Timber Sale Appraisal
Harlan Hangover

Sale WO-341-2021-W00685-01

District: West Oregon

Date: November 09, 2020

Cost Summary

	Conifer	Hardwood	Total
Gross Timber Sale Value	$1,375,032.36	$19,285.14	$1,394,317.50
		Project Work:	($54,672.00)
		Advertised Value:	$1,339,645.50

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District: West Oregon **Date: November 09, 2020**

Timber Description

Location:

Stand Stocking: 60%

Specie Name	AvgDBH	Amortization (%)	Recovery (%)
Douglas - Fir	26	0	97
Alder (Red)	15	0	94

Volume by Grade	2S	3S & 4S 6"-11"	Camprun	Total
Douglas - Fir	2,158	351	0	2,509
Alder (Red)	0	0	111	111
Total	2,158	351	111	2,620

Comments: Pond Values Used: Local Pond Values, September, 2020

Western Hemlock and Other Conifers Stumpage Price = Pond Value minus Logging Cost:
$265.41/MBF = $547/MBF - $281.59/MBF

Western redcedar and Other Cedars Stumpage Price = Pond Value minus Logging Cost:
$518.41/MBF = $950/MBF - $281.59/MBF - $150.00/MBF(extra haul distance)

Bigleaf maple and other Hardwoods Stumpage Price = Hardwood Pulp price using a conversion factor of 10 MBF/ton = $25/MBF

PULP (Conifer and Hardwood Price) = $2.5/TON

Other Costs (with Profit & Risk to be added):
Intermediate Support/Tail Trees: 7 supports @ $100/support = $700.00
Artificial anchor (dead man): 2 anchors @ $500.00/anchor = $1,000.00
Extra yarding cost (SE end of Timber Sale):
Logging cost = $211/MBF x 10% extra = 21.10/MBF
Total cost = $21.10/MBF x 1.6 acres x 43MBF/ acre = $1,452
TOTAL Other Costs (with Profit & Risk to be added) = $3,152

Other Costs (No Profit & Risk added):
Equipment Cleaning (Invasive Species): $2,000
Landing slash piling/firewood sorting: 4 Landings @ $180/Landing = $720
TOTAL Other Costs (No Profit & Risk added) = $2,720

ROAD MAINTENANCE
Move-in: (Grader) $875
Final Road Maintenance: $12,545.47
TOTAL Road Maintenance: $13,420.47/2,652 MBF = $5.06/MBF

SLASH DISPOSAL
Weed Wash: $300
Move-In: $1,290
Project Work:
In Unit:30 hrs @ $150/hr = $4,500
TOTAL Slash Disposal = $6,090

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Logging Conditions

Combination#: 1

Douglas - Fir	83.00%
Alder (Red)	83.00%

Logging System: Cable: Large Tower >=70 **Process:** Manual Falling/Delimbing
yarding distance: Medium (800 ft) **downhill yarding:** No
tree size: Mature / Regen Cut (900 Bft/tree), 3-5 logs/MBF
loads / day: 9 **bd. ft / load:** 4600
cost / mbf: $164.25
machines: Log Loader (A)
Tower Yarder (Large)

Combination#: 2

Douglas - Fir	4.00%
Alder (Red)	4.00%

Logging System: Shovel **Process:** Manual Falling/Delimbing
yarding distance: Short (400 ft) **downhill yarding:** No
tree size: Mature / Regen Cut (900 Bft/tree), 3-5 logs/MBF
loads / day: 10 **bd. ft / load:** 4600
cost / mbf: $85.60
machines: Shovel Logger

Combination#: 3

Douglas - Fir	13.00%
Alder (Red)	13.00%

Logging System: Cable: Large Tower >=70 **Process:** Manual Falling/Delimbing
yarding distance: Long (1,500 ft) **downhill yarding:** No
tree size: Mature / Regen Cut (900 Bft/tree), 3-5 logs/MBF
loads / day: 7 **bd. ft / load:** 4600
cost / mbf: $211.18
machines: Log Loader (A)
Tower Yarder (Large)

District: West Oregon **Date: November 09, 2020**

Logging Costs

Operating Seasons:	3.00	**Profit Risk:**	10%
Project Costs:	$54,672.00	**Other Costs (P/R):**	$3,152.00
Slash Disposal:	$6,090.00	**Other Costs:**	$2,720.00

Miles of Road

Road Maintenance: $5.06

Dirt	Rock (Contractor)	Rock (State)	Paved
0.0	0.0	0.0	0.0

Hauling Costs

Species	$ / MBF	Trips/Day	MBF / Load
Douglas - Fir	$0.00	3.0	4.5
Alder (Red)	$0.00	2.0	3.5

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District: West Oregon **Date: November 09, 2020**

Logging Costs Breakdown

Logging	Road Maint	Fire Protect	Hauling	Other P/R appl	Profit & Risk	Slash Disposal	Brand & Paint	Other	Total
Douglas - Fir									
$167.20	$5.21	$5.03	$72.48	$1.20	$25.11	$2.32	$2.00	$1.04	$281.59
Alder (Red)									
$167.20	$5.36	$5.03	$143.85	$1.20	$32.26	$2.32	$2.00	$1.04	$360.26

Specie	Amortization	Pond Value	Stumpage	Amortized
Douglas - Fir	$0.00	$829.63	$548.04	$0.00
Alder (Red)	$0.00	$534.00	$173.74	$0.00

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District: West Oregon **Date: November 09, 2020**

Summary

Amortized

Specie	MBF	Value	Total
Douglas - Fir	0	$0.00	$0.00
Alder (Red)	0	$0.00	$0.00

Unamortized

Specie	MBF	Value	Total
Douglas - Fir	2,509	$548.04	$1,375,032.36
Alder (Red)	111	$173.74	$19,285.14

Gross Timber Sale Value

Recovery: $1,394,317.50

Prepared By: David Bailey **Phone:** 541-929-9164

SUMMARY OF ALL PROJECT COSTS

Sale Name: Harlan Hangover

Date: December 2020
Time: 12:02

Project #1 - Road Improvement

Road Segment	Length	Cost
1 to 2	315.7 sta	$12,073
3 to 4	19.0 sta	$10,250
5 to 6	3.7 sta	$6,099
7 to 8	3.1 sta	$2,369
2 to 9	3.7 sta	$2,408
2 to 10	27.2 sta	$496
11 to 12	11.8 sta	$364
13 to 14	8.6 sta	$264
15 to 16	42.3 sta	$651
17 to 18	3.2 sta	$106
19 to 20	50.3 sta	$1,677
21 to 22	23.0 sta	$354
TOTALS	511.6 sta	$37,111

Project #2 - Rock Stockpiling

	Cost
	$13,486

Project #3 - Move in

	Cost
Excavator, C325 or equiv.	$1,450
Grader, Cat 14-G or equiv.	$875
Vibratory roller	$875
Front end loader	$875
TOTAL	$4,075

