

ROAD CLAUSES

SECTION 0 - SCOPE OF PROJECT

- 0-1 ROAD PLAN SCOPE: Clauses in this road plan apply to all road-related work, including landings and rock source development, unless otherwise noted, permitted through FPA#'s 2817134, 2817867, and 2817914. All requirements of these permits shall follow Forest Practice Rules.
- 0-2 REQUIRED ROADS: The specified work on the following roads is required.

ROAD	STATIONS	ACTION
1A	12+50	CONSTRUCT
1B	2+00	CONSTRUCT
3A	1+60	CONSTRUCT
3B	1+60	CONSTRUCT
3C	1+50	CONSTRUCT
4A	1+65	CONSTRUCT
5A	2+10	CONSTRUCT
6A	1+00	CONSTRUCT
6B	1+50	CONSTRUCT
7A	17+15	CONSTRUCT
7B	2+70	CONSTRUCT
7C	1+50	CONSTRUCT
7D	1+30	CONSTRUCT
9A	4+75	CONSTRUCT
10A	9+80	CONSTRUCT
T-1240 B	2+30	CONSTRUCT
T-1000 JCT	0+50	CONSTRUCT
D-1460	10+00	MAINTENANCE
HB-ML Seg. 2	70+00	MAINTENANCE
D-1000	20+00	MAINTENANCE
C-1300	1+80	MAINTENANCE
C-1330	7+40	MAINTENANCE
HB-ML	20+00	MAINTENANCE
LL-ML	214+00	MAINTENANCE
T-1240	25+00	MAINTENANCE
T-1200	43+00	MAINTENANCE
T-1000	102+00	MAINTENANCE

- 0-4 CONSTRUCTION: Construction includes, but is not limited to clearing, grubbing, excavation and embankment to sub-grade, full bench end-haul, landing and turnout construction, culvert installation, bridge installation, culvert removal, geotextile installation, drill and shoot, application of 3-inch-minus ballast rock or gravel ballast.

- 0-12 DEVELOP ROCK SOURCE: The Purchaser shall develop an existing rock source. Development will involve clearing, stripping, drilling, shooting, and processing rock to generate riprap, 3- inch-minus ballast, and gravel ballast. Work for developing rock sources is listed in Section 6 ROCK AND SURFACING.
- 0-13 STRUCTURES: The Purchaser shall acquire and install a bridge. Requirements for this structure are listed in Section 7 STRUCTURES.

SECTION 1 - GENERAL CLAUSES

- 1-1 ROAD PLAN CHANGES: If the Purchaser desires a change from this road plan including, but not limited to relocation, extension, change in design, or adding roads; a revised road plan shall be submitted, in writing, to the Contract Administrator for consideration. The City must approve the submitted plans before road work begins.
- 1-2 UNFORESEEN CONDITIONS: Quantities established in this road plan are minimum acceptable values. Additional quantities required by the City due to unforeseen conditions or Purchaser's choice of construction season or techniques shall be at the Purchaser's expense. Unforeseen conditions include, but are not limited to, solid subsurface rock, subsurface springs, saturated ground, and unstable soils.
- 1-3 ROAD DIMENSIONS: Unless controlled by construction stakes, road work shall be performed in accordance with the dimensions shown on the TYPICAL SECTION SHEET and the specifications within this road plan.
- 1-4 ROAD TOLERANCES: Road work shall be performed within the tolerance listed below. The tolerance class for each road is listed on the TYPICAL SECTION SHEET.

Tolerance Class	ft.
Road and Subgrade Width (feet)	+1.5
Subgrade Elevation (feet +)	0.25
Centerline alignment (feet lt./rt.)	1.0

- 1-6 ORDER OF PRECEDENCE: Any conflict or inconsistency in the road plan shall be resolved by giving the documents precedence in the following order:
 - 1. Permit conditioning.
 - 2. Designs or Plans. On designs and plans, figured dimensions shall take precedence over scaled dimensions.
 - 3. Road Plan Clauses.
 - 4. Typical Section Sheet.

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

- 1-21 HAUL APPROVAL: Purchaser shall not use roads under this Road Plan for hauling, other than timber cut on the right-of-way, without written approval from the Contract administrator.
- 1-25 ACTIVITY TIMING RESTRICTION: The specified activities are not permitted during the listed closure period(s) unless authorized in writing by the Contract Administrator.

ROAD	STATIONS	ACTIVITY	CLOSURE PERIOD
ALL		Rock hauling, construction, or abandonment	October 15 to May 31
D-1000	1+100	Chaplain Creek bridge in-stream work	October 1 to June 30

1-26 OPERATING DURING CLOSURE PERIOD: If permission is granted to operate during a closure period listed in Clause 1-25 ACTIVITY TIMING RESTRICTION the Purchaser shall provide a maintenance plan to include further protection of City resources. The Contract Administrator must approve the maintenance plan in writing, and preventative measures shall be put in place, before operation in the closure period. The Purchaser shall be required to maintain all haul roads at their own expense including those listed in Contract Clause C-60 DESIGNATED ROAD MAINTAINER. If other operators are using, or desire to use these designated maintainer roads, a joint operating plan shall be developed. All parties shall follow this plan.

