



TIMBER NOTICE OF SALE

SALE NAME: BOLOGNA

AGREEMENT NO: 30-105951

AUCTION: June 12, 2024 starting at 10:00 a.m.,
Northwest Region Office, Sedro Woolley, WA

COUNTY: Snohomish

SALE LOCATION: Sale located approximately 19 miles southeast of Granite Falls, WA.

**PRODUCTS SOLD
AND SALE AREA:**

All timber bounded by white timber sale boundary tags and the PD-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 Units #1 and #2.

All timber bounded by white timber sale boundary 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 Units #3, #4 and #8.

All timber bounded by white timber sale boundary tags, pink flag line and the EK-65 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 #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 Units #6 and #7.

All timber bounded by orange right-of-way tags and all timber within 30 feet of centerline of roads to be constructed.

All forest products above located on part(s) of Sections 1, 2, 12 and 13 all in Township 29 North, Range 7 East, W.M., containing 92 acres, more or less.

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

ESTIMATED SALE VOLUMES AND QUALITY:

Species	Avg Ring DBH Count	Total MBF	MBF by Grade								
			1P	2P	3P	SM	1S	2S	3S	4S	UT
Hemlock	18.7	1,880						1,192	607	64	17
Douglas fir	22.9	1,805				57		1,331	351	55	11
Redcedar	23.9	88							72	16	
Maple	18.1	34						17	4	7	6
Red alder	15.5	30						10	2	18	
Cottonwood	25.8	28						28			
Sale Total		3,865									



TIMBER NOTICE OF SALE

MINIMUM BID: \$0.00 **BID METHOD:** Sealed Bids

PERFORMANCE SECURITY: \$0.00 **SALE TYPE:** Lump Sum

EXPIRATION DATE: March 31, 2027 **ALLOCATION:** Export Restricted

BID DEPOSIT: \$0.00 or Bid Bond. Said deposit shall constitute an opening bid at the appraised price.

HARVEST METHOD: Cable OR tethered equipment (See below for restrictions); shovel, “6-wheeled rubber-tired skidders with over-the-tire tracks spanning both sets of rear tires” (See below for restrictions) or tracked equipment on sustained slopes 35% or less; self-leveling equipment on sustained slopes 55% or less (See below for restrictions).

Prior written approval of the Contract Administrator is required before tethered or self-leveling equipment may be used. If ground disturbance is causing excessive damage, as determined by the Contract Administrator, the use of this equipment will no longer be authorized.

Purchaser must obtain prior written approval from the Contract Administrator for areas as to where “6 wheeled rubber tired skidders with over-the-tire tracks spanning both sets of rear tires” can operate (Use shall not be allowed in Unit #8). If ground disturbance is causing excessive damage, as determined by the Contract Administrator, the equipment will no longer be authorized. 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.

Additional restrictions apply, see Remarks section below.

ROADS: 56.63 stations of required construction. 49.28 stations of required reconstruction. 929.22 stations of required prehaul maintenance. 32.77 stations of abandonment. 12.51 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. Airplane Pit at station 97+90 of the EK-49 Road.

Development of existing rock sources will involve drilling, shooting, and processing rock to generate riprap, 2-inch-minus surfacing rock, and 3-inch-minus ballast rock.

An estimated total quantity of rock needed for this proposal: 263 cubic yards of riprap, 3,395 cubic yards surfacing rock and 7,890 cubic yards of ballast rock.

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.



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ACREAGE DETERMINATION

CRUISE METHOD: Acres determined by GPS traverse. Cruise was conducted via variable plot sample type. 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: \$65,705.00 is due on day of sale. \$9.00 per MBF is due upon removal. These are in addition to the bid price.

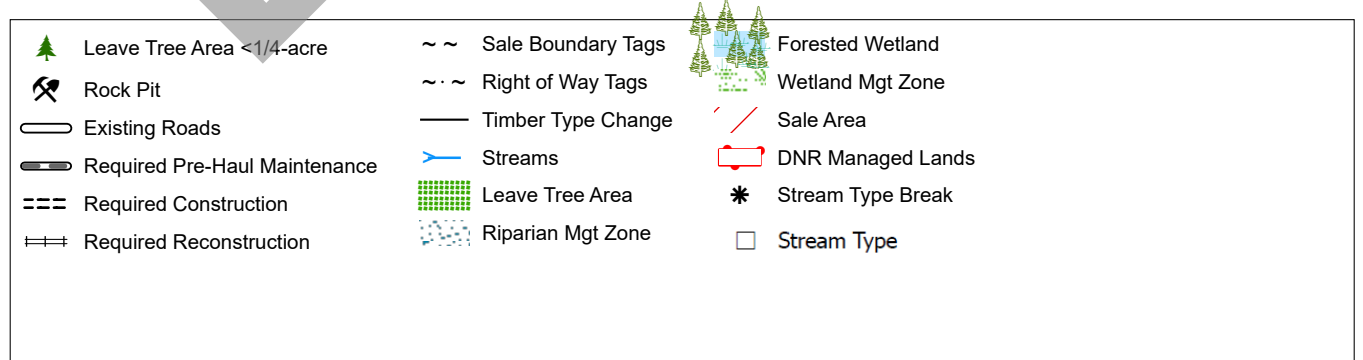
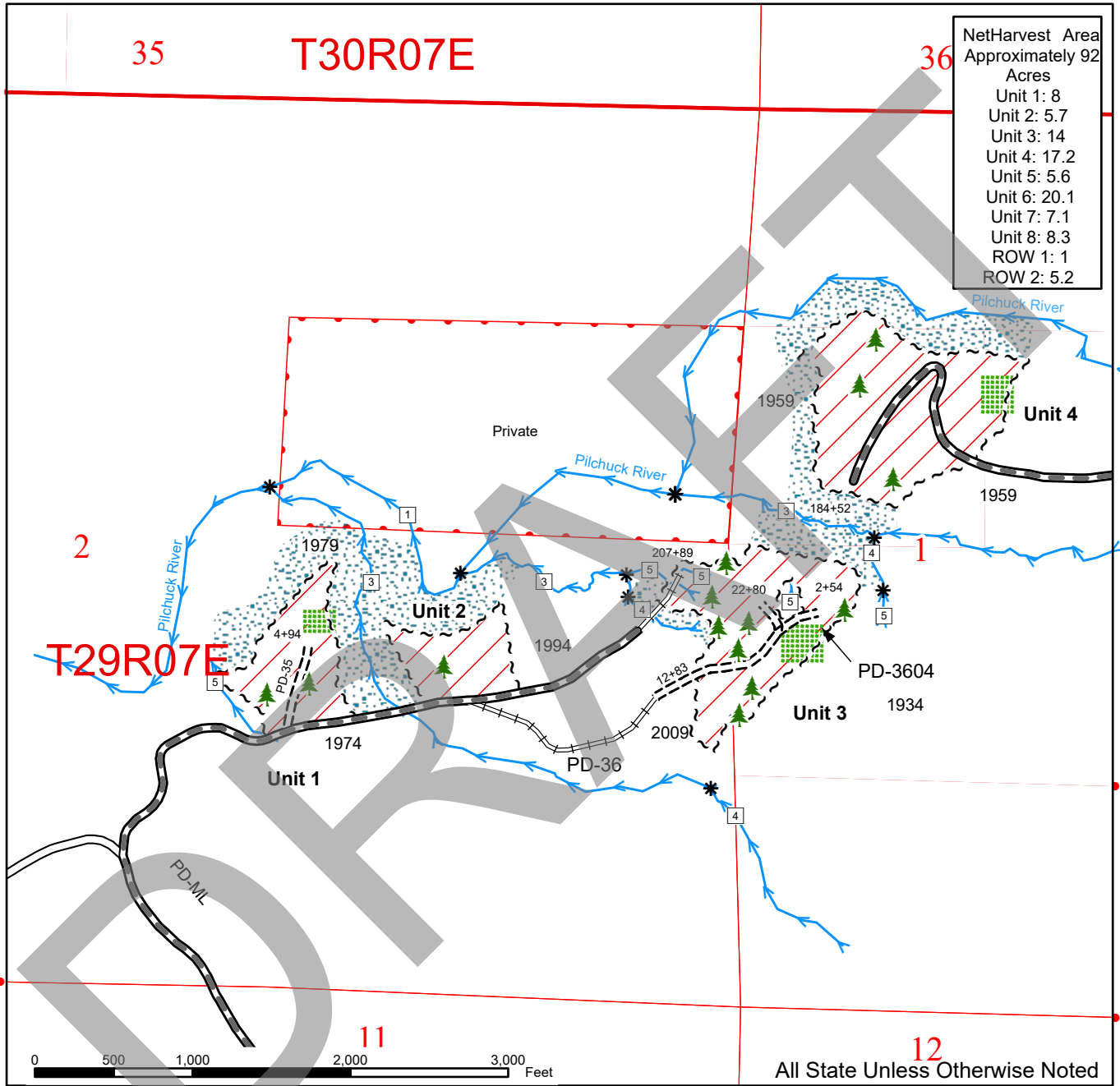
SPECIAL REMARKS:

1. Unit #8 exhibits wet soils during the winter. Falling and yarding will not be permitted BY GROUND-BASED EQUIPMENT from October 1 through April 30. This timing restriction cannot not be waived. Rubber-tired skidders or non-tracked equipment shall not be permitted within Unit #8. These restrictions do not apply to road construction through and adjacent to Unit #8.
2. HQ DF noted within the sale area. See cruise for further details.
3. Douglas-fir poles were noted within the sale area.
4. Blowdown adjacent to Unit 5 is a sold product and not included with the Bologna timber sale.

TIMBER SALE MAP

SALE NAME: BOLOGNA
AGREEMENT #: 30-105951
TOWNSHIP(S): T29R7E
TRUST(S): Common School (3), Charitable/Educational/Penal & Reformatory Instit. (6), Normal School (8), State Forest Transfer (1)

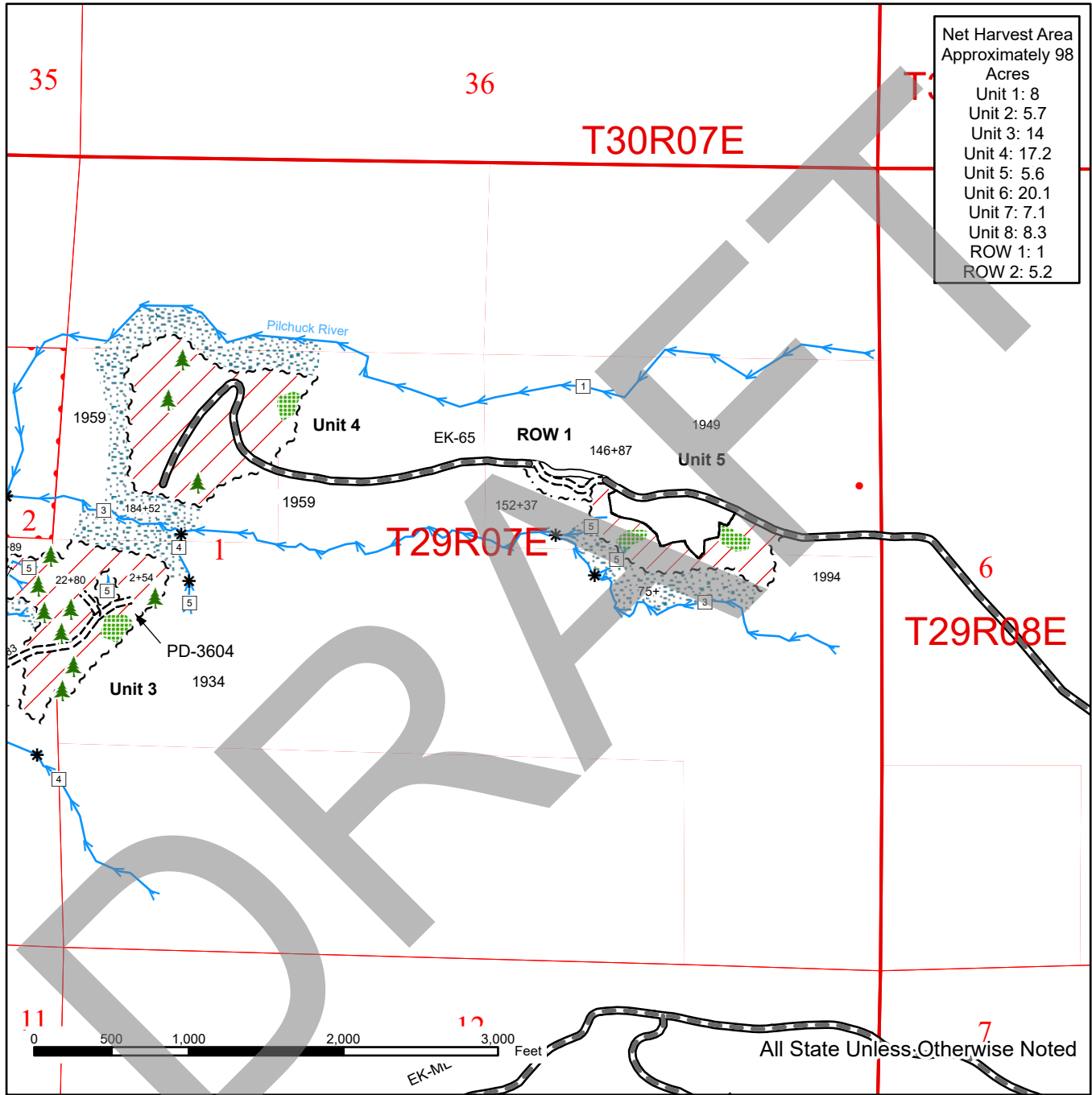
REGION: Northwest Region
COUNTY(S): Snohomish
ELEVATION RGE: 600-2120



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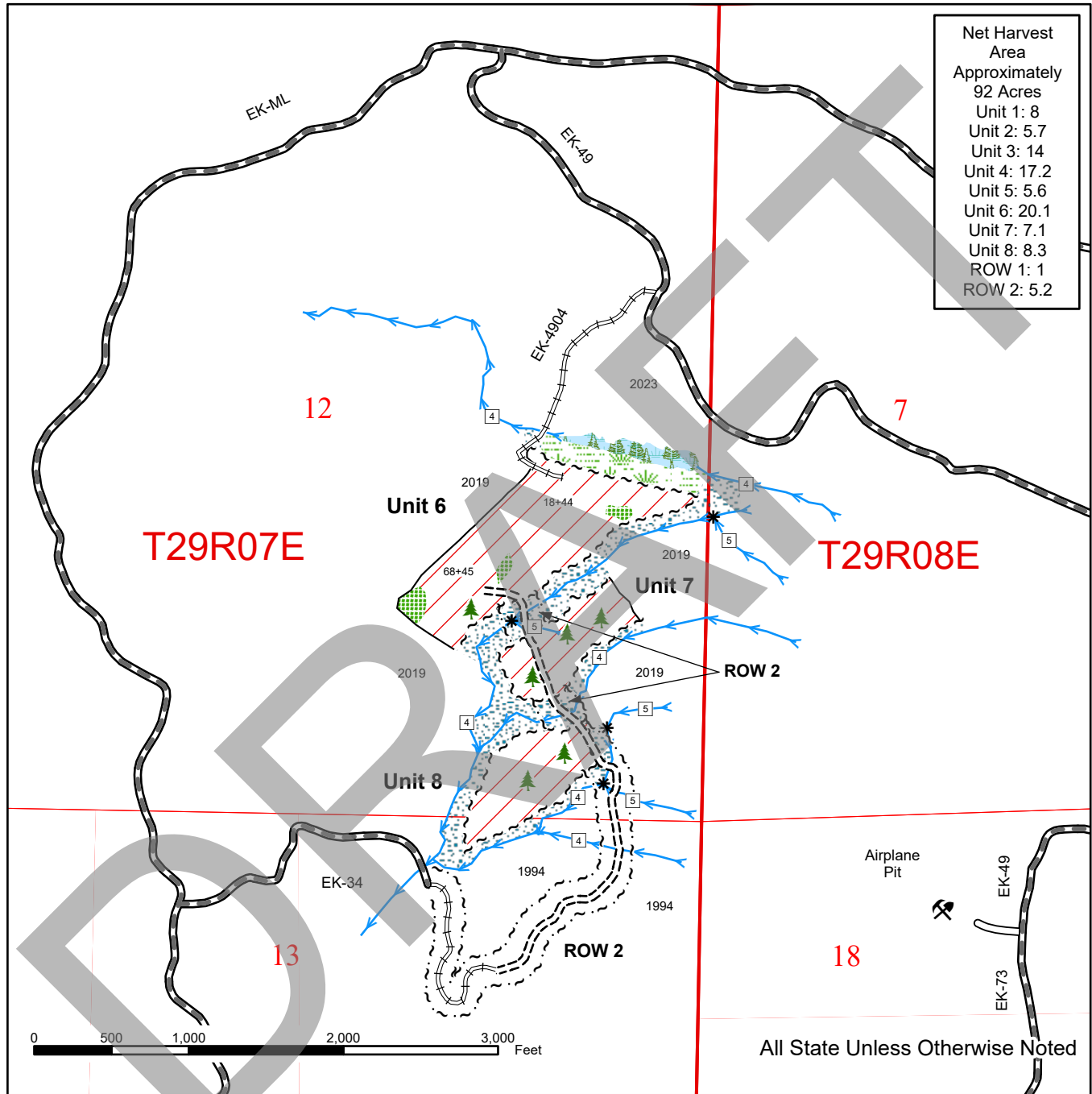


Leave Tree Area <1/4-acre	Sale Boundary Tags	Forested Wetland
Rock Pit	Right of Way Tags	Wetland Mgt Zone
Existing Roads	Timber Type Change	Sale Area
Required Pre-Haul Maintenance	Streams	DNR Managed Lands
Required Construction	Leave Tree Area	Stream Type Break
Required Reconstruction	Riparian Mgt Zone	Stream Type