GRAND TOTAL **$54,672**

Compiled by David Bailey/Cody Valencia Date 12/02/2020

SUMMARY OF CONSTRUCTION COST

SALE Harlan Hangover Project # 1 LENGTH Improve 315.7 sta
ROAD 1 to 2 Surfaced

EXCAVATION With C325 Excavator or equivalent

Excavate bank slough (Sta. 218+50)	2 hr	@	$145.00	/hr	=	$290
				TOTAL EXCAVATION =		$290

IMPROVEMENT

Shape surface Pt. 1 to Sta.159+50 (with road grader)	10.0 sta	@	$20.63	/sta	=	$206
Shape surface Sta. 159+50 to Pt. 2 (with road grader)	156.2 sta	@	$20.63	/sta	=	$3,222
Compact surface (with vibratory roller)	156.2 sta	@	$16.00	/sta	=	$2,499
Ditch re-establishment Sta. 190+50 to 192+00 (with road grader)	1.5 sta	@	$44.00	/sta	=	$66
				TOTAL IMPROVEMENT =		$5,993

SURFACING

			Size	Cost/yd		
Spot rock (Sta. 0+00 to Sta. 315+70)	210 cy of		1½"-0"	$27.12	=	$5,695
				TOTAL ROCK COST =		$5,695

SPECIAL PROJECTS

Clean out culverts (inlets and outlets)	2 culverts	@	$25.00	ea	=	$50
Repair culvert (Sta. 24+10)	1 hr	@	$45.00	/hr	=	$45
			TOTAL SPECIAL PROJECTS COST =			$95

Compiled by: David Bailey/Cody Valencia
Date: Dec 2, 2020 **GRAND TOTAL =====> $12,073**

SUMMARY OF CONSTRUCTION COST

SALE Harlan Hangover Project # 1 LENGTH const 19.0 sta
ROAD 3 to 4 Surfaced

EXCAVATION	With C325 Excavator or equivalent						
Re-open/Expand Landing (Pt. 4)	3 hr	@	$145.00	/hr	=	$435	
Construct turnaround Sta. 7+80(Pt. 5)	1 hr	@	$145.00	/hr	=	$145	
Remove Alder Sta. 10+50 (with excavator)	0.5 hr	@	$145.00	/hr	=	$73	
				TOTAL EXCAVATION =			$653
IMPROVEMENT							
Sod Removal	19.0 sta	@	$15.40	/sta	=	$293	
Shape subgrade (with road grader)	19.0 sta	@	$20.63	/sta	=	$392	
Compact subgrade (with vibratory roller)	19.0 sta	@	$16.00	/sta	=	$304	
Ditch re-establishment Sta. 0+00 to 2+00 (with road grader)	2.0 sta	@	$44.00	/sta	=	$88	
				TOTAL IMPROVEMENT =			$1,077

SURFACING			Size	Cost/yd			
Junction rock (Pt. 3)	10	cy of	1½"-0"	$27.12	=	$271	
Surface rock (2" lift)	210	cy of	1½"-0"	$27.12	=	$5,695	
Turnout rock (Sta. 15+10)	20	cy of	3"-0"	$26.78	=	$536	
Turnaround rock Sta. 7+80(Pt. 5)	20	cy of	Jaw-Run	$25.44	=	$509	
Landing rock (Pt. 4)	30	cy of	Jaw-Run	$25.44	=	$763	
Shape surface (with road grader)	19.0 sta	@	$20.63	/sta	=	$392	
Compact surface (with vibratory roller)	19.0 sta	@	$16.00	/sta	=	$304	
				TOTAL ROCK COST =			$8,470
SPECIAL PROJECTS							
Clean out culverts (inlets and outlets)	2 culvert	@	$25.00	ea	=	$50	
				TOTAL SPECIAL PROJECTS COST =			$50

Compiled by: David Bailey/Cody Valencia
Date: Dec 2, 2020

GRAND TOTAL =====> $10,250

SUMMARY OF CONSTRUCTION COST

SALE Harlan Hangover Project # 1 LENGTH const 3.7 sta
ROAD 5 to 6 Surfaced

EXCAVATION With C325 excavator or equivalent

Re-open road (with excavator)	4	hr	@	$145.00	/hr	=	$580
Re-open/expand Landing (Pt. 6) (with excavator)	1	hr	@	$145.00	/hr	=	$145

TOTAL EXCAVATION = $725

IMPROVEMENT

Shape subgrade (with road grader)	3.7	sta	@	$20.63	/sta	=	$76
Compact subgrade (with vibratory roller)	3.7	sta	@	$16.00	/sta	=	$59

TOTAL IMPROVEMENT = $135

SURFACING

			Size	Cost/yd		
Junction rock (Pt. 5)	10	cy of	1½"-0"	$27.12	=	$271
Landing rock (Pt. 6)	30	cy of	Jaw-Run	$25.44	=	$763
Surface rock (8"lift)	160	cy of	Jaw-Run	$25.44	=	$4,070
Shape surface (with road grader)	3.7	sta	@	$20.63	/sta	=	$76
Compact surface (with vibratory roller)	3.7	sta	@	$16.00	/sta	=	$59

TOTAL ROCK COST = $5,239

Compiled by: David Bailey/Cody Valencia
Date: Dec 2, 2020

GRAND TOTAL =====> $6,099

SUMMARY OF CONSTRUCTION COST

SALE Harlan Hangover Project # 1 LENGTH const 3.1 sta
ROAD 7 to 8 Surfaced

IMPROVEMENT

Re-open road (with road grader)	3.1 sta	@	$15.40	/sta	=	$48
Sod removal (with road grader)	3.1 sta	@	$15.40	/sta	=	$48
Re-open Landing (with road grader)	0.5 hrs	@	$114.00	/hr	=	$57

TOTAL IMPROVEMENT = $153

SURFACING			Size	Cost/yd		
Junction rock (Pt. 7)	20	cy of	3"-0"	$26.78	=	$536
Surface rock (2" lift)	30	cy of	3"-0"	$26.78	=	$803
Landing rock (Pt. 8)	30	cy of	Jaw-Run	$25.44	=	$763
Shape surface (with road grader)	3.1 sta	@	$20.63	/sta	=	$64
Compact surface (with vibratory roller)	3.1 sta	@	$16.00	/sta	=	$50

TOTAL ROCK COST = $2,216

Compiled by: David Bailey/Cody Valencia
Date: Dec 2, 2020

GRAND TOTAL =====> $2,369

SUMMARY OF CONSTRUCTION COST

SALE	Harlan Hangover		Project # 1	LENGTH const	3.7 sta
ROAD	2 to 9	Surfaced			

IMPROVEMENT

Re-open road (with road grader)	3.7	sta	@	$15.40	/sta	=	$57
Sod removal (with road grader)	3.7	sta	@	$15.40	/sta	=	$57
Re-open Landing (with road grader)	0.5	hrs	@	$114.00	/hr	=	$57