1-29 SEDIMENT RESTRICTION: Silt-bearing runoff shall not be permitted to go into streams.

1-33 SNOW PLOWING RESTRICTION: Snowplowing shall be permitted only after the execution of a SNOW PLOWING AGREEMENT, which is available from the Contact Administrator upon request.

SECTION 2 - MAINTENANCE

2-2 ROAD MAINTENANCE – PURCHASER MAINTENANCE: Purchaser shall perform maintenance on roads listed in Contract Clause C-50 PURCHASER ROAD MAINTENANCE AND REPAIR in accordance with FOREST ACCESS ROAD MAINTENANCE SPECIFICATIONS.

2-3 ROAD MAINTENANCE – DESIGNATED MAINTAINER: Purchaser may be required to perform maintenance on roads listed in Contract Clause C-60 DESIGNATED ROAD MAINTAINER as directed by the Contract Administrator. Maintenance work shall be in accordance with FOREST ACCESS ROAD MAINTENANCE SPECIFICATIONS.

2-7 CLEANING DITCHES, HEADWALLS, AND CATCH BASINS: Purchaser shall clean the ditchlines, culvert headwalls, and catch basins. Work shall be completed before application of rock and shall be done in accordance with the TYPICAL SECTION.

SECTION 3 – CLEARING, GRUBBING, AND DISPOSAL

3-5 CLEARING: Fell all vegetative material larger than 2 inches DBH or over 5 feet high between the marked right-of-way boundaries or if not marked in the field, between the clearing limits specified on the TYPICAL SECTION SHEET. Clearing shall be completed before starting excavation and embankment.

3-10 GRUBBING: Remove all stumps between the grubbing limits specified on the TYPICAL SECTION SHEET. Those stumps outside the grubbing limits but with undercut roots shall also be removed. Grubbing shall be completed before starting excavation and embankment.

3-20 ORGANIC DEBRIS DEFINITION: Organic debris is defined as all vegetative material not eligible for removal by Contract Clause G-10 PRODUCTS SOLD AND SALE AREA that is larger than one cubic foot in volume within the clearing limits as shown on the TYPICAL SECTION SHEET.

3-21 DISPOSAL COMPLETION: All disposal of organic debris shall be completed before the application of rock.

3-23 PROHIBITED DISPOSAL AREAS: Organic debris shall not be deposited in the following areas:

- Within 30 feet of a cross drain culvert.
- Within 30 feet of a live stream, or wetland.

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- On embankments.
- On slopes greater than 40%.
- Within the operational area for cable landings where debris may shift or roll.
- On locations where brush will fall into the ditch or onto the road surface.
- Against standing timber.

3-24 BURYING ORGANIC DEBRIS RESTRICTED: Organic debris shall not be buried unless otherwise stated in this plan.

3-25 SCATTERING ORGANIC DEBRIS: Organic debris shall be scattered outside of the clearing limits in natural openings unless otherwise detailed in this road plan.

SECTION 4 - EXCAVATION

4-2 PIONEERING: Pioneering shall not extend past construction that will be completed during the current construction season. Pioneering shall not extend more than 500 feet beyond completed construction unless approved in writing by the Contract Administrator. In addition, the following actions shall be taken as pioneering progresses:

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

4-3 ROAD GRADE AND ALIGNMENT STANDARDS: The following road grade and alignment standards shall be followed:

- Grade and alignment shall have smooth continuity, without abrupt changes in direction.
- Maximum grade shall not exceed 18 percent favorable and 15 percent adverse.
- Minimum curve radius is 50 feet at centerline.
- Sag vertical curves shall not have a grade change greater than 5% in 100 feet.
- Crest vertical curves shall not have a grade change greater than 4% in 100 feet.

4-5 CUT SLOPE RATIO: Excavation slopes shall be constructed no steeper than shown on the following table:

Material Type	Excavation Slope Ratio	Excavation Slope Percent
Common Earth (on side slopes to 55%)	1:1	100%
Fractured or Loose Rock	½:1	200%
Hardpan or Solid Rock	¼:1	400%

4-6 EMBANKMENT SLOPE RATIO: Unless construction staked or designed embankment slopes shall be constructed no steeper than shown on the following table:

