



Oregon State University

FOREST ROAD INFRASTRUCTURE 2019-2023

ATTACHMENT 2 – TECHNICAL SPECIFICATIONS

Includes:

Unit Prices	Section 01 22 00
Equipment Rental	Section 807
Delivered Aggregate	Section 810
Blading	Section 811
Ditch Maintenance	Section 831
Culvert Replacement	Section 833
Drainage Structure Maintenance	Section 834
Cutting Roadway Vegetation	Section 842
Mobilization	Section 881
Water Supply and Watering	Section 891
Road Maintenance and Reconstruction	Exhibit 1
Road Reconstruction Specifications	Exhibit 3 (Exhibit 2 – Not used)
Reconstruction Detail Crowned Section	Exhibit 3B1
Reconstruction Detail Out-Sloped Section	Exhibit 3B2
Earthwork	Exhibit B
Road Surfacing	Exhibit D (Exhibit C – Not used)
Crushed Rock Specifications	Exhibit E
Crushed Rock Specifications	Exhibit F
Rock Accountability	Exhibit G
Rock Spreading, Processing, and Compaction	Exhibit H
Compaction and Processing Requirements	Exhibit I
Compaction Equipment Options	Exhibit J
Culvert Specifications	Exhibit K
Culvert Specifications	Exhibit L
Watershed Regulations	Exhibit N (Exhibit M – Not used)
Map – OSU College Forests in Oregon	Map 1
Map – McDonald Dunn Forest	Map 2
Map – Cameron Tract	Map 3
Map – Spaulding Tract	Map 4
Map – Machell Tract	Map 5
Map – Ram’s Dell Forest	Map 6
Map – Matteson Forest	Map 7
Map – Blodgett Tract	Map 8

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UNIT PRICES
Section 01 22 00

PART 1 GENERAL

1.01 DESCRIPTION

- A. Provide unit prices for the Work described herein.

1.02 QUALITY ASSURANCE

- A. For each unit price item which is performed, coordinate the work of the various trades involved, and modify surrounding work as required to complete the project, as intended.
- B. In the figure for each unit price, include incidental costs which, as attributable to adjustments in the work of other trades, may be required to achieve the contemplated final conditions.
- C. If there is a question regarding the extent, scope, nature, or intent of the unit price work, contact the Owner for clarification. Failure on the part of the Contractor to clarify any unclear items shall not relieve the Contractor of the responsibility for performing the Work in accordance with the intent and requirements of the Project Manual or Drawings.
- D. The description of unit price items listed hereinafter is qualitative. The quantities listed are estimated quantities and are included for the purpose of award of the Contract. Actual quantities of labor and materials required to execute the unit price items of Work will be determined by project conditions and with concurrence of the Owner's Authorized Representative.

PART 2 PRODUCTS

2.01 GENERAL

- A. The applicable Sections of the Specifications apply to the Work under each unit price item.

PART 3 EXECUTION

3.01 LIST OF UNIT PRICE ITEMS OF WORK

- A. See Schedule of Items, attached.

END OF SECTION

Item No.	Exhibit or Spec.	Schedule of Items	Qty	Unit
1	N/A	Consultation	20	HOUR
2	Tech Specs 881	Mobilization to Benton County	1	EA
3	Tech Specs 881	Mobilization to Blodgett Tract	1	EA
4	Tech Specs 881	Mobilization to Rams Dell Tract	1	EA
5	Tech Specs 881	Mobilization to Matteson Tract	1	EA
6	Tech Specs 881	Mobilization to Collins Tract	1	EA
7	EX. 1, Section 17	Equipment Cleaning	2	EA
8	Tech Specs 833 (1)	Furnish & Install 18" Polyethylene Culvert	40	LF
9	Tech Specs 833 (2)	Furnish & Install 24" Polyethylene Culvert	40	LF
10	Tech Specs 833 (3)	Furnish & Install 36" Polyethylene Culvert	40	LF
11	Tech Specs 833 (4)	Furnish & Install 48" Polyethylene Culvert	40	LF
12	Tech Specs 810 (1)	Delivered Aggregate 3/8"-minus to Benton County	25	TON
13	Tech Specs 810 (2)	Delivered Aggregate 3/4"-minus to Benton County	25	TON
14	Tech Specs 810 (3)	Delivered Aggregate 1"-minus to Benton County	200	TON
15	Tech Specs 810 (4)	Delivered Aggregate 1"-Open to Benton County	40	TON
16	Tech Specs 810 (5)	Delivered Aggregate 1-1/4"-Open to Benton County	40	TON
17	Tech Specs 810 (6)	Delivered Aggregate 1-1/2"-minus to Benton County	40	TON
18	Tech Specs 810 (7)	Delivered Aggregate 1-1/2" -Open to Benton County	40	TON
19	Tech Specs 810 (8)	Delivered Aggregate 3"-minus to Benton County	40	TON
20	Tech Specs 810 (9)	Delivered Aggregate 4-6" Open to Benton County	40	TON
21	Tech Specs 810 (10)	Delivered Aggregate Jaw Run to Benton County	40	TON
22	Tech Specs 810 (11)	Delivered Aggregate Shot Rock to Benton County	40	TON
23	Tech Specs 810 (12)	Delivered Aggregate Class 700 Rip Rap Benton County	40	TON
24	Tech Specs 810 (12)	Delivered Aggregate Class 700 Rip Rap Blodgett Tract	40	TON
25	Tech Specs 810 (6)	Delivered Aggregate 1 1/2"-minus Blodgett Tract	14	TON
26	Tech Specs 810 (8)	Delivered Aggregate 3"-minus Blodgett Tract	14	TON
27	Tech Specs 810 (10)	Delivered Aggregate Jaw Run Blodgett Tract	14	TON
28	Tech Specs 810 (11)	Delivered Aggregate Shot Rock Blodgett Tract	14	TON
29	Tech Specs 842	Cutting Side Vegetation	1	SIDE MILE
30	Tech Specs 811 (2-d-1)	Blading Surfaced Roads Compaction A Benton County	1	MILE
31	Tech Specs 811 (2-d-2)	Blading Surfaced Roads Compaction B Benton County	1	MILE
32	Tech Specs 831	Clean and Reshape Drainage Ditch Benton County	1	MILE
33	Tech Specs 807(1)	Backhoe/Loader	10	HOUR
34	Tech Specs 807(2)	Excavator	50	HOUR
35	Tech Specs 807(3)	Dump Truck	10	HOUR
36	Tech Specs 807(4)	Grader	10	HOUR
37	Tech Specs 807(5)	Tractor	10	HOUR
38	Tech Specs 807(6)	Laborer/Tools	20	HOUR
39	Tech Specs 811 (2d)	Roller	10	HOUR
40	Tech Specs 842	Brushcutter	10	HOUR
41	Tech Specs 807(7)	Front End Loader	10	HOUR
42	Tech Specs 807(8)	Self-Loading Log Truck	1	HOUR
43	Tech Specs 807(9)	Log Truck	1	HOUR
44	Tech Specs 807(10)	Log Loader	1	HOUR
45	Tech Specs 807(11)	Water Truck	10	HOUR
46	Tech Specs 882(1)	Move Equipment, Tilt Top Trailer	5	HOUR
47	Tech Specs 882(2)	Move Equipment, Lowboy	5	HOUR
48	OR Seed Cert. Service	Grass Seed: Annual Rye; Endophyte & Weed Free	100	LB
49	N/A	Straw Bale, Wheat/ Oat straw, weed free	10	EA
50	ASTM D6461	Silt Fence, 3-foot height	50	LF
51	AASHTO M-288-06	Geotextile Fabric, Woven Class 3	200	SY

STANDARD SPECIFICATION
807 - EQUIPMENT RENTAL

1. DESCRIPTION

- A. This Section establishes the basis for the Owner to order work not otherwise included in the contract.

2. EQUIPMENT

- A. Equipment under this Section shall be provided with a fully qualified operator. In addition, the ordered equipment shall be furnished on a fully operational basis, of modern design, in good operating condition with no fuel or oil leaks and shall meet the following minimum specifications:

1. 807(1) Backhoe/loader – Minimum requirements: Digging depth 15 feet, 85 HP diesel engine, 24 inch backhoe bucket and 1-1/4 cubic yard (CY) loader bucket.
2. 807(2) Excavator – Minimum requirements: Digging depth 19 feet, 120 HP Diesel Engine, 2 CY bucket with hydraulic thumb.
3. 807(3) Dump Truck – Minimum requirements: highway legal, 10 CY (truck) dump box, 220 HP diesel engine and a two way radio.
4. 807(4) Grader – Minimum requirements: 150 HP Diesel Engine, 32,000lbs operating weight, 12 foot Blade, blade to be equipped with scarifier teeth.
5. 807(5) Tractor – Minimum Requirements: 90 HP Diesel Engine, 20,000lbs operating weight, power angle and tilt blade.
6. 807(6) Laborer with required hand tools including: chain saw, hand compactor, flagging equipment (as required). Laborer time spent flagging will be reported as “Flagger”.
7. 807(7) Front End Loader – Minimum requirements: 200 HP Diesel Engine, 3 CY bucket, wheeled carrier.
8. 807(8) Self Loading Log Truck – Minimum Requirements: 400 HP Diesel Engine, 80,000 GVW, log loading boom and grapple.
9. 807(9) Log Truck - Minimum Requirements: 400 HP Diesel Engine, 80,000 GVW.
10. 807(10) Log Loader – Minimum Requirements: 130 HP Diesel Engine, Log loading grapple and heel boom, 34-foot reach.
11. 807(11) Water Truck – Minimum Requirements: 200 HP Diesel Engine, 4000 gallon capacity, self filling capability, front and rear discharge nozzles.

3. DELIVERY OF EQUIPMENT TO SITE

- A. The Owner, in conjunction with the Contractor, will determine if equipment is to be moved onto and off the site by roading under its own power or by use of Contractor's truck

transport. The Work Order will include the method of moving as roading or transport. Subsequent moving of equipment from one portion of the job to another shall be by roading unless otherwise documented in the Work Order.

4. HOURS OF OPERATION

- A. Hours of operation shall be the same as for the Contractor's regular work shift, unless otherwise directed in writing by the Owner.

5. TIMEKEEPING AND COMPENSATION

- A. The Owner and the contractor will maintain a daily record showing the actual hours, to the nearest quarter (0.25) hour, that the equipment is in operation and/or laborer is performing work under this item. The owner and contractor will rectify differences in recorded hours prior to billing.
- B. Time for equipment roading will commence with the beginning of the move. Time will be counted for the operator during roading.
- C. Time for equipment transported will be in accordance with the following:
 - 1. When equipment is not being actively used on the Project at the time moving is ordered under this Section, time will be counted for the transporting vehicle, but not the equipment being transported. All equipment moving under this section shall be paid for under 882 Equipment Moving.

END OF SECTION

STANDARD SPECIFICATION
810 – DELIVERED AGGREGATE

1. DESCRIPTION

A. This section establishes the basis for the Owner to order the delivery of crushed aggregate or Rip Rap bid in this contract.