TOTAL IMPROVEMENT = $171

SURFACING

			Size	Cost/yd		
Junction rock (Pt. 2)	10	cy of	3"-0"	$26.78	=	$268
Surface rock (2" lift)	40	cy of	3"-0"	$26.78	=	$1,071
Landing rock (Pt. 9)	30	cy of	Jaw-Run	$25.44	=	$763
Shape surface (with road grader)	3.7	sta @	$20.63	/sta	=	$76
Compact surface (with vibratory roller)	3.7	sta @	$16.00	/sta	=	$59

TOTAL ROCK COST = $2,237

Compiled by: David Bailey/Cody Valencia
Date: Dec 2, 2020

GRAND TOTAL =====> $2,408

SUMMARY OF CONSTRUCTION COST

SALE Harlan Hangover Project # 1 LENGTH const 27.2 sta
ROAD 2 to 10 Surfaced

IMPROVEMENT

Sod removal (with road grader) Sta. 14+90 to Pt. 10)	12.3 sta	@	$15.40 /sta	=	$189	
Shape surface (with road grader) (Pt. 2 to Sta.14+90)	14.9 sta	@	$20.63 /sta	=	$307	
				TOTAL IMPROVEMENT =		$496

Compiled by: David Bailey/Cody Valencia
Date: Dec 2, 2020 **GRAND TOTAL =====> $496**

SUMMARY OF CONSTRUCTION COST

SALE Harlan Hangover Project # 1 LENGTH Improve 11.8 sta
ROAD 11 to 12 Surfaced

IMPROVEMENT

Re-open road	11.8 sta	@	$15.40	/sta	=	$182
(with road grader)						
Sod removal	11.8 sta	@	$15.40	/sta	=	$182

TOTAL IMPROVEMENT = $364

Compiled by: David Bailey/Cody Valencia
Date: Dec 2, 2020

GRAND TOTAL =====> $364

SUMMARY OF CONSTRUCTION COST

SALE Harlan Hangover Project # 1 LENGTH const 8.6 sta
ROAD 13 to 14 Surfaced

IMPROVEMENT

Re-open road	8.6 sta	@	$15.40 /sta	=	$132	
(with road grader)						
Sod removal	8.6 sta	@	$15.40 /sta	=	$132	

Compiled by: David Bailey/Cody Valencia
Date: Dec 2, 2020

GRAND TOTAL =====> **$264**

SUMMARY OF CONSTRUCTION COST

SALE	Harlan Hangover	Project #	1	LENGTH	const	42.3 sta
ROAD	15 to 16	Surfaced				

IMPROVEMENT

Sod removal	42.3	sta	@	$15.40	/sta	=	$651

Compiled by: David Bailey/Cody Valencia
Date: Dec 2, 2020

GRAND TOTAL =====> **$651**

SUMMARY OF CONSTRUCTION COST

SALE Harlan Hangover Project # 1 LENGTH const 3.2 sta
ROAD 17 to 18 Surfaced

IMPROVEMENT

Sod removal	3.2 sta	@	$15.40 /sta	=	$49	
Re-open Landing (Pt. 18) (with road grader)	0.5 hrs	@	$114.00 /hr	=	$57	

Compiled by: David Bailey/Cody Valencia
Date: Dec 2, 2020

GRAND TOTAL =====> **$106**

SUMMARY OF CONSTRUCTION COST

SALE Harlan Hangover Project # 1 LENGTH const 50.3 sta
ROAD 19 to 20 Surfaced

IMPROVEMENT

Sod removal	50.3	sta	@	$15.40	/sta	=	$775
Re-open Landing (Pt. 20) (with road grader)	0.5	hrs	@	$114.00	/hr	=	$57

SURFACING

				Size	Cost/yd		
Spot rock (Sta. 43+70)	20	cy of		3"-0"	$26.78	=	$536
Landing rock (Pt. 20)	10	cy of		3"-0"	$26.78	=	$268
Shape surface (with road grader)	2.0	sta	@	$20.63	/sta	=	$41

Compiled by: David Bailey/Cody Valencia
Date: Dec 2, 2020

GRAND TOTAL =====> **$1,677**

SUMMARY OF CONSTRUCTION COST

SALE Harlan Hangover Project # 1 LENGTH const 23.0 sta
ROAD 21 to 22 Surfaced

IMPROVEMENT

Sod removal	23 sta	@	$15.40 /sta	=	$354	

Compiled by: David Bailey/Cody Valencia
Date: Dec 2, 2020

GRAND TOTAL =====> $354

SUMMARY OF PROJECT COST

SALE Harlan Hangover
ROAD Wolf Cabin

Project # 2 - Rock Stockpile

STOCKPILING				Size	Cost/yd		
Stockpile rock (using 18cy truck)	700 CY	1½"-0"	@	$17.88	/CY	=	$12,516
Create stockpile (front end loader)	10 hr.		@	$97.00	/hr.	=	$970

TOTAL ROCK COST = $13,486

Compiled by: David Bailey
Date: Dec 2, 2020

GRAND TOTAL =====> $13,486

SUMMARY OF MAINTENANCE COST

SALE Harlan Hangover Final log haul Maintenance Cost Estimate

(Costed in appraisal, not in project costs)

Grading Move-in $ 875

Road Segment	Length	Cost/Sta	Cost	Mileage
1 to 2	315.7	$20.63	$6,512.89	5.98
3 to 4	19.0	$20.63	$391.97	0.36
5 to 6	3.7	$20.63	$76.33	0.07
7 to 8	3.1	$20.63	$63.95	0.06
2 to 9	3.7	$20.63	$76.33	0.07
Total	345.2		$7,121.47	6.54

Maintenance Rock:

	Volume	Cost/CY	Cost
1½"-0"	200	$27.12	$5,424.00

Grand Total $13,420.47

TS Volume 2,652 MBF

Cost / MBF = $5.06

NOTES:

Rock Haul Cost Computation

SALE NAME: Harlan Hangover DATE: Dec 2, 2020
ROAD NAME: Long Haul Road CLASS: Medium
ROCK SOURCE: Hard Rock Quarries 10 CY truck
Route: Hwy 20 to Harlan Burnt Woods Rd to Burnt Woods Ridge Rd. to Wolf

TIME Computation:
Road speed time factors:

1.	55 MPH		MRT	0.0	minutes
2.	50 MPH	16.6	MRT	19.9	minutes
3.	45 MPH		MRT	0.0	minutes
4.	40 MPH		MRT	0.0	minutes
5.	35 MPH	4.0	MRT	6.9	minutes
6.	30 MPH		MRT	0.0	minutes
7.	25 MPH		MRT	0.0	minutes
8.	20 MPH	7.9	MRT	23.7	minutes
9.	15 MPH	6.3	MRT	25.2	minutes
10.	10 MPH	0.6	MRT	3.6	minutes
11.	05 MPH		MRT	0.0	minutes