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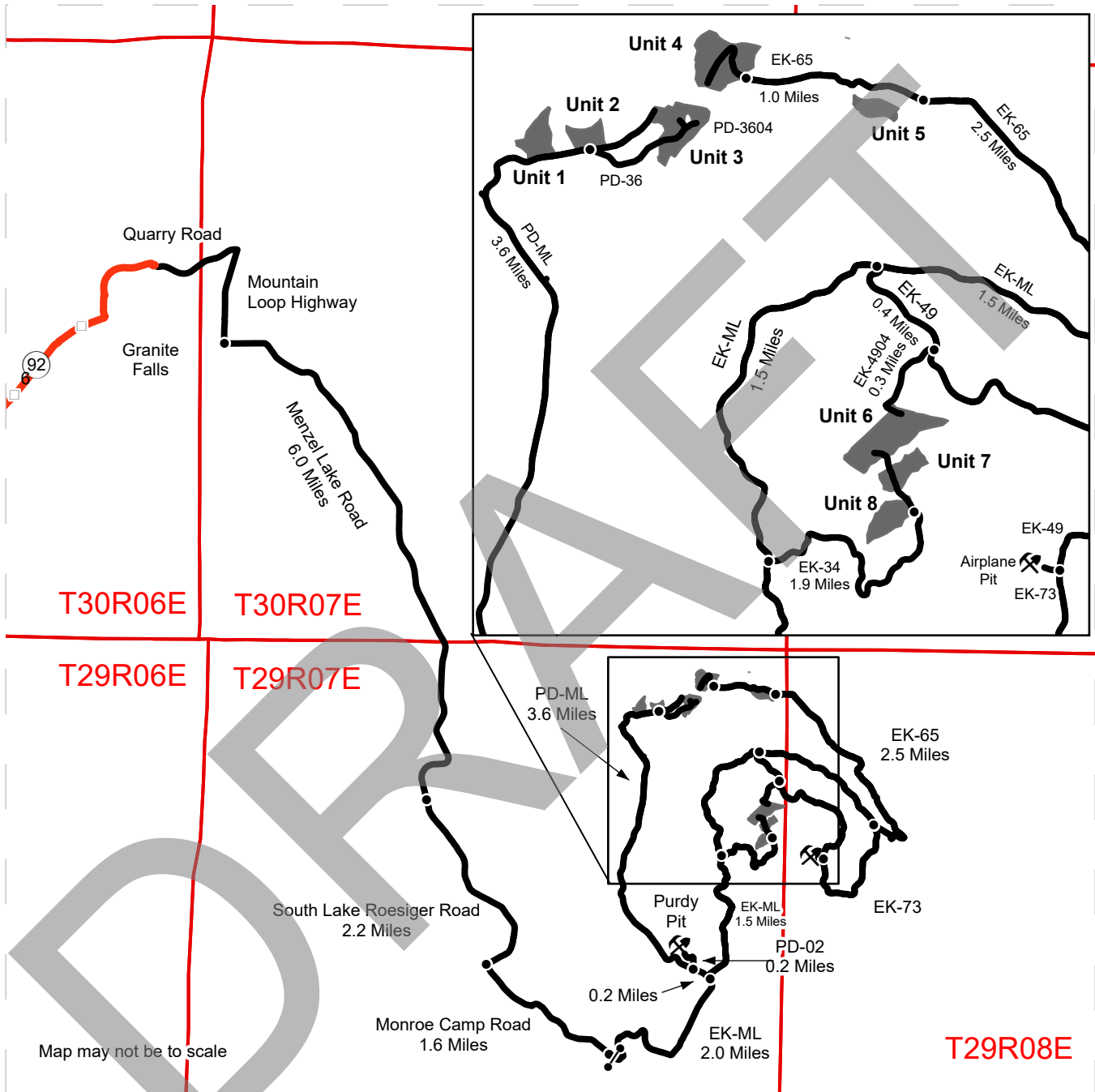
Net Harvest Area	
Approximately 92 Acres	
Unit 1:	8
Unit 2:	5.7
Unit 3:	14
Unit 4:	17.2
Unit 5:	5.6
Unit 6:	20.1
Unit 7:	7.1
Unit 8:	8.3
ROW 1:	1
ROW 2:	5.2

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Rock Pit	Right of Way Tags	Wetland Mgt Zone
Existing Roads	Timber Type Change	Sale Area
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DRIVING MAP

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TRUST(S): Common School (3), Charitable/Educational/Penal & Reformatory Instit. (6), Normal School (8), State Forest Transfer (1)

REGION: Northwest Region
COUNTY(S): Snohomish
ELEVATION RGE: 600-2120



Map may not be to scale

- Timber Sale Unit
- Haul Route
- Other Road
- Highway
- Milepost Markers
- Distance Indicator
- Gate (F1-3)
- ⛏ Rock Pit

DRIVING DIRECTIONS:
 From Granite Falls, travel south towards Lake Roseiger on Menzel Lake Road for approximately 6 miles. Continue onto S Lake Roseiger Road and follow for approximately 2 miles to the Lake Roseiger Store. Turn left onto Monroe Camp Road, continue for 1.6 miles to the EK-ML gate on the left. (F-1-3 key required)

Unit 1, 2, 3: Follow the EK-ML for 2.0 miles, turn left onto the PD-ML, follow for 3.8 miles.

Unit 4 and 5: From the gate, follow the EK-ML 6.5 miles to the EK-65. Take a left and follow the EK-65 2.5 miles to Unit 5, continue 1.0 miles to Unit 4.

Unit 6: From the gate, follow the EK-ML 5.0 miles to the EK-49. Take a right and follow the EK-49 for 0.4 miles. Take right onto the EK-4904, follow 0.3 miles to unit 6.

Unit 7, 8: From the gate, follow the EK-ML 3.5 miles to the EK-34 road. Take a right and follow the EK-34 1.9 miles to the end of road to access units 6, 7 and 8.



Timber Sale Cruise Report Bologna - NW

Sale Name: BOLOGNA

Sale Type: LUMP SUM

Region: NORTHWEST

District: CASCADE

Lead Cruiser: Matt Llobet

Other Cruisers: Bailey Vos

Cruise Narrative:

Bologna was sampled using a combination of BAF's based on stocking levels and timber size. The smallest merchantable tree cruised throughout the sale had a DBH of 7.0 inches and 5.0 inches at 16 feet. My plots were generated in GIS and located in the field using Avenza Maps. Bole height was measured with a laser 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 considered accordingly within each tree cruised.

- Conifer log lengths were cruised in 2' multiples - maximizing 32-40 ft. lengths.
- Hardwood log lengths were cruised in 10' multiples - no longer than 30 feet long.

My total net cruise volume for the Bologna is 3,865 MBF. The stand characteristics throughout Bologna showed a uniform stocking with DF(47%) and Western Hemlock(49%) being the dominant species. The remaining 4% comprised of WRC and scattered hardwoods. The hardwoods observed throughout the parcel were in scattered small groves. The DF component throughout units 6 and 7 showed a consistent 16"+ HQ log in the first segment which carried 28 MBF. The terrain throughout Bologna was mild - making for excellent operator ground.

Timber Sale Notice Volume (MBF)

Sp	DBH	Rings/In	Age	MBF Volume by Grade					
				All	Spec Mill	2 Saw	3 Saw	4 Saw	Utility
WH	18.7			1,880		1,192	607	64	17
DF	22.9	8.4		1,805	57	1,331	351	55	11
RC	23.9			89			72	16	
MA	18.1			33		17	4	7	6
RA	15.5			30		10	2	18	
BC	25.8			28		28			
ALL	19.2	8.5		3,865	57	2,579	1,035	161	34

Timber Sale Notice Weight (tons)

Sp	Tons by Grade					
	All	Spec Mill	2 Saw	3 Saw	4 Saw	Utility
WH	14,561		8,514	5,298	634	115
DF	11,365	305	7,893	2,625	466	76
RC	681			553	128	
RA	255		75	13	167	

Sp	Tons by Grade					
	All	Spec Mill	2 Saw	3 Saw	4 Saw	Utility
MA	243		108	34	66	35
BC	166		166			
ALL	27,271	305	16,757	8,523	1,460	226

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 (%)
225.6	4.5	185.6	2.0	41,924	4.8

Timber Sale Unit Cruise Design

Unit	Design	Cruise Acres	FMA Acres	N Plots	N Cruise Plots	N Void Plots
BOLOGNA 1	B2: VR, 2 BAF (54.44, 40 for some species) Measure All, Sighting Ht = 0 ft	8.0	8.3	7	7	0
BOLOGNA 2	B2: VR, 2 BAF (54.44, 40 for some species) Measure All, Sighting Ht = 0 ft	5.7	5.8	4	4	0
BOLOGNA 3	B2: VR, 2 BAF (62.5, 40 for some species) Measure All, Sighting Ht = 0 ft	14.0	15.1	10	10	0
BOLOGNA 4	B2C: VR, 2 BAF (54.44, 40 for some species) Measure/Count Plots, Sighting Ht = 4.5 ft	17.2	20.3	14	14	0
BOLOGNA 5	B2: VR, 2 BAF (54.44, 40 for some species) Measure All, Sighting Ht = 4.5 ft	5.6	11.5	6	6	0
BOLOGNA 6	B2: VR, 2 BAF (62.5, 40 for some species) Measure All, Sighting Ht = 4.5 ft	20.1	21.4	12	12	0
BOLOGNA 7	B2: VR, 2 BAF (62.5, 40 for some species) Measure All, Sighting Ht = 4.5 ft	7.1	7.4	5	5	0
BOLOGNA 8	B1: VR, 1 BAF (40) Measure All, Sighting Ht = 4.5 ft	8.3	8.5	7	7	0
BOLOGNA ROW 1	FX: FR plots (20 tree / acre expansion)	1.0	1.0	3	3	0
BOLOGNA ROW 2	FX: FR plots (20 tree / acre expansion)	5.2	5.3	7	7	0
All		92.2	104.6	75	75	0

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	15.2	38	309	309	0.0	166.1	28.5

Sp	Status	Grade	Sort	Dia	Len	BF Gross	BF Net	Defect %	Tons	MBF Net
DF	LIVE	2 SAW	Domestic	16.2	39	11,123	11,018	0.9	6,026.4	1,015.8
DF	LIVE	2 SAW	HQ-A	16.6	40	284	284	0.0	155.3	26.2
DF	LIVE	2 SAW	HQ-B	17.8	39	2,993	2,982	0.4	1,624.2	275.0
DF	LIVE	2 SAW	Pole	15.2	40	153	153	0.0	87.0	14.1
DF	LIVE	3 SAW	Domestic	9.2	36	3,757	3,753	0.1	2,585.1	346.0
DF	LIVE	3 SAW	Pole	9.4	40	50	50	0.0	39.6	4.6
DF	LIVE	4 SAW	Domestic	6.7	21	599	599	0.0	465.9	55.2
DF	LIVE	CULL	Cull	10.9	12	26	0	100.0	0.0	0.0
DF	LIVE	SPECIAL MILL	HQ-A	22.4	38	613	613	0.0	305.1	56.5
DF	LIVE	UTILITY	Pulp	7.6	29	124	124	0.0	75.9	11.4
MA	LIVE	2 SAW	Domestic	20.6	30	191	184	3.5	108.5	17.0
MA	LIVE	3 SAW	Domestic	11.4	30	42	42	0.0	34.1	3.9
MA	LIVE	4 SAW	Domestic	7.8	30	75	75	0.0	65.6	7.0
MA	LIVE	UTILITY	Pulp	9.8	19	61	61	0.0	35.0	5.6
RA	LIVE	2 SAW	Domestic	13.2	30	106	106	0.0	74.8	9.7
RA	LIVE	3 SAW	Domestic	11.4	30	20	20	0.0	13.5	1.9
RA	LIVE	4 SAW	Domestic	8.1	30	195	195	0.0	166.9	18.0
RC	LIVE	3 SAW	Domestic	12.4	37	724	699	3.3	495.8	64.5
RC	LIVE	3 SAW	Pole	14.0	40	87	87	0.0	56.9	8.0
RC	LIVE	4 SAW	Domestic	5.7	26	176	176	0.0	128.2	16.2
RC	LIVE	CULL	Cull	19.9	28	116	0	100.0	0.0	0.0
WH	LIVE	2 SAW	Domestic	15.2	39	13,041	12,934	0.8	8,514.2	1,192.5
WH	LIVE	3 SAW	Domestic	9.0	36	6,598	6,578	0.3	5,297.7	606.5
WH	LIVE	4 SAW	Domestic	6.2	24	703	699	0.6	633.6	64.5
WH	LIVE	CULL	Cull	18.6	22	247	0	100.0	0.0	0.0
WH	LIVE	UTILITY	Pulp	9.5	26	184	184	0.0	115.4	17.0

Timber Sale Log Sort x Diameter Bin Summary

Sp	Bin	Status	Sort	Dia	Len	BF Net	Defect %	Tons	MBF Net
BC	8 - 11	LIVE	Domestic	11.9	40	50	0.0	30.2	4.6
BC	12 - 15	LIVE	Domestic	13.2	30	33	0.0	17.7	3.0
BC	16 - 19	LIVE	Domestic	17.9	40	225	0.0	118.2	20.8
DF	5 - 7	LIVE	Domestic	6.5	28	1,289	0.0	944.0	118.9
DF	5 - 7	LIVE	Pulp	6.6	29	60	0.0	50.1	5.6
DF	8 - 11	LIVE	Pole	9.4	40	50	0.0	39.6	4.6
DF	8 - 11	LIVE	Domestic	9.9	34	3,063	0.1	2,107.0	282.4
DF	8 - 11	LIVE	Cull	10.9	12	0	100.0	0.0	0.0

Sp	Bin	Status	Sort	Dia	Len	BF Net	Defect %	Tons	MBF Net
DF	12 - 15	LIVE	Domestic	13.7	39	3,622	0.4	2,210.7	334.0
DF	12 - 15	LIVE	HQ-B	13.9	38	542	0.6	351.4	49.9
DF	12 - 15	LIVE	HQ-A	15.2	40	69	0.0	39.4	6.4
DF	12 - 15	LIVE	Pole	15.2	40	153	0.0	87.0	14.1
DF	16 - 19	LIVE	HQ-A	17.3	38	339	0.0	180.9	31.2
DF	16 - 19	LIVE	Domestic	17.4	40	3,869	0.6	2,113.0	356.7
DF	16 - 19	LIVE	HQ-B	17.7	38	1,211	0.6	688.1	111.7
DF	20+	LIVE	HQ-B	22.2	40	1,229	0.0	584.8	113.4
DF	20+	LIVE	Domestic	23.5	39	3,526	1.9	1,702.8	325.1
DF	20+	LIVE	HQ-A	23.9	40	489	0.0	240.2	45.1
DF	20+	LIVE	Pulp	26.2	24	63	0.0	25.9	5.8
MA	5+	LIVE	Pulp	9.8	19	61	0.0	35.0	5.6
MA	5+	LIVE	Domestic	10.5	30	302	2.2	208.2	27.8
RA	5+	LIVE	Domestic	8.9	30	321	0.0	255.3	29.6
RC	5 - 7	LIVE	Domestic	5.8	26	177	0.2	134.1	16.3
RC	8 - 11	LIVE	Domestic	9.7	37	164	0.0	131.7	15.1
RC	8 - 11	LIVE	Pole	10.3	40	22	0.0	14.1	2.0
RC	12 - 15	LIVE	Domestic	13.5	37	351	0.9	255.8	32.3
RC	16 - 19	LIVE	Domestic	16.7	40	66	0.0	41.4	6.1
RC	16 - 19	LIVE	Pole	17.7	40	65	0.0	42.8	6.0
RC	16 - 19	LIVE	Cull	18.2	30	0	100.0	0.0	0.0
RC	20+	LIVE	Cull	22.1	26	0	100.0	0.0	0.0
RC	20+	LIVE	Domestic	33.8	40	117	15.0	60.9	10.8
WH	5 - 7	LIVE	Domestic	6.5	30	2,012	0.4	1,788.7	185.5
WH	5 - 7	LIVE	Pulp	6.7	28	41	0.0	40.6	3.8
WH	8 - 11	LIVE	Domestic	9.9	36	5,150	0.3	4,055.9	474.8
WH	12 - 15	LIVE	Domestic	13.7	39	6,560	0.8	4,726.7	604.8
WH	16 - 19	LIVE	Cull	17.0	26	0	100.0	0.0	0.0
WH	16 - 19	LIVE	Domestic	17.9	39	4,868	0.9	2,972.1	448.8
WH	16 - 19	LIVE	Pulp	18.0	24	80	0.0	42.3	7.4
WH	20+	LIVE	Domestic	22.0	40	1,621	0.7	902.2	149.5
WH	20+	LIVE	Cull	23.8	12	0	100.0	0.0	0.0
WH	20+	LIVE	Pulp	24.7	24	62	0.0	32.6	5.8

Cruise Unit Report BOLOGNA 1

Unit Sale Notice Volume (MBF): BOLOGNA 1

Sp	DBH	Rings/In	Age	MBF Volume by Grade			
				All	2 Saw	3 Saw	4 Saw
WH	15.2			187	83	101	4
DF	12.5			125	21	94	10
ALL	13.8			312	103	195	14

Unit Cruise Design: BOLOGNA 1

Design	Cruise Acres	FMA Acres	N Plots	N Cruise Plots	N Void Plots
B2: VR, 2 BAF (54.44, 40 for some species) Measure All, Sighting Ht = 0 ft	8.0	8.3	7	7	0

Unit Cruise Summary: BOLOGNA 1

Sp	Cruised Trees	All Trees	Trees/Plot	Ring-Count Trees
WH	18	18	2.6	0
DF	14	14	2.0	0
ALL	32	32	4.6	0

Unit Cruise Statistics: BOLOGNA 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 (%)
WH	140.0	66.8	25.3	167.4	15.1	3.6	23,436	68.5	25.5
DF	108.9	50.0	18.9	143.1	23.2	6.2	15,577	55.1	19.9
ALL	248.9	37.6	14.2	156.8	19.8	3.5	39,014	42.5	14.6

Unit Summary: BOLOGNA 1

Sp	Status	Rx	N	D	DBH	BL	THT	BF Gross	BF Net	Defect %	TPA	BA	RD	MBF Net
DF	LIVE	CUT	14	ALL	12.5	60	100	15,906	15,577	2.1	127.8	108.9	30.8	124.6
WH	LIVE	CUT	18	ALL	15.2	74	106	23,472	23,436	0.2	111.1	140.0	35.9	187.5
ALL	LIVE	CUT	32	ALL	13.8	66	103	39,378	39,014	0.9	238.9	248.9	66.7	312.1
ALL	ALL	ALL	32	ALL	13.8	66	103	39,378	39,014	0.9	238.9	248.9	66.7	312.1

Cruise Unit Report BOLOGNA 2

Unit Sale Notice Volume (MBF): BOLOGNA 2

Sp	DBH	Rings/In	Age	MBF Volume by Grade			
				All	2 Saw	3 Saw	4 Saw
WH	19.2			167	112	47	8
RC	60.0			11		11	
RA	13.3			6			6
ALL	18.6			184	112	58	14

Unit Cruise Design: BOLOGNA 2

Design	Cruise Acres	FMA Acres	N Plots	N Cruise Plots	N Void Plots
B2: VR, 2 BAF (54.44, 40 for some species) Measure All, Sighting Ht = 0 ft	5.7	5.8	4	4	0

Unit Cruise Summary: BOLOGNA 2

Sp	Cruised Trees	All Trees	Trees/Plot	Ring-Count Trees
WH	11	11	2.8	0
RC	1	1	0.3	0
RA	2	2	0.5	0
ALL	14	14	3.5	0