2. REQUIREMENTS

A. The aggregate or Rip Rap will meet the requirements of this contract and bid items. It will be delivered as directed by the Owner. The gradation and quality will be specified by the Owner.

3. MEASUREMENT

A. Payments will be made by the ton, weighed at a certified scale. Truck measure may be used as agreed to by the Owner.

4. PAYMENT

A. The ordered and accepted quantities shall be paid for at the unit prices shown in the schedule of items.

Payment will be made under:

Pay Item	Pay Unit
810(1) Crushed Aggregate 3/8 – 0”	Ton
810(2) Crushed Aggregate 3/4 - 0”	Ton
810(3) Crushed Aggregate 1.0 - 0”	Ton
810(4) Crushed Aggregate 1.0” - OPEN	Ton
810(5) Crushed Aggregate 1.25”- OPEN	Ton
810(6) Crushed Aggregate 1.5 - 0”	Ton
810(7) Crushed Aggregate 1.5”- OPEN	Ton
810(8) Crushed Aggregate 3 – 0”	Ton
810(9) Crushed Aggregate 4-6” OPEN	Ton
810(10) Crushed Aggregate JAW RUN	Ton
810(11) Crushed Aggregate SHOT ROCK	Ton
810(12) Rip Rap class 700	Ton

END OF SECTION

STANDARD SPECIFICATION
811 - BLADING

1. DESCRIPTION

This work consists of surface blading native or aggregate roadbed to a condition to facilitate traffic and provide proper drainage. Blading includes shaping the crown or slope of traveled way, and drainage dips in accordance with this specification.

2. MAINTENANCE REQUIREMENTS

a. Timing

Surface blading shall be performed during the contract period as ordered by the Owner. Contractor shall commence surface blading within two (2) contract days after receipt of written order unless otherwise stated in the order.

b. General

1. The existing traveled way and shoulders, including turnouts unless otherwise ordered, shall be bladed and shaped to produce a surface which is uniform, consistent to grade, and crowned or cross-sloped as indicated by the character of the existing surface unless otherwise shown in the Road Listing, to at least one quarter inch (1/4") per foot of width. Surfacing materials shall be thoroughly loosened to no less than 2 inch depth or the depth of potholes or corrugations. Scarification to facilitate cutting to the full depth of potholes or corrugations may be elected by the Contractor but will be considered incidental to blading. Scarification shall not go deep enough to cause contamination of the surfacing.

2. The Contractor shall apply water during blading when sufficient moisture is not present to prevent segregation. Water supply, hauling, and application shall be in accordance shall be incidental to blading, with no additional pay item.

3. The Contractor shall establish a blading pattern which provides a uniform driving surface, retains the surfacing on the roadbed and provides a thorough mixing of the materials within the completed surface width. Upon final blading, no disturbed rock shall protrude more than two (2) inches above the adjacent surface unless otherwise provided in the contract. Material not meeting this dimension shall be removed and placed outside the roadbed so as not to obstruct drainage-ways or structures. This material may be scattered off the roadbed if there is free drainage.

c. Routine Blading

1. Upon completion of blading, the surfaces shall conform to the dimensions of Table 1 on Drawing 811-1, Blading Standards.

2. Roadbed width in excess of the dimensions shown shall be shaped only as needed to provide drainage away from the traveled way. Established grasses and other vegetation shall not be removed from the excess width except as incidental to providing drainage or unless otherwise provided in the contract.

d. Compaction

Compaction methods are as follows:

1. Compaction Method A: By breaking track while operating equipment on the traveled way.

2. Compaction Method B: 8 to 10 ton pneumatic, steel or equivalent vibrating roller, operated to cover the full width with three passes. A pass is one trip up and back over the same area.

Compaction will be required on all Roads. Compaction shall be performed in accordance with method A or B above.

e. Intrusions

Where the minimum width shown in Table 1 cannot be provided, the Contractor shall notify the Owner within 24 hours.

f. Undercutting

Roadway back-slope shall not be undercut.

g. Intersections

1. At intersections, the roadbeds of side roads which are not closed or restricted from vehicular use shall be bladed to assure smooth transitions.

2. Field evidence of closure or restrictions shall be considered to be signing, cross ditching in the road surface (traveled way), earth berms or other devices placed to discourage or eliminate use by passenger cars.

3. Side roads listed for work under this Section shall be considered as not restricted.

h. Cleaning of Structures

Materials resulting from work under this Section shall not be allowed to remain on or in structures, such as bridges, culverts, cattle guards, or drainage dips.

3. MEASUREMENT

Measurement under this Section will be made by the total number of units for each item listed in the Schedule of Items completed and accepted.

a. Measurement for blading will be single-lane mile measured along the centerline of the roadway. Measurement will be measured to the nearest one-tenth (0.1) mile.

b. Each intersection bladed under 2.g. will be equivalent to one-tenth of a mile.

4. PAYMENT

a. The quantities measured and accepted will be paid for at the contract unit price shown in the Schedule of Items.

b. Payment: Unless specified in the Schedule of Items, compaction shall be incidental to work ordered.

Pay Item

Pay Unit

811(1) Blading Surfaced Roads Compaction A

Single-Lane Mile

811(2) Blading Surfaced Roads Compaction B

Single-Lane Mile

END OF SECTION

STANDARD SPECIFICATION
831 - DITCH MAINTENANCE

1. DESCRIPTION

This Section provides for routine maintenance of various types of ditches to provide a waterway which is unobstructed, as shown on the road listing or marked on the ground. Drainage ditch maintenance is limited to materials contained within the ditch below the elevation of the adjacent edge of the traveled way or shoulder.

2. MAINTENANCE REQUIREMENTS

- A. During ditch maintenance all material within the ditch shall be removed to the dimensions matching the existing ditch.
- B. Ditches shall be maintained by removing rock, soil, wood, and other materials. Upon completion, the maintained ditch shall be of the same character as abutting segments that were not required to be maintained.
- C. Back-slopes shall not be undercut by removal operations.
- D. Suitable material up to four inches in greatest dimension removed from the ditches may be blended into existing native road surface and shoulder.
- E. Material from ditch cleaning operations shall not be blended into or bladed across aggregate surfaced roads nor bladed onto or across bituminous surfaced roads.
- F. Material in excess of 2(D) or subject to 2(E) will be hauled to a designated waste area under Section 832. Excess materials temporarily stored on the ditch slope or edge of the shoulder shall be removed daily, or as agreed to in writing by the Owner's Representative. The distance to any waste area shall be no more than two (2) miles.
- G. Limbs and wood chunks in excess of one (1) foot in length or three (3) inches in diameter shall be removed from ditches and placed outside the roadway.
- H. Paved surfaces shall be cleaned of all materials resulting from Contractor's ditch maintenance work.
- I. Lead-off ditches shall be shaped to drain away from the traveled way.
- J. Contractor will not disturb any underground utilities marked by signs standard to the industry.

3. MEASUREMENT

- A. Drainage ditch maintenance will be measured to the nearest one-tenth (0.1) mile. Segments of less than one-tenth (0.1) mile will be counted as a full one-tenth (0.1) mile. Lead off ditches are incidental to this item.
- B. Ordered haul of excess material will be incidental to this item.

4. PAYMENT

A. The accepted quantity will be paid for at the contract unit price shown in the Schedule of Items.

B. Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
831 Clean and Reshape Drainage Ditch	Ditch Mile

END OF SECTION

STANDARD SPECIFICATION
833 - CULVERT REPLACEMENT

1. **DESCRIPTION**

- A. This work includes new culvert placement, removal of existing culverts and bed preparation, installation and backfill of new culverts of the size and length specified. Removed culverts become the property of the Contractor. Disposal will not be allowed on the Owners land.

2. **MATERIALS**

- A. Culverts shall be furnished by the contractor. Culverts shall meet enclosed specifications.

3. **MAINTENANCE REQUIREMENT**

- A. Excavation for culverts shall be at least as wide as three diameters of the existing pipe, and long enough to provide for proper joining of the culvert. The completed bottom shall be firm for its entire length and width. The culvert shall be installed to maintain a uniform flow line from inlet to outlet ditch.
- B. After the bedding is prepared and the pipe is placed, backfill material shall be placed in layers not exceeding six (6) inches loose thickness and compacted under the haunches and alongside the pipe. The material shall be readily compactable material free of frozen lumps, chunks of highly plastic clay or other objectionable material. Rocks larger than three (3) inches in greatest dimension shall not be used within one foot (1) of the pipe.
- C. Backfill density shall be that obtained by compacting each layer with mechanical equipment designed for this purpose. Compaction shall continue until visual displacement ceases.
- D. Backfill and compacting shall continue until backfill is a minimum of twelve (12) inches above the top of the culvert.
- E. Backfill over all installed culverts shall be crushed aggregate furnished by the Contractor, placed and compacted as specified above. Crushed aggregate shall be incidental to the cost of the culvert.

4. **Method of Measurement**

- A. Measurement will be made for each lineal foot of culvert specified and installed.

5. **Basis of Payment**

- A. Accepted quantities will be paid for at the Contract unit prices shown in the Schedule of Items.
- B. Payment will be made under:

<u>Pay Item</u>	<u>Description</u>	<u>Pay Unit</u>
833(1)	Furnish and install 18" culvert	LF
833(2)	Furnish and install 24" culvert	LF
833(3)	Furnish and install 36" culvert	LF

833(4)

Furnish and install 48" culvert

LF

END OF SECTION

STANDARD SPECIFICATION
834 - DRAINAGE STRUCTURE MAINTENANCE

1. DESCRIPTION

A. This work consists of cleaning and reconditioning culverts and other drainage structures

2. MAINTENANCE REQUIREMENTS

A. Drainage structures, inlet structures, culverts, catch basins, and outlet channels shall be cleaned when required by the Owner. Catch basins shall be cleaned by removing the material within the area shown on Drawing 834-1.

B. The transition from the ditch line to the catch basin shall be cleaned a distance of ten (10) feet. Outlet channels and lead-off ditches shall be cleaned a distance of six (6) feet. Debris and vegetation shall be removed and placed so as to not enter the channel or ditch or obstruct traffic. Debris and vegetation ordered to be hauled shall be hauled to a designated disposal area in accordance with Section 832.

C. Hydraulic flushing of drainage structures is not allowed unless directed by the OWNER

D. Cleaning is limited to the first four (4) feet of inlet and outlet determined along the top of structure. Damaged culverts shall be reported to the owner in writing upon completions of work on each road. Any damage by the contractor shall be repaired at Contractor's expense.

3. MEASUREMENT

A. Measurement will be the number of units of each culvert type including cleaning of inlet and outlet ditches or channels and catch basins completed and accepted.

B. Ordered haul of materials will be incidental to this item.

4. PAYMENT

A. Quantities as determined above will be paid at the contract unit price.

B. Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
834(1), Clean Culverts 24" Diameter and under	N/A
834(2), Clean Culverts Over 24" through 48" diameter	N/A

END OF SECTION

STANDARD SPECIFICATION
842 - CUTTING ROADWAY VEGETATION

1. DESCRIPTION

- A. This work consists of cutting all vegetative growth including trees and other vegetation less than four (4) inches in diameter.