Dump or spread time per RT		0.50	minutes
Total hauling cycle time for this setting (100% efficiency)		79.80	minutes
Operator efficiency correction	0.85	93.88	minutes
Job efficiency correction	0.90	104.31	minutes
Truck capacity (CY)	10.00	10.43	min/CY
Loading time, delay time per CY			min/CY
TIME (minutes) per cubic yard		10.43	min/CY

COST per CY computation

Cost of truck and operator per hour	$90.00	/hr.
Cost of truck and operator per minute	$1.50	/min
Cost per CY	$15.65	/CY
Spread and compact — Water truck, Grader & Roller	$1.50	/CY

Size	**Cost/Yd (Pit)**	**Cost Delivered w/o processing**	**Cost Delivered with processing**
1½ - 0"	$ 11.47	$27.12	$28.62
3 - 0"	$ 11.13	$26.78	$28.28
Jaw-Run	$ 9.79	$25.44	$26.94
Pit-Run	$ 8.77	$24.42	$25.92

Rock Haul Cost Computation

SALE NAME: Harlan Hangover DATE: Dec 2, 2020
ROAD NAME: Long Haul Road CLASS: Medium
ROCK SOURCE: Hard Rock Quarries 18 CY truck
Route: Hwy 20 to Harlan Burnt Woods Rd to Burnt Woods Ridge Rd. to Wolf Cabin to Long Haul

TIME Computation:
Road speed time factors:

1.	55 MPH		MRT	0.0	minutes
2.	50 MPH	16.6	MRT	19.9	minutes
3.	45 MPH		MRT	0.0	minutes
4.	40 MPH		MRT	0.0	minutes
5.	35 MPH	4.0	MRT	6.9	minutes
6.	30 MPH		MRT	0.0	minutes
7.	25 MPH		MRT	0.0	minutes
8.	20 MPH	4.1	MRT	12.3	minutes
9.	15 MPH	4.8	MRT	19.2	minutes
10.	10 MPH		MRT	0.0	minutes
11.	05 MPH		MRT	0.0	minutes

Dump or spread time per RT		0.50	minutes
Total hauling cycle time for this setting (100% efficiency)		58.80	minutes
Operator efficiency correction	0.85	69.18	minutes
Job efficiency correction	0.90	76.87	minutes
Truck capacity (CY)	18.00	4.27	min/CY
Loading time, delay time per CY			min/CY
TIME (minutes) per cubic yard		4.27	min/CY

COST per CY computation

Cost of truck and operator per hour	$90.00	/hr.
Cost of truck and operator per minute	$1.50	/min
Cost per CY	$6.41	/CY
Spread and compact — Water truck, Grader & Roller	$1.50	/CY

Size	Cost/Yd (Pit)	Cost Delivered w/o processing	Cost Delivered with processing
1½ - 0"	$ 11.47	$17.88	$19.38
3 - 0"	$ 11.13	$17.54	$19.04
Jaw-Run	$ 9.79	$16.20	$17.70
Pit-Run	$ 8.77	$15.18	$16.68

TIMBER CRUISE REPORT

Harlan Hangover
(WO-341-2021-W00685-01)
FY 2021

1. **Sale Area Location**: Portions of Sections 5 & 6, T12S, R8W, W.M., Lincoln County, Oregon.

2. **Fund Distribution:**
   a. **Fund** BOF 67% CSL 33%

3. **Sale Acreage by Area:**

Area	Treatment	Gross Acres	Stream Buffers	Existing Roads	Green Tree Reserve Area	Net Sale Acres	Acreage Comp. Method
1	Modified Clearcut	79	13	1	3	62	GIS

4. **Cruisers and Cruise Dates:** The sale was cruised by David Bailey, Zane Sandborg, Cody Valencia and Aaron McEwen in October 2020.

5. **Cruise Method and Computation:** The sale consists of one modified clearcut area that was cruised using variable radius plot sampling. The sale area was cruised using a 40 BAF with plots spaced 5 chains apart on plot lines spaced 4 chains apart. A total of 31 plots were taken with 19 measure plots and 12 count plots.

6. Measure plots were measured for DBH, height, form factor, grade, and defect. Data was entered into the Atterbury SuperACE cruise program to determine stand statistics and net board foot volume. Additional volume was removed to account for hidden defect and breakage.

   Digital ortho photos, Lidar data, and GPS data were used to map the boundaries for the sale, and ArcMap GIS was used to determine gross and net acreage.

7. **Measurement Standards:** Tree heights were measured to the nearest foot, to a top diameter of 6 inches inside bark or to 40% of form factor. Diameters at breast height (DBH) were measured to the nearest inch, and a form point of 16 feet was used to calculate form factor. Form factors were measured or estimated on every tree. Most trees were graded in 40 foot log segments unless breakage, defect, or length to top of grade cruise diameter warranted otherwise.

8. **Timber Description:** Timber in the sale area includes 62 acres of 89 year-old Douglas-fir and red alder with some scattered bigleaf maple. The average Douglas-fir to be removed is approximately 26 inches DBH, with an average height of 117 feet to a merchantable top. The average red alder is approximately 15 inches DBH, with an average height of 46 feet to a merchantable top. The average volume per acre to be harvested (net) is approximately 43 MBF. Conifer trees other than Douglas-fir are reserved from cutting.

9. **Statistical Analysis and Stand Summary:** (See attached "Statistics").

Area	Target CV	Target SE	Actual CV	Actual SE
1	45%	9%	45.1%	8.1%

Note: Statistics shown are for conifer and hardwood trees combined. Percentages are for net board foot volume.

10. **Total Volume (MBF) by Species and Grade:** (See attached volume report "Species, Sort Grade – Board Foot Volumes - Project").

Species	Gross Cruise Volume	Cruised D & B	Cruised D & B (MBF)	Hidden D & B	Hidden D & B (MBF)	Net Sale Volume
Douglas-fir	2,627	0.5%	13	4%	105	2,509
Red Alder	122	3.2%	4	6%	7	111
Bigleaf Maple	36	4.8%	2	6%	2	32
Total	2,785	--	19	--	223	2,652

Species	Ave. DBH	Net Vol.	2-Saw	3-Saw	4-Saw	Camp Run
Douglas-fir	25	Grade %	86%	12%	2%	-
		2,509	2,158	301	50	-
Red Alder	15	Grade %	-	-	-	100%
		111	-	-	-	111
Bigleaf Maple	16	Grade %	-	-	-	100%
		32	-	-	-	32
Total		2,652	2,158	301	50	143

Attachments: Cruise Design
Cruise Maps
Species, Sort Grade – Board Foot Volumes
Statistics
Stand Table Summary
Log Stock Table – MBF

Prepared by: David Bailey Date: 11/24/2020

Unit Forester: Evelyn Hukari Date: 12/02/2020

Revised August, 2002

CRUISE DESIGN
WEST OREGON DISTRICT

Sale Name: Harlan Hangover **Area** 1

Harvest Type: MC
Approx. Cruise Acres: 64 **Estimated CV%** 45 Net BF /Acre **SE% Objective** 9 Net BF /Acre

Planned Sale Volume: 3.52 MMBF **Estimated Sale Area Value/Acre:** $ 26,125

A. Cruise Goals: (a) Grade minimum 65 conifer and 5 hardwood trees: (b) Sample 32 cruise plots (16 grade: 16 count); (c) Other goals X Determine log grades for sale value.