Unit Cruise Statistics: BOLOGNA 2

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	149.7	45.8	22.9	196.0	26.6	8.0	29,339	52.9	24.2
RC	10.0	200.0	100.0	192.5	0.0	0.0	1,925	200.0	100.0
RA	20.0	200.0	100.0	51.6	19.3	13.7	1,032	200.9	100.9
ALL	179.7	21.1	10.6	179.7	38.7	10.3	32,296	44.1	14.8

Unit Summary: BOLOGNA 2

Sp	Status	Rx	N	D	DBH	BL	THT	BF Gross	BF Net	Defect %	TPA	BA	RD	MBF Net
RA	LIVE	CUT	2	ALL	13.3	37	45	1,032	1,032	0.0	20.7	20.0	5.5	5.9
RC	LIVE	CUT	1	ALL	60.0	124	132	2,265	1,925	15.0	0.5	10.0	1.3	11.0

Sp	Status	Rx	N	D	DBH	BL	THT	BF Gross	BF Net	Defect %	TPA	BA	RD	MBF Net
WH	LIVE	CUT	11	ALL	19.2	84	106	29,550	29,339	0.7	74.5	149.7	34.2	167.2
ALL	LIVE	CUT	14	ALL	18.5	74	93	32,848	32,296	1.7	95.7	179.7	40.9	184.1
ALL	ALL	ALL	14	ALL	18.5	74	93	32,848	32,296	1.7	95.7	179.7	40.9	184.1

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Cruise Unit Report BOLOGNA 3

Unit Sale Notice Volume (MBF): BOLOGNA 3

Sp	DBH	Rings/In	Age	MBF Volume by Grade						
				All	Spec Mill	2 Saw	3 Saw	4 Saw	Utility	
DF	31.4			310	15	280	15			
WH	17.6			300		218	72	10		
MA	18.1			33		17	4	7	6	
RC	16.5			33			26	7		
BC	25.0			16		16				
ALL	19.7			693	15	531	117	24	6	

Unit Cruise Design: BOLOGNA 3

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 = 0 ft	14.0	15.1	10	10	0

Unit Cruise Summary: BOLOGNA 3

Sp	Cruised Trees	All Trees	Trees/Plot	Ring-Count Trees
DF	11	11	1.1	0
WH	18	18	1.8	0
MA	6	6	0.6	0
RC	6	6	0.6	0
BC	1	1	0.1	0
ALL	42	42	4.2	0

Unit Cruise Statistics: BOLOGNA 3

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	68.8	108.8	34.4	321.9	17.3	5.2	22,132	110.2	34.8
WH	112.5	104.1	32.9	190.3	38.2	9.0	21,408	110.9	34.1
MA	24.0	161.0	50.9	99.6	52.1	21.3	2,390	169.2	55.2
RC	24.0	140.5	44.4	99.0	25.5	10.4	2,376	142.8	45.6
BC	6.3	316.2	100.0	188.1	0.0	0.0	1,176	316.2	100.0
ALL	235.5	30.6	9.7	210.1	48.4	7.5	49,482	57.3	12.2

Unit Summary: BOLOGNA 3

Sp	Status	Rx	N	D	DBH	BL	THT	BF Gross	BF Net	Defect %	TPA	BA	RD	MBF Net
BC	LIVE	CUT	1	ALL	25.0	103	129	1,176	1,176	0.0	1.8	6.3	1.3	16.5
DF	LIVE	CUT	11	ALL	31.4	136	176	22,417	22,132	1.3	12.8	68.8	12.3	309.9
MA	LIVE	CUT	6	ALL	18.1	51	70	2,434	2,390	1.8	13.4	24.0	5.6	33.5
RC	LIVE	CUT	6	ALL	16.5	55	71	2,376	2,376	0.0	16.2	24.0	5.9	33.3
WH	LIVE	CUT	18	ALL	17.6	76	102	22,828	21,408	6.2	66.6	112.5	26.8	299.7
ALL	LIVE	CUT	42	ALL	19.7	77	103	51,231	49,482	3.4	110.8	235.5	51.9	692.7
ALL	ALL	ALL	42	ALL	19.7	77	103	51,231	49,482	3.4	110.8	235.5	51.9	692.7

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Cruise Unit Report BOLOGNA 4

Unit Sale Notice Volume (MBF): BOLOGNA 4

Sp	DBH	Rings/In	Age	MBF Volume by Grade				
				All	2 Saw	3 Saw	4 Saw	Utility
WH	20.3			551	379	153	8	10
DF	24.2			95	78	16	2	
BC	27.0			12	12			
RA	24.0			3	3			
ALL	20.8			661	473	168	10	10

Unit Cruise Design: BOLOGNA 4

Design	Cruise Acres	FMA Acres	N Plots	N Cruise Plots	N Void Plots
B2C: VR, 2 BAF (54.44, 40 for some species) Measure/Count Plots, Sighting Ht = 4.5 ft	17.2	20.3	14	14	0

Unit Cruise Summary: BOLOGNA 4

Sp	Cruised Trees	All Trees	Trees/Plot	Ring-Count Trees
WH	46	46	3.3	0
DF	7	7	0.5	0
BC	1	1	0.1	0
RA	1	1	0.1	0
ALL	55	55	3.9	0

Unit Cruise Statistics: BOLOGNA 4

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	178.9	56.5	15.1	179.0	22.4	3.3	32,020	60.8	15.5
DF	27.2	268.9	71.9	203.6	21.4	8.1	5,541	269.8	72.3
BC	3.9	374.2	100.0	179.3	0.0	0.0	697	374.2	100.0
RA	2.9	374.2	100.0	68.1	0.0	0.0	195	374.2	100.0
ALL	212.8	47.8	12.8	180.7	23.9	3.2	38,453	53.5	13.2

Unit Summary: BOLOGNA 4

Sp	Status	Rx	N	D	DBH	BL	THT	BF Gross	BF Net	Defect %	TPA	BA	RD	MBF Net
BC	LIVE	CUT	1	ALL	27.0	90	112	697	697	0.0	1.0	3.9	0.7	12.0
DF	LIVE	CUT	7	ALL	24.2	97	124	5,541	5,541	0.0	8.5	27.2	5.5	95.3
RA	LIVE	CUT	1	ALL	24.0	50	60	195	195	0.0	0.9	2.9	0.6	3.3
WH	LIVE	CUT	46	ALL	20.3	86	108	32,414	32,020	1.2	79.6	178.9	39.7	550.7
ALL	LIVE	CUT	55	ALL	20.8	87	109	38,846	38,453	1.0	90.0	212.8	46.6	661.4
ALL	ALL	ALL	55	ALL	20.8	87	109	38,846	38,453	1.0	90.0	212.8	46.6	661.4

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Cruise Unit Report BOLOGNA 5

Unit Sale Notice Volume (MBF): BOLOGNA 5

Sp	DBH	Rings/In	Age	MBF Volume by Grade				
				All	2 Saw	3 Saw	4 Saw	Utility
WH	19.0			230	139	76	9	6
DF	25.0			22	20	2		
RC	16.6			3		2	0	
ALL	19.2			255	159	80	9	6

Unit Cruise Design: BOLOGNA 5

Design	Cruise Acres	FMA Acres	N Plots	N Cruise Plots	N Void Plots
B2: VR, 2 BAF (54.44, 40 for some species) Measure All, Sighting Ht = 4.5 ft	5.6	11.5	6	6	0

Unit Cruise Summary: BOLOGNA 5

Sp	Cruised Trees	All Trees	Trees/Plot	Ring-Count Trees
WH	24	24	4.0	0
DF	2	2	0.3	0
RC	1	1	0.2	0
ALL	27	27	4.5	0

Unit Cruise Statistics: BOLOGNA 5

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	217.8	57.0	23.3	188.5	26.2	5.4	41,057	62.8	23.9
DF	18.1	244.9	100.0	216.9	37.4	26.5	3,937	247.8	103.4
RC	6.7	244.9	100.0	69.9	0.0	0.0	466	244.9	100.0
ALL	242.6	57.0	23.3	187.4	29.3	5.6	45,460	64.1	23.9

Unit Summary: BOLOGNA 5

Sp	Status	Rx	N	D	DBH	BL	THT	BF Gross	BF Net	Defect %	TPA	BA	RD	MBF Net
DF	LIVE	CUT	2	ALL	25.0	101	129	3,975	3,937	1.0	5.3	18.1	3.6	22.0
RC	LIVE	CUT	1	ALL	16.6	60	75	466	466	0.0	4.4	6.7	1.6	2.6

Sp	Status	Rx	N	D	DBH	BL	THT	BF Gross	BF Net	Defect %	TPA	BA	RD	MBF Net
WH	LIVE	CUT	24	ALL	19.0	84	108	41,860	41,057	1.9	110.6	217.8	50.0	229.9
ALL	LIVE	CUT	27	ALL	19.2	84	108	46,301	45,460	1.8	120.3	242.6	55.2	254.6
ALL	ALL	ALL	27	ALL	19.2	84	108	46,301	45,460	1.8	120.3	242.6	55.2	254.6

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Cruise Unit Report BOLOGNA 6

Unit Sale Notice Volume (MBF): BOLOGNA 6

Sp	DBH	Rings/In	Age	MBF Volume by Grade				
				All	Spec Mill	2 Saw	3 Saw	4 Saw
DF	21.2	8.0		724	17	526	151	30
WH	21.4			176		146	27	2
RA	14.7			16		6		10
RC	10.6			12			5	6
ALL	20.1	8.0		928	17	679	183	48

Unit Cruise Design: BOLOGNA 6

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	20.1	21.4	12	12	0

Unit Cruise Summary: BOLOGNA 6

Sp	Cruised Trees	All Trees	Trees/Plot	Ring-Count Trees
DF	33	33	2.8	1
WH	8	8	0.7	0
RA	2	2	0.2	0
RC	2	2	0.2	0
ALL	45	45	3.8	1

Unit Cruise Statistics: BOLOGNA 6

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	171.9	41.4	11.9	209.7	22.7	4.0	36,035	47.2	12.6
WH	41.7	97.7	28.2	209.6	15.6	5.5	8,735	98.9	28.7
RA	6.7	346.4	100.0	122.4	10.9	7.7	816	346.6	100.3
RC	6.7	233.5	67.4	86.7	20.0	14.1	578	234.4	68.9
ALL	226.9	21.2	6.1	203.5	25.9	3.9	46,164	33.4	7.2

Unit Summary: BOLOGNA 6

Sp	Status	Rx	N	D	DBH	BL	THT	BF Gross	BF Net	Defect %	TPA	BA	RD	MBF Net
DF	LIVE	CUT	33	ALL	21.2	95	120	36,184	36,035	0.4	70.1	171.9	37.3	724.3
RA	LIVE	CUT	2	ALL	14.7	73	92	816	816	0.0	5.7	6.7	1.7	16.4
RC	LIVE	CUT	2	ALL	10.6	33	52	578	578	0.0	10.9	6.7	2.0	11.6
WH	LIVE	CUT	8	ALL	21.4	98	125	8,735	8,735	0.0	16.7	41.7	9.0	175.6
ALL	LIVE	CUT	45	ALL	20.1	88	112	46,314	46,164	0.3	103.4	226.9	50.1	927.9
ALL	ALL	ALL	45	ALL	20.1	88	112	46,314	46,164	0.3	103.4	226.9	50.1	927.9

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Cruise Unit Report BOLOGNA 7

Unit Sale Notice Volume (MBF): BOLOGNA 7

Sp	DBH	Rings/In	Age	MBF Volume by Grade				
				All	Spec Mill	2 Saw	3 Saw	4 Saw
WH	17.0			199		96	91	12
DF	24.8	9.0		157	11	130	13	2
RC	25.5			25			23	2
ALL	19.5	9.0		381	11	227	127	16

Unit Cruise Design: BOLOGNA 7

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	7.1	7.4	5	5	0

Unit Cruise Summary: BOLOGNA 7

Sp	Cruised Trees	All Trees	Trees/Plot	Ring-Count Trees
WH	14	14	2.8	0
DF	8	8	1.6	1
RC	5	5	1.0	0
ALL	27	27	5.4	1

Unit Cruise Statistics: BOLOGNA 7

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	175.0	63.9	28.6	160.1	18.1	4.8	28,017	66.4	29.0
DF	100.0	71.3	31.9	220.5	31.8	11.2	22,054	78.0	33.8
RC	40.0	223.6	100.0	88.7	47.6	21.3	3,549	228.6	102.2
ALL	315.0	32.7	14.6	170.2	37.6	7.2	53,621	49.8	16.3

Unit Summary: BOLOGNA 7

Sp	Status	Rx	N	D	DBH	BL	THT	BF Gross	BF Net	Defect %	TPA	BA	RD	MBF Net
DF	LIVE	CUT	8	ALL	24.8	96	123	22,054	22,054	0.0	29.8	100.0	20.1	156.6
RC	LIVE	CUT	5	ALL	25.5	78	99	5,093	3,549	30.3	11.3	40.0	7.9	25.2

Sp	Status	Rx	N	D	DBH	BL	THT	BF Gross	BF Net	Defect %	TPA	BA	RD	MBF Net
WH	LIVE	CUT	14	ALL	17.0	77	95	28,334	28,017	1.1	111.0	175.0	42.4	198.9
ALL	LIVE	CUT	27	ALL	19.5	81	101	55,482	53,621	3.4	152.1	315.0	70.4	380.7
ALL	ALL	ALL	27	ALL	19.5	81	101	55,482	53,621	3.4	152.1	315.0	70.4	380.7

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Cruise Unit Report BOLOGNA 8

Unit Sale Notice Volume (MBF): BOLOGNA 8

Sp	DBH	Rings/In	Age	MBF Volume by Grade				
				All	2 Saw	3 Saw	4 Saw	Utility
DF	19.0	8.5		277	201	53	10	11
WH	11.5			26		16	10	
ALL	16.9	8.5		303	201	69	21	11

Unit Cruise Design: BOLOGNA 8

Design	Cruise Acres	FMA Acres	N Plots	N Cruise Plots	N Void Plots
B1: VR, 1 BAF (40) Measure All, Sighting Ht = 4.5 ft	8.3	8.5	7	7	0

Unit Cruise Summary: BOLOGNA 8

Sp	Cruised Trees	All Trees	Trees/Plot	Ring-Count Trees
DF	31	32	4.6	2
WH	6	6	0.9	0
ALL	37	38	5.4	2

Unit Cruise Statistics: BOLOGNA 8

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	182.9	71.3	26.9	182.3	32.4	5.8	33,333	78.3	27.6
WH	34.3	141.7	53.6	91.5	20.4	8.3	3,135	143.2	54.2
ALL	217.1	47.4	17.9	167.9	38.2	6.3	36,468	60.9	19.0

Unit Summary: BOLOGNA 8

Sp	Status	Rx	N	D	DBH	BL	THT	BF Gross	BF Net	Defect %	TPA	BA	RD	MBF Net
DF	LIVE	CUT	31	ALL	19.0	75	94	33,758	33,333	1.3	92.9	182.9	42.0	276.7
WH	LIVE	CUT	6	ALL	11.5	47	62	3,135	3,135	0.0	47.5	34.3	10.1	26.0
ALL	LIVE	CUT	37	ALL	16.8	65	83	36,894	36,468	1.2	140.4	217.1	52.1	302.7
ALL	ALL	ALL	37	ALL	16.8	65	83	36,894	36,468	1.2	140.4	217.1	52.1	302.7

Cruise Unit Report BOLOGNA ROW 1

Unit Sale Notice Volume (MBF): BOLOGNA ROW 1

Sp	DBH	Rings/In	Age	MBF Volume by Grade			
				All	2 Saw	3 Saw	4 Saw
DF	20.1	9.0		7	4	3	
WH	16.5			3		3	0
RA	14.0			0			0
ALL	18.1	9.0		10	4	6	1

Unit Cruise Design: BOLOGNA ROW 1

Design	Cruise Acres	FMA Acres	N Plots	N Cruise Plots	N Void Plots
FX: FR plots (20 tree / acre expansion)	1.0	1.0	3	3	0

Unit Cruise Summary: BOLOGNA ROW 1

Sp	Cruised Trees	All Trees	Trees/Plot	Ring-Count Trees
DF	3	3	1.0	1
WH	2	2	0.7	0
RA	1	1	0.3	0
ALL	6	6	2.0	1

Unit Cruise Statistics: BOLOGNA 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	44.1	173.2	100.0	151.6	16.5	9.5	6,693	174.0	100.5
WH	19.8	87.1	50.3	143.3	2.7	1.9	2,840	87.1	50.3
RA	7.1	173.2	100.0	67.4	0.0	0.0	480	173.2	100.0
ALL	71.1	75.8	43.7	140.9	25.4	10.4	10,013	79.9	45.0

Unit Summary: BOLOGNA ROW 1

Sp	Status	Rx	N	D	DBH	BL	THT	BF Gross	BF Net	Defect %	TPA	BA	RD	MBF Net
DF	LIVE	CUT	3	ALL	20.1	89	113	6,693	6,693	0.0	20.0	44.1	9.8	6.7
RA	LIVE	CUT	1	ALL	14.0	60	73	480	480	0.0	6.7	7.1	1.9	0.5
WH	LIVE	CUT	2	ALL	16.5	75	93	2,840	2,840	0.0	13.3	19.8	4.9	2.8
ALL	LIVE	CUT	6	ALL	18.0	79	99	10,013	10,013	0.0	40.0	71.1	16.6	10.0

Sp	Status	Rx	N	D	DBH	BL	THT	BF Gross	BF Net	Defect %	TPA	BA	RD	MBF Net
ALL	ALL	ALL	6	ALL	18.0	79	99	10,013	10,013	0.0	40.0	71.1	16.6	10.0

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Cruise Unit Report BOLOGNA ROW 2

Unit Sale Notice Volume (MBF): BOLOGNA ROW 2

Sp	DBH	Rings/In	Age	MBF Volume by Grade					
				All	Spec Mill	2 Saw	3 Saw	4 Saw	Utility
DF	28.0	10.0		89	12	71	4	1	
WH	17.5			42		19	20	2	1
RC	19.8			5			4	1	
RA	15.0			3			2	2	
ALL	20.7	10.0		139	12	90	31	5	1

Unit Cruise Design: BOLOGNA ROW 2

Design	Cruise Acres	FMA Acres	N Plots	N Cruise Plots	N Void Plots
FX: FR plots (20 tree / acre expansion)	5.2	5.3	7	7	0

Unit Cruise Summary: BOLOGNA ROW 2

Sp	Cruised Trees	All Trees	Trees/Plot	Ring-Count Trees
DF	6	6	0.9	2
WH	11	13	1.9	0
RC	2	2	0.3	0
RA	2	2	0.3	0
ALL	21	23	3.3	2