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

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- 4-7 SHAPING CUT AND FILL SLOPE: Excavation and embankment slopes shall be constructed to a uniform line and left rough for easier revegetation.
- 4-8 CURVE WIDENING: The minimum widening placed on the inside of curves is:
- 6 feet for curves of 50 to 79 feet radius.
 - 4 feet for curves of 80 to 100 feet radius.
- 4-9 EMBANKMENT WIDENING: The minimum embankment widening is:
- 2 feet for embankment heights at centerline of 2 to 6 feet.
 - 4 feet for embankment heights at centerline of greater than 6 feet.
- Embankment widening shall be applied equally to both sides of the road to achieve the required width.
- 4-12 FULL BENCH CONSTRUCTION: Where side slopes exceed 50% full bench construction shall be utilized for the entire subgrade width except as construction staked or designed.
- 4-21 TURNOUTS: Turnouts shall be intervisible with maximum of 1,000 feet between turnouts unless shown otherwise on drawings. Locations shall be adjusted to fit the final subgrade alignment and sight distances. Turnout locations shall be subject to written approval by the Contract Administrator. Minimum dimensions are shown on the TYPICAL SECTION SHEET.
- 4-25 DITCH CONSTRUCTION AND RECONSTRUCTION: The Purchaser shall construct ditches into the subgrade as specified on the TYPICAL SECTION SHEET. Excavated slopes shall be consistent with Clause 4-5 CUT SLOPE RATIO. Ditches shall be constructed concurrently with construction of the subgrade.
- 4-28 DITCH DRAINAGE: Ditches shall drain to cross-drain culverts and ditchouts.
- 4-35 WASTE MATERIAL DEFINITION: Waste material is defined as all dirt, rock, mud, or related material that is extraneous or unsuitable for construction material. Waste material, as used in Section 4 EXCAVATION, is not organic debris.
- 4-36 DISPOSAL OF WASTE MATERIAL: Waste material may be sidecast on side slopes up to 50% if the waste material is compacted and free of organic debris. On side slopes greater than 50%, all excavation shall be end hauled or pushed to designated embankment sites and waste areas. All end haul material shall be placed in a specific location in the South Pit specified by the Contract Administrator.
- 4-38 PROHIBITED WASTE DISPOSAL AREAS: Waste material shall not be deposited in the following areas, except as otherwise specified in this plan:
- Within 30 feet of a cross drain culvert.
 - Within 30 feet of a live stream or wetland.
 - In locations that interfere with the construction of the road prism.
 - In locations that impede drainage.
 - Against standing timber.
 - Outside the clearing limits.
- 4-55 ROAD SHAPING: The road subgrade and surface shall be shaped as shown on the TYPICAL SECTION SHEET. The subgrade and surface shape shall ensure runoff in an even, un-concentrated manner, and shall be uniform, firm, and rut-free.

- 4-60 FILL COMPACTION: All embankment and waste material shall be compacted by routing equipment over the entire width of each lift.
- 4-61 SUBGRADE COMPACTION: Constructed subgrades shall be compacted by routing equipment over the entire width.

SECTION 5 - DRAINAGE

- 5-5 CULVERTS: Culverts shall be installed as part of this contract. Culverts shall be installed concurrently with subgrade work and shall be installed before subgrade compaction and rock application. Culvert locations and the minimum requirements for culvert length and diameter are designated on the MATERIALS LIST. Culvert, downspout, and flume lengths shall be adjusted to fit as-built conditions and shall not terminate directly on unprotected soil. Culverts shall be new and meet the material specifications in Clauses 10-15 through 10-23.
- 5-11 UNUSED MATERIALS CITY PROPERTY: On required roads, any materials listed on the MATERIALS LIST that are not installed shall become the property of the City. Purchaser shall stockpile materials as directed by the Contract Administrator.
- 5-15 CULVERT INSTALLATION: Installation shall be in accordance with the CULVERT AND DRAINAGE SPECIFICATION DETAIL and the National Corrugated Metal Pipe Association's "Installation Manual for Corrugated Steel Drainage Structures."
- 5-16 APPROVAL FOR LARGER CULVERT INSTALLATION: Installation of culverts 36 inches in diameter and over shall be subject to written approval by the Contract Administrator before making backfill.
- 5-17 CROSS DRAIN SKEW AND SLOPE: Cross drains, on road grades in excess of 3%, shall be skewed at least 30 degrees from perpendicular to the road centerline, except where the cross drain is at the low point in the road, culverts shall not be skewed. Cross drain culverts shall be installed at a slope steeper than the incoming ditch grade, but not less than 3% or more than 10%.
- 5-25 CATCH BASINS: Catch basins shall be constructed to resist erosion in accordance with the CULVERT AND DRAINAGE SPECIFICATION DETAIL. Minimum dimensions of catch basins are 2 feet wide and 4 feet long with backslopes consistent with Clause 4-5 CUT SLOPE RATIO.
- 5-26 HEADWALLS FOR CROSS DRAIN CULVERTS: Headwalls shall be constructed in accordance with the CULVERT AND DRAINAGE SPECIFICATION DETAIL at all cross drain culverts. Rock used for headwalls shall weigh at least 50 pounds. Rock shall be placed on shoulders, slopes, and around culvert inlets and outlets. Rock shall not restrict the flow of water into culvert inlets or catch basins. No placement by end dumping or dropping of rock shall be allowed.