(Special cruising directions – leave trees etc.) Take plots as shown on map. Do not take plots in buffers.

DO NOT RECORD 12', 22' and 32' (for Hardwoods).

DO NOT RECORD 22' LENGTHS.

B. Cruise Design:

1. **Plot Cruises:** BAF 40 (Full point; Half point) (circle one)
   Cruise Line Direction(s) See Map
   Cruise Line Spacing 5/330 (chains) (feet)
   Cruise Plot Spacing 4/264 (chains) (feet)
   Grade/Count Ratio 1:1

C. Tree Measurements:

1. **Diameter:** Minimum DBH to cruise is 8" for conifers and 10" for hardwoods. Record dbh to nearest ½" for trees < 16", to nearest 1" for trees 16-24", and to nearest 2" for trees > 24". If tree diameters are estimated (only estimate on variable plot cruises), then record to closest estimate.

2. **Bole Length:** Record bole length to nearest foot at TCD. For trees greater than 100 feet in merchantable height, estimating to the nearest 5 feet is acceptable.

3. **Top Cruise Diameter (TCD):** Minimum top outside bark for conifer is 7", 7" for hardwoods or 40 % of dob at 16' form point. Generally, use 7" outside bark for trees < 18" dbh and 40% of dob @ FP for trees > 18" dbh.

4. **Form Factors:** (1) Measure or estimate a 16' form factor for every conifer tree measured/graded; OR (2) Measure a minimum of 20 form factors for each major conifer species on the cruise area, and use these to calculate average FF for the species on the cruise. Hardwood form factors are a Standard 87.

5. **Tree Segments:** Record log segments in "standard" log lengths in general use, such as 32' and 40' lengths, whenever possible. Do not record odd segments just to maximize grade. Cull segments can be any length. For conifers, minimum merchantable segment length is 12'; for

hardwoods, it's 8'. Maximum segment length is 40'. One foot of trim is assumed for each merch. log segment. Do not use "double dash" (--) feature on the data recorder except for the top segment of the tree.

6. **Species, Sort, and Grade Codes:** A. Species: Record as DF (Douglas-fir); WH (Western hemlock); SS (Sitka Spruce); RC (Western red cedar); NF (Noble fir); SF (Silver fir); RA (Red alder); BM (Bigleaf maple). For "leave trees" in partial cuts, or for marked "wildlife trees," add an "L" to the species code (such as DFL, HL, CL, etc.)
   B. Sort: Use code "1" (Domestic).
   C. Grade: A = 1 Peeler; B = 2 Peeler; C = 3 Peeler; D = Special Mill; 2 = 2 Sawmill; 3 = 3 Sawmill; 4 = 4 Sawmill; K = Camp Run; 0 = Cull ;
   Hardwoods: K = Camprun; #1 Sawmill = 12"+ scaling diameter; #2 Sawmill = 10" and 11"; #3 Sawmill = 8" and 9"; #4 Sawmill = 6" and 7"

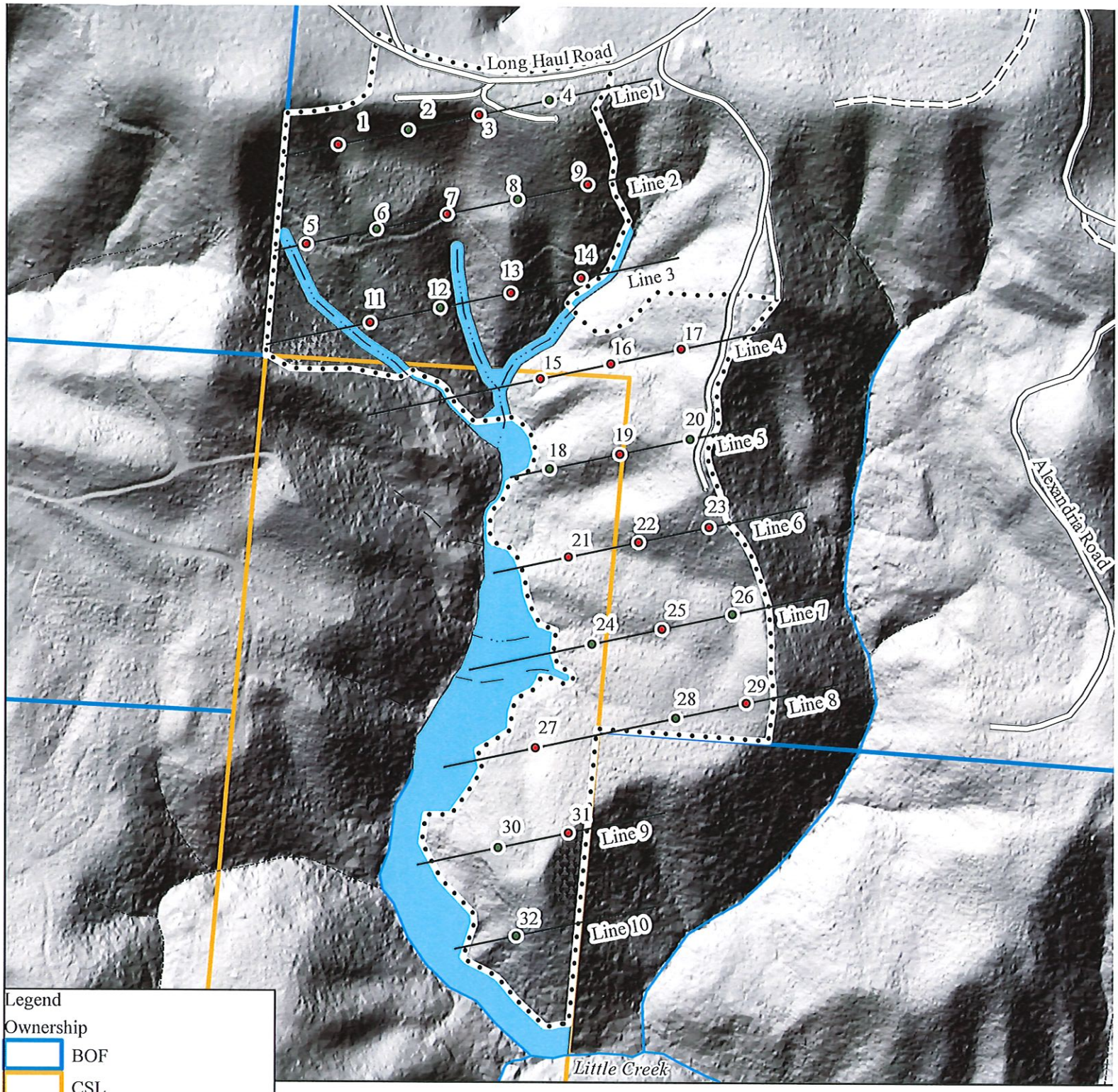
7. **Deductions:** Estimate visible defect or damage as a "length deduction" (most often), or as a "diameter deduction," as applicable. Estimate hidden defect and breakage (usually some breakage is encountered in trees > 100 feet in height) on a "per tree" basis. Steep and broken topography generally results in higher breakage percentages than gentler topography, and hemlock generally breaks more than D-fir and spruce.

