECIFICATIONS

Cuts and Fills

- Maintain slope lines to a stable gradient compatible with the construction materials. Remove slides from ditches and the roadway. Repair fill-failures, in accordance with Clause 4-6 EMBANKMENT SLOPE RATIO, with selected material or material approved by the Contract Administrator. Remove overhanging material from the top of cut slopes.
- Waste material from slides or other sources shall be placed and compacted in stable locations identified in the road plan or approved by the Contract Administrator, so that sediment will not deliver to any streams or wetlands.
- Slide material and debris shall not be mixed into the road surface materials, unless approved by the Contract Administrator.

Surface

- Grade and shape the road surface, turnouts, and shoulders to the original shape on the TYPICAL SECTION SHEET. Inslope or outslope as directed to provide a smooth, rut-free traveled surface and maintain surface water runoff in an even, unconcentrated manner.
- Blading shall not undercut the backslope or cut into geotextile fabric on the road.
- If required by the Contract Administrator, water shall be applied as necessary to control dust and retain fine surface rock.
- Surface material shall not be bladed off the roadway. Replace surface material when lost or worn away, or as directed by the Contract Administrator.
- Remove shoulder berms, created by grading, to facilitate drainage, except as marked or directed by the Contract Administrator.
- For roads with geotextile fabric: spread surface aggregate to fill in soft spots and wheel ruts (barrel spread) to prevent damage to the geotextile fabric.

Drainage

- Prevent silt bearing road surface and ditch runoff from delivering sediment to any streams or wetlands.
- Maintain rolling dips and drivable waterbars as needed to keep them functioning as intended.
- Maintain headwalls to the road shoulder level with material that will resist erosion.
- Maintain energy dissipaters at culvert outlets with non-erodible material or rock.
- Keep ditches, culverts, and other drainage structures clear of obstructions and functioning as intended.
- Inspect and clean culverts at least monthly, with additional inspections during storms and periods of high runoff. This shall be done even during periods of inactivity.

FOREST ACCESS ROAD MAINTENANCE SPECIFICATIONS

Preventative Maintenance

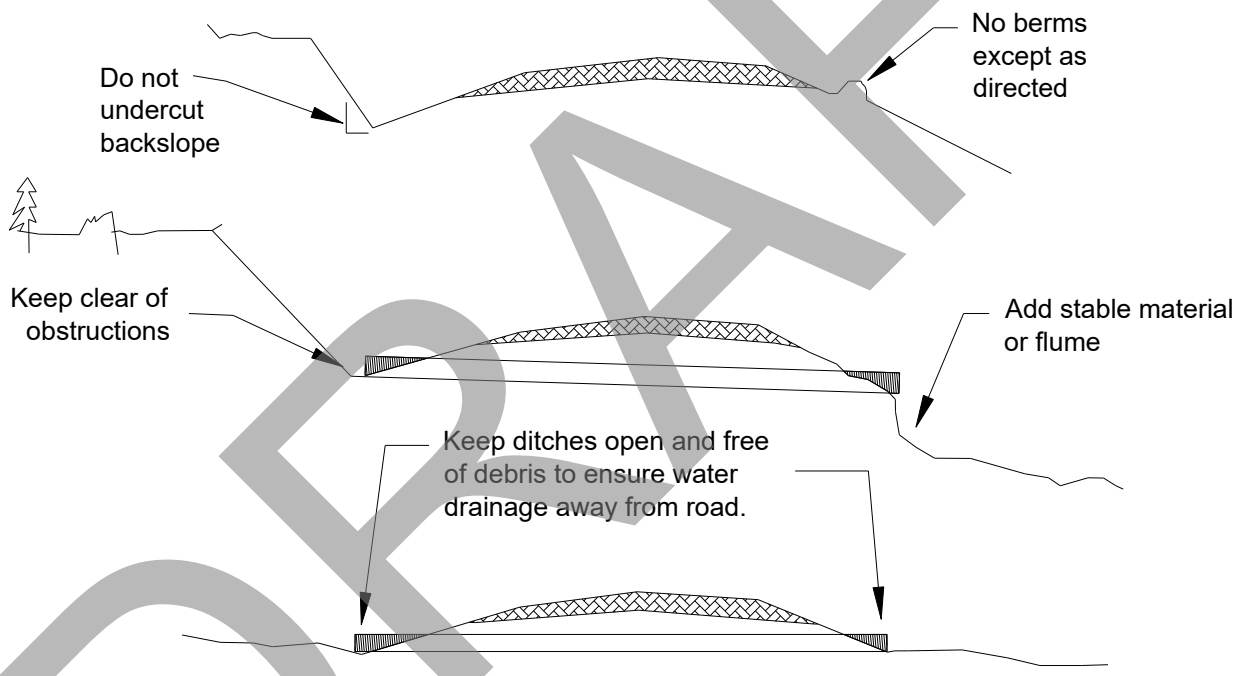
- Perform preventative maintenance work to safeguard against storm damage, such as blading to ensure correct runoff, ditch and culvert cleaning, and waterbar maintenance.