SECTION 6 – ROCK AND SURFACING

- 6-2 ROCK SOURCE ON CITY LAND: Rock used in accordance with the quantities on the TYPICAL SECTION and MATERIALS LIST may be obtained from the following source(s) on City land at no charge to the Purchaser. Use of material from any other source must have prior written approval from the Contract Administrator. If other operators are using, or desire to use the rock source(s), a joint operating plan shall be developed. All parties shall follow this plan.

Source	Location
South Pit	D-1360, STA 10+00
North Pit	E-1300 road, STA 2+40

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6-5 ROCK FROM COMMERCIAL SOURCE: Rock used in accordance with the quantities on the TYPICAL SECTION SHEET and MATERIALS LIST may be obtained from any commercial source at the Purchaser's expense. Rock sources will be subject to written approval by the Contract Administrator before their use.

6-11 ROCK SOURCE DEVELOPMENT PLAN BY PURCHASER: All rock source development and use shall be in accordance with a written ROCK SOURCE DEVELOPMENT PLAN to be prepared by the Purchaser. The plan is subject to written approval by the Contract Administrator before any rock source development or use. Upon completion of operations, the rock source shall be left in the condition specified in the ROCK SOURCE DEVELOPMENT PLAN, and approved in writing by the Contract Administrator.

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

- Rock source location.
- Rock source overview showing access roads, development areas, stockpile locations, waste areas, and floor drainage.
- Rock source profiles showing development areas, bench locations including widths, and wall faces including heights.

6-23 ROCK GRADATION TYPES: Purchaser shall supply manufactured rock in accordance with the types and amounts listed in the TYPICAL SECTION SHEET and MATERIALS LIST. Rock shall meet the following specifications for gradation and uniform quality when placed in hauling vehicles or during manufacture and placement into a stockpile. The exact point of evaluation for conformance to specifications will be determined by the Contract Administrator.

6-34 3-INCH MINUS BALLAST ROCK: Ballast rock shall be 100% equal to, or smaller than, 3 inches in at least one dimension.

Rock shall contain no more than 5 percent organic debris, dirt, and trash. All percentages are by weight.

6-50 LIGHT LOOSE RIPRAP: Riprap shall consist of angular, hard, sound, and durable stone. It shall be free from segregation, seams, cracks, and other defects. Light loose riprap shall be free of rock fines, soil, organic debris or other extraneous material, and shall meet the following requirements:

<u>At Least/Not More Than</u>	<u>Weight Range</u>
20% / 90%	300 lbs. to 1 ton
80% / --	50 lbs. to ½ ton
10% / 20%	50 lbs. max

6-51 HEAVY LOOSE RIPRAP: Riprap shall consist of angular, hard, sound, and durable stone. It shall be free from segregation, seams, cracks, and other defects. Heavy loose riprap shall be free of rock fines, soil, organic debris or other extraneous material, and shall meet the following requirements:

<u>At Least/Not More Than</u>	<u>Weight Range</u>	<u>Size Range</u>
30% / 90%	1 ton to 3 ton	36"- 54"
70% / 90%	500 lbs. to 1 ½ ton	24"- 42"
10% / 30%	50 lbs. max	3"- 8"

6-55 ROCK APPLICATION MEASURED BY COMPACTED DEPTH: Measurement of specified rock depths, are defined as the compacted depth(s) using the compaction methods required in this road plan. Estimated quantities specified in the TYPICAL SECTION SHEET are loose yards. Purchaser shall apply adequate amounts of rock to meet the specified rock depths. Specified rock depths are minimum requirements, and are not subject to reduction.

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- 6-70 APPROVAL BEFORE ROCK APPLICATION: Subgrade drainage installation including culvert installation, ditch construction, ditch reconstruction, headwall construction, and headwall reconstruction, shall be completed and approved in writing by the Contract Administrator, before rock application.
- 6-71 ROCK APPLICATION: Rock shall be applied in accordance with the specifications and quantities shown on the TYPICAL SECTION SHEET. Rock shall be spread, shaped, and compacted full width concurrent with rock hauling operations. Road surfaces shall be compacted in accordance with the TYPICAL SECTION SHEET by routing equipment over the entire width.
- 6-73 ROCK FOR WIDENED PORTIONS: Turnarounds, turnouts, and areas with curve widening shall have rock applied to the same depth and specifications as the traveled way.

SECTION 7 STRUCTURES

- 7-50 BRIDGE CONSTRUCTION: The Purchaser shall construct and install a bridge in accordance with this plan. Refer to BRIDGE INSTALLATION DETAILS design sheet for specifications and requirements.