8. **Standard Field Procedures:** Plot Type Cruises: Mark cruise line beginning points with red flagging. Write plot identification numbers and line direction on the ribbon. At each plot, tie red flagging above eye level near plot center and another red flagging around a sturdy wooden stake marking plot center. On red flagging, write the plot identification number. On "measure/grade" plots write the tree number and/or tree diameter on all measured trees (clockwise from the line direction) in yellow paint. Mark leave trees with an L for leave.
   ITS and 100% Cruises: Mark cruise "strips" with various colored flagging (not pink). Mark trees measured and graded with yellow paint.

9. **Cruising Equipment:** Relaskop, Rangefinder or Lazer, Logger's Tape (with dbh on back), Biltmore Stick, Compass, Cruise Cards or Data Recorder, Cruise Design, Cruise Map, Yellow Flagging, Blue Flagging, Yellow Paint.

10. **Attachments:** A. Cruise Map (showing cruise unit boundaries, roads, streams, approx. acres/unit, cruise lines and plot locations, legal description and section lines, BAF or plot size, measure/count plot ratio, north arrow, and scale.

Cruise Design by: David Bailey
Approved by: Cody Allen
Date: 10/5/2020



Legend

Ownership

- BOF
- CSL
- Timber Sale Boundary
- Type F Stream
- Type N Stream
- Unknown Stream

Roads

- Surfaced
- Unsurfaced
- Green Tree Retention Area

Cruise Plots

- Measure
- Count

Harlan Hangover Cruise Map

Portions of sections 5 & 6
T12S R8W, W.M.,
Lincoln County, Oregon

Scale 1:6,000

500 0 500 1,000 Feet

Line Spacing: 4 Chains 264'
Plot Spacing: 5 Chains 330'
Bearing: 258 / 78
BAF: 40

N

Date: 10/13/2020

TC TSTATS

STATISTICS

PROJECT HH

DATE 11/18/2020

TWP	RGE	SECT	TRACT	TYPE	ACRES	PLOTS	TREES	CuFt	BdFt
12S	08W	05	HH	CC	62.00	31	155	1	W

	PLOTS	TREES	TREES PER PLOT	ESTIMATED TOTAL TREES	PERCENT SAMPLE TREES
TOTAL	31	155	5.0		
CRUISE	19	86	4.5	4,321	2.0
DBH COUNT					
REFOREST					
COUNT	12	66	5.5		
BLANKS					
100 %					

STAND SUMMARY

	SAMPLE TREES	TREES /ACRE	AVG DBH	BOLE LEN	REL DEN	BASAL AREA	GROSS BF/AC	NET BF/AC	GROSS CF/AC	NET CF/AC
DF	77	45.7	25.6	117	32.4	163.9	42,362	42,157	9,198	9,198
R ALDER	4	17.1	15.3	46	5.6	21.9	1,966	1,904	630	630
BL MAPLE	4	5.2	16.5	41	1.9	7.7	582	554	190	190
SNAG	1	1.6	17.0	64	0.6	2.6				
TOTAL	*86*	*69.7*	*22.7*	*93*	*41.2*	*196.1*	*44,910*	*44,615*	*10,019*	*10,019*

CONFIDENCE LIMITS OF THE SAMPLE

68.1 TIMES OUT OF 100 THE VOLUME WILL BE WITHIN THE SAMPLE ERROR

CL: 68.1 %	COEFF	SAMPLE TREES - BF			# OF TREES REQ.		INF. POP.
SD: 1.0	VAR.%	S.E.%	LOW	AVG	HIGH	5	10	15
DF	76.6	8.7	1,120	1,227	1,334			
R ALDER	57.9	33.1	87	130	173			
BL MAPLE	125.3	71.6	45	160	275			
SNAG								
TOTAL	*85.5*	*9.2*	*1,010*	*1,112*	*1,215*	*292*	*73*	*32*

CL: 68.1 %	COEFF	SAMPLE TREES - CF			# OF TREES REQ.		INF. POP.
SD: 1.0	VAR.%	S.E.%	LOW	AVG	HIGH	5	10	15
DF	62.9	7.2	237	255	274			
R ALDER	50.3	28.7	31	43	55			
BL MAPLE	89.3	51.0	24	49	73			
SNAG								
TOTAL	*71.3*	*7.7*	*215*	*233*	*251*	*203*	*51*	*23*

CL: 68.1 %	COEFF	TREES/ACRE			# OF PLOTS REQ.		INF. POP.
SD: 1.0	VAR.%	S.E.%	LOW	AVG	HIGH	5	10	15
DF	53.8	9.7	41	46	50			
R ALDER	230.5	41.4	10	17	24			
BL MAPLE	371.3	66.6	2	5	9			
SNAG	387.1	69.5	0	2	3			
TOTAL	*58.8*	*10.6*	*62*	*70*	*77*	*138*	*35*	*15*

CL: 68.1 %	COEFF	BASAL AREA/ACRE			# OF PLOTS REQ.		INF. POP.
SD: 1.0	VAR.%	S.E.%	LOW	AVG	HIGH	5	10	15
DF	48.6	8.7	150	164	178			
R ALDER	234.7	42.1	13	22	31			
BL MAPLE	338.0	60.7	3	8	12			
SNAG	387.1	69.5	1	3	4			
TOTAL	*36.6*	*6.6*	*183*	*196*	*209*	*54*	*13*	*6*

CL: 68.1 %	COEFF	NET BF/ACRE			# OF PLOTS REQ.		INF. POP.
SD: 1.0	VAR.%	S.E.%	LOW	AVG	HIGH	5	10	15
DF	51.4	9.2	38,265	42,157	46,048			
R ALDER	235.9	42.3	1,098	1,904	2,710			
BL MAPLE	310.6	55.7	245	554	863			
SNAG								
TOTAL	*45.1*	*8.1*	*41,008*	*44,615*	*48,222*	*81*	*20*	*9*