2. MAINTENANCE REQUIREMENTS

A. General

1. Brush, trees, and other vegetation less than four (4) inches in diameter within each area treated shall be cut to a maximum height of six (6) inches above the ground surface or obstruction such as rocks or existing stumps. When work is performed under this section, the contractor shall remove all limbs which extend in to the treated area or over the roadbed to a height of fourteen (14) feet above the traveled way surface elevation.
2. Signs, markers, and other road related structures, are designated to be retained. Other items to remain will be marked on the ground.
3. Work under this section will not be ordered to more than twelve (12) feet slope distance along back slope and eight foot slope distance along the fill slope.
4. Work may be performed either by hand or mechanically unless specifically shown in the Road Listing and Schedule of Items. Self-propelled equipment shall not be allowed on cut and fill slopes or in ditches.
5. Damage to trunks of standing trees caused by Contractor's operation shall be corrected by Contractor, either by treatment with a commercial nursery sealer or by removing the tree as directed by the Owner.
6. Mechanical brush cutters shall not be operated when there are non-Contractor personnel or occupied vehicles within a hazardous distance of immediate operating area.
7. Trees within the cutting limits which are over four (4) inches in diameter shall be limbed in lieu of cutting.
8. When trees are limbed, limbs shall be cut within four (4) inches of the trunk.

B. Cutting Side Vegetation

1. Pass mile work will be ordered in four (4) foot increments of width regardless of slope deviations.
2. Side mile work will be ordered in uniform width for the length of the listed segments of roads.
3. Unless otherwise included in Special Project Specifications work shall commence at the edge of the traveled way and proceed away from the road centerline. For roads without a defined traveled way the starting point for cutting will be marked in the field or defined in Special Project Specifications.

4. Transitions between differing increments of cutting width shall be provided. Transitions shall be accomplished in a taper length of not less than fifty (50) nor more than seventy (70) feet.

C. Debris

1. Materials resulting from the cutting operation in excess of one (1) foot in length or three (3) inches in diameter shall not be allowed to remain on roadway slopes within the treated area, in ditches, or within water courses.
2. Limbs and chunks in excess of three (3) inches in any dimension shall be removed from the traveled way and shoulders.
3. Materials may be scattered downslope from the roadbed, outside of the work area and drainage's. Concentrations shall be re-scattered or removed.

3. MEASUREMENT

- A. Measurement for cutting vegetation by the pass mile will be determined by the number of four (4) foot passes ordered and accepted. Partial increments ordered to complete the outside edge of back-slope or fill slope cutting and transitions will be measured as full passes. The length of each pass will be determined to the nearest one-tenth (1/10) mile on each road.
- B. Measurement for cutting side vegetation by the side mile will be the length of roads or segments ordered and accepted. The length will be determined to the nearest one-tenth (1/10) mile on each side of each road.
- C. No reduction in the mileage between road terminal shown on the road listing will be made for areas where there is little or no vegetation to be cut.

4. PAYMENT

- A. The accepted quantities will be paid at the unit price shown in the Schedule of Items.
- B. Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
842, Cutting Side Vegetation	Side Mile

END OF SECTION

STANDARD SPECIFICATION
881 - MOBILIZATION

1. DESCRIPTION

A. This Section consists of one or more mobilizations of personnel, equipment, supplies, and incidentals to the project site, or sites listed in the Schedule of Items.

2. MEASUREMENT

A. When the contract establishes separate work periods within the contract time any additional mobilization included as a Bid Item will be retained until the actual work period.

3. PAYMENT

A. Progress payments will be made on the basis of the Bid Items contained in the Schedule of Items as follows:

1. When five (5) percent of the estimated contract amount in the work period is earned, fifty (50) percent of the amount of mobilization will be paid.
2. When 10 percent or more of the original contract amount is earned from other pay items, 100 percent of the amount for mobilization, or 10 percent of the original contract amount, whichever is less, will be paid.
3. Upon completion of all work on the project, any unpaid amount for mobilization will be paid.
4. The contract amount for mobilization shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals involved in mobilization.

B. Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
881 Mobilization Work Period	Each

END OF SECTION

STANDARD SPECIFICATION
891 - WATER SUPPLY AND WATERING

1. DESCRIPTION

- A. This work consists of providing facilities to furnish an adequate water supply, hauling and applying water, including times outside normal work hours.

2. MATERIALS

- A. Suitable and adequate water sources and use restrictions are designated in the Drawings or Special Project Specifications. If the Contractor elects to provide water from other than designated sources the Contractor shall be responsible to obtain the right to use the water including any cost for royalties involved. The rate of applications shall be based on the gallonage per mile ordered by the Owner, or as specified in other pay items.

3. EQUIPMENT

- A. Mobile watering equipment shall have watertight tanks of known capacity. If tank capacity is not known, it shall be measured and certified by the Contractor prior to use.
- B. Positive control of water application is required. Equipment shall provide uniform application of water without puddling or washing.
- C. An air gap or positive anti-siphon device shall be provided between the water source and the vehicle being loaded if the vehicle has been used for other than water haul if the source is a domestic potable water supply, or the water is used for tank mixing with any other materials.
- D. The designated water sources may require some work prior to their use. Such work may include cleaning ponded areas, installing temporary weirs or sandbags, pipe repair, pump installation or other items (appropriate to the Contractor's operations). Flowing streams may be temporarily sandbagged or a weir placed to pond water. Contractor shall obtain approval on improvements for sandbags or weirs prior to placement.

4. MEASUREMENT

- A. Unless specified in the Schedule of Items, development of water supply sources shall be incidental to work ordered. If in the Schedule of Items, measurement for development of water supply sites will be the number of sites ordered and accepted.
- B. Unless specified in the Schedule of Items as watering for a specific Section of these specifications, measurement of water haul and application will be incidental. If indicated in the Schedule of Items, measurement shall be M-GALLONS (1,000 gallons) using calibrated tanks, distributors, or accurate water meters furnished by the Contractor. Hauling shall be incidental. In no case will payment be made for more gallons than ordered by the Owner.

5. PAYMENT

- A. The accepted quantities will be paid for at the contract unit price shown in the Schedule of Items.
- B. Payment is incidental to other pay items.

END OF SECTION

EXHIBIT 1

ROAD MAINTENANCE AND RECONSTRUCTION

Technical Specifications

Section 1. Permits. OWNER has prepared or will prepare the required Forest Practices Act (FPA) "Written Plan" for operations within 100 feet of Type F or Type D streams or for other operations requiring a FPA "Written Plan".

Any changes to the plan must have OWNER approval. CONTRACTOR shall comply with all provisions of the Written Plan.

Contractors Certification Contractor shall have Oregon Professional Logger status or other American Forest and Paper Association (AF&PA) Sustainable Forestry Initiative(SFI) approved certified logger program. Contractor will provide proof of certification before contract is awarded.

Seasonal Restrictions.

Bridge and culvert installations in "live" streams shall not be allowed from September 1 through July 14, unless otherwise approved in writing by Oregon Department of Forestry and the OWNER.

From September 15 through June 15 the Contractor will operate all vehicles over 10,000 GVW at reduced tire pressures. The steering axles of these Vehicles shall be at 91 psi and the drive axles shall be at 71 psi.

Section 8. Access. Except as otherwise provided for in this contract, CONTRACTOR shall have the right of access over, in, and through any Forest Tract listed in this contract, for the purpose of performing the operations. CONTRACTOR in so using, improving, or constructing roads, shall at no time have an interest in the land or timber other than the right of access. CONTRACTOR shall be responsible for obtaining all road use permits, paying any road use fees, and performing any maintenance associated with log and rock haul tributary to the Listed Tracts.

CONTRACTOR shall comply with all applicable terms and conditions of any access documents set forth in the provisions of this contract, which are by this reference made a part of this contract.

Access Easement. Contractor's use of any road listed below is subject to a road use agreement by and between parties named; which may include requirements to furnish evidence of insurance coverage, performance bond, entering into a third-party agreement, maintenance, or other actions.

Section 9. Road Maintenance. Contractor's responsibility for normal road maintenance commences with Contractor's first use of a road for any activity under the contract. Contractor's responsibility shall continue through any active periods until final acceptance of the maintenance is made by OWNER.

Normal road maintenance applies to all existing roads used for any activity under this contract. A road which is constructed or reconstructed by CONTRACTOR shall assume the status of an existing road upon acceptance in writing by OWNER.

Normal maintenance shall be inclusive of work needed to protect the road from seasonal weather damage, restore damage caused by road use, and safeguard soil, water, and drainage structures, as follows:

Should CONTRACTOR jointly share maintenance responsibilities with other authorized parties to use the roads, then each party shall be responsible for a proportionate part of normal maintenance, based upon the ratio of each party's use to total road use, as determined by OSU. OSU may determine when maintenance is needed and issue instructions to CONTRACTOR specifying the work to be done and the date by which it must be completed.

- (a) CONTRACTOR shall maintain the existing cross section of dirt or graveled roads by blading and shaping the surface and shoulders. Banks shall not be undercut. Established berms shall be maintained. Additional berms shall be placed where needed to protect fills. OWNER may require cross ditching on certain roads.
- (b) CONTRACTOR shall perform all cleanup including the removal of bank slough, minor slides, and fallen timber. This material shall be deposited at a location identified by OWNER. CONTRACTOR shall replace material eroded from fill slopes and clean out drainage ditches and culverts.
- (c) CONTRACTOR shall patch and place additional rock on gravel road surfaces as necessary to repair damage and restore the road.
- (d) CONTRACTOR shall remove brush or tree growth, which encroaches on the road and develops during the contract period. Herbicides may be used only with written authorization of OWNER.
- (e) CONTRACTOR shall be required to place and maintain straw bales for filtering road run-off water before it enters waters of the state.

While performing normal road maintenance work, CONTRACTOR shall not contaminate gravel or bituminous road surfaces by covering or mixing earth or debris from ditches, slides, or other sources. CONTRACTOR shall not blade any of the surface material from the roads.

While performing the operations, CONTRACTOR shall minimize damage to ditches, cut banks, fill slopes, and road surfaces. Where damage does occur, CONTRACTOR shall restore the road to its original condition, as directed by OWNER.

Prior to any inactive periods, drainage systems on the roads and landings shall be re-established so that:

- (1) Exposed soil will not erode into waters of the State; and
- (2) drainage water will not saturate fills.

During active periods, CONTRACTOR is responsible for maintenance needs that are caused by public use of the road and that can be accomplished under the terms of normal maintenance. Upon written approval from OWNER, CONTRACTOR may restrict use of the roads by others. Measures may include signing, gating, or blocking off the road. Approval of measures by OWNER does not relieve CONTRACTOR from normal maintenance responsibilities during active periods in the event that such measures do not restrict vehicular traffic.

Upon written acceptance of road maintenance at the end of the active period, CONTRACTOR shall not be required to perform normal road maintenance during the inactive period. Upon resuming activity, CONTRACTOR shall become responsible for any normal road maintenance, which has developed during the inactive period.