Termination of Use or End of Season

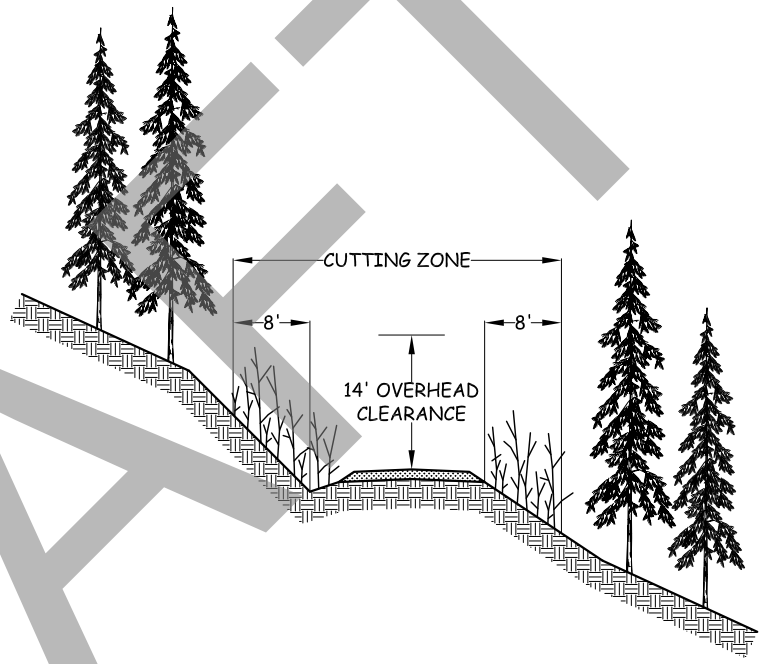
- At the conclusion of logging operations, ensure all conditions of these specifications have been met.

Debris

- Remove fallen timber, limbs, and stumps from the slopes, roadway, ditchlines, and culvert inlets.



ROAD BRUSHING DETAILS



SPECIFICATIONS

BRUSH SHALL BE CUT ON THE ROAD SURFACE AND 8 ft. BACK FROM ROAD DITCH AND OUTSIDE EDGE OF RUNNING SURFACE.

ON THE INSIDE OF SWITCHBACKS AND TIGHT CURVES, BRUSH SHALL BE CUT BACK 16 ft. FOR VISIBILITY.

ON TRUCK TURNOUTS, BRUSH SHALL BE CUT 8 ft. BACK FROM OUTSIDE EDGE.

BRUSH SHALL BE CUT TO PROVIDE AN OVERHEAD CLEARANCE OF 14 ft. ABOVE THE ROAD RUNNING SURFACE.

BRUSH SHALL BE CUT TO WITHIN 6 in. OF THE GROUND.

SLASH SHALL BE REMOVED FROM CUT SLOPES ABOVE THE ROAD AND SCATTERED ON EMBANKMENT SLOPES.

DITCHES SHALL BE CLEARED OF WOODY DEBRIS.

CULVERT INLETS AND OUTLETS SHALL BE CLEANED A MINIMUM DISTANCE OF TWO PIPE DIAMETERS AWAY.