Unit Cruise Statistics: BOLOGNA ROW 2

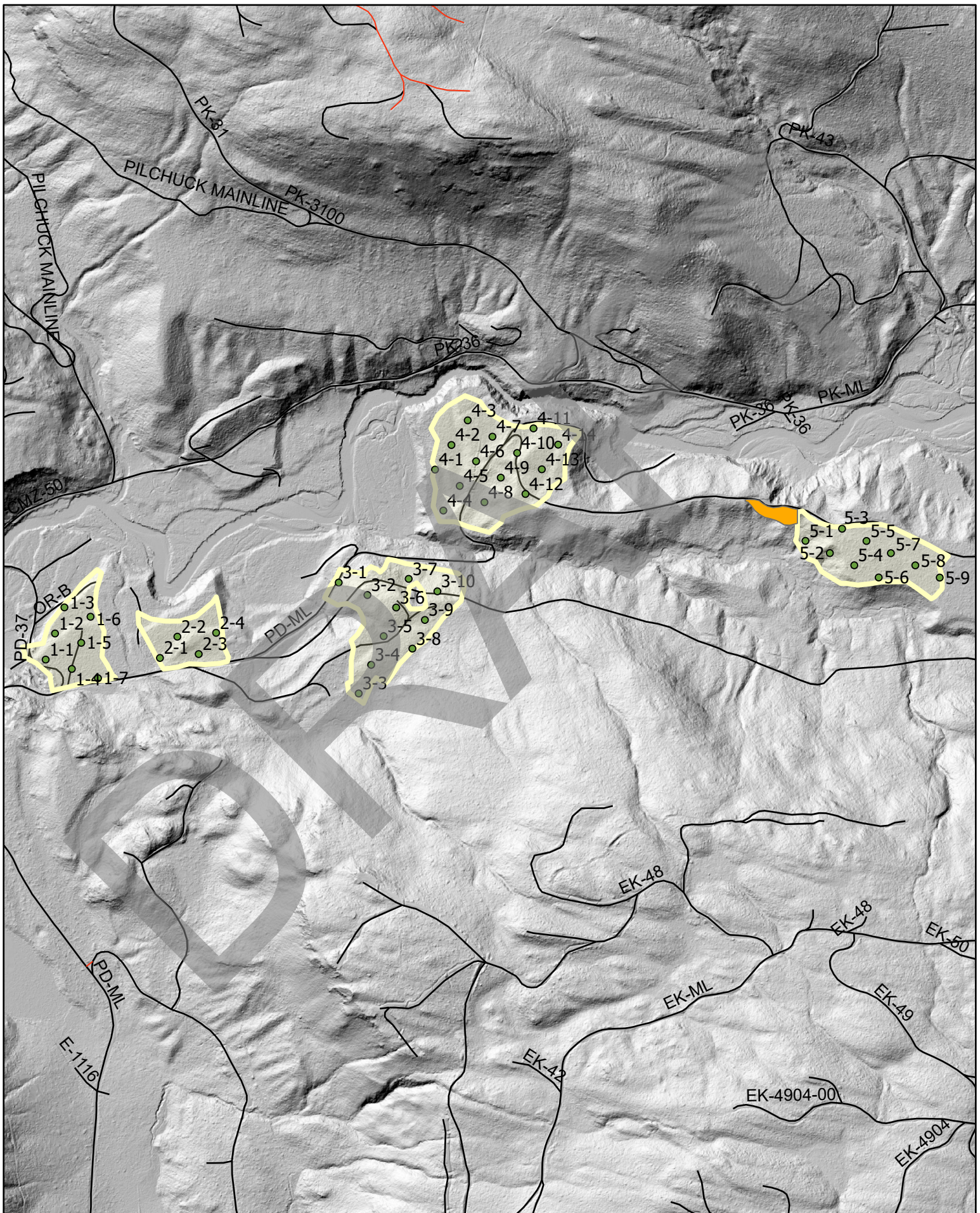
Sp	BA (sq ft/acre)	BA CV (%)	BA SE (%)	V-BAR (bf/sq ft)	V-BAR CV (%)	V-BAR SE (%)	Net Vol (bf/acre)	Vol CV (%)	Vol SE (%)
DF	73.3	157.4	59.5	232.9	34.8	14.2	17,063	161.2	61.1
WH	61.8	119.6	45.2	130.6	27.2	8.2	8,071	122.6	45.9
RC	12.2	184.7	69.8	78.5	29.3	20.7	960	187.0	72.8
RA	7.0	172.9	65.3	94.9	36.3	25.6	669	176.6	70.2
ALL	154.3	81.1	30.6	173.4	38.1	8.3	26,763	89.6	31.7

Unit Summary: BOLOGNA ROW 2

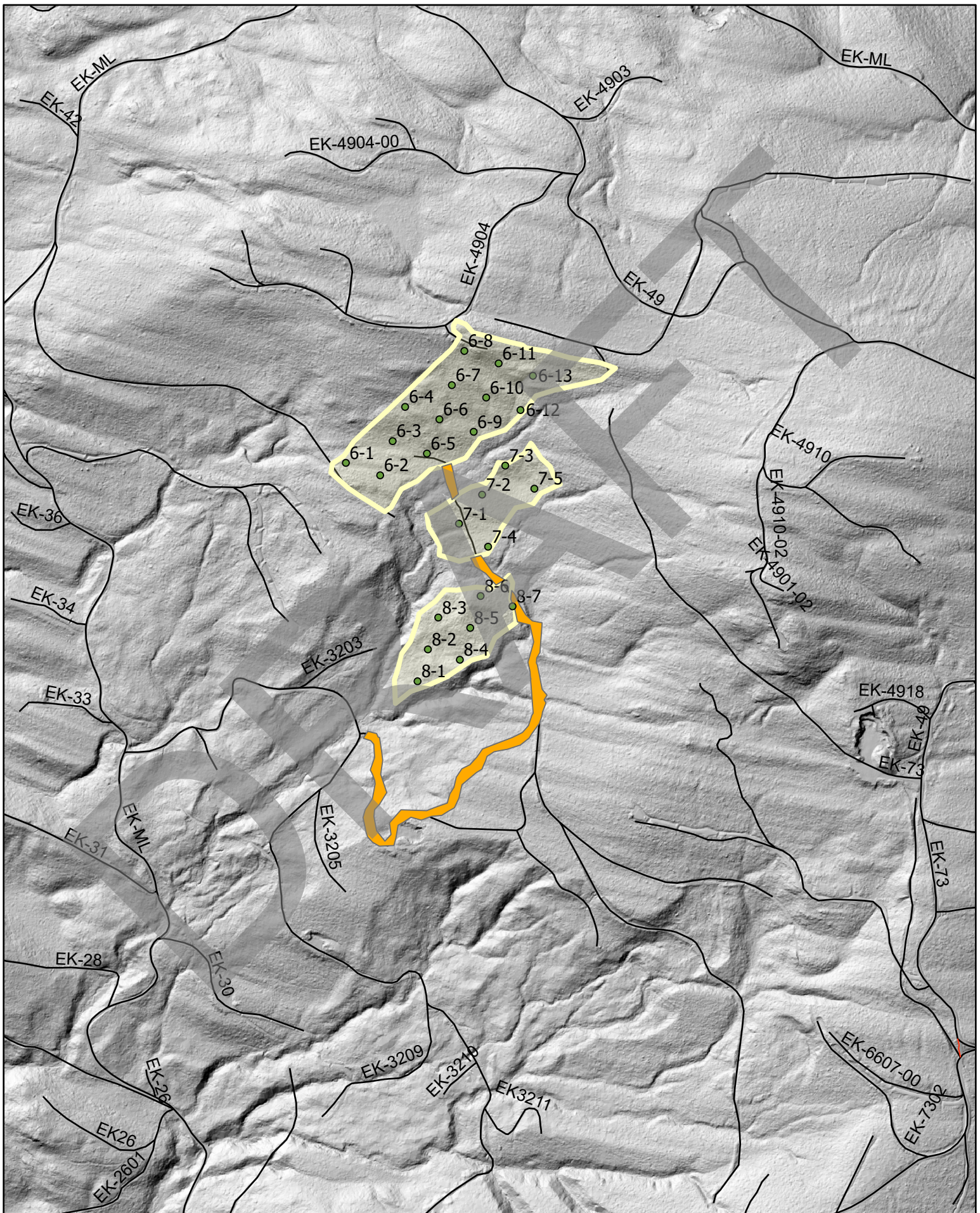
Sp	Status	Rx	N	D	DBH	BL	THT	BF Gross	BF Net	Defect %	TPA	BA	RD	MBF Net
DF	LIVE	CUT	6	ALL	28.0	101	129	17,077	17,063	0.1	17.1	73.3	13.8	88.7
RA	LIVE	CUT	2	ALL	15.0	60	74	669	669	0.0	5.7	7.0	1.8	3.5
RC	LIVE	CUT	2	ALL	19.8	58	72	960	960	0.0	5.7	12.2	2.7	5.0
WH	LIVE	CUT	11	ALL	17.5	71	88	8,071	8,071	0.0	37.0	61.8	14.8	42.0
ALL	LIVE	CUT	21	ALL	20.8	77	96	26,777	26,763	0.1	65.5	154.3	33.2	139.2
ALL	ALL	ALL	21	ALL	20.8	77	96	26,777	26,763	0.1	65.5	154.3	33.2	139.2

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Bologna Sample Point Map - NW



Bologna Sample Point Map - NW

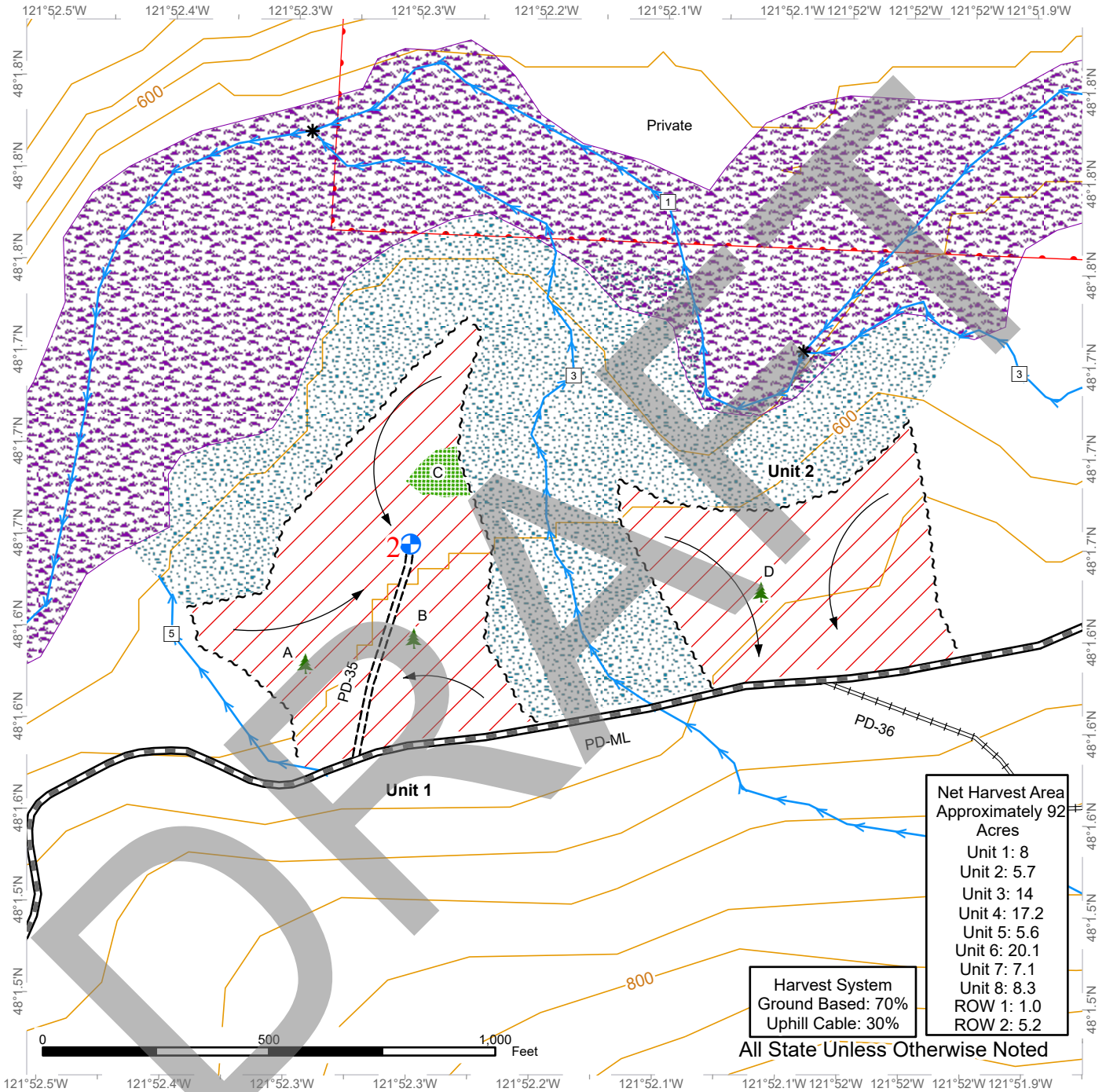


LOGGING PLAN MAP

SALE NAME: BOLOGNA
AGREEMENT#: 30-105951
TOWNSHIP(S): T29R7E
TRUST(S): Common School (3), Charitable/Educational/Penal & Reformatory Instit. (6), Normal School (8), State Forest Transfer (1)

REGION: Northwest Region
COUNTY(S): Snohomish
ELEVATION RGE: 600-2120

Common School (3), Charitable/Educational/Penal & Reformatory Instit. (6), Normal School (8), State Forest Transfer (1)



Net Harvest Area Approximately 92 Acres	
Unit 1:	8
Unit 2:	5.7
Unit 3:	14
Unit 4:	17.2
Unit 5:	5.6
Unit 6:	20.1
Unit 7:	7.1
Unit 8:	8.3
ROW 1:	1.0
ROW 2:	5.2

Harvest System	
Ground Based:	70%
Uphill Cable:	30%

All State Unless Otherwise Noted

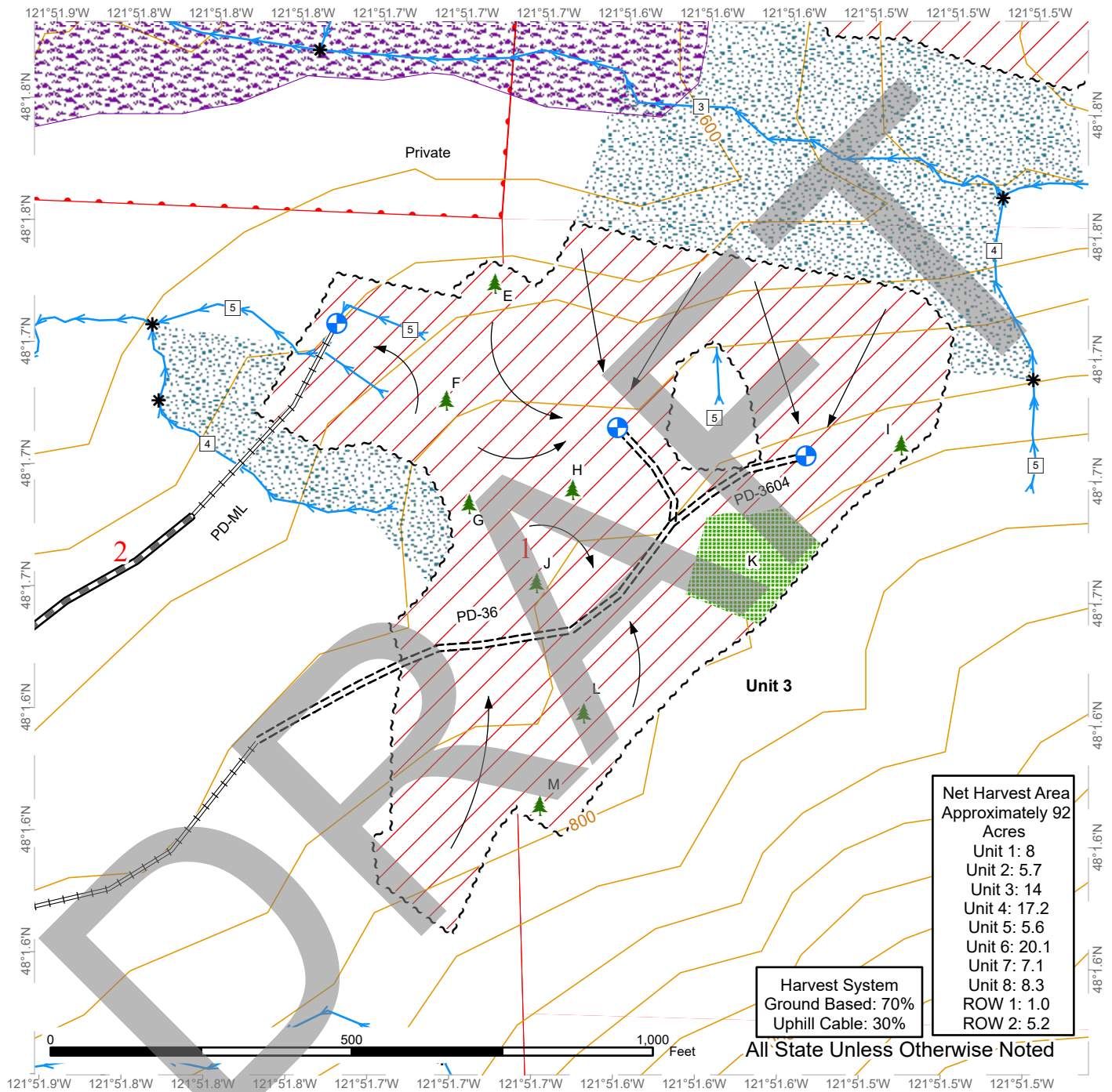
Variable Retention Harvest	Sale Boundary Tags	Stream Type
DNR Managed Lands	Existing Roads	Stream Type Break
Channel Migration Zone	Required Pre-Haul Maintenance	Contours 40-foot
Leave Tree Area	Required Construction	Landing - Proposed
Riparian Mgt Zone	Required Reconstruction	Leave Tree Area <1/4-acre
Ground Harvest	Streams	



LOGGING PLAN MAP

SALE NAME: BOLOGNA
AGREEMENT#: 30-105951
TOWNSHIP(S): T29R7E
TRUST(S): Common School (3), Charitable/Educational/Penal & Reformatory Instit. (6), Normal School (8), State Forest Transfer (1)

REGION: Northwest Region
COUNTY(S): Snohomish
ELEVATION RGE: 600-2120



Net Harvest Area Approximately 92 Acres	
Unit 1:	8
Unit 2:	5.7
Unit 3:	14
Unit 4:	17.2
Unit 5:	5.6
Unit 6:	20.1
Unit 7:	7.1
Unit 8:	8.3
ROW 1:	1.0
ROW 2:	5.2