In addition to forest road maintenance required under this contract, no track-mounted machinery shall cross any bridge without first providing a protective barrier between the tracks and bridge surface. The barrier shall be adequate to protect the bridge surface.

Section 11. Protection of Watershed. CONTRACTOR shall take all necessary precautions to prevent damage to stream banks, any stream course, lake, reservoir, or forested wetland within or adjacent to the project area. Definitions of Type F, Type D, and Type N streams contained in the Oregon Forest Practice Act apply to this contract.

CONTRACTOR shall comply with the following instructions for removal of debris that enters streams as a result of CONTRACTOR's operations:

- Debris entering Type F streams shall be removed by the end of operations each day, unless OWNER approves an alternate practice.

OWNER may direct certain debris to be left in stream areas for habitat structure purposes.

In addition to other protective measures required, CONTRACTOR shall discontinue all or part of the operations under this contract upon notice from OWNER that operations will cause excessive damage to the watershed.

Section 13 Warning Signs. CONTRACTOR shall post and maintain signs adequately warning forest users of active felling, and road construction operations. Signs shall be posted at locations designated by OWNER.

FIRE CONTROL AND SLASH DISPOSAL

Section 14. Precautions Against Fire It is recognized that the activities of CONTRACTOR under this contract may cause extraordinary fire risk on the areas of operations. CONTRACTOR agrees to use the highest degree of care to prevent forest fires from starting on or from spreading to the areas of operations. CONTRACTOR shall require the employees and contractors of CONTRACTOR and the employees of such contractors to do likewise. OWNER may, at any time during the contract period, require CONTRACTOR to prepare a Fire Plan for the areas of operations. The plan shall set forth the resources and required actions to be taken by CONTRACTOR and contractors of CONTRACTOR for the prevention and suppression of fire on the areas of operations. The plan shall meet with the approval of OWNER and may be revised as necessary.

Section 15. Efforts on Fire. Should a fire occur on any part of the areas of operations, CONTRACTOR shall immediately proceed to extinguish the fire, provided CONTRACTOR was willful, malicious, or negligent in the origin of the fire, or the fire started as a result of operations, or during operations. In addition, once CONTRACTOR is informed of the fire, CONTRACTOR shall require the employees and contractors of CONTRACTOR and the employees of such contractors to extinguish the fire. CONTRACTOR shall defend and hold harmless OWNER from any and all loss, costs, damage, and expense that OWNER may incur as a result of any fire caused by the operations of CONTRACTOR, employees and contractors of CONTRACTOR, and employees of such contractors. In no event shall the requirements of this section be construed as relieving CONTRACTOR of the duty and responsibility under Oregon law to fight, control, and suppress fire on forestland. It is understood that the provisions of this section may be in addition to any duty and responsibility required by law.

Section 16. Fire Equipment During closed fire season, CONTRACTOR shall provide an engine with at least a 300-gallon capacity, 500 feet of fire hose, one gated wye valve, and two adjustable nozzles, in constant readiness in the project area. The engine must be self-filling and be able to travel fully loaded, under its own power, on all truck roads providing access to or within the project area. Alternatively, a trailer mounted Fire Wagon with at least 500-gallon capacity and the required hose, wye valve, and nozzles passing ODF inspection will be acceptable. Such equipment shall be credited toward the requirements of OAR 629-043-0020 for water supply, hose, and nozzle, subject to OWNER approval. During closed fire season, CONTRACTOR shall also provide hand tools, fire extinguishers, spark arresters and mufflers for engines, fire tools for trucks, and watchman as required in OAR 629-43.

EQUIPMENT CLEANING

Section 17.

All logging and construction equipment must be washed at designated locations prior to entering and leaving the Forest.

PROJECTS

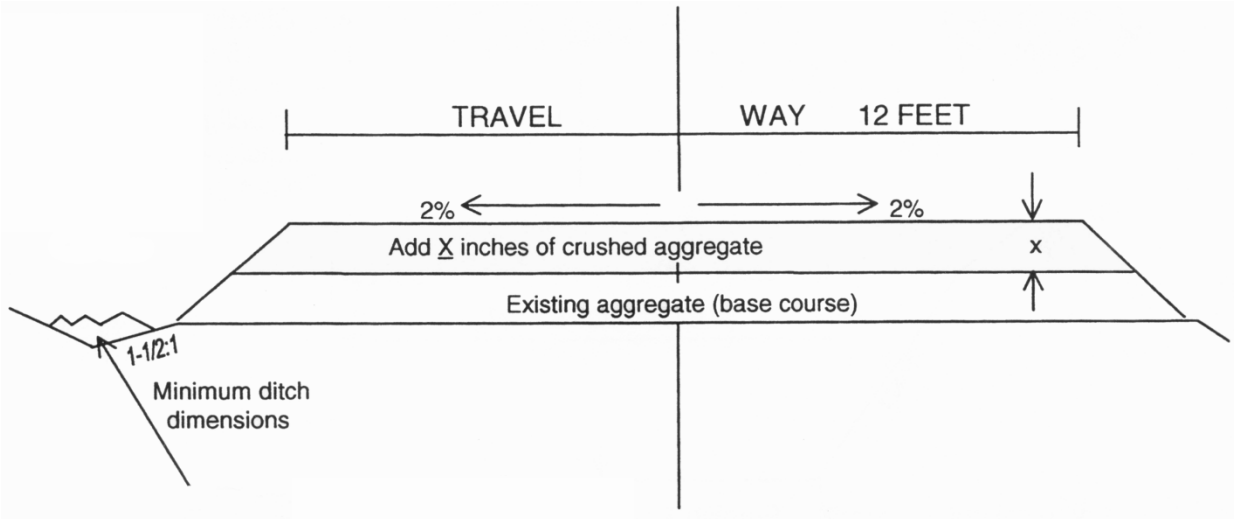
Section 18 Project Work CONTRACTOR shall complete the projects in accordance with the specifications provided, and written instructions from OWNER. Project locations are shown in Exhibits

CONTRACTOR shall furnish all material unless otherwise specified. For summary of project refer to Section 01010,1.01 A.

EXHIBIT 3**ROAD RECONSTRUCTION SPECIFICATIONS**

CONTRACTOR shall furnish, spread and compact crushed surface rock on haul road sections as specified in Exhibits 3, 3B1 and 3B2. Roads shall be reshaped with a grader and compacted prior to rocking. Ditches shall be pulled and culvert inlets and outlets shall be cleaned and approved by OSU prior to rocking. Berms shall be pulled back. For typical cross section and additional details, see Exhibits 3B1 and 3B2. CONTRACTOR shall construct leadoff ditches and furnish and install culverts as specified in Exhibits A, B, K, L, M, and 3.

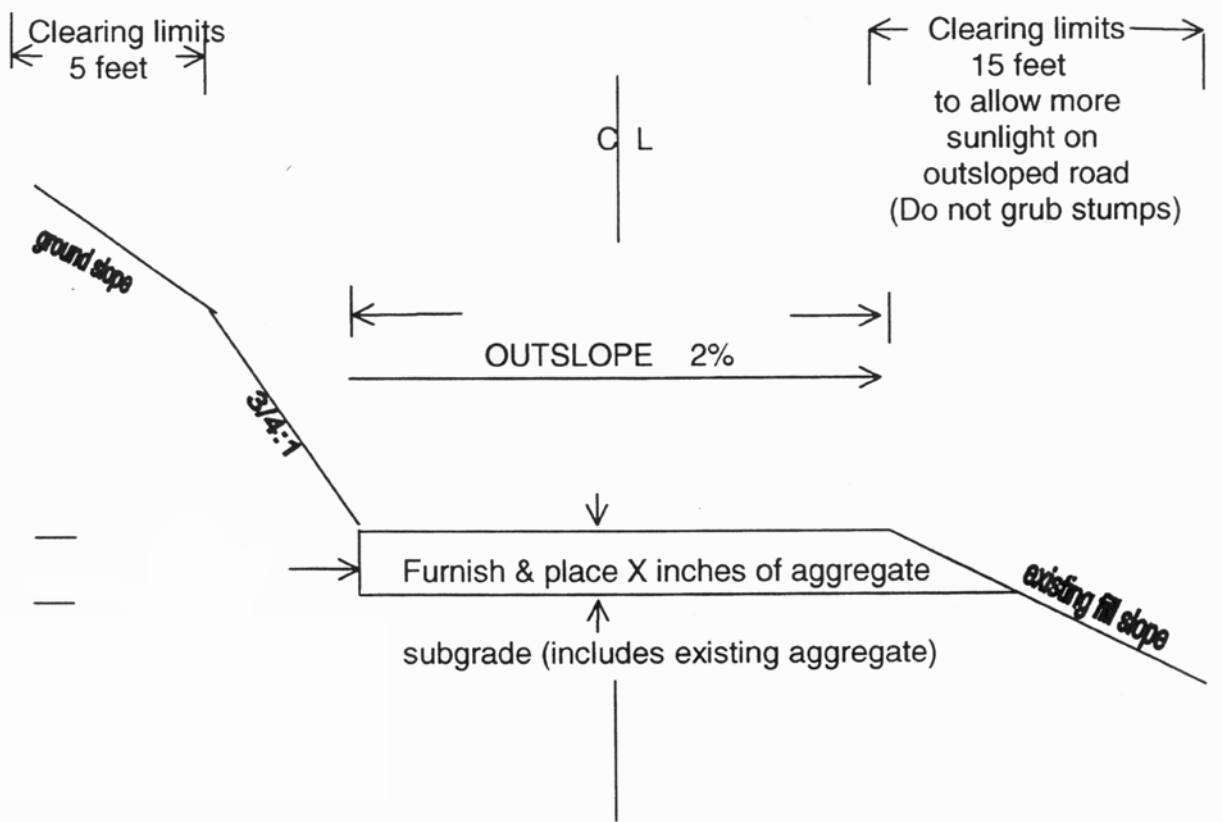
EXHIBIT 3B1
Reconstruction Detail
Crowned Section



General Note

1. Finished surface will have 2 percent crown and 14 foot running surface. Curve widening, turnouts and intersections shall be rocked to the extent of the existing surface.
2. See Exhibit D for rock depth X.
3. Shape and compact existing aggregate prior to placement of new aggregate.
4. Clean all culvert inlets and outlets, and pull all ditches prior to placement of new aggregate.
5. Install/replace culverts prior to placement of new aggregate.

EXHIBIT 3B2
Reconstruction Detail
Out-sloped Section



General Notes

1. Finished surface will have 3% out-slope and minimum 12 foot running surface plus at least 2 feet curve widening on all curves.
2. Widen subgrade where necessary by moving into cut bank. Excavated material shall be end hauled to a designated waste area. Excavated material shall not be side cast.
3. Compact subgrade prior to rocking.
4. See Exhibit 3A for aggregate depth X.

EXHIBIT B

EARTHWORK

CLEARING & GRUBBING

Description. This work will consist of clearing, grubbing, trimming, removing, and disposing or treatment of timber, construction slash, and debris.