CONTRACT #	PROJECT	SHEET
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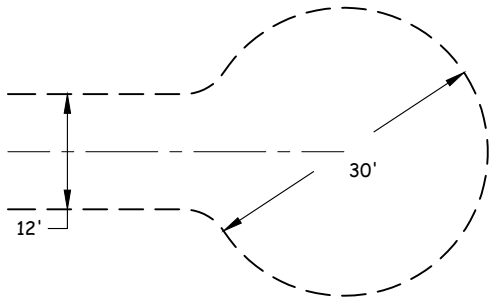
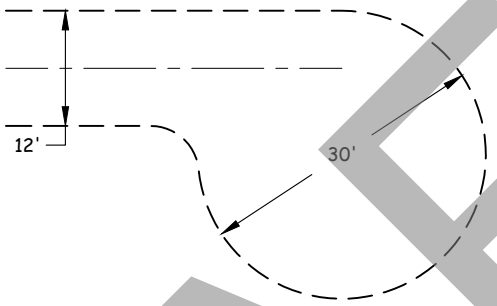
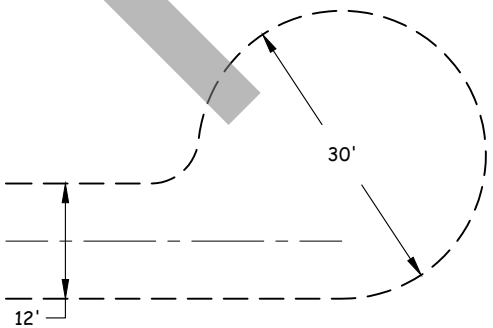
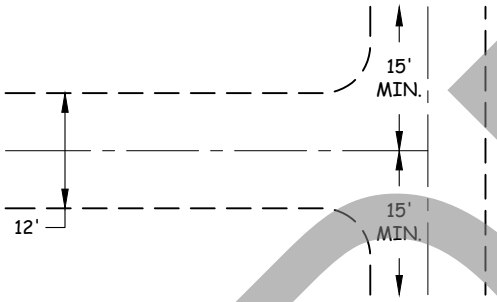
TURNAROUND DETAILS



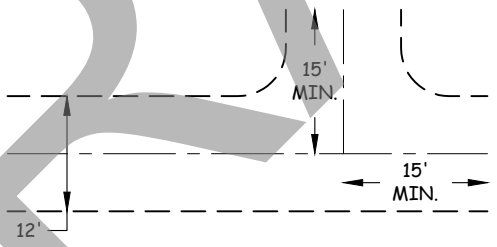




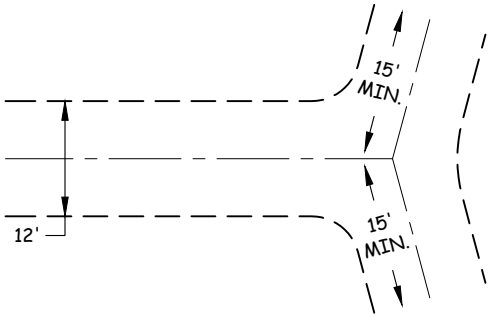
CUL-DE-SAC



HAMMERHEAD



3-POINT SIDE



3-POINT WYE

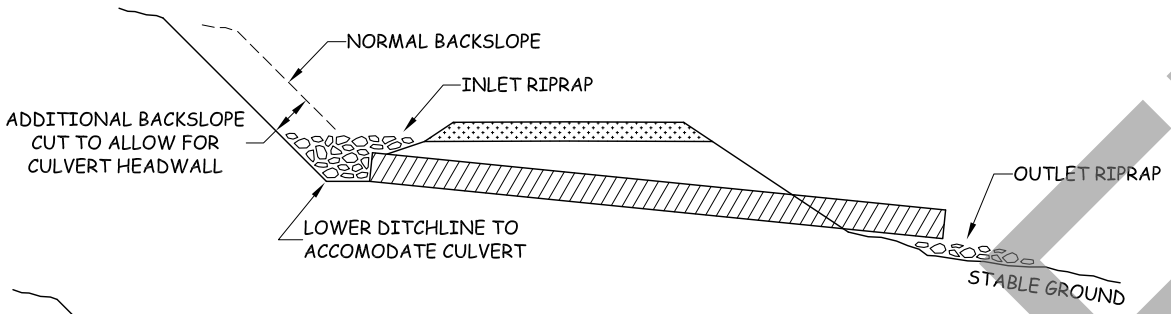
TURNAROUND TYPE AND TURNAROUND LOCATION ARE SUBJECT TO THE APPROVAL OF THE CONTRACT ADMINISTRATOR.