TC PLOGSTVB

Log Stock Table - MBF

T12S R08W S05 TyCC 62.00

Project: HH
Acres 62.00

Page 1
Date 11/18/2020
Time 9:21:51AM

Spp	ST	Sort	Grade	Log Len	Gross MBF	Def %	Net MBF	% Spc	Net Volume by Scaling Diameter in Inches 2-3	4-5	6-7	8-9	10-11	12-13	14-15	16-19	20-23	24-29	30-39	40+
DF		DO	2M	16	1		1	.1						1						
DF		DO	2M	20	2		2	.1							2					
DF		DO	2M	26	11		11	.4							5	6				
DF		DO	2M	32	59		59	2.3						32	10			17		
DF		DO	2M	34	12		12	.5						6		6				
DF		DO	2M	36	33	1.5	33	1.3						25		7				
DF		DO	2M	38	29	1.2	28	1.1						9	19					
DF		DO	2M	40	2,106		2,097	80.2						184	377	800	391	277	68	
DF		DO	3M	16	6	3.3	6	.2					2		2	1				
DF		DO	3M	20	6	7.9	6	.2									6			
DF		DO	3M	24	4		4	.1				2		2						
DF		DO	3M	28	7		7	.3				2	5							
DF		DO	3M	30	4		4	.1			2	2								
DF		DO	3M	32	41	1.8	40	1.5			9	22	9							
DF		DO	3M	34	13		13	.5			3	4	6							
DF		DO	3M	36	47		47	1.8			11	15	8					13		
DF		DO	3M	38	19		19	.7			3	7	8							
DF		DO	3M	40	188		187	7.2			9	44	91				13		31	
DF		DO	4M	12	2		2	.1				1	2							
DF		DO	4M	14	1		1	.1			1									
DF		DO	4M	16	11		11	.4			5	4	2							
DF		DO	4M	18	3		3	.1			3									
DF		DO	4M	24	14		14	.5			13	1								
DF		DO	4M	26	2		2	.1				2								
DF		DO	4M	30	2		2	.1			2									
DF		DO	4M	32	3		3	.1			3									
DF		Totals			2,626		2,614	94.5			63	107	133	260	415	820	409	307	99	
BM		DO	CR	28	6		6	16.3				6								
BM		DO	CR	32	6	28.6	4	12.5				4								
BM		DO	CR	34	2		2	6.7			2									
BM		DO	CR	38	7		7	20.0				7								
BM		DO	CR	40	15		15	44.5								15				
BM		Totals			36	4.8	34	1.2			2	17				15				
RA		DO	CR	16	12		12	9.8			6	6								
RA		DO	CR	30	26		26	22.0				26								
RA		DO	CR	38	33	5.9	31	26.1					31							

TC PSPCSTGR

Species, Sort Grade - Board Foot Volumes (Project)

T12S R08W S05 TyCC 62.00

Project: HH
Acres 62.00

Date 11/18/2020
Time 9:21:51AM

Spp	S T	So Gr rt ad	% Net BdFt	Bd. Ft. per Acre Def%	Gross	Net	Total Net MBF	Percent of Net Board Foot Volume: Log Scale Dia. 4-5	6-11	12-16	17+	Log Length 12-20	21-30	31-35	36-99	Average Log: Ln Ft	Dia In	Bd Ft	CF/ Lf	Logs Per /Acre
DF		DO 2M	85	.5	36,353	36,183	2,243			38	62	0	1	3	96	39	16	445	2.37	81.3
DF		DO 3M	13	.7	5,392	5,356	332		80	2	19	4	4	16	76	36	9	125	0.94	42.9
DF		DO 4M	2		617	617	38		100			46	47	7		20	7	31	0.49	20.1
DF	**Totals**		94	.5	42,362	42,157	2,614		12	33	56	1	2	5	92	36	13	292	1.80	144.3
BM		DO CR	100	4.8	582	554	34		56	44			16	19	64	33	9	95	0.98	5.8
BM	**Totals**		1	4.8	582	554	34		56	44			16	19	64	33	9	95	0.98	5.8
RA		DO CR	100	3.2	1,966	1,904	118		100			10	22		68	30	8	82	0.89	23.3
RA	**Totals**		4	3.2	1,966	1,904	118		100			10	22		68	30	8	82	0.89	23.3
Totals				0.7	44,910	44,615	2,766		16	31	53	2	3	5	91	35	12	257	1.66	173.4