Clearing & Grubbing. All debris, trees, stumps, roots, and other protruding vegetative material within the clearing limits shall be cleared, grubbed, removed, and disposed, except the following:

(a) Undisturbed stumps outside of roadway or in embankment areas, provided they do not extend more than 12 inches above the original ground (measured from the uphill side) nor closer than 2 feet to the finished subgrade or 1 foot to any slope surface and they do not interfere with the placement or compaction of embankments.

(b) Grubbing of pits, channel changes, rock sections, and ditches, below the depth of the proposed excavation.

All roots over 2-1/2 inches in diameter within the roadbed area shall be grubbed to a minimum depth of 6 inches below subgrade. Roots over 2- 1/2 inches in diameter protruding from the excavated slope shall be cut flush with the excavated slope surface.

Utilization of Timber. Trees inside right-of-way clearing shall be felled and bucked to lengths specified by Owner. The logs shall lie along the long axis of road. Contractor shall deck the logs to provide room for construction activities. Decking shall be done in such a manner that logs are piled parallel to one another. Decks shall be free of brush and soil and accessible from completed roadway.

Pioneer Roads. The construction of pioneer roads shall be confined to inside the roadway unless otherwise approved by the Engineer.

Treatment of construction slash larger than 2-1/2 inches in diameter and 3 feet in length shall be accomplished by scattering, and stumps over 18 inches in diameter at the root collar shall be hauled to designated locations.

Construction slash shall be scattered outside the clearing limits without damaging trees.

No construction slash shall be deposited in streams or streambeds. Construction slash that interferes with drainage structures shall be removed immediately.

Grubbed stumps over 18 inches in diameter at the root collar shall be removed from roadway, hauled, and stacked at locations shown on the drawings (when provided) or as designated.

**EXHIBIT D
ROAD SURFACING**

TURNOUTS:			NO. OF T.O.	POINT TO POINT	
AS STAKED BY OWNER		“			CY

Roads shall be uniformly graded, compacted and approved by OWNER prior to rocking. For typical cross sections see Exhibits 3B1, 3B2.

EXHIBIT E
CRUSHED ROCK SPECIFICATIONS

Materials. The material shall be fragments of rock or other hard, durable particles crushed to the required size and a filler of finely crushed stone, sand, or other finely divided mineral matter. The material shall be free from vegetation and lumps of clay.

Quality and Grading Requirements. The stone base materials shall be crushed rock. River gravel shall not be used.

The material from which base material is produced or manufactured shall conform to the general requirements of Section 2630 of the "Standard Specifications for Highway Construction" prepared by the Highway Division, Oregon Department of Transportation, and shall meet the following test requirements:

Hardness - Test Method AASHTO T 96: 35% Maximum

Durability - Test Method OSHD Standard Passing No.20 Sieve: 30% Maximum
Sediment Height: 75mm Maximum

Sand Equivalent – Test Method: AASHTO T176 – 35 minimum

**EXHIBIT F
CRUSHED ROCK SPECIFICATIONS**

Grading Requirements

For 3/8"-0"	Passing	1/2" sieve	100%
	Passing	3/8" sieve	90-100%
	Passing	1/4" sieve	25-75%
	Passing	#10 sieve	0-35%

For 3/4"-0"	Passing	1" sieve	100%
	Passing	3/4" sieve	90-100%
	Passing	3/8" sieve	55-75%
	Passing	1/4" sieve	40-60%

Of the fraction passing 1/4" sieve, 40% to 60% shall pass the No.10 sieve.

For 1½"-0"	Passing	2" sieve	100%
	Passing	1-1/2" sieve	95-100%
	Passing	3/4" sieve	55-75%
	Passing	1/4" sieve	35-50%

Of the fraction passing 1/4" sieve, 40% to 60% shall pass the No.10 sieve.

For 2"-0"	Passing	2½" sieve	100%
	Passing	2" sieve	95-100%
	Passing	1" sieve	55-75%
	Passing	1/4" sieve	30-45%

Of the fraction passing 1/4" sieve, 40% to 60% shall pass the No.10 sieve.

For 2½"-0"	Passing	3" sieve	100%
	Passing	2½" sieve	95-100%
	Passing	1¼" sieve	55-75%
	Passing	1/4" sieve	30-45%

Of the fraction passing 1/4" sieve, 40% to 60% shall pass the No.10 sieve.

For 3"-0"	Passing	3-1/2" sieve	100%
	Passing	2-1/2" sieve	60-90%
	Passing	1/4" sieve	15-35%

Of the fraction passing 1/4" sieve, 40% to 60% shall pass the No.10 sieve.

For Jaw-Run	Passing	6" sieve	100%
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For 6"-0" Pit-Run	Passing	10" sieve	100%
	Passing	6" sieve	65%

The referenced sieve shall have square openings as set forth in AASHTO M 92, Woven Cloth Series. The determinations of size and gradings shall be as set forth in AASHTO T 27.

EXHIBIT G ROCK ACCOUNTABILITY

The rock shall meet the quality and size specifications in Exhibits D, E, and F. Upon request by OWNER, CONTRACTOR shall have samples of the rock tested for gradation, hardness, and durability at a laboratory acceptable to OWNER and supply the test results to OWNER for approval prior to rocking. Subgrades must be approved by OWNER prior to rocking. Rocking must be done only when weather conditions are acceptable to OWNER, and must be suspended when muddy water could enter streams from runoff.

Rock accountability shall be determined by the following method. OWNER shall be given 24 hours' notice prior to rocking.

CONTRACTOR shall supply OSU with weight receipts for all rock placed. Weight receipts must be generated from a State of Oregon certified and sealed scale. The gross weight and truck tare weight for each load must be machine printed on the weight ticket along with the truck number, date, and time. The CONTRACTOR shall, along with the weight receipts, supply OSU with a summary sheet of rock quantities hauled and on which road the rock was placed.

**EXHIBIT H
ROCK SPREADING, PROCESSING, AND COMPACTION**

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

ROAD SEGMENT	COMPACTION EQUIPMENT OPTIONS
	Exhibit J

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

ROAD SEGMENT	COMPACTION EQUIPMENT OPTIONS
	Exhibit J

**EXHIBIT I
COMPACTION AND PROCESSING REQUIREMENTS**

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

ROAD SEGMENT	COMPACTION EQUIPMENT OPTIONS
	Exhibit J

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

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

ROAD SEGMENT	COMPACTION EQUIPMENT OPTIONS
	Exhibit J

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

ROAD SEGMENT	COMPACTION EQUIPMENT OPTIONS
	Exhibit J

EXHIBIT J
COMPACTION EQUIPMENT OPTIONS

- (1) Smooth-Wheel Power Rollers. Smooth-wheel power rollers shall either be of the 3-wheel type, weighing not less than 10 tons, or of the tandem type, 2-wheel or 3-wheel, weighing not less than 8 tons. Smooth-wheel rollers shall provide compression of 325 pounds per lineal inch of width of rear wheels or drum.
- (2) Pneumatic-Tired Rollers. Pneumatic-tired rollers shall be of the double-axle type equipped with pneumatic tires of equal size and type. The spacing between the sidewalls of adjacent tires shall not exceed 5 inches; the rear tires shall be staggered with relation to the front tires. The rolling width of the unit shall be not less than 60 inches exclusive of the power unit. The roller shall be so constructed that the contact pressure is uniformly distributed on all of the tires. The tires shall be inflated to maintain the air pressure in the several tires within a total tolerance of 5 pounds per square inch. The roller shall be so constructed that the total weight is between 1,000 and 2,000 pounds per tire. The actual operating weight of the rollers shall be as ordered by OWNER.

Each pneumatic-tired roller shall be drawn by equipment having sufficient power and sufficient weight, under normal conditions, to pull the roller at a minimum speed of 5 miles per hour, or may be self-propelled to obtain a minimum speed of 5 miles per hour.
- (3) Vibratory Rollers. The drum shall have a smooth surface, a diameter not less than 48 inches, a width not less than 58 inches, and a turning radius of 15 feet or less. Vibration frequency shall be regulated in steps to 1400, 1500, and 1600 VPM, corresponding to engine speeds of 1575, 1690, and 1800 RPM. The centrifugal force developed shall be 7 tons at 1600 VPM. It shall be activated by a power unit of not less than 25 horsepower. The vibratory roller shall be self-propelled and operated at speeds ranging from 0.9 miles to 1.8 miles per hour, as directed by OWNER.
- (4) Vibratory Compactors. Vibratory compactors shall consist of multiple or gang type compacting units or pads with a minimum variable width of 2 feet. It shall be self-contained and capable of compacting material as required.
- (5) Rock Trucks. Rock spreading shall begin at the nearest point to the rock source and progress toward the end of the project. Rock trucks shall be routed over the entire cross section of rock layers.
- (6) Tampingfoot Compactors. Tampingfoot or sheepsfoot compactors shall exert a minimum pressure of 250 pounds per square inch on the ground area in contact with the tamping feet. The compactor shall cover a minimum width of 60 inches per pass and weigh a minimum of 16,000 pounds.

EXHIBIT K CULVERT SPECIFICATIONS

All culvert materials shall be furnished and installed by CONTRACTOR, unless otherwise specified in the contract. Culverts shall be constructed of corrugated aluminized steel type 2, and shall conform to the material and fabricating requirements of AASHTO M274 (aluminized steel type 2 material) ASTM A 929, AASHTO M36 and ASTM A760 (conduit, pipe) **OR** Polyethylene culverts (12" to 48" in diameter), double walled, and meet the requirements of AASHTO M-294-901, Type S. Corrugation types and shapes other than those meeting the above minimum Highway requirements, shall be approved in writing by OWNER.

The joints between bands and pipe of unlike material shall be coated with an approved bituminous material.

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

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

Camber shall be incorporated into all culvert trench beds by increasing the lower half of the trench bed slope 1/2 of 1 percent of the culvert grade.

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

The foundation and trench walls for all culverts shall be free from logs, stumps, limbs, stones over 3 inches, and other objects which would dent or damage the pipe during installation or use. If tamping is required, the trench shall be excavated wide enough to permit working on each side of pipe. Bedrock shall be excavated as required to provide a uniform foundation for the full length of the culvert.

A bedding of granulated material or job-excavated soil shall be placed to provide a wide band of support and to transmit the load from above evenly over the entire length of the pipe. The top 1 foot of cover shall be crushed aggregate.

Transporting of the pipe shall be done carefully. Dragging or allowing free fall from trucks or into trenches shall not be permitted. Damage to bituminous coating shall be repaired before the pipe is covered.

On new installations of pipe of like material, joining shall be done with bands of like material and corrugations. Manufacturers' instructions shall be followed for prefabricated pipe assembly.

Tamping shall be done in 8-inch lifts, 1 pipe diameter each side of the pipe to 95 percent density or over.