ROCK SHALL BE APPLIED THROUGHOUT THE TURNAROUND TO THE SAME DEPTH AND SPECIFICATIONS AS LISTED IN THE TYPICAL SECTION.

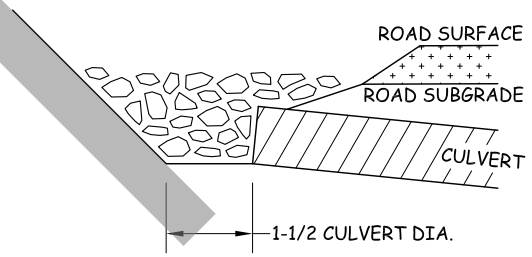
CONTRACT #	PROJECT	SHEET
30-106246	COUGAR	32 OF 34

CULVERT AND DRAINAGE SPECIFICATIONS

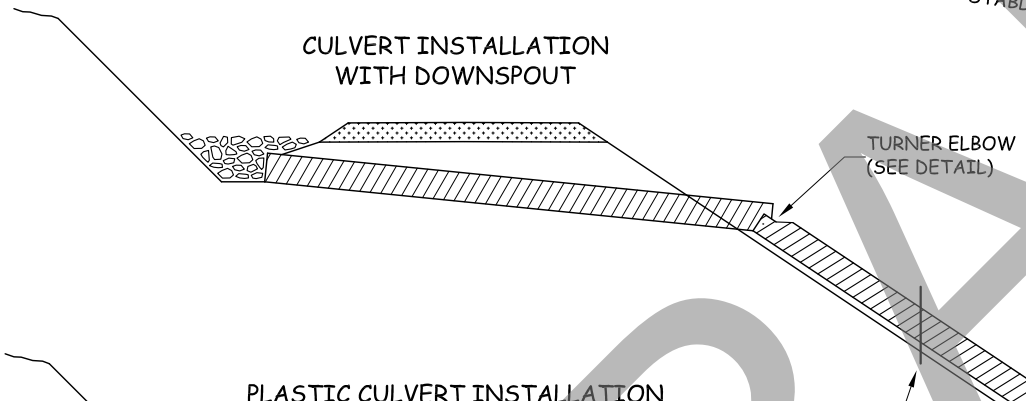
CULVERT INSTALLATION (TYPICAL)