SECTION 8 EROSION CONTROL

- 8-15 PUMP-AROUND: Purchaser must pump live water around construction areas during all in-water activities related to removal of culverts and installation of bridge on D-1000 road.
- 8-16 REVEGETATION: Purchaser shall spread seed on all exposed soils within the grubbing limits resulting from road work activities. Covering of all exposed soils shall be accomplished by manual dispersal of grass seed. Other methods of covering must be approved in writing by the Contract Administrator.
- 8-17 REVEGETATION TIMING: The Purchaser shall perform revegetation during the first available opportunity after road work is completed. Soils shall not be allowed to sit exposed for longer than one month without receiving revegetation treatment unless otherwise approved in writing by the Contract Administrator.
- 8-18 PROTECTION FOR SEED: Purchaser shall provide a protective cover for seed if revegetation occurs between July 1 and March 31. The protective cover shall consist of, but not be limited to dispersed straw, jute matting, or clear plastic sheets as approved by the Contract Administrator. The protective cover requirement may be waived by the Contract Administrator, in writing, if the Purchaser is able to demonstrate a revegetation plan that will result in the establishment of a uniform dense crop (at least 50% coverage) of 3-inch tall grass by October 31.
- 8-19 ASSURANCE FOR SEEDED AREA: The Purchaser shall be responsible to ensure a uniform and dense crop (at least 50% coverage) of 3-inch tall grass. The Purchaser shall reapply the grass seed in areas that have failed to germinate or have been damaged through any cause, before approval from the Contract Administrator. The Purchaser shall restore eroded or disturbed areas, clean up and properly dispose of eroded materials, and reapply the seed at no addition cost to the City.
- 8-25 GRASS SEED: Purchaser shall evenly spread the seed mixture listed below on all exposed soil inside the grubbing limits at a rate of 120 pounds per acre of exposed soil. Grass seed shall meet the following specifications:
1. Weed seed shall not exceed 0.5% by weight.
 2. All seed species shall have a minimum 90% germination rate, unless otherwise specified.
 3. Seed shall be certified free of noxious weeds.
 4. Seed shall be furnished in standard containers that show the following information:
 - a. Common name of seed
 - b. Net weight

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- c. Percent of purity
 - d. Percentage of germination
 - e. Percentage of weed seed and inert material
5. Seed shall conform to the following mixture:

Kind and Variety of Seed in Mixture	% by Weight
Annual Ryegrass	50
Winter Triticale	50

SECTION 9 POST HAUL ROAD WORK

- 9-3 REMOVAL OF CULVERT MATERIAL FROM CITY LAND: Culvert material removed from roads becomes the property of the Purchaser and must be removed from City land.
- 9-10 LANDING DRAINAGE: Purchaser shall provide for drainage of the landing surface as approved, in writing, by the Contract Administrator.
- 9-12 LANDING EMBANKMENT REMOVAL: The Purchaser shall reduce or relocate landing embankment, in a manner approved, in writing, by the Contract Administrator. Excavated material shall be placed in a waste area designated by the Contract Administrator.
- 9-21 ROAD ABANDONMENT: The following road(s) shall be abandoned by the Purchaser before the termination of this contract.

ROAD	STATIONS
3A	0+00 to 1+60
3B	0+00 to 1+60
3C	0+00 to 1+50
4A	0+00 to 1+65
5A	0+00 to 2+10
6A	0+00 to 1+00
6B	0+00 to 1+50
7C	0+00 to 1+50
7D	0+00 to 1+30
C-1330	0+00 to 7+40

- 9-22 ABANDONMENT:
- Remove all ditch relief culverts. The resulting slopes shall be 1:1 or flatter. The removed fill material shall be placed and compacted in a location that will not erode into any Typed waters or wetlands.
 - Remove all culverts in natural drainages. The resulting slopes shall be 1:1 or flatter. Strive for matching the existing native stream bank gradient. The natural streambed width shall be re-established. The removed fill material shall be placed and compacted in a location that will not erode into any Typed waters or wetlands.
 - Transport all removed culverts off site. All removed culverts shall become the property of the Purchaser.

- Construct non-drivable waterbars at natural drainage points and at a spacing that will produce a vertical drop of no more than 20 feet between waterbars and with a maximum horizontal spacing of 400 feet.
- Skew waterbars at least 30 degrees from perpendicular to the road centerline on roads in excess of 3 percent grade.
- Key waterbars into the cut-slope to intercept the ditch. Waterbars shall be outsloped to provide positive drainage. Outlets shall be on stable locations.
- Inslope or outslope the road as appropriate.
- Remove bridges and other structures.
- Pull back unstable fill that has potential of failing and entering any Typed waters or wetlands. Removed material shall be placed and compacted in a stable location.
- Remove berms except as designed.
- Block the road by constructing an aggressive barrier of dense interlocked large woody debris (logs, stumps, root wads, etc.) so that four wheel highway vehicles cannot pass the point of abandonment. Typical barrier dimensions are 10 feet high by 20 feet deep, spanning the entire road prism from top of cutslope to toe of fillslope. Long term effectiveness is the primary objective. If necessary construct a vehicular turn-around near the point of abandonment.
- Apply grass seed to all exposed soils resulting from the abandonment work and in accordance with Section 8 EROSION CONTROL.