EXHIBIT L CULVERT SPECIFICATIONS

Minimum height of cover over top of culvert to subgrade when road is to be rocked shall be as follows: 12" for steel culverts 12" to 96", (12" for aluminum culverts 12" to 42", 24" for aluminum culverts 48" to 96",) and 12" for polyethylene culverts (add 6" for roads which will not be rocked). Minimum vertical cover for other steel (or aluminum) designs shall be as specified by OWNER.

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

The ends of each culvert shall be free of logs and debris which would restrict the free flow of water. Culverts in Type F streams must allow free passage of fish as provided in the Oregon Forest Practice Rules. The intake end of relief culverts shall be provided with a sediment catching basin 3 feet in diameter at the bottom. The outlet end of any culvert which would allow water to erode embankment soil into waters of the State shall be provided with a downspout or other approved slope protection device.

Following are the minimum standard gauges for pipe and coupling bands. All other designs shall be in accordance with the minimum requirements of the Highway Division (Drawing Nos. 2091-A and B), or as approved by OWNER.

<u>Dia.</u>	<u>Pipe Gauge</u>		<u>Band Gauges</u>		<u>Band Widths ("</u>	
	(*Alum.)	Steel	(*Alum.)	Steel	Annular	Helical
12-15	16	16	16	16	7	12
18-24	16	16	16	16	12	12
30-36	14	16	14	16	12	12
42	12	14	12	16	12	12
48	12	14	12	16	24	24
54	12	14	12	16	24	24
60	10	12	10	16	24	24
66-72	10	12	10	16	24	24
78	10	12	10	16	24	24
84	8	12	8	16	24	24
90-120	8	12	8	16	26	26

(3"x1")

*Up to 33"

Polyethylene culverts between 3" to 10" in diameter shall meet the requirements of AASHTO M-252-851. Polyethylene culverts between 12" to 48" in diameter shall be double walled and meet the requirements of AASHTO M-294-901, Type S.

EXHIBIT N WATERSHED REGULATIONS

CONTRACTOR shall take precautions necessary to protect the watershed from damage and to prevent pollution to the water supply. Precautions shall include, but not be limited to, the following regulations.

Laws, Rules, and Regulations. Comply with Oregon laws and with the rules and regulations of the Oregon State Board of Health relative to protection of watersheds and sanitation of public water supply.

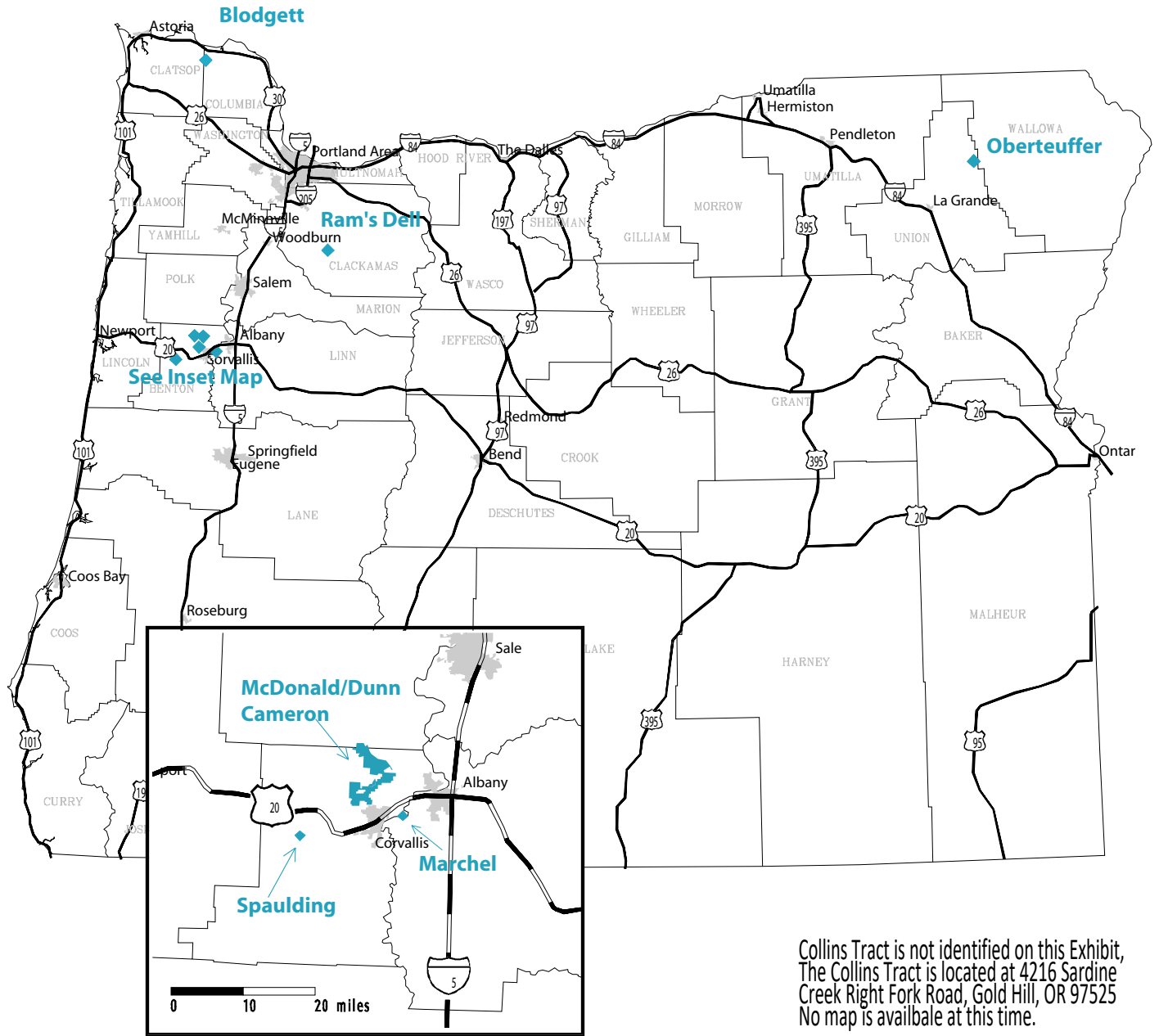
Debris in Streams. Prevent, insofar as possible, logs, chunks, and other debris, resulting from logging and road building operations, from being deposited in streams. If such material should become deposited in streams, immediately remove the material to restore normal stream flow, using necessary care to prevent unnecessary damage to the stream channel and banks.

General Sanitary Conditions. Do not create any conditions which may permit breeding of flies or mosquitoes. Machinery, equipment, soil, and fuel storage shall not be located near streams. Waste oil shall be removed from the watershed. Camping shall not be permitted.



Personal. Persons with a history of typhoid fever, amoebic dysentery, or infectious hepatitis shall not be employed on the watershed. All personnel shall be required to use the privies. CONTRACTOR shall verbally instruct all personnel employed on the watershed in the required sanitary precautions to be observed and shall give each such person a copy of these regulations.

Overnight Camping Prohibited. No person shall remain on the watershed overnight, unless authorized in writing by OWNER.

OSU College Forests in Oregon



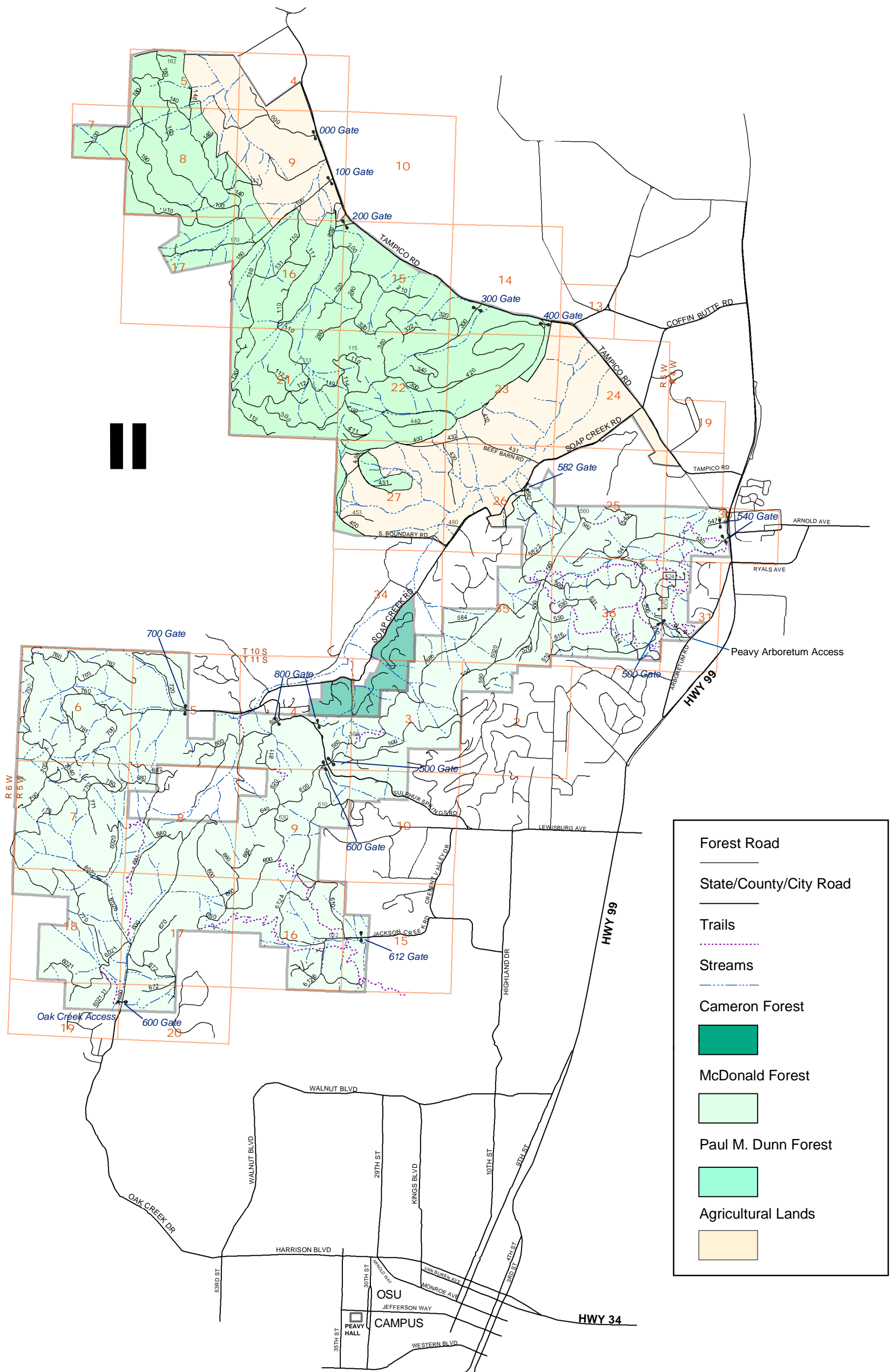
Collins Tract is not identified on this Exhibit,
The Collins Tract is located at 4216 Sardine
Creek Right Fork Road, Gold Hill, OR 97525
No map is available at this time.