Harvest System
 Ground Based: 70%
 Uphill Cable: 30%

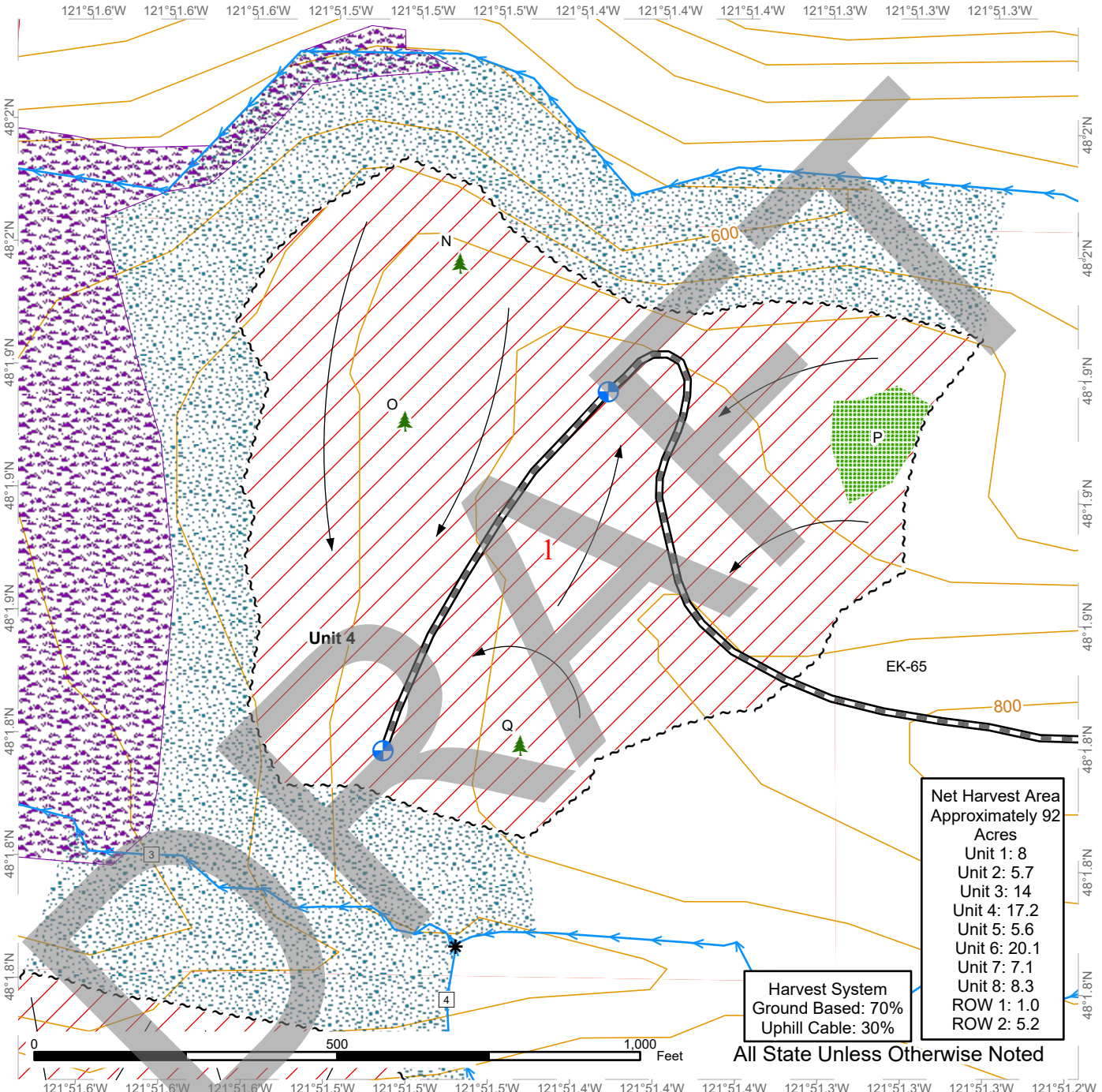
All State Unless Otherwise Noted

- | | | |
|----------------------------|-------------------------------|---------------------------|
| Variable Retention Harvest | Sale Boundary Tags | Stream Type Break |
| DNR Managed Lands | Existing Roads | Contours 40-foot |
| Channel Migration Zone | Required Pre-Haul Maintenance | Landing - Proposed |
| Leave Tree Area | Required Construction | Leave Tree Area <1/4-acre |
| Riparian Mgt Zone | Required Reconstruction | |
| Ground Harvest | Streams | |
| Cable Harvest | Stream Type | |

LOGGING PLAN MAP

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ROW 2:	5.2

Harvest System
 Ground Based: 70%
 Uphill Cable: 30%

All State Unless Otherwise Noted

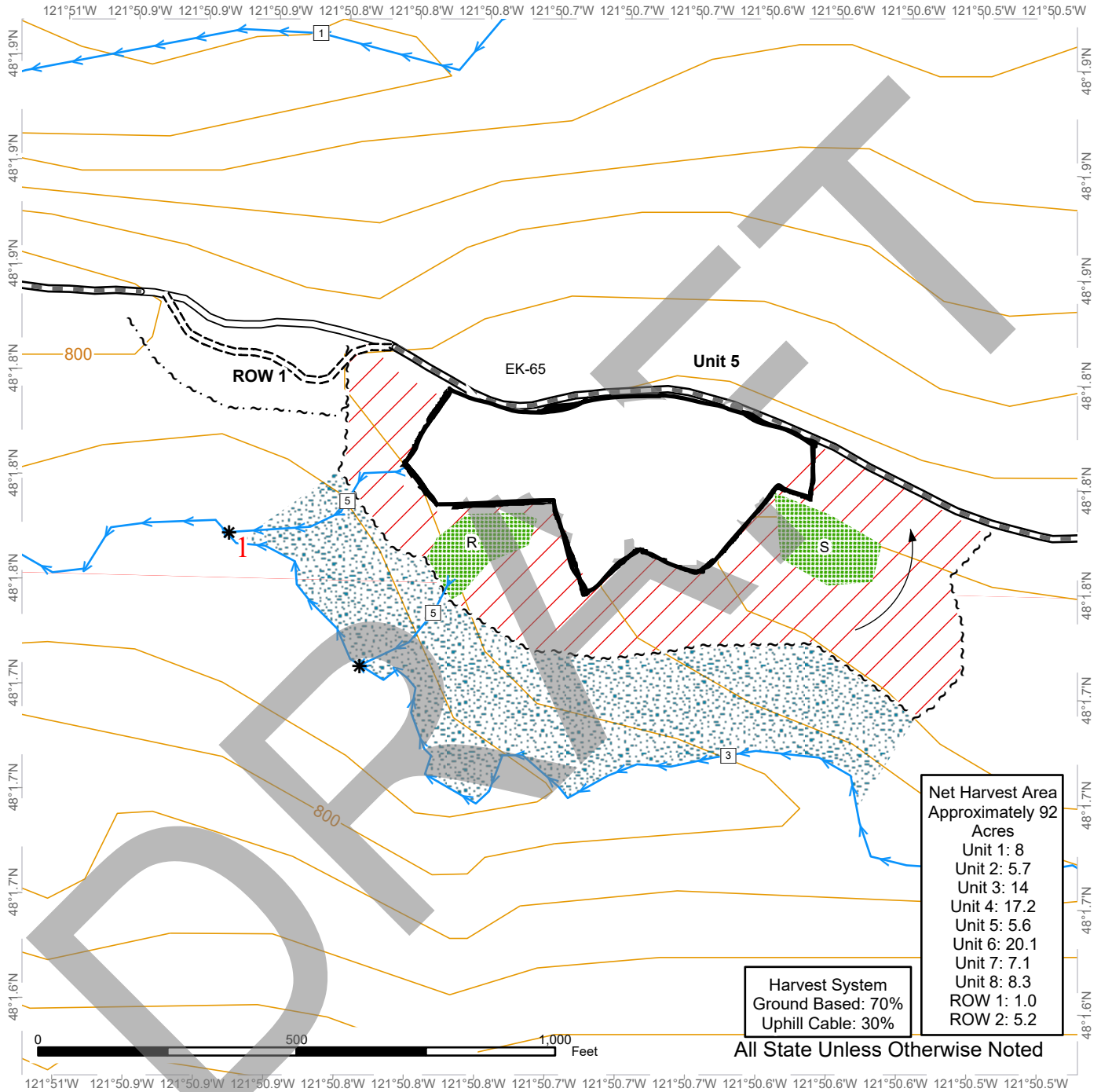
Variable Retention Harvest	Cable Harvest	Stream Type Break
DNR Managed Lands	Sale Boundary Tags	Contours 40-foot
Channel Migration Zone	Existing Roads	Landing - Proposed
Leave Tree Area	Required Pre-Haul Maintenance	Leave Tree Area <1/4-acre
Riparian Mgt Zone	Streams	
Ground Harvest	Stream Type	



LOGGING PLAN MAP

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AGREEMENT#: 30-105951
TOWNSHIP(S): T29R7E
TRUST(S): Common School (3), Charitable/Educational/Penal & Reformatory Instit. (6), Normal School (8), State Forest Transfer (1)

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ROW 2:	5.2

Harvest System
 Ground Based: 70%
 Uphill Cable: 30%

All State Unless Otherwise Noted

Variable Retention Harvest	Sale Boundary Tags	Streams
DNR Managed Lands	Right of Way Tags	Stream Type
Leave Tree Area	Existing Roads	Stream Type Break
Riparian Mgt Zone	Required Pre-Haul Maintenance	Contours 40-foot
Ground Harvest	Required Construction	

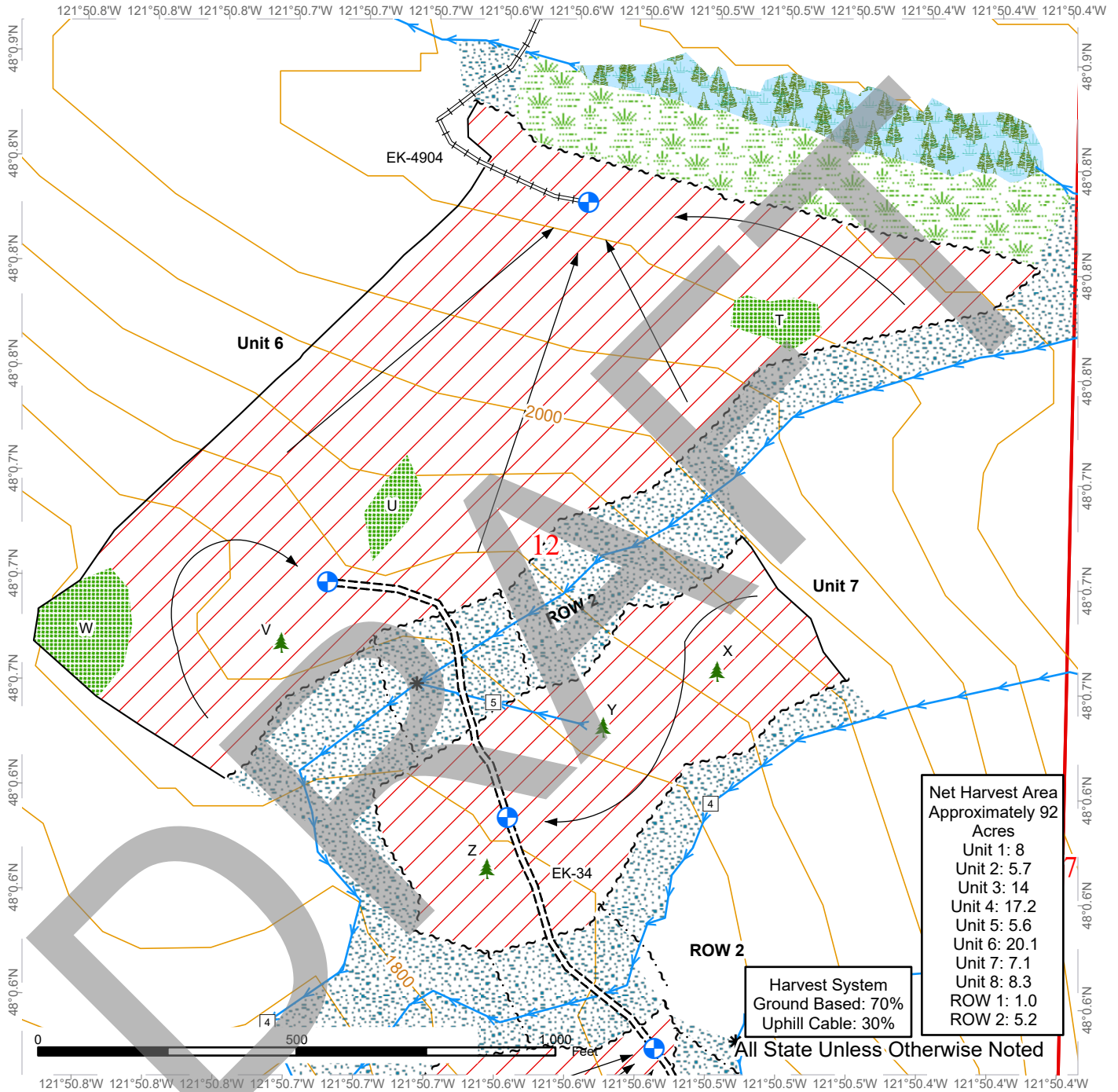


LOGGING PLAN MAP

SALE NAME: BOLOGNA
AGREEMENT#: 30-105951
TOWNSHIP(S): T29R7E

REGION: Northwest Region
COUNTY(S): Snohomish
ELEVATION RGE: 600-2120

TRUST(S): Common School (3), Charitable/Educational/Penal & Reformatory Instit. (6), Normal School (8), State Forest Transfer (1)



Net Harvest Area Approximately 92 Acres	
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Harvest System
 Ground Based: 70%
 Uphill Cable: 30%

All State Unless Otherwise Noted

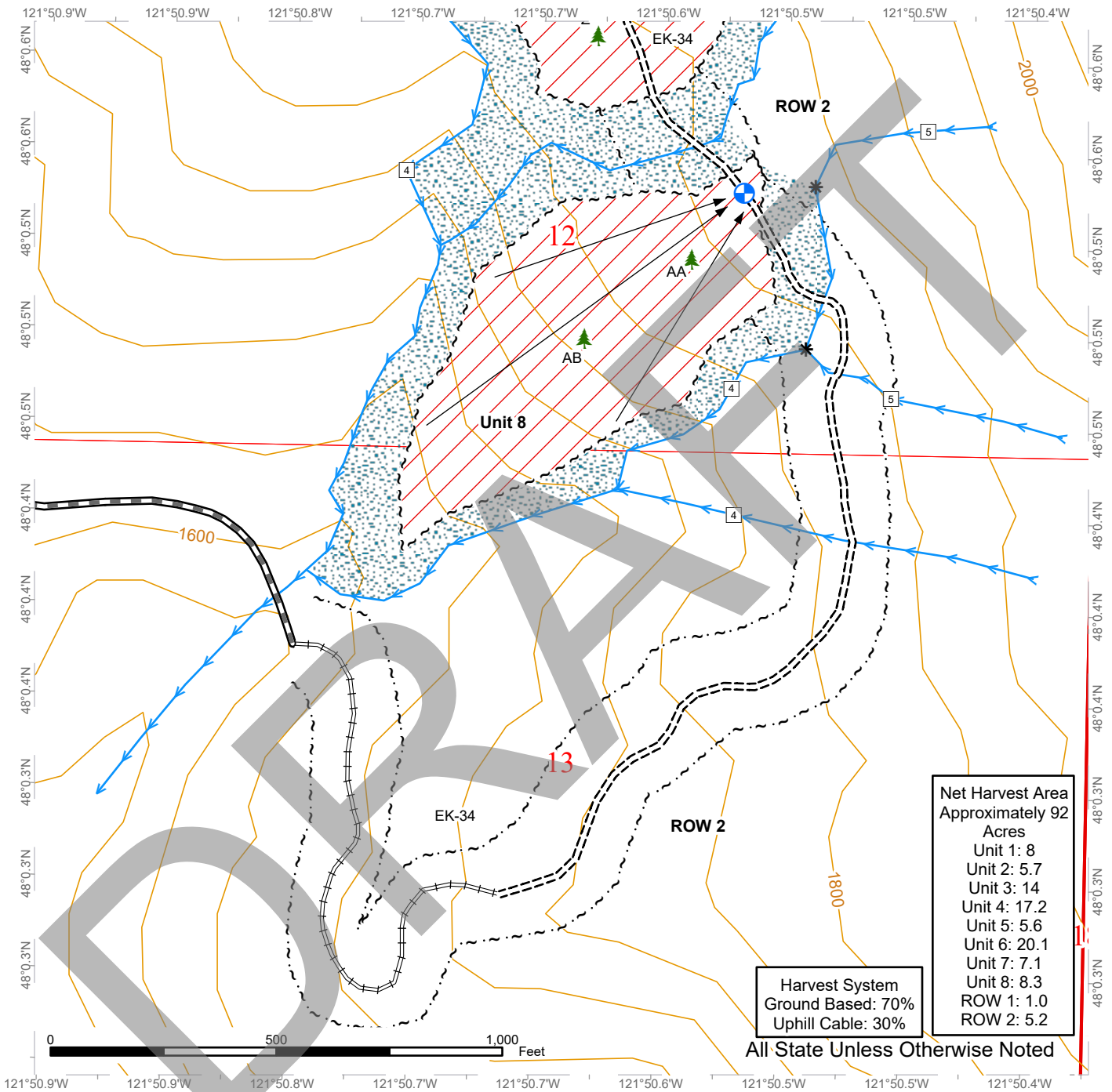
Variable Retention Harvest	Sale Boundary Tags	Stream Type
DNR Managed Lands	Timber Type Change	Stream Type Break
Leave Tree Area	Right of Way Tags	Contours 40-foot
Riparian Mgt Zone	Existing Roads	Landing - Proposed
Forested Wetland	Required Pre-Haul Maintenance	Leave Tree Area <1/4-acre
Wetland Mgt Zone	Required Construction	
Ground Harvest	Required Reconstruction	
Cable Harvest	Streams	



LOGGING PLAN MAP

SALE NAME: BOLOGNA
AGREEMENT#: 30-105951
TOWNSHIP(S): T29R7E
TRUST(S): Common School (3), Charitable/Educational/Penal & Reformatory Instit. (6), Normal School (8), State Forest Transfer (1)

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Net Harvest Area Approximately 92 Acres	
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- | | | |
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| DNR Managed Lands | Required Pre-Haul Maintenance | Contours 40-foot |
| Riparian Mgt Zone | Required Construction | Landing - Proposed |
| Cable Harvest | Required Reconstruction | Leave Tree Area <1/4-acre |
| Sale Boundary Tags | Streams | |
| Right of Way Tags | Stream Type | |