SECTION 10 MATERIALS

- 10-3 GEOTEXTILE FOR STABILIZATION: Geotextiles shall meet the following minimum requirements for strength and property qualities, and shall be designed by the manufacturer to be used for stabilization or reinforcement, and filtration. Material shall be free of defects, cuts, and tears.

	ASTM Test	Requirements
Type	--	Woven
Apparent opening size	D 4751	No. 40 max
Water permittivity	D 4491	0.10 sec-1
Grab tensile strength	D 4632	315 lb
Grab tensile elongation	D 4632	50%
Puncture strength	D 6241	620 lb
Tear strength	D 4533	112 lb
Ultraviolet stability	D 4355	50% retained after 500 hours of exposure

- 10-15 CORRUGATED STEEL CULVERT: Metallic coated steel culverts shall meet AASHTO M-36 (ASTM A-760) specifications. Culverts shall be galvanized (zinc coated meeting AASHTO M-218).
- 10-16 CORRUGATED ALUMINUM CULVERT: Aluminum culverts shall meet AASHTO M-196 (ASTM A-745) specifications.
- 10-17 CORRUGATED PLASTIC CULVERT: Polyethylene culverts shall meet AASHTO M-294 specifications, or ASTM F-2648 specifications for recycled polyethylene. Culverts shall be Type S – double walled with a corrugated exterior and smooth interior.
- 10-21 METAL BAND: Metal coupling and end bands shall meet the AASHTO specification designated for the culvert and shall have matching corrugations. On culverts 24 inches and smaller, bands shall have a minimum width of 12 inches. On culverts over 24 inches, bands shall have a minimum width of 24 inches.

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- 10-22 **PLASTIC BAND:** Plastic coupling and end bands shall meet the AASHTO specification designated for the culvert. Only fittings supplied or recommended by the culvert manufacturer shall be used.
- 10-23 **GAUGE AND CORRUGATION:** Unless otherwise stated in the engineer's design, metal culverts shall conform to the following specifications for gauge and corrugation as a function of diameter.

Diameter	Gauge	Corrugation
18"	16 (0.064")	2 2/3" x 1/2"
24" to 48"	14 (0.079")	3 2/3" x 1/2"
54" to 96"	14 (0.079")	3" x 1"

SECTION 11 SPECIAL NOTES

FOREST ACCESS ROAD MAINTENANCE SPECIFICATIONS

CUTS AND FILLS:

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

SURFACE:

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

DRAINAGE:

- Prevent silt bearing road surface and ditch runoff from delivering sediment to any streams or wetlands.
- Maintain rolling dips and drivable waterbars as needed to keep them functioning as intended.
- Maintain headwalls to the road shoulder level with material that will resist erosion.
- Maintain energy dissipators at culvert outlets with non-erodible material or rock.
- Keep ditches, culverts, and other drainage structures clear of obstructions and functioning as intended.

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- Inspect and clean culverts at least monthly, with additional inspections during storms and periods of high runoff. This shall be done even during periods of inactivity.

PREVENTATIVE MAINTENANCE:

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

TERMINATION OF USE OR END OF SEASON:

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

DEBRIS:

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

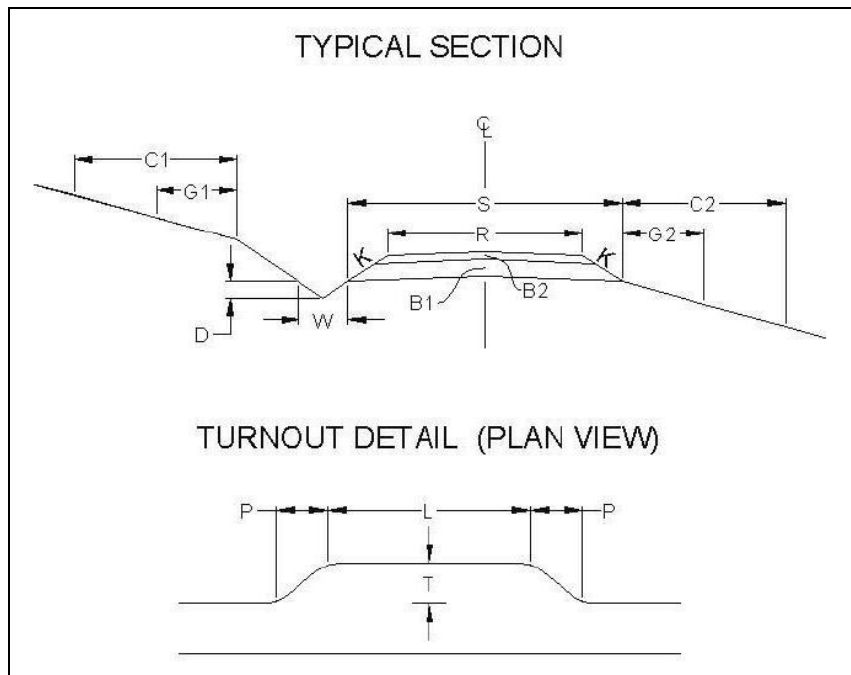
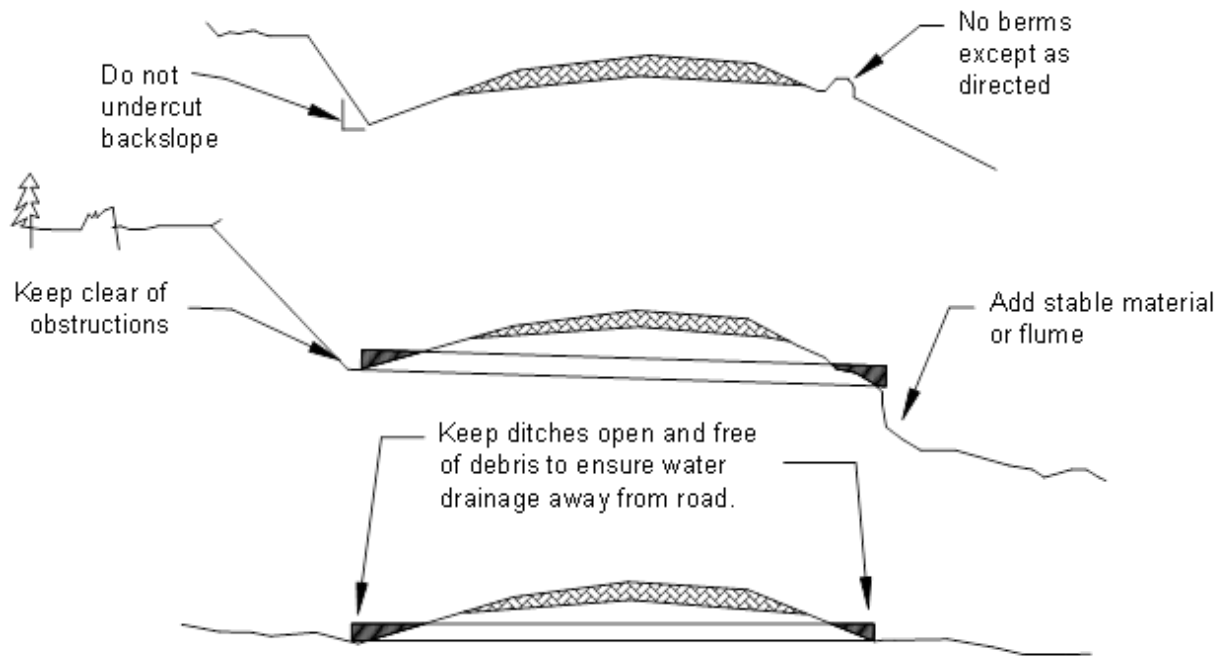
DESIGNATED HAUL ROUTES:

- Log haul shall occur according to the table below for each unit unless written permission is granted by the Contract Administrator:
 - Unit 1: E-1000 to Monroe Camp Road
 - Units 2, 5, 6, 7, 8: Lost Lake Mainline to Woods Creek Road
 - Units 3, 4: C-1000 through the Allen Gate to Lake Chaplain Road
 - Units 9, 10: T-1000 to Woods Creek Road

DEBRIS:

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

TYPICAL SECTION SHEET



Chaplain Gap Timber Sale

ROAD #		1A	1B	3A	3B	3C	4A	5A	6A	6B	7A
REQUIRED / OPTIONAL		REQUIRED	REQUIRED	REQUIRED	REQUIRED	REQUIRED	REQUIRED	REQUIRED	REQUIRED	REQUIRED	REQUIRED
CONSTRUCT / RECONSTRUCT		CONSTRUCT	CONSTRUCT	CONSTRUCT	CONSTRUCT	CONSTRUCT	CONSTRUCT	CONSTRUCT	CONSTRUCT	CONSTRUCT	CONSTRUCT
TOLERANCE CLASS (A/B/C)		C	C	C	C	C	C	C	C	C	C
STATION TO STATION		0+00	0+00	0+00	0+00	0+00	0+00	0+00	0+00	0+00	0+00
		12+50	2+00	1+60	1+60	1+50	1+65	2+10	1+00	1+50	17+15
ROAD WIDTH	R	12	12	12	12	12	12	12	12	12	12
CROWN (INCHES @ C/L)		3	3	3	3	3	3	3	3	3	3
DITCH WIDTH	W	3	3	3	3	3	3	3	3	3	3
DITCH DEPTH	D	1	1	1	1	1	1	1	1	1	1
TURNOUT LENGTH	L	50	50	50	50	50	50	50	50	50	50
TURNOUT WIDTH	T	10	10	10	10	10	10	10	10	10	10
TURNOUT TAPER	P	25	25	25	25	25	25	25	25	25	25
GRUBBING	G1	5	5	5	5	5	5	5	5	5	5
	G2	5	5	5	5	5	5	5	5	5	5
CLEARING	C1	10	10	10	10	10	10	10	10	10	10
	C2	10	10	10	10	10	10	10	10	10	10
ROCK FILL SLOPE	K:1	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½
BALLAST DEPTH ¹	B1	12	12	12	12	12	12	12	12	12	12
CUBIC YARDS / STATION		44	44	44	44	44	44	44	44	44	44
TOTAL CUBIC YARDS BALLAST ²		556	89	71	71	67	73	93	44	67	762
SURFACING DEPTH ¹	B2	/	/	/	/	/	/	/	/	/	/
CUBIC YARDS / STATION		/	/	/	/	/	/	/	/	/	/
TOTAL CUBIC YARDS SURFACING ²		/	/	/	/	/	/	/	/	/	/
TOTAL CUBIC YARDS ²		556	89	71	71	67	73	93	44	67	762
SUBGRADE WIDTH	S	15	15	15	15	15	15	15	15	15	15
BRUSHCUT (Y/N)		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BLADE, SHAPE & DITCH (Y/N)		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

¹ Specified rock depth is FINISHED COMPACTED DEPTH in inches.

² Specified rock quantity is LOOSE MEASURE (Truck Cubic Yards) needed to accomplish specified FINISHED COMPACTED DEPTH. Rock quantities include volume for turnouts, curve widening, and landings.

Chaplain Gap Timber Sale

ROAD #		7B	7C	7D	9A	10A	C-1330	HB-ML Seg. 2	D-1000	D-1460	C-1300	HB-ML
REQUIRED / OPTIONAL		REQUIRED	REQUIRED	REQUIRED	REQUIRED	REQUIRED	REQUIRED	REQUIRED	REQUIRED	REQUIRED	REQUIRED	REQUIRED
CONSTRUCT / RECONSTRUCT		CONSTRUCT	CONSTRUCT	CONSTRUCT	CONSTRUCT	CONSTRUCT	MAINT.	MAINT.	MAINT.	MAINT.	MAINT.	MAINT.
TOLERANCE CLASS (A/B/C)		C	C	C	C	C	C	C	C	C	C	C
STATION TO STATION		0+00	0+00	0+00	0+00	0+00	0+00	0+00	0+00	0+00	0+00	0+00
		2+70	1+50	1+30	4+75	9+80	7+40	70+00	20+00	10+00	1+80	20+00
ROAD WIDTH	12	12	12	12	12	12	12	12				
CROWN (INCHES @ C/L)		3	3	3	3	3	3	3				
DITCH WIDTH	3	3	3	3	3	3	3	3				
DITCH DEPTH	1	1	1	1	1	1	1	1				
TURNOUT LENGTH	50	50	50	50	50	50	50	50				
TURNOUT WIDTH	10	10	10	10	10	10	10	10				
TURNOUT TAPER	25	25	25	25	25	25	25	25				
GRUBBING	5	5	5	5	5	5	5	5				
	5	5	5	5	5	5	5	5				
CLEARING	10	10	10	10	10	10	10	10				
	10	10	10	10	10	10	10	10				
ROCK FILLSLOPE	1½	1½	1 ½	1½	1½	1½	1½	1½				
BALLAST DEPTH ¹	12	12	12	12	12	12	0	0				
CUBIC YARDS / STATION		44	44	44	44	44	0	0				
TOTAL CUBIC YARDS BALLAST ²		120	67	58	211	436	0	0				
SURFACING DEPTH ¹							3	3		3		
CUBIC YARDS / STATION							11	11		11		
TOTAL CUBIC YARDS SURFACING ²							82	778		111	Y	
TOTAL CUBIC YARDS ²		120	67	58	211	436	82	778	N/A	111	N/A	0
SUBGRADE WIDTH	15	15	15	15	15	15						
BRUSHCUT (Y/N)		N/A	N/A	N/A	N/A	N/A	Y	Y	Y	Y	Y	Y
BLADE, SHAPE & DITCH (Y/N)		N/A	N/A	N/A	N/A	N/A	Y	Y	N/A	N/A	N/A	N/A

Chaplain Gap Timber Sale