-  OSU College Forests
-  Major City Limits

McDonald Forest - Paul M. Dunn Forest

Map 2

College of Forestry - Oregon State University - College Forests
Corvallis, Oregon - March 2005



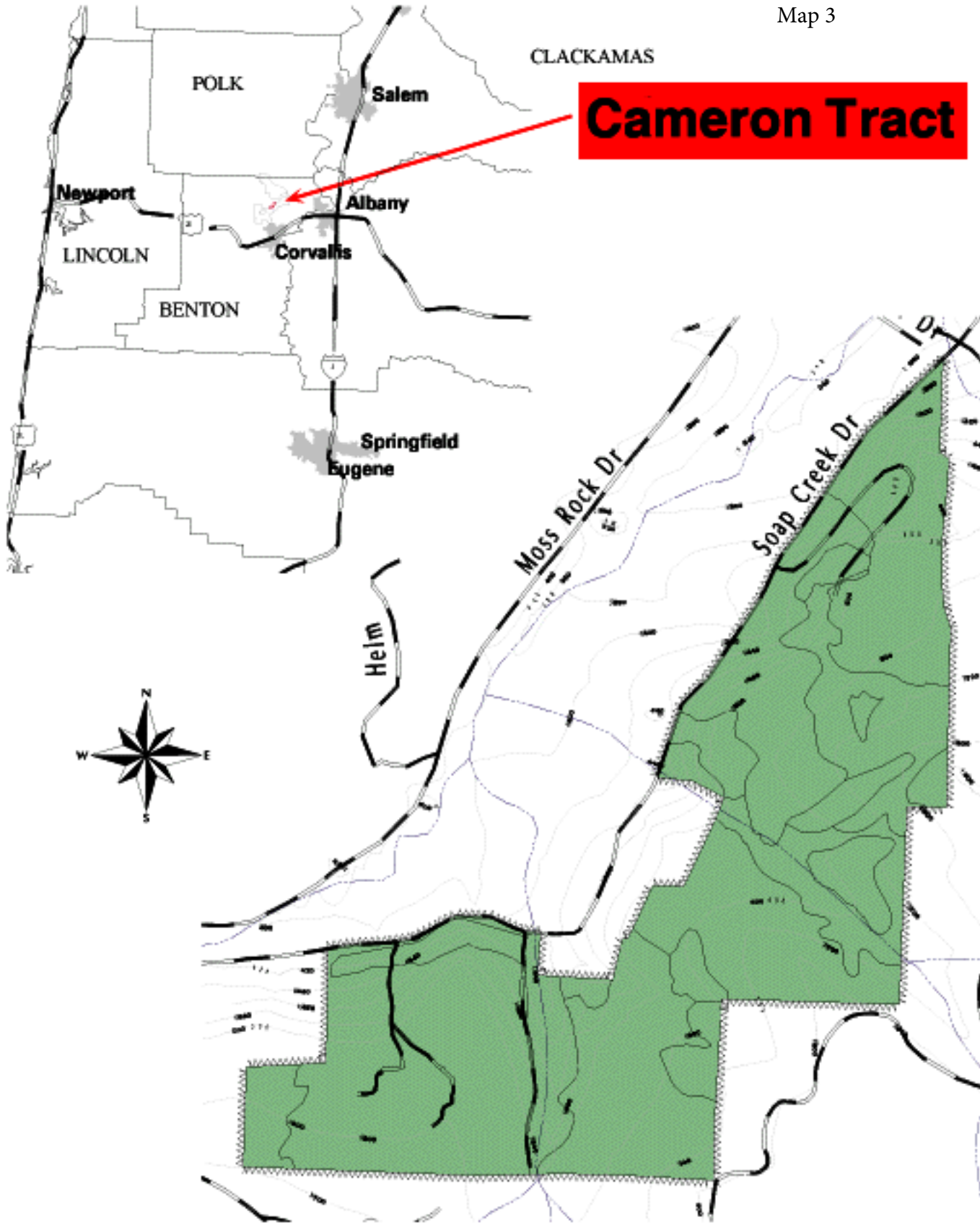
Forest Road	—
State/County/City Road	—
Trails	- - -
Streams	- - -
Cameron Forest	■ (Dark Green)
McDonald Forest	■ (Light Green)
Paul M. Dunn Forest	■ (Medium Green)
Agricultural Lands	■ (Yellow)