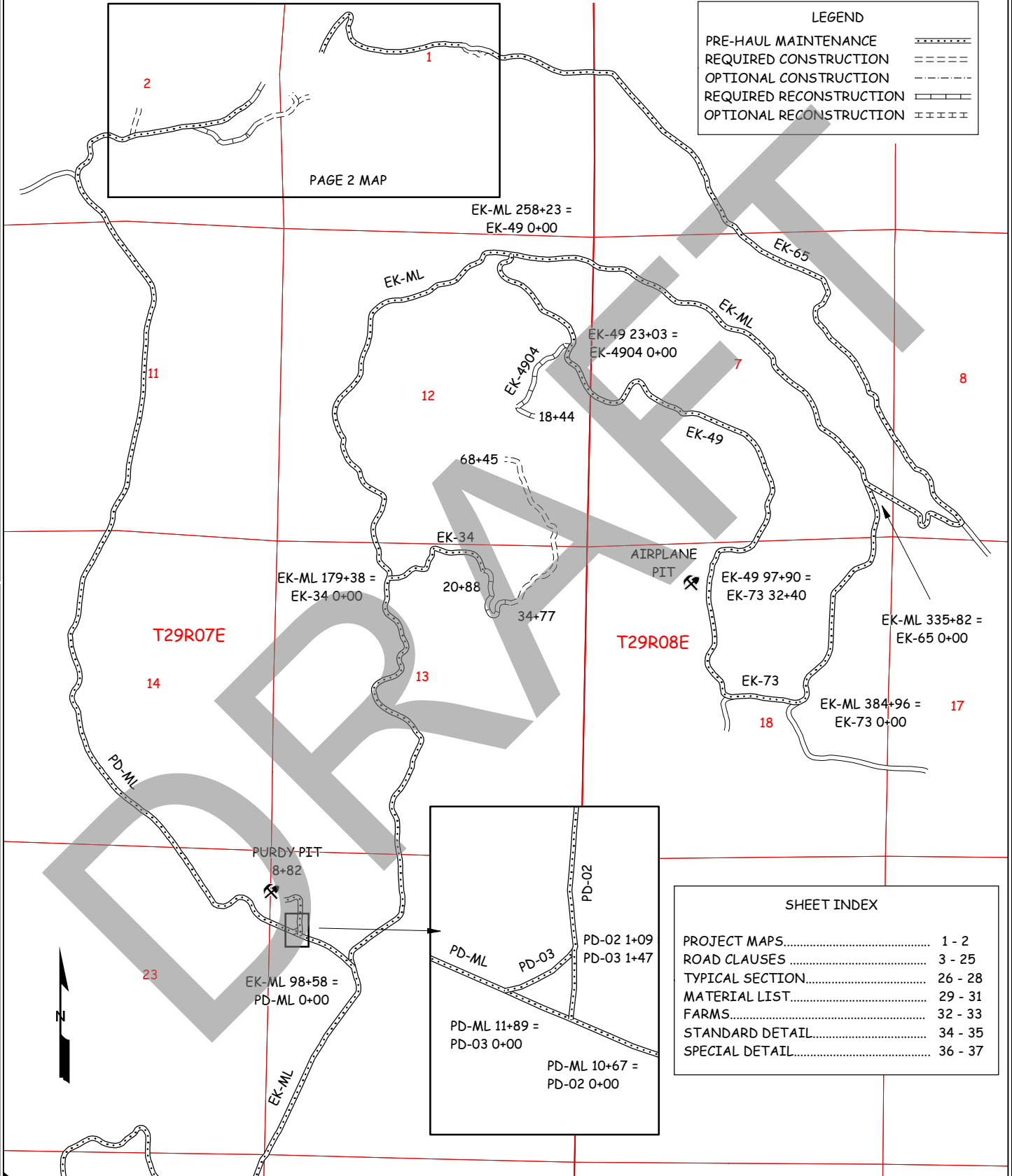
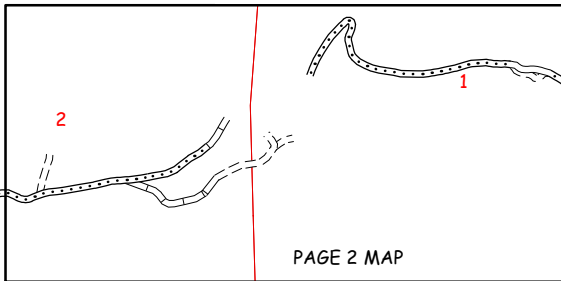




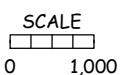
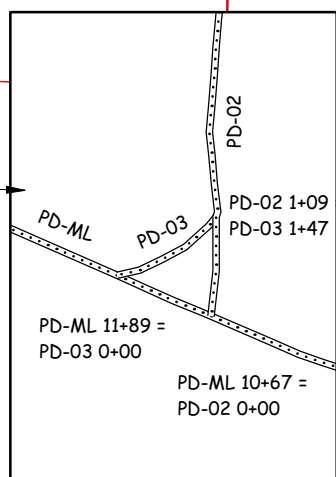
ROAD PLAN AND SPECIFICATIONS

#30-105951 BOLOGNA TIMBER SALE

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



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MATERIAL LIST.....	29 - 31
FARMS.....	32 - 33
STANDARD DETAIL.....	34 - 35
SPECIAL DETAIL.....	36 - 37



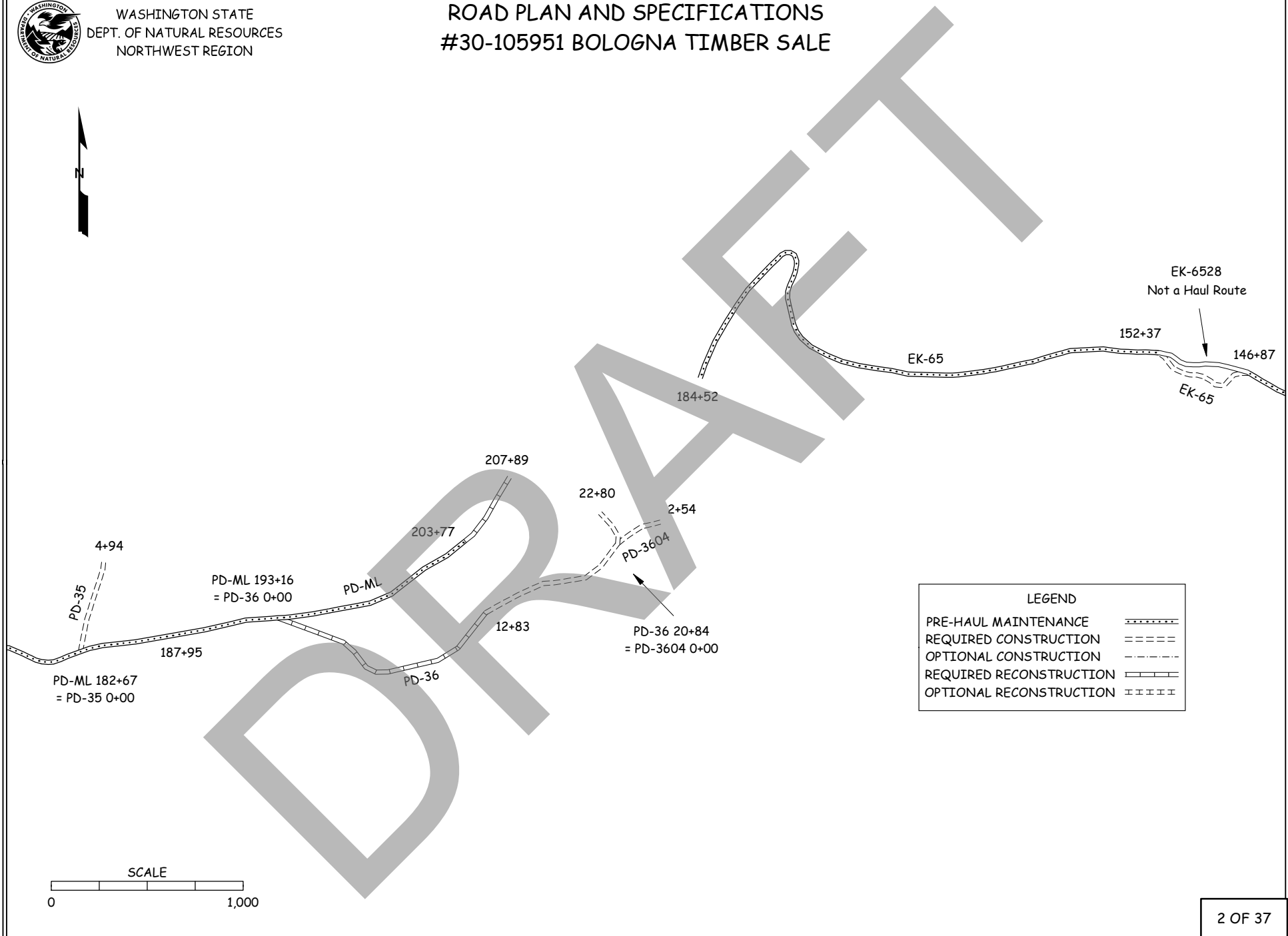
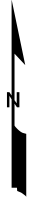
EK-ML 0+00 =
MONROE CAMP
ROAD MP 1.6

DESIGNED BY	REVIEWED BY	APPROVED BY	PLAN DATE	SHEET
J. WESTRA	ZYLSTRA 11/20/2023	ZYLSTRA 11/20/2023	10/04/2023	1 OF 37

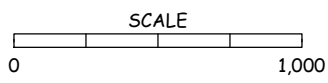


WASHINGTON STATE
DEPT. OF NATURAL RESOURCES
NORTHWEST REGION

ROAD PLAN AND SPECIFICATIONS #30-105951 BOLOGNA TIMBER SALE



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



STATE OF WASHINGTON
DEPARTMENT OF NATURAL RESOURCES

BOLOGNA TIMBER SALE ROAD PLAN
SNOHOMISH COUNTY
CASCADE DISTRICT
NORTHWEST REGION

AGREEMENT NO.: 30-105951

STAFF ENGINEER: J. WESTRA

DATE: OCTOBER 4, 2023

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.

<u>Road</u>	<u>Stations</u>	<u>Type</u>
EK-ML	0+00 to 384+96	PREHAUL MAINTENANCE
EK-34	0+00 to 20+88	PREHAUL MAINTENANCE
EK-34	20+88 to 34+77	RECONSTRUCTION
EK34	34+77 to 68+45	CONSTRUCTION
EK-49	0+00 to 97+90	PREHAUL MAINTENANCE
EK-4904	0+00 to 18+44	RECONSTRUCTION
EK-65	0+00 to 146+87 152+37 to 184+52	PREHAUL MAINTENANCE
EK-65	146+87 to 152+37	CONSTRUCTION
EK-73	0+00 to 32+40	PREHAUL MAINTENANCE
PD-ML	0+00 to 203+77	PREHAUL MAINTENANCE
PD-ML	203+77 to 207+89	RECONSTRUCTION
PD-02	0+00 to 8+82	PREHAUL MAINTENANCE
PD-03	0+00 to 1+47	PREHAUL MAINTENANCE
PD-35	0+00 to 4+94	CONSTRUCTION
PD-36	0+00 to 12+83	RECONSTRUCTION
PD-36	12+83 to 22+80	CONSTRUCTION
PD-3604	0+00 to 2+54	CONSTRUCTION

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, 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:

<u>Road</u>	<u>Stations</u>	<u>Requirements</u>
EK-ML	0+00 to 384+96	BRUSHCUT, GRADE
EK-34	0+00 to 20+88	BRUSHCUT, GRADE, APPLICATION OF 3" LIFT OF 2" MINUS
EK-49	0+00 to 97+90	BRUSHCUT, GRADE
EK-65	0+00 to 184+52	BRUSHCUT, GRADE, CULVERT INSTALLATION, DITCH CLEANOUT, CULVERT INLET CLEANOUT APPLICATION OF 3" LIFT OF 2" MINUS
EK-73	0+00 to 32+40	BRUSHCUT, GRADE
PD-ML	0+00 to 203+77	BRUSHCUT, GRADE, SPOT PATCH
PD-02	0+00 to 8+82	BRUSHCUT, GRADE
PD-03	0+00 to 1+47	BRUSHCUT, GRADE

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 may develop an existing rock source. Rock source development will involve drilling, shooting and processing rock. 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.

<u>Tolerance Class</u>	<u>A</u>	<u>B</u>	<u>C</u>
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. Road Plan Clauses.
3. Typical Section Sheet.
4. Standard Lists.
5. 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.

<u>Road</u>	<u>Activity</u>	<u>Closure Period</u>
ALL ROADS	ALL ACTIVITIES	November 1 to March 31
PD-ML	CULVERT REMOVAL ON FISH STREAM	October 1 to June 30

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 Contract Administrator upon request. If damage occurs while plowing, further permission to plow may be revoked by the Contract Administrator.

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.

2-4 PASSAGE OF LIGHT VEHICLES

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

2-5 MAINTENANCE GRADING – EXISTING ROAD

Purchaser shall use a grader to shape the existing surface before timber haul.

2-6 CLEANING CULVERTS

On the following roads, Purchaser shall clean the inlets and outlets of all culverts before timber haul.

<u>Road</u>	<u>Stations</u>
EK-65	0+00 to 184+52

2-7 CLEANING DITCHES, HEADWALLS, AND CATCH BASINS

Purchaser shall clean ditches, headwalls, and catchbasins. Work must be completed before timber haul and must be done in accordance with the TYPICAL SECTION SHEET.

<u>Road</u>	<u>Stations</u>
EK-65	0+00 to 184+52

SECTION 3 – CLEARING, GRUBBING, AND DISPOSAL

3-1 BRUSHING

On 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:

<u>Material Type</u>	<u>Excavation Slope Ratio</u>	<u>Excavation Slope Percent</u>
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:

<u>Material Type</u>	<u>Embankment Slope Ratio</u>	<u>Embankment Slope Percent</u>
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.

SECTION 5 – DRAINAGE

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 meet the specifications in Clauses 10-15 through 10-24.

5-7 USED CULVERT MATERIAL

On temporary roads, Purchaser may install used culverts. All other roads must have new culverts installed. Purchaser shall obtain approval from the Contract Administrator for the quality of the used culverts before installation.

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 STREAM CROSSING 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.

SECTION 6 – ROCK AND SURFACING

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 sources 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 sources, a joint operating plan must be developed. All parties shall follow this plan.

<u>Source</u>	<u>Location</u>	<u>Rock Type</u>
PURDY PIT	8+82 of the PD-02	3-INCH MINUS BALLAST, RIPRAP
AIRPLANE PIT	97+90 of the EK-49	2-INCH MINUS SURFACING, 3-INCH MINUS BALLAST, RIPRAP

6-3 ROCK SOURCE STATE LAND, EXISTING STOCKPILE

Rock used in accordance with the quantities on the TYPICAL SECTION and MATERIALS LIST may be obtained from the following existing stockpiles on state land at no charge to the Purchaser. Purchaser shall not remove additional yardage without prior written approval from the Contract Administrator. Other stockpiles may not be used.

<u>Source</u>	<u>Location</u>	<u>Rock Type</u>	<u>Quantity</u>
PURDY PIT*	8+82 of the PD-02	3-INCH MINUS BALLAST	ALL AVAILABLE
AIRPLANE PIT	97+90 of the EK-49	2-INCH MINUS SURFACING	3,395 Yds.

*Stockpiles from the Purdy Pit may only be used for roads in the Purdy road network.

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.

6-11 ROCK SOURCE DEVELOPMENT PLAN BY PURCHASER

Purchaser shall conduct rock source development and use at the following sources, in accordance with a written ROCK SOURCE DEVELOPMENT PLAN to be prepared by the Purchaser. The plan is subject to written approval by the Contract Administrator before any rock source operations. 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.

<u>Source</u>	<u>Rock Type</u>
AIRPLANE PIT	3-INCH MINUS BALLAST and RIPRAP
PURDY PIT	

Rock source development plans prepared by the Purchaser must show the following information:

- Rock source location.
- Rock source overview showing access roads, development areas, stockpile locations, waste areas, and floor drainage.
- Rock source profiles showing development areas, bench locations including widths, and wall faces including heights.
- Rock source reclamation plan describing how the area will be left in a condition that will ensure public safety and minimize environmental impacts.

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. The exact point of evaluation

6-30 2-INCH MINUS CRUSHED ROCK

% Passing 2" square sieve	100%
% Passing 1" square sieve	55 - 75%
% Passing U.S. #4 sieve	20 - 45%

Of the fraction passing the No. 4 sieve, 40% to 60% must pass the No. 10 sieve.

The portion of aggregate retained on the No. 4 sieve may not contain more than 0.2 percent organic debris and trash. All percentages are by weight.

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:

<u>Quantity</u>	<u>Approximate Size Range</u>
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")

6-51 HEAVY LOOSE RIP RAP

Heavy 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. Heavy loose rip rap must be free of rock fines, soil, organic debris or other extraneous material, and must meet the following requirements:

<u>Quantity</u>	<u>Size Range</u>
30% to 90%	1 ton to 2 ton (28" - 36")
30% to 70%	500 lbs. to 1 ton (18" - 28")
20% to 50%	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.

6-70 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.

6-75 OPTIONAL ROCK EXCEPTION

On the following roads, if hauling takes place from May 1 to September 30 Purchaser may provide and place less rock than shown on the TYPICAL SECTION and MATERIALS LIST, when approved in writing by the Contract Administrator.

If less rock is applied, Purchaser shall submit a written plan, for approval, describing how these roads will be constructed, used, maintained, and treated post-haul. Purchaser shall meet post-haul specifications in Section 9 POST-HAUL ROAD WORK, the FOREST ACCESS ROAD MAINTENANCE SPECIFICATIONS, or other conditions of the approved plan.

<u>Road</u>	<u>Stations</u>
PD-ML	203+77 to 207+89
PD-35	0+00 to 4+94
PD-36	0+00 to 22+80
PD-3604	0+00 to 2+54

SECTION 8 – EROSION CONTROL

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.

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

8-27 FERTILIZER

Purchaser shall evenly spread the fertilizer listed below on all exposed soil inside the grubbing limits at a rate of 200 pounds per acre of exposed soil. Fertilizer must meet the following specifications:

<u>Chemical Component</u>	<u>% by Weight</u>
Nitrogen	16
Phosphorous	16
Potassium	16
Sulphur	3
Inerts	49

SECTION 9 – POST-HAUL ROAD WORK

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 and as specified below.

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.

<u>Road</u>	<u>Stations</u>
PD-ML	187+95 to 207+89
PD-36	0+00 to 22+80
PD-3604	0+00 to 2+54

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.

SECTION 10 MATERIALS

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.