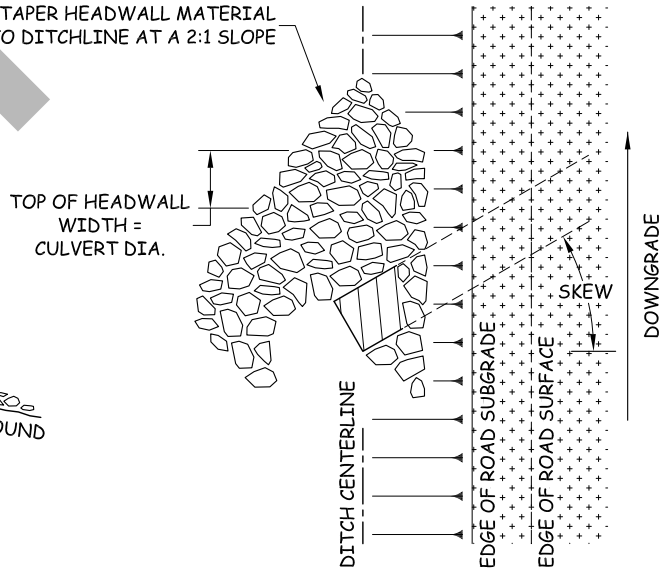
CULVERT HEADWALL - SECTION VIEW



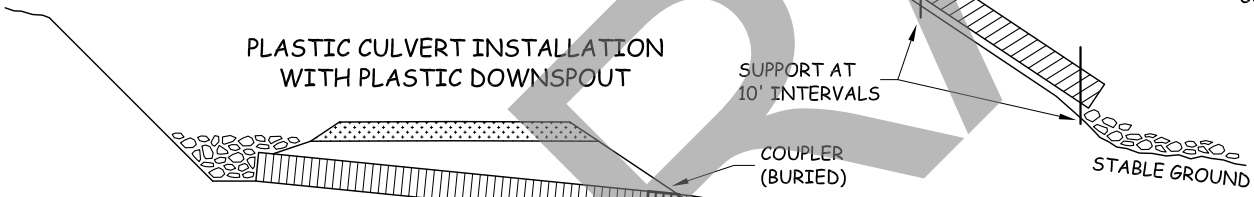
CULVERT INSTALLATION WITH DOWNSPOUT



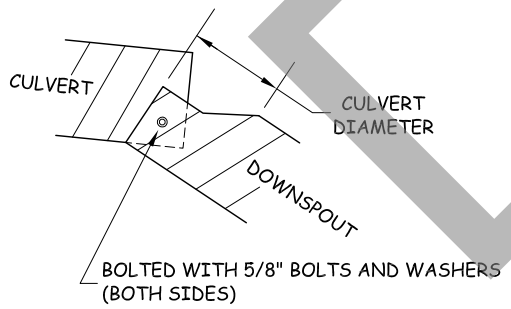
CULVERT HEADWALL - PLAN VIEW

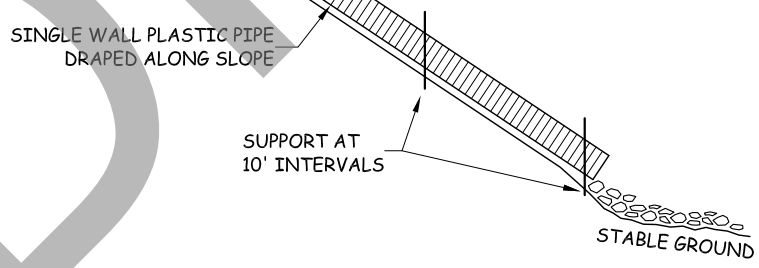


PLASTIC CULVERT INSTALLATION WITH PLASTIC DOWNSPOUT



TURNER ELBOW

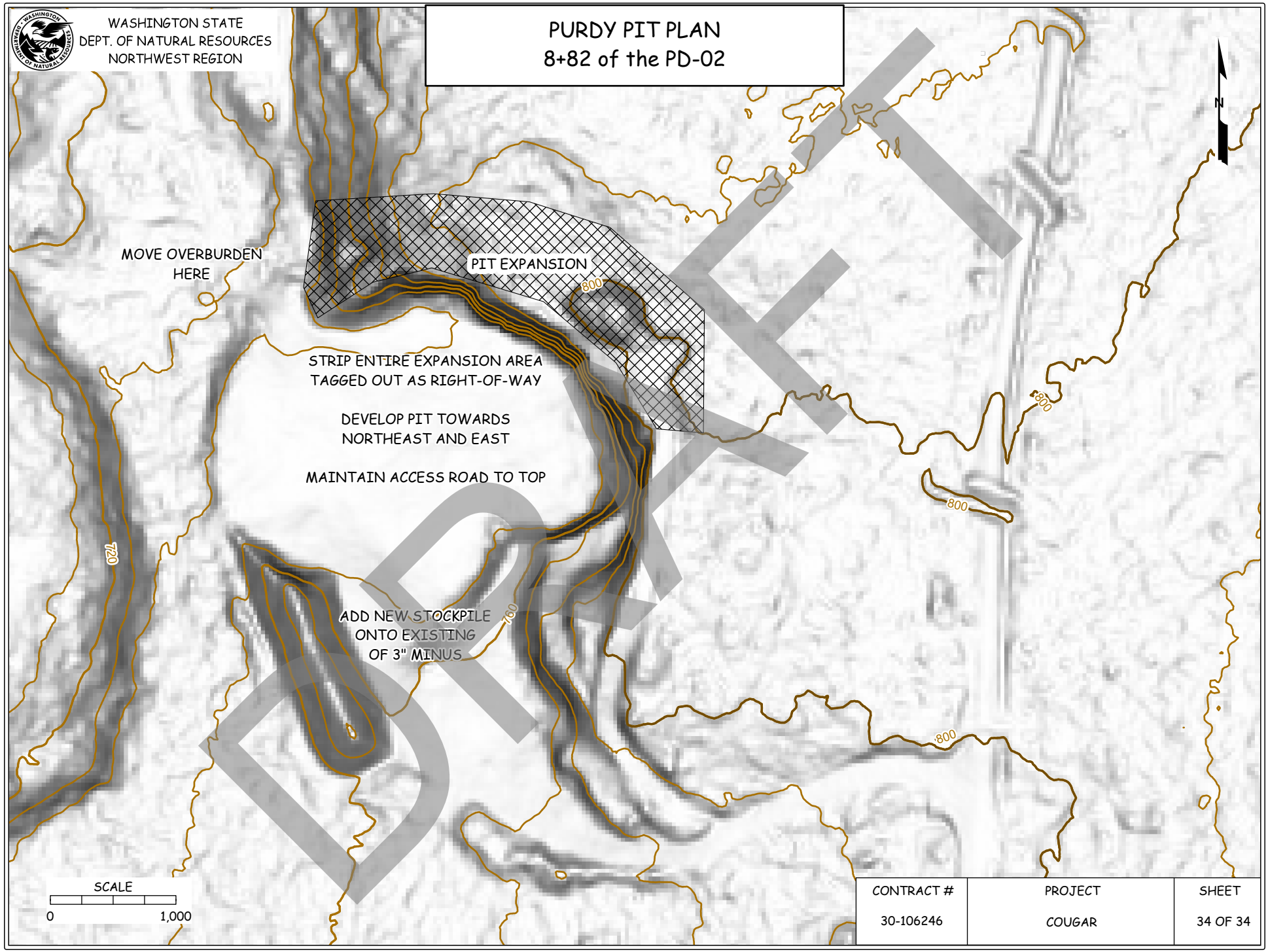




HEADWALL NOTE:

HEADWALL TO BE CONSTRUCTED OF IMPERVIOUS MATERIAL THAT WILL RESIST EROSION AND ARMORED WITH RIPRAP QUANTITY SPECIFIED IN ROAD PLAN.

CONTRACT #	PROJECT	SHEET
30-106246	COUGAR	33 OF 34



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SUMMARY - Road Development Costs

REGION: NW
DISTRICT: Cascade

SALE/PROJECT NAME: Cougar CONTRACT #: 30-106246

ROAD NUMBERS:	CLR-28, LR-14, LR-1416	CLR-28, LR-ML, LR-14, LR-19	CLR-30, LR-ML, LR-12, LR-16
ROAD STANDARD:	Construction	Reconstruction	Pre-Haul Maintenance
NUMBER OF STATIONS:	19.14	28.82	179.06
CLEARING & GRUBBING:	$8,720	$1,767	$0
EXCAVATION & FILL:	$21,248	$5,506	$0
MISC. MAINTENANCE:	$0	$0	$6,111
ROAD ROCK:	$117,938	$24,036	$4,333
ROCK STOCKPILE PROD:	$0	$0	$0
CULVERTS & FABRIC:	$4,480	$7,612	$640
STRUCTURES:	$0	$0	$0
MOBILIZATION:	$3,176	$3,176	$440
TOTAL COSTS:	$155,562	$42,097	$11,524
COST PER STATION:	$8,128	$1,461	$64

ROAD DEACTIVATION & ABANDONMENT COSTS: $839

TOTAL (All Roads) = $210,021
ESTIMATED PRECRUISE SALE VOLUME MBF = 5000
ESTIMATED TOTAL $/MBF = $42.00

Compiled by: J. Westra Date: 5/7/2024