0 0.5 1 2 Miles

Speed Limit on all forest roads is 20 mph unless otherwise posted

CLACKAMAS

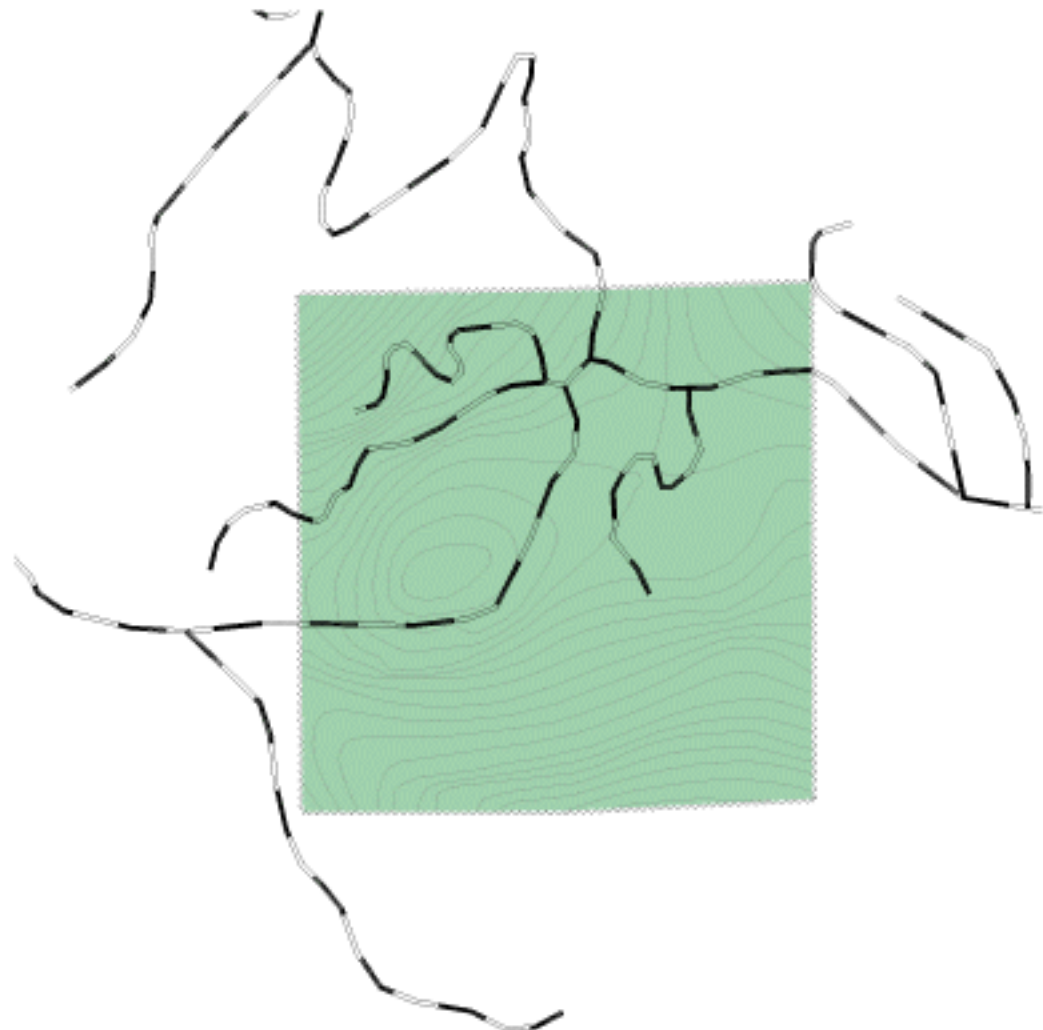
Cameron Tract



- Road
- - - Stream
- Stand Boundary



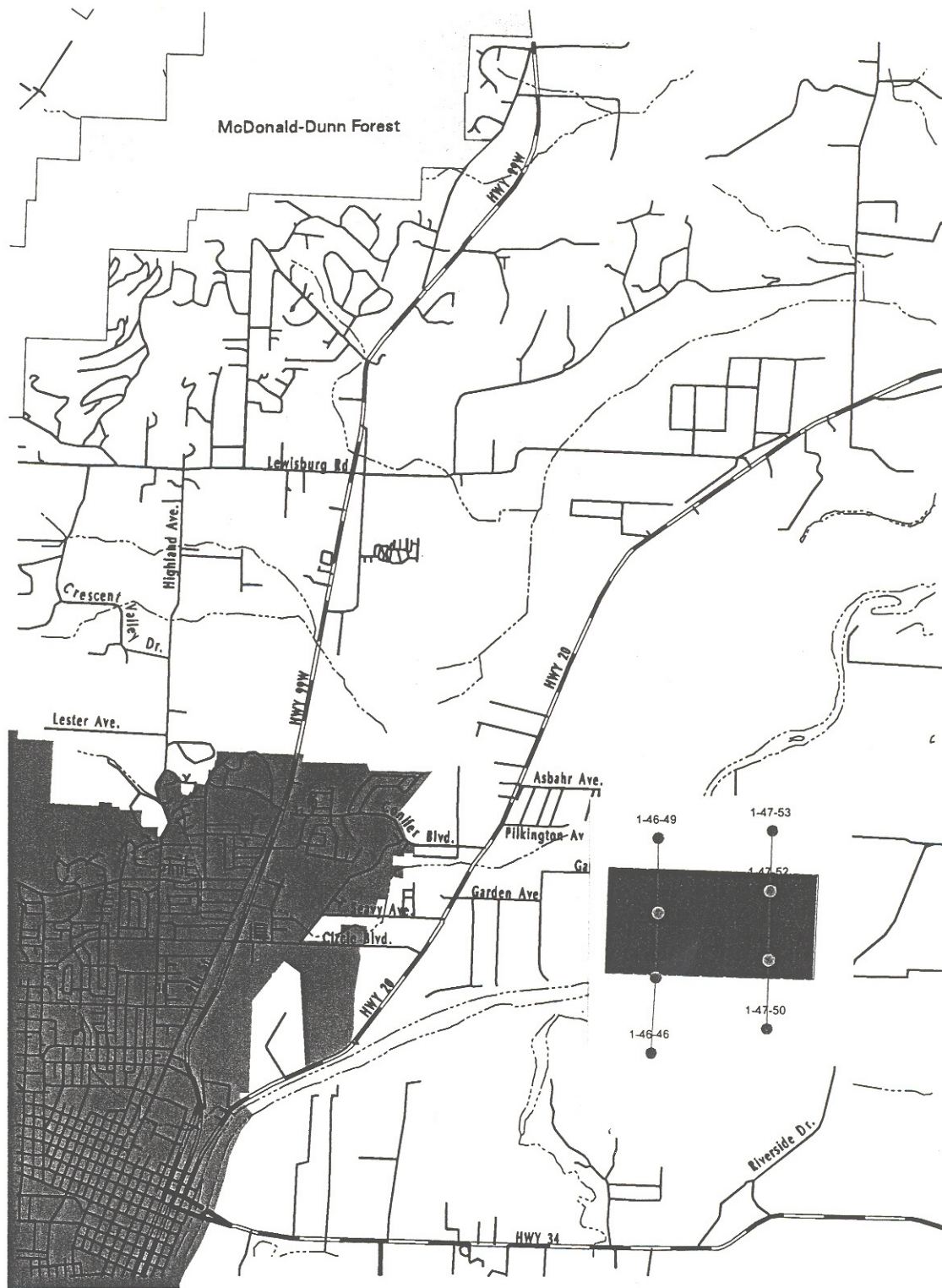
Spaulding Tract



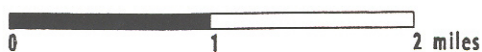
- Contour Line
- Road
- Stand Boundary





Marchell Tract

Map 5



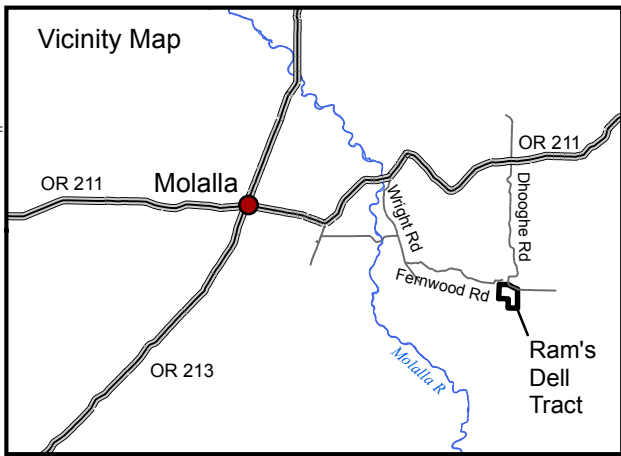
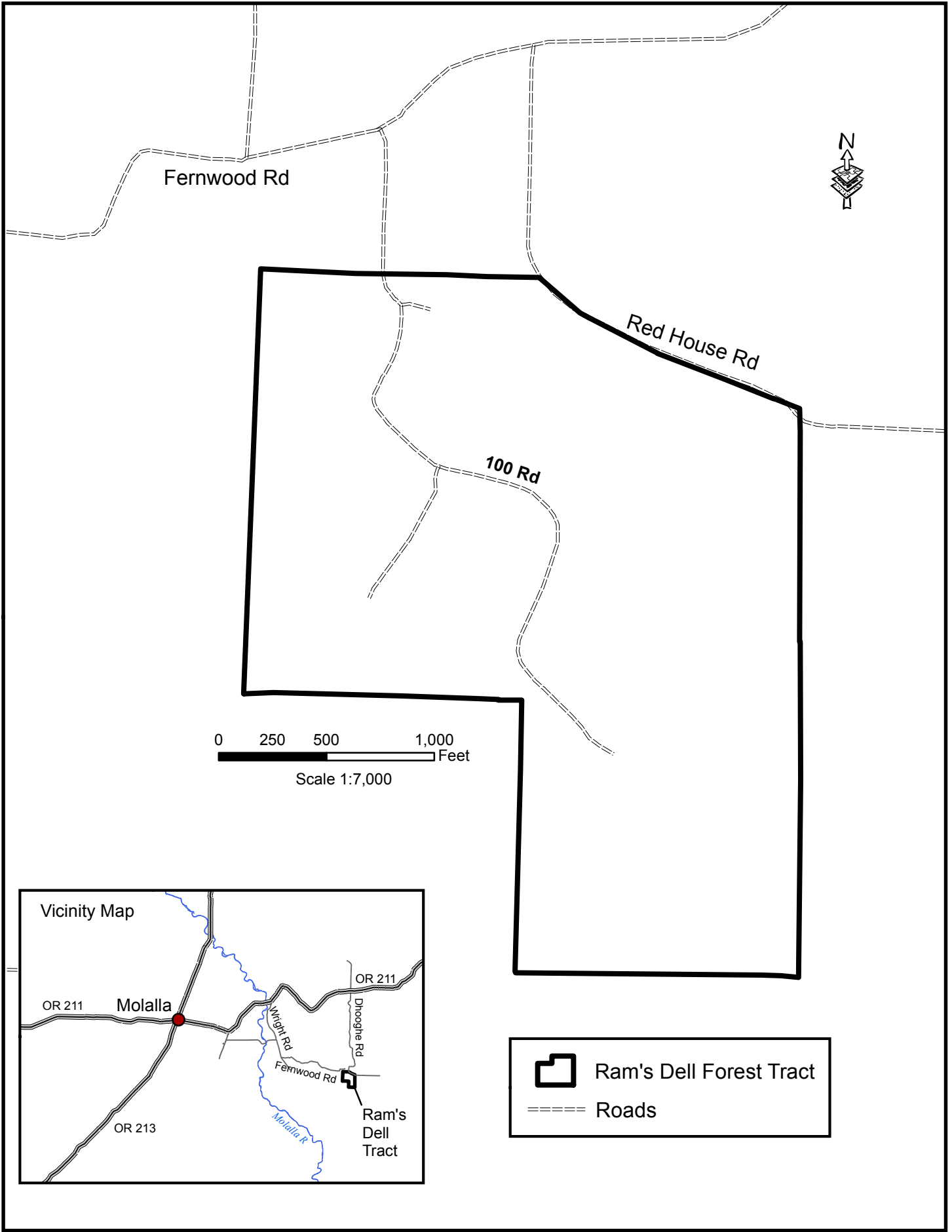
Scale - 1:60,000





-  Corvallis City Limits
-  Highway
-  Road
-  River, Stream

OSU Ram's Dell Forest Clackamas County, OR

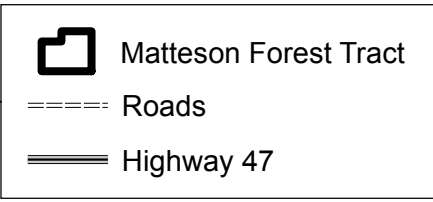
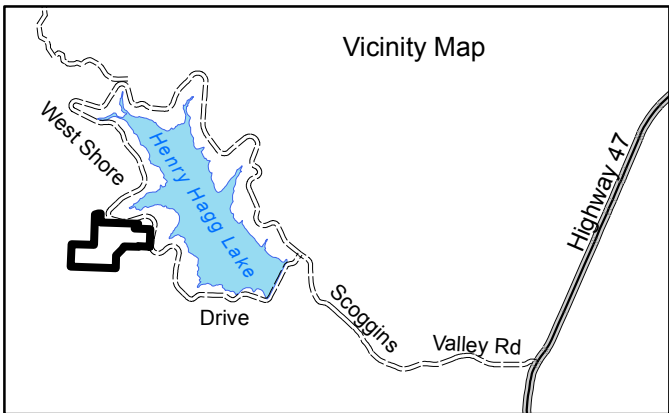
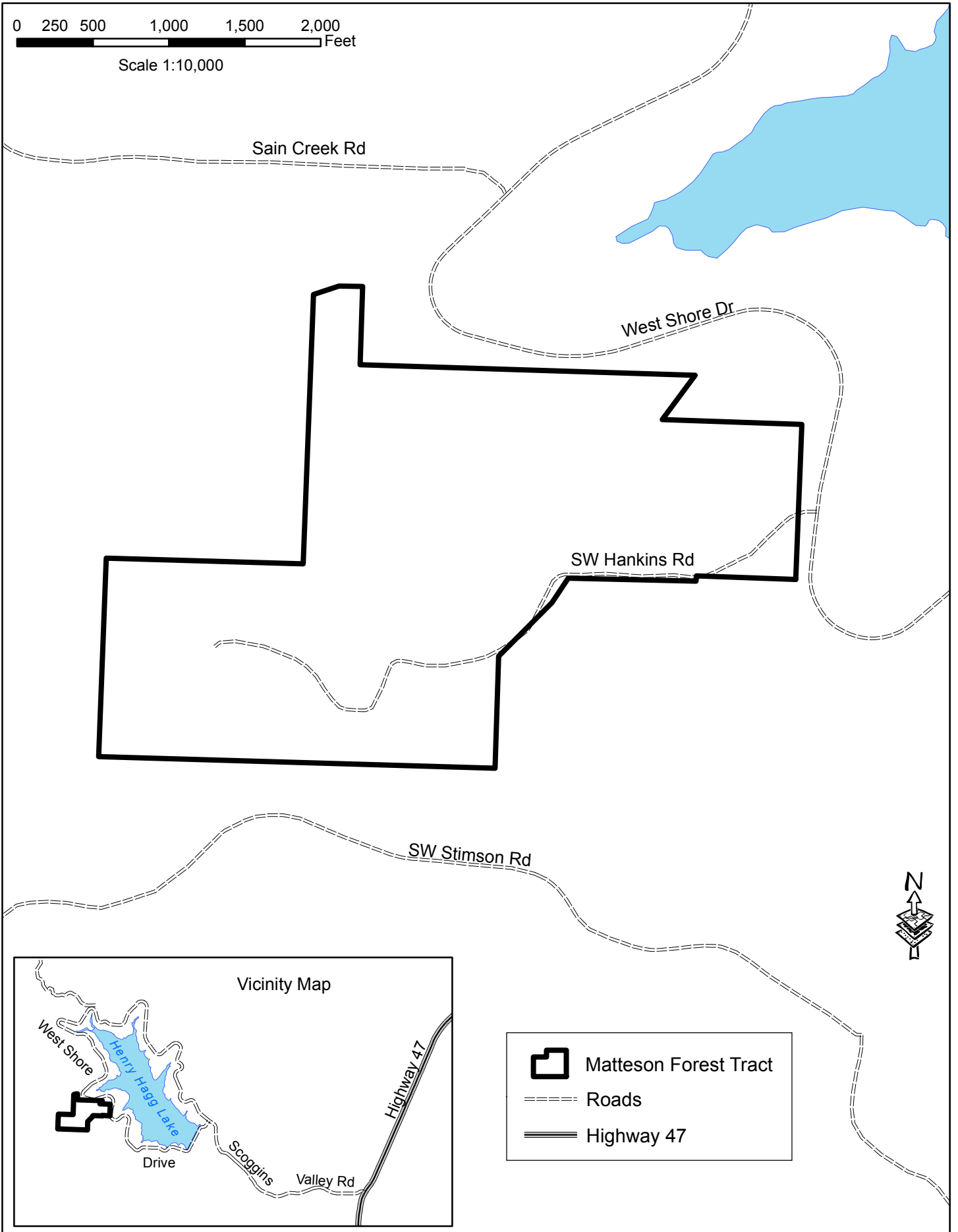
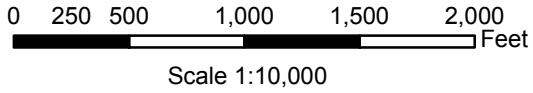
Map 6



	Ram's Dell Forest Tract
	Roads

OSU Matteson Forest Washington County, OR

Map 7



Blodgett Tract