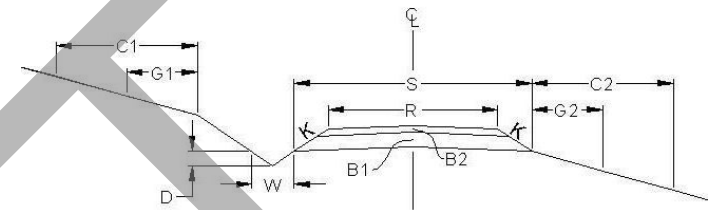
10-24 GAUGE AND CORRUGATION

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

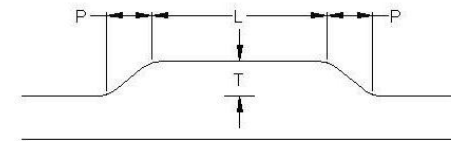
<u>Diameter</u>	<u>Gage</u>	<u>Corrugation</u>
18"	16 (0.064")	2 ² / ₃ " X 1/2"
24" to 48"	14 (0.079")	2 ² / ₃ " X 1/2"
54" to 96"	14 (0.079")	3" X 1"

ROAD #		EK-ML	EK-34	EK-34	EK-34
REQUIRED / OPTIONAL		REQUIRED	REQUIRED	REQUIRED	REQUIRED
CONSTRUCT / RECONSTRUCT		MAINTENANCE	MAINTENANCE	RECONSTRUCT	CONSTRUCT
TOLERANCE CLASS (A/B/C)		C	C	C	C
STATION / MP TO		0+00	0+00	20+88	34+77
STATION / MP		384+96	20+88	34+77	68+45
ROAD WIDTH	R	12	12	12	12
CROWN (INCHES @ C/L)		3	3	3	3
DITCH WIDTH	W	3	3	3	3
DITCH DEPTH	D	1	1	1	1
TURNOUT LENGTH	L	--	--	50	50
TURNOUT WIDTH	T	--	--	10	10
TURNOUT TAPER	P	--	--	25	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	1 ½ : 1
❖ BALLAST DEPTH	B1	--	--	12	18
CUBIC YARDS / STATION		--	--	72	114
➤ TOTAL CY BALLAST		--	--	1,000 ^B	3,840 ^B
❖ SURFACING DEPTH	B2	--	3	--	--
CUBIC YARDS / STATION		--	17	--	--
➤ TOTAL CY SURFACING		--	355 ^A	--	--
➤ TOTAL CUBIC YARDS		--	355	1,000	3,840
SUBGRADE WIDTH	S	--	12.5	14	16.5
BRUSHCUT (Y/N)		Y	Y	N	N
BLADE, SHAPE, & DITCH (Y/N)		Y	Y	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)
A: 2-Inch Minus Surfacing	3,395
B: 3-Inch Minus Ballast	7,890
Rip Rap	263

ROAD #		EK-49	EK-4904	EK-65	EK-65	EK-65	EK-73	PD-ML	PD-ML
REQUIRED / OPTIONAL		REQUIRED	REQUIRED	REQUIRED	REQUIRED	REQUIRED	REQUIRED	REQUIRED	REQUIRED
CONSTRUCT / RECONSTRUCT		MAINTENANCE	RECONSTRUCT	MAINTENANCE	CONSTRUCT	MAINTENANCE	MAINTENANCE	MAINTENANCE	RECONSTRUCT
TOLERANCE CLASS (A/B/C)		C	C	C	C	C	C	C	C
STATION / MP TO		0+00	0+00	0+00	146+87	152+37	0+00	0+00	203+77
STATION / MP		97+90	18+44	146+87	152+37	184+52	32+40	203+77	207+89
ROAD WIDTH	R	12	12	12	12	12	12	12	12
CROWN (INCHES @ C/L)		3	3	3	3	3	3	3	3
DITCH WIDTH	W	3	3	3	3	3	3	3	3
DITCH DEPTH	D	1	1	1	1	1	1	1	1
TURNOUT LENGTH	L	--	50	--	--	--	--	--	--
TURNOUT WIDTH	T	--	10	--	--	--	--	--	--
TURNOUT TAPER	P	--	25	--	--	--	--	--	--
GRUBBING	G1	--	5	--	5	--	--	--	5
	G2	--	5	--	5	--	--	--	5
CLEARING	C1	--	10	--	10	--	--	--	10
	C2	--	10	--	10	--	--	--	10
ROCK FILLSLOPE	K:1	--	1 ½ : 1	1 ½ : 1	1 ½ : 1	1 ½ : 1	--	--	1 ½ : 1
❖ BALLAST DEPTH	B1	--	4	--	18	--	--	--	12
CUBIC YARDS / STATION		--	23	--	114	--	--	--	72
➤ TOTAL CY BALLAST		--	425 ^B	--	625 ^B	--	--	--	295 ^B
❖ SURFACING DEPTH	B2	--	--	3	--	3	--	--	--
CUBIC YARDS / STATION		--	--	17	--	17	--	--	--
➤ TOTAL CY SURFACING		--	--	2,495 ^A	--	545 ^A	--	--	--
➤ TOTAL CUBIC YARDS		--	425	2,495	625	545	--	10 ^B	295
SUBGRADE WIDTH	S	--	12.5	12.5	16.5	12.5	--	--	12.5
BRUSHCUT (Y/N)		Y	N	Y	N	Y	Y	Y	N
BLADE, SHAPE, & DITCH (Y/N)		Y	N	Y	N	Y	Y	Y	N

ROAD #		PD-02	PD-03	PD-35	PD-36	PD-36	PD-3604		
REQUIRED / OPTIONAL		REQUIRED	REQUIRED	REQUIRED	REQUIRED	REQUIRED	REQUIRED		
CONSTRUCT / RECONSTRUCT		MAINTENANCE	MAINTENANCE	CONSTRUCT	RECONSTRUCT	CONSTRUCT	CONSTRUCT		
TOLERANCE CLASS (A/B/C)		C	C	C	C	C	C		
STATION / MP TO		0+00	0+00	0+00	0+00	12+83	0+00		
STATION / MP		8+82	1+47	4+94	12+83	22+80	2+54		
ROAD WIDTH	R	12	12	12	12	12	12		
CROWN (INCHES @ C/L)		3	3	3	3	3	3		
DITCH WIDTH	W	3	3	3	3	3	3		
DITCH DEPTH	D	1	1	1	1	1	1		
TURNOUT LENGTH	L	--	--	--	50	--	--		
TURNOUT WIDTH	T	--	--	--	10	--	--		
TURNOUT TAPER	P	--	--	--	25	--	--		
GRUBBING	G1	--	--	5	5	5	5		
	G2	--	--	5	5	5	5		
CLEARING	C1	--	--	10	10	10	10		
	C2	--	--	10	10	10	10		
ROCK FILLSLOPE	K:1	--	--	1 ½ : 1	1 ½ : 1	1 ½ : 1	1 ½ : 1		
❖ BALLAST DEPTH	B1	--	--	12	6	12	12		
CUBIC YARDS / STATION		--	--	72	34	72	72		
➤ TOTAL CY BALLAST		--	--	355 ^B	435 ^B	720 ^B	185 ^B		
❖ SURFACING DEPTH	B2	--	--	--	--	--	--		
CUBIC YARDS / STATION		--	--	--	--	--	--		
➤ TOTAL CY SURFACING		--	--	--	--	--	--		
➤ TOTAL CUBIC YARDS		--	--	355	435	720	185		
SUBGRADE WIDTH	S	--	--	16.5	12.5	16.5	16.5		
BRUSHCUT (Y/N)		Y	Y	N	N	N	N		
BLADE, SHAPE, & DITCH (Y/N)		Y	Y	N	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
EK-34	23+78	18	30	PD	--	--	2	3	L	NT	C			
EK-34	25+37	30	30	XX	--	--	3	5	L/H	NT	C	TYPE 4 STREAM		
EK-34	25+93	18	30	PD	--	--	2	3	L	NT	C			
EK-34	28+65	18	30	PD	--	--	2	3	L	NT	C			
EK-34	32+91	18	30	PD	--	--	2	3	L	NT	C			
EK-34	35+53	18	30	PD	--	--	2	3	L	NT	C			
EK-34	36+65	18	30	PD	--	--	2	3	L	NT	C			
EK-34	38+51	18	30	PD	--	--	2	3	L	NT	C			
EK-34	39+71	18	30	PD	--	--	2	3	L	NT	C			
EK-34	41+27	18	30	PD	--	--	2	3	L	NT	C			
EK-34	43+01	18	30	PD	--	--	2	3	L	NT	C			
EK-34	43+99	18	30	PD	--	--	2	3	L	NT	C			
EK-34	46+73	30	30	XX	--	--	3	5	L/H	NT	C	TYPE 4 STREAM		
EK-34	48+80	18	30	PD	--	--	2	3	L	NT	C			
EK-34	50+64	30	40	XX	--	--	3	5	L/H	NT	C	TYPE 4 STREAM		
EK-34	51+96	18	30	PD	--	--	2	3	L	NT	C			
EK-34	52+43	30	40	XX	--	--	3	5	L/H	NT	C	TYPE 4 STREAM		
EK-34	55+42	18	30	PD	--	--	2	3	L	NT	C			
EK-34	57+12	30	30	XX	--	--	3	5	L/H	NT	C	TYPE 4 STREAM		
EK-34	57+92	18	30	PD	--	--	2	3	L	NT	C			

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 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: <table style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <tr> <td style="text-align: center;"><u>Diameter</u></td> <td style="text-align: center;"><u>Gage</u></td> <td style="text-align: center;"><u>Corrugation</u></td> </tr> <tr> <td style="text-align: center;">18"</td> <td style="text-align: center;">16</td> <td style="text-align: center;">2 2/3" x 1/2"</td> </tr> <tr> <td style="text-align: center;">24" – 48"</td> <td style="text-align: center;">14</td> <td style="text-align: center;">2 2/3" x 1/2"</td> </tr> <tr> <td style="text-align: center;">54" – 96"</td> <td style="text-align: center;">14</td> <td style="text-align: center;">3" x 1"</td> </tr> </table>	<u>Diameter</u>	<u>Gage</u>	<u>Corrugation</u>	18"	16	2 2/3" x 1/2"	24" – 48"	14	2 2/3" x 1/2"	54" – 96"
<u>Diameter</u>	<u>Gage</u>	<u>Corrugation</u>																				
18"	16	2 2/3" x 1/2"																				
24" – 48"	14	2 2/3" x 1/2"																				
54" – 96"	14	3" x 1"																				
EK-34	60+30	18	30	PD	--	--	2	3	L	NT	C											
EK-34	63+42	24	30	PD	--	--	2	3	L	NT	C	TYPE 5 STREAM										
EK-34	64+50	30	30	XX	--	--	3	5	L/H	NT	C	TYPE 4 STREAM										
EK-4904	0+15	18	30	PD	--	--	2	3	L	NT	C											
EK-4904	3+00	18	30	PD	--	--	2	3	L	NT	C											
EK-4904	6+05	18	30	PD	--	--	2	3	L	NT	C											
EK-4904	12+07	30	45	XX	--	--	5	10	L/H	NT	C	TYPE 4 STREAM										
EK-4904	14+54	18	30	PD	--	--	2	3	L	NT	C											
EK-65	148+57	18	30	PD	--	--	2	3	L	NT	C											
EK-65	149+52	18	40	PD	--	--	2	3	L	NT	C											
EK-65	150+73	18	30	PD	--	--	2	3	L	NT	C											
EK-65	181+89	18	30	PD	--	--	2	3	L	NT	C	PREHAUL MAINTENANCE										
PD-ML	23+42	--	--	--	--	--	--	--	--	--	--	PREHAUL: 10 YARDS SPOT PATCH OVER STREAM CULVERT										
PD-ML	204+62	18	30	PD	--	--	2	3	L	NT	C											
PD-ML	205+12	30	36	XX	--	--	4	6	L/H	NT	C	TYPE 4 STREAM										
PD-ML	205+81	18	30	PD	--	--	2	3	L	NT	C											
PD-ML	207+33	24	30	PD	--	--	2	3	L	NT	C	TYPE 5 STREAM										

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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: <table style="margin-left: auto; margin-right: auto; border: none;"> <tr> <td style="text-align: center;"><u>Diameter</u></td> <td style="text-align: center;"><u>Gage</u></td> <td style="text-align: center;"><u>Corrugation</u></td> </tr> <tr> <td style="text-align: center;">18"</td> <td style="text-align: center;">16</td> <td style="text-align: center;">2 2/3" x 1/2"</td> </tr> <tr> <td style="text-align: center;">24" – 48"</td> <td style="text-align: center;">14</td> <td style="text-align: center;">2 2/3" x 1/2"</td> </tr> <tr> <td style="text-align: center;">54" – 96"</td> <td style="text-align: center;">14</td> <td style="text-align: center;">3" x 1"</td> </tr> </table>	<u>Diameter</u>	<u>Gage</u>	<u>Corrugation</u>	18"	16	2 2/3" x 1/2"	24" – 48"	14	2 2/3" x 1/2"	54" – 96"
<u>Diameter</u>	<u>Gage</u>	<u>Corrugation</u>																				
18"	16	2 2/3" x 1/2"																				
24" – 48"	14	2 2/3" x 1/2"																				
54" – 96"	14	3" x 1"																				
PD-36	0+15	18	40	PD	--	--	2	3	L	NT	C											
PD-36	2+64	18	30	PD	--	--	2	3	L	NT	C											
PD-36	4+25	18	30	PD	--	--	2	3	L	NT	C											
PD-36	5+28	18	30	PD	--	--	2	3	L	NT	C											
PD-36	7+48	18	30	PD	--	--	2	3	L	NT	C											
PD-36	10+14	18	30	PD	--	--	2	3	L	NT	C											
PD-36	12+58	18	30	PD	--	--	2	3	L	NT	C											
PD-36	16+32	18	30	PD	--	--	2	3	L	NT	C											
PD-36	19+95	18	30	PD	--	--	2	3	L	NT	C											
PD-3604	0+24	18	30	PD	--	--	2	3	L	NT	C											

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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

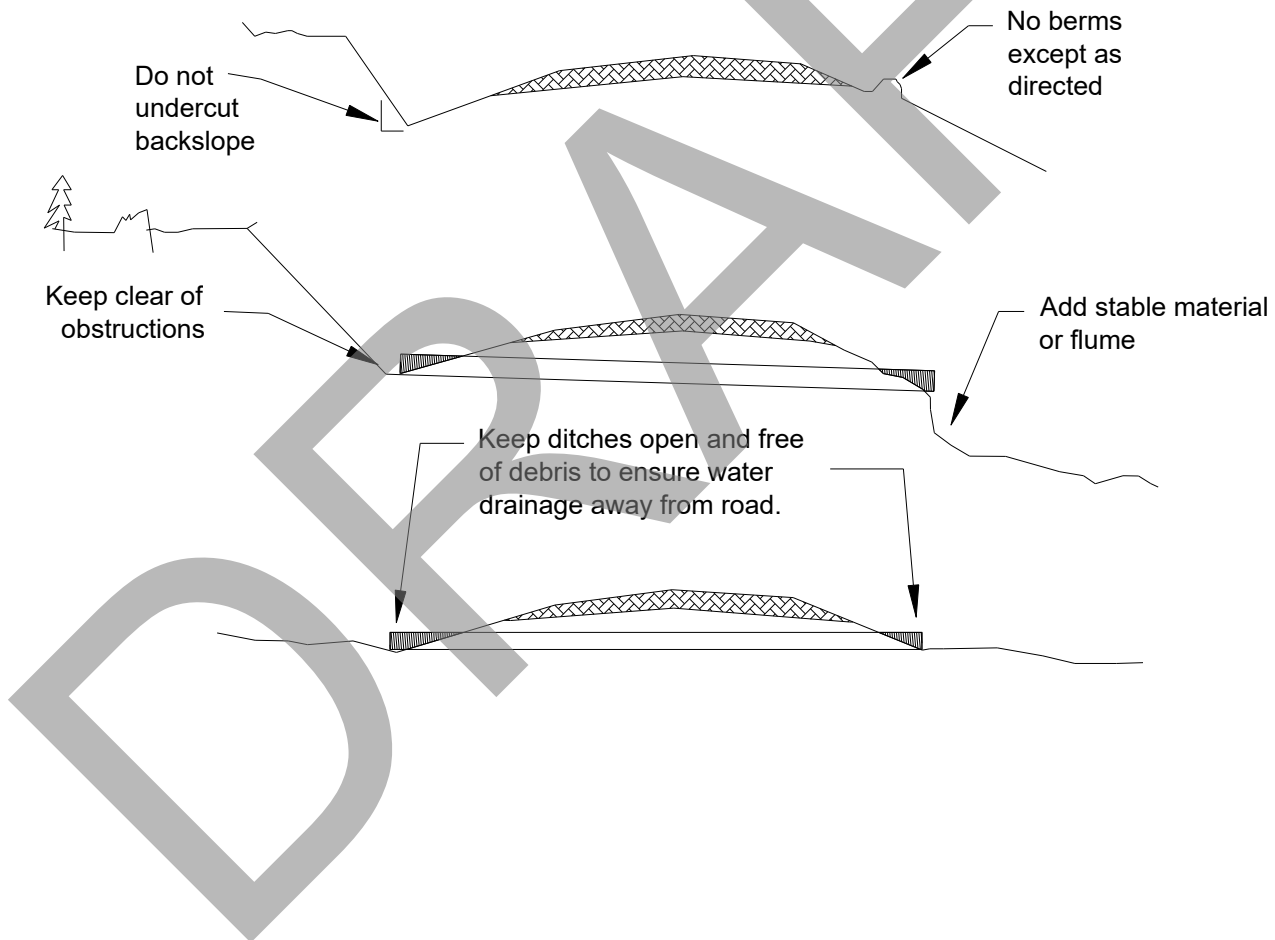
- Perform preventative maintenance work to safeguard against storm damage, such as blading to ensure correct runoff, ditch and culvert cleaning, and waterbar maintenance.

Termination of Use or End of Season

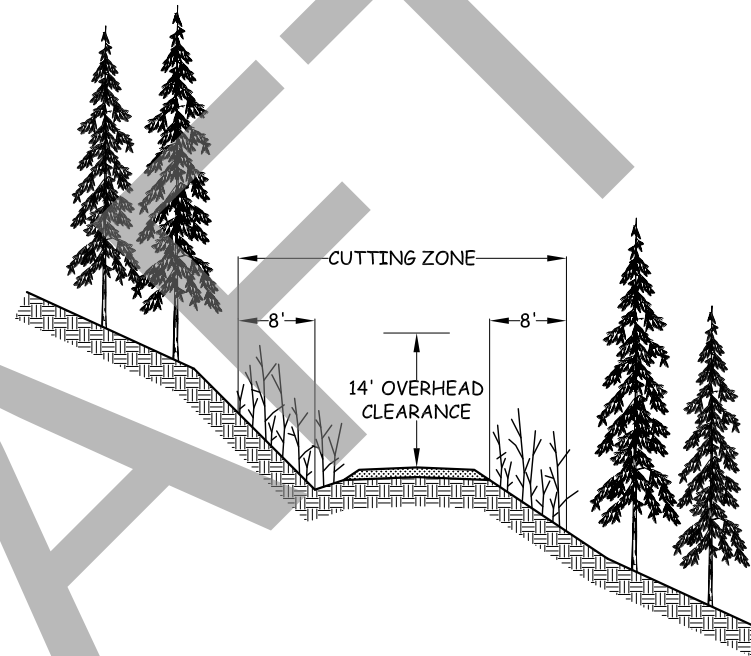
- At the conclusion of logging operations, ensure all conditions of these specifications have been met.