TC TSTNDSUM

Stand Table Summary

Project HH

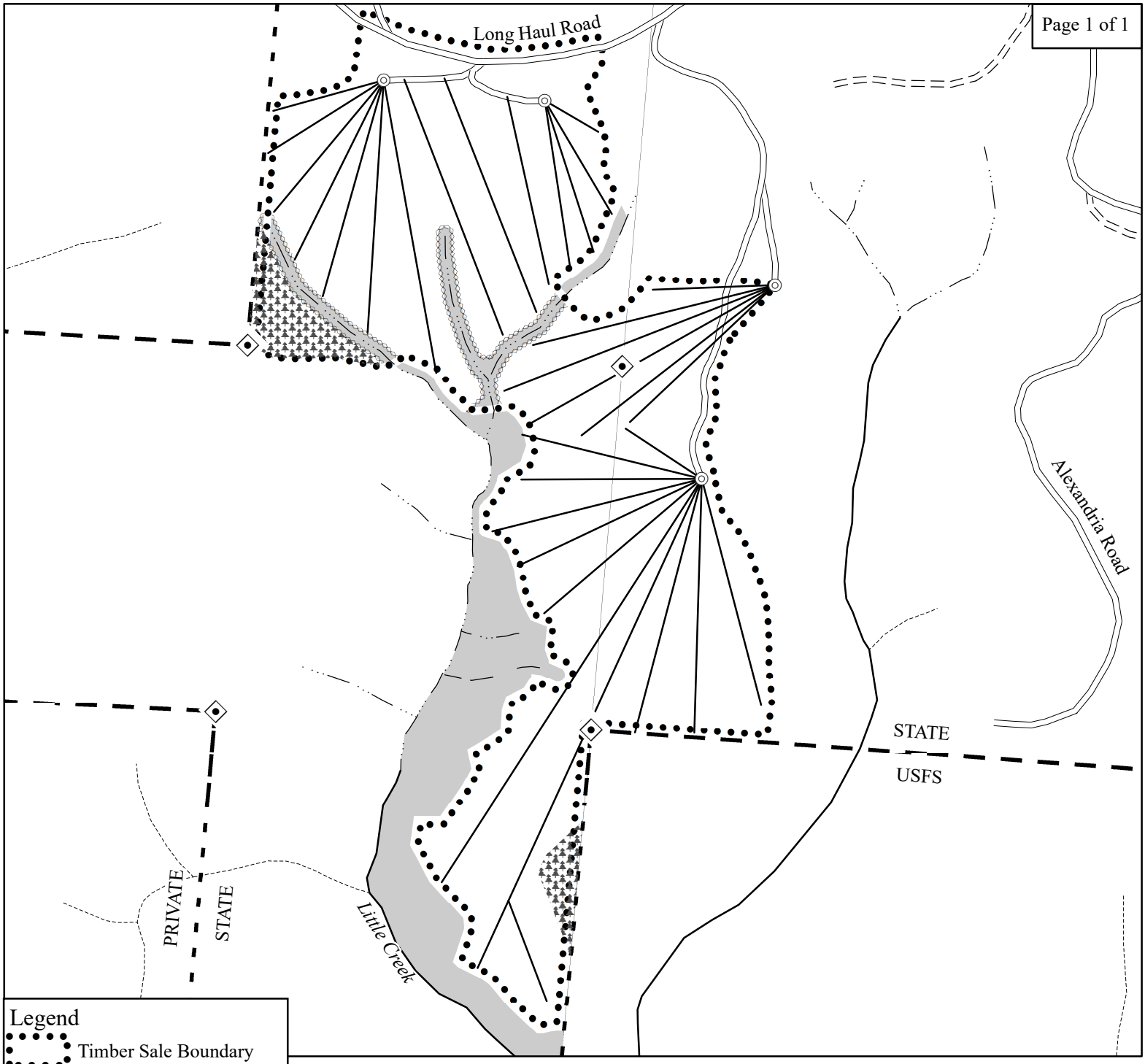
T12S R08W S05 TCC

Twp	Rge	Sec	Tract	Type	Acres	Plots	Sample Trees
12S	08W	05	HH	CC	62.00	31	89

T12S R08W S05 TCC

Page: 1
Date: 11/18/202(
Time: 9:21:52AM

Spc	S T	DBH	Sample Trees	FF 16'	Av Ht Tot	Trees/ Acre	BA/ Acre	Logs Acre	Average Log Net Cu.Ft.	Average Log Net Bd.Ft.	Tons/ Acre	Net Cu.Ft. Acre	Net Bd.Ft. Acre	Totals Tons	Totals Cunits	Totals MBF
DF		17	1	86	145	1.350	2.13	4.05	29.7	116.7		120	473		75	29
DF		18	2	84	122	2.409	4.26	7.23	27.5	93.3		199	674		123	42
DF		19	2	86	121	2.162	4.26	6.49	31.5	120.0		204	778		127	48
DF		20	2	86	139	1.951	4.26	5.85	39.7	158.3		232	927		144	57
DF		21	5	86	137	4.424	10.64	13.27	41.9	168.0		556	2,230		345	138
DF		22	8	87	145	6.450	17.03	18.54	48.6	207.8		901	3,854		559	239
DF		23	4	87	160	2.950	8.51	9.59	52.2	230.8		501	2,213		311	137
DF		24	6	87	154	4.065	12.77	12.87	57.5	249.5		740	3,211		459	199
DF		25	3	86	147	1.873	6.38	5.62	63.3	271.1		356	1,523		221	94
DF		26	7	86	155	4.041	14.90	13.85	62.0	280.4		859	3,885		533	241
DF		27	4	86	162	2.141	8.51	6.96	72.7	336.2		506	2,339		314	145
DF		28	3	86	142	1.493	6.38	4.48	75.8	334.4		339	1,498		210	93
DF		29	5	86	153	2.320	10.64	7.42	80.9	378.7		601	2,812		373	174
DF		30	5	87	159	2.168	10.64	6.94	90.0	441.2		624	3,061		387	190
DF		31	3	88	157	1.218	6.38	4.47	84.1	416.4		376	1,860		233	115
DF		32	1	91	155	.381	2.13	1.14	111.7	563.3		128	644		79	40
DF		33	2	87	163	.717	4.26	2.51	101.7	510.0		255	1,279		158	79
DF		34	3	85	160	1.013	6.38	3.38	109.8	536.0		371	1,809		230	112
DF		35	1	82	172	.319	2.13	1.27	101.5	492.5		129	628		80	39
DF		37	3	85	176	.855	6.38	3.14	127.9	680.9		401	2,135		249	132
DF		38	1	86	169	.270	2.13	1.08	121.5	657.5		131	711		81	44
DF		39	2	87	136	.513	4.26	1.80	115.9	638.6		208	1,147		129	71
DF		42	1	85	184	.221	2.13	.88	156.3	862.5		138	763		86	47
DF		48	1	82	66	.169	2.13	.34	173.0	675.0		59	229		36	14
DF		53	2	86	172	.278	4.26	1.11	237.2	1328.7		264	1,477		163	92
DF		Totals	77	86	148	45.749	163.87	144.27	63.8	292.2		9,199	42,157		5,703	2,614
RA		12	1	89	64	6.982	5.48	6.98	18.0	60.0		126	419		78	26
RA		16	1	89	56	3.928	5.48	3.93	32.0	70.0		126	275		78	17
RA		18	2	88	77	6.206	10.97	12.41	30.5	97.5		379	1,210		235	75
RA		Totals	4	89	67	17.116	21.94	23.32	27.0	81.6		630	1,904		391	118
BM		14	1	89	44	1.811	1.94	1.81	20.0	50.0		36	91		22	6
BM		16	2	89	49	2.772	3.87	2.77	30.5	65.0		85	180		52	11
BM		24	1	89	103	.616	1.94	1.23	56.5	230.0		70	283		43	18
BM		Totals	4	89	53	5.199	7.74	5.82	32.7	95.3		190	554		118	34
SN		17	1	99	64	1.637	2.58									
SN		Totals	1	99	64	1.637	2.58									
Totals			86	87	119	69.701	196.13	173.41	57.8	257.3		10019	44,615		6,212	2,766



Legend

- Timber Sale Boundary

Roads

- Surfaced Road
- Unsurfaced Road

Streams

- Type F Stream
- Type N Stream
- Unknown Stream
- Posted Stream Buffer
- Stream Buffer
- GreenTree Retention Area
- Cable Corridor
- Landing
- Land Survey Monument

LOGGING PLAN

OF TIMBER SALE CONTRACT NO.
WO-341-2021-W00685-01
HARLAN HANGOVER
PORTIONS OF SECTIONS 5 & 6
T12S R8W, W.M.,
LINCOLN COUNTY, OREGON

This product is for informational use and may not have been prepared for or be suitable for legal, engineering or survey purposes. User of this information should review or consult the primary data and information sources to ascertain the usability of this information.

Scale 1:6000

500 0 500 1,000 Feet

UNIT	TRACTOR ACRES	CABLE ACRES
1 (MC)	3	59
TOTAL	3	59

N

Date: 11/19/2020