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.

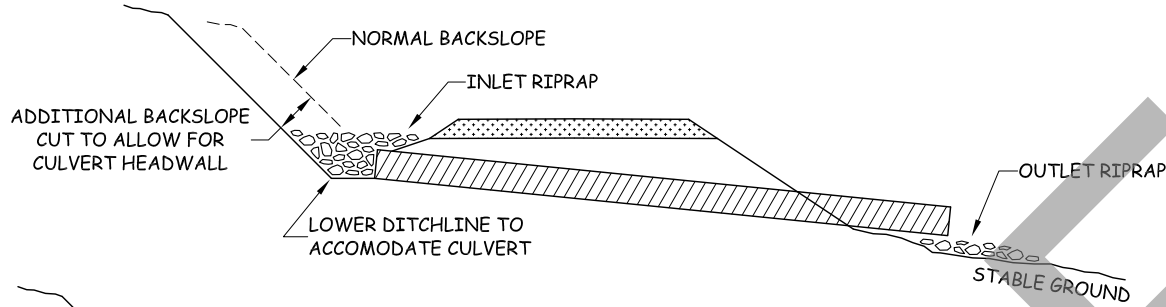
DITCHES SHALL BE CLEARED OF WOODY DEBRIS.

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

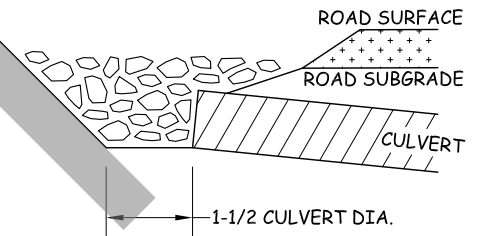
CONTRACT #	PROJECT	SHEET
30-105951	BOLOGNA	34 OF 37

CULVERT AND DRAINAGE SPECIFICATIONS

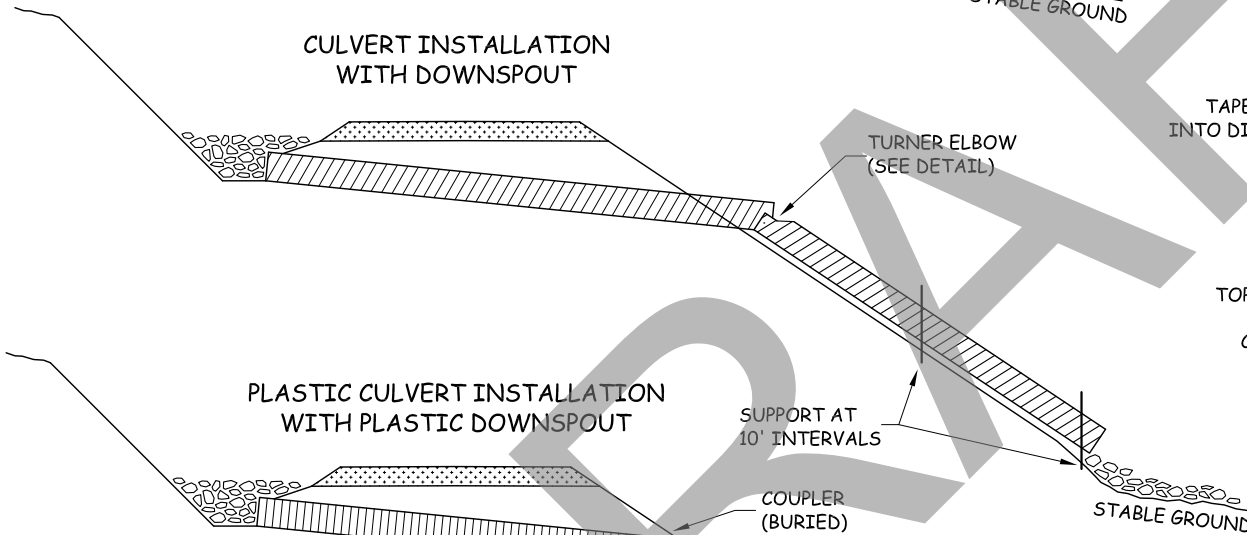
CULVERT INSTALLATION (TYPICAL)



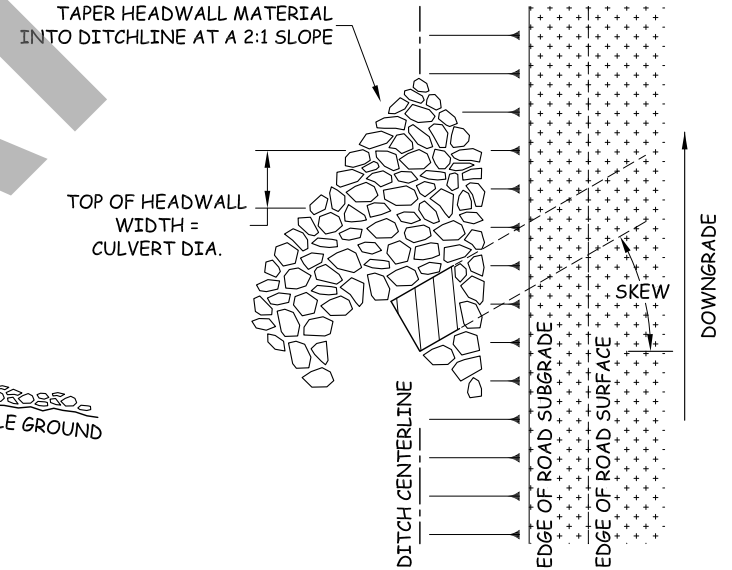
CULVERT HEADWALL - SECTION VIEW



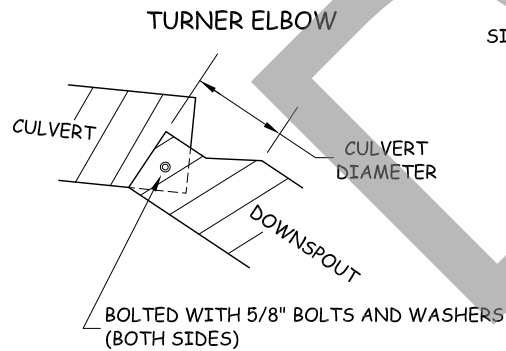
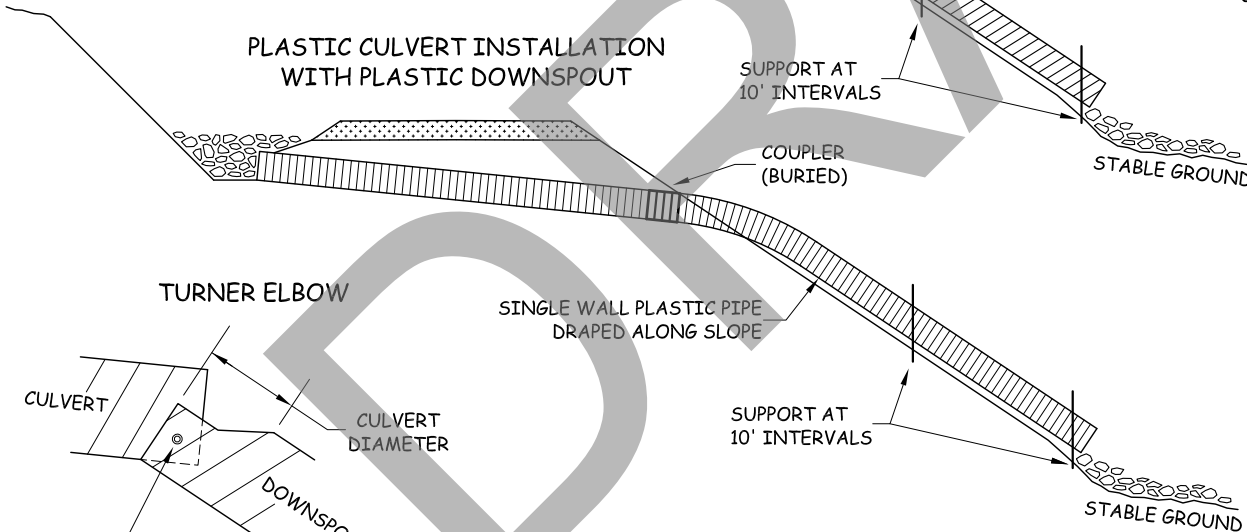
CULVERT INSTALLATION WITH DOWNSPOUT



CULVERT HEADWALL - PLAN VIEW



PLASTIC CULVERT INSTALLATION WITH PLASTIC DOWNSPOUT



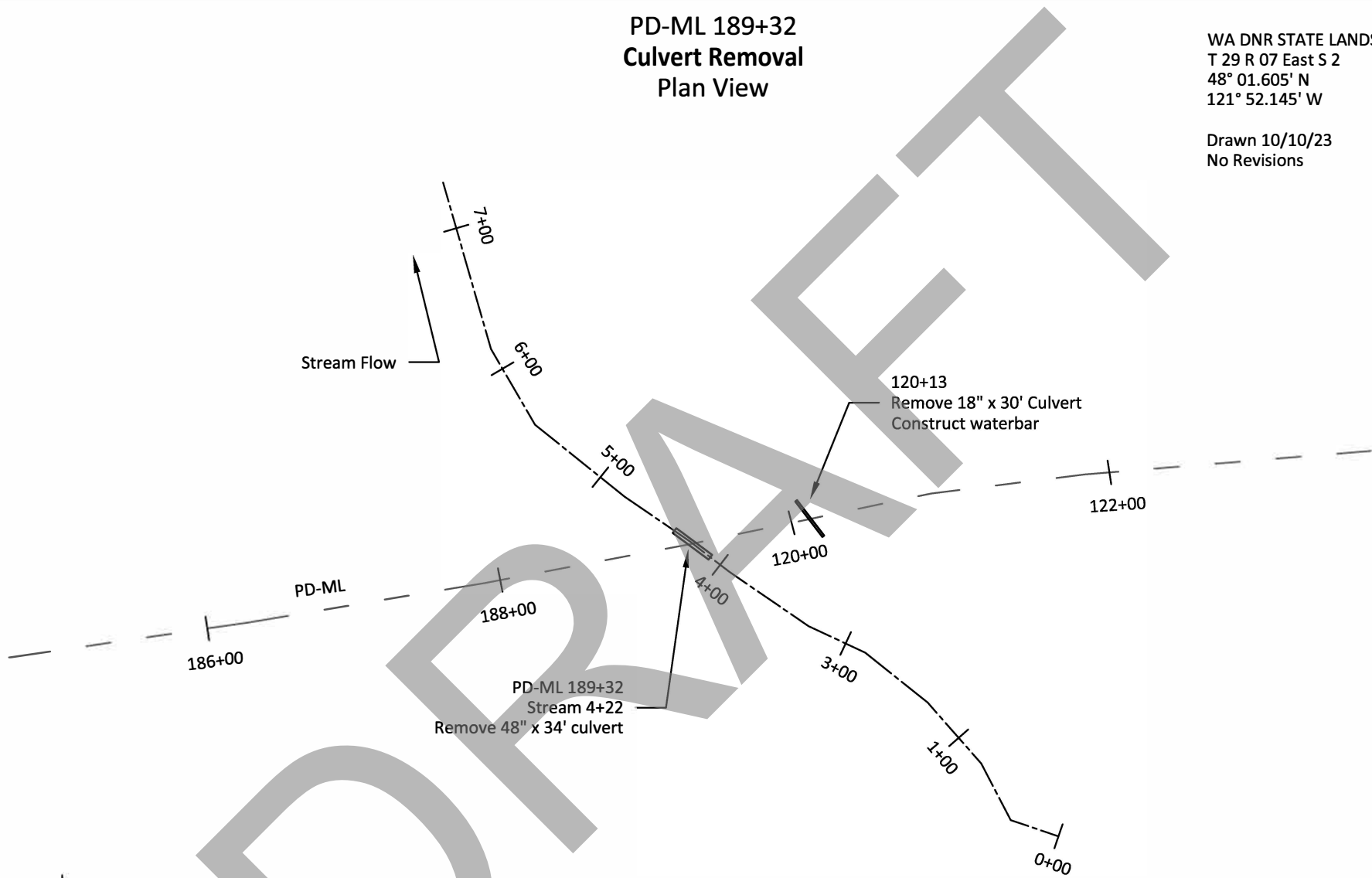
HEADWALL NOTE:
 HEADWALL TO BE CONSTRUCTED OF IMPERVIOUS MATERIAL THAT WILL RESIST EROSION AND ARMORED WITH RIPRAP QUANTITY SPECIFIED IN ROAD PLAN.

CONTRACT #	PROJECT	SHEET
30-105951	BOLOGNA	35 OF 37

PD-ML 189+32
Culvert Removal
 Plan View

WA DNR STATE LANDS
 T 29 R 07 East S 2
 48° 01.605' N
 121° 52.145' W

 Drawn 10/10/23
 No Revisions



DRAFT

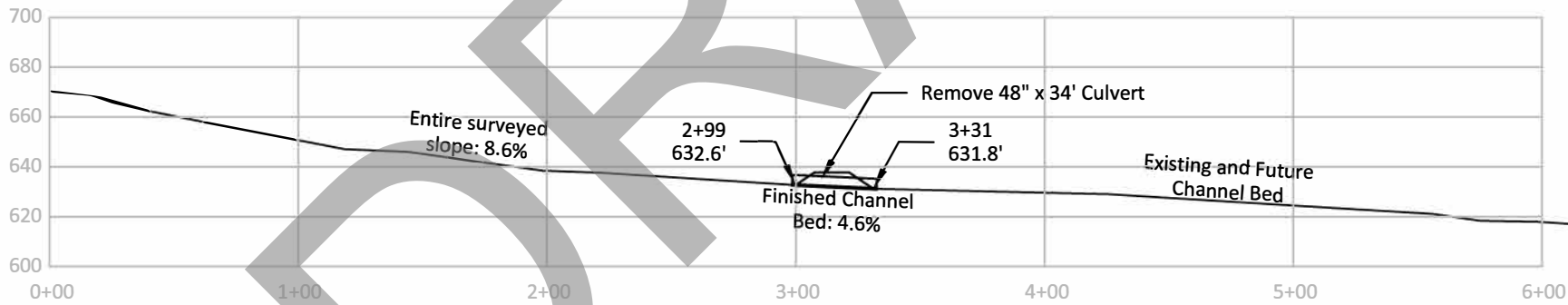
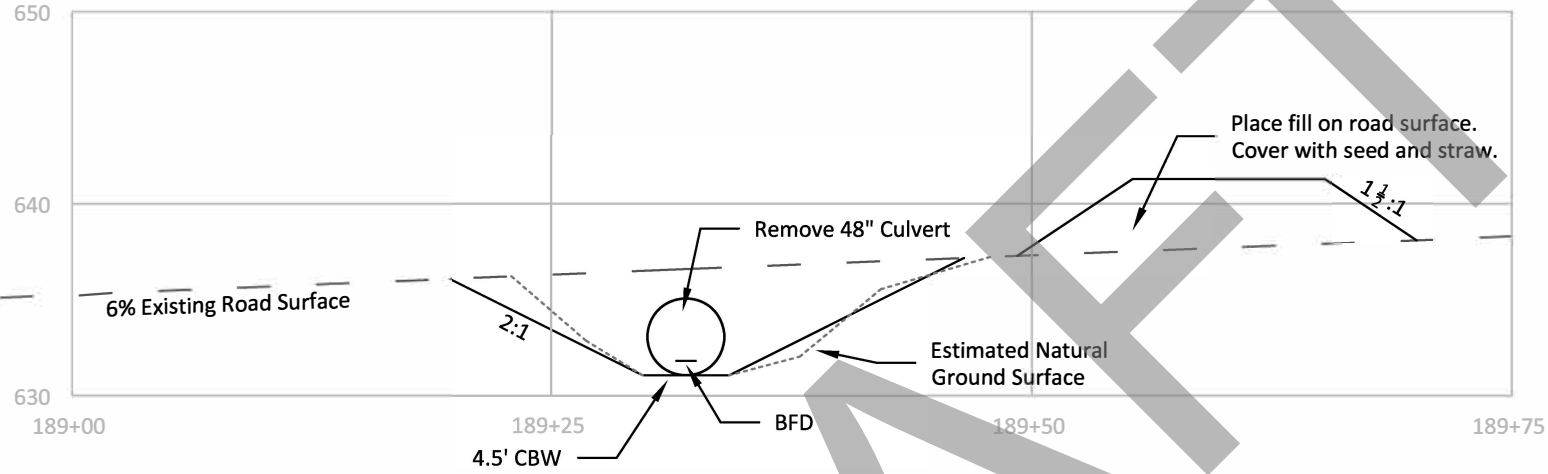


CONTRACT #	PROJECT	SHEET
30-105951	BOLOGNA	36 OF 37

PD-ML 189+32
Culvert Removal
 Road and Stream Profile

WA DNR STATE LANDS
 T 29 R 07 East S 2
 48° 01.605' N
 121° 52.145' W

Drawn 10/10/23
 No Revisions



CONTRACT #	PROJECT	SHEET
30-105951	BOLOGNA	37 OF 37

SUMMARY - Road Development Costs

REGION: NW

DISTRICT: Cascade

SALE/PROJECT NAME: Bologna

CONTRACT #: 30-105951

ROAD NUMBERS:	EK-34, EK-65, PD-35, PD-36, PD-3604	EK-34, EK-4904, PD-ML, PD-36	EK-ML, EK-34, EL-49, EK-65, EK-73, PD-ML, PD-02, PD-03
ROAD STANDARD:	Construction	Reconstruction	Pre-Haul Maintenance
NUMBER OF STATIONS:	56.63	49.28	929.22
CLEARING & GRUBBING:	\$20,721	\$9,640	\$0
EXCAVATION & FILL:	\$61,296	\$20,826	\$0
MISC. MAINTENANCE:	\$0	\$0	\$74,306
ROAD ROCK:	\$139,329	\$46,285	\$44,085
ROCK STOCKPILE PROD:	\$0	\$0	\$0
CULVERTS & FABRIC:	\$19,576	\$16,337	\$640
STRUCTURES:	\$0	\$0	\$0
MOBILIZATION:	\$1,831	\$1,831	\$932
TOTAL COSTS:	\$242,754	\$94,919	\$119,963
COST PER STATION:	\$4,287	\$1,926	\$129
ROAD DEACTIVATION & ABANDONMENT COSTS:		\$4,460	
TOTAL (All Roads) =			\$462,095
ESTIMATED PRECRUISE SALE VOLUME MBF =			4500
ESTIMATED TOTAL \$/MBF =			\$102.69

Compiled by: J. Westra

Date: 10/4/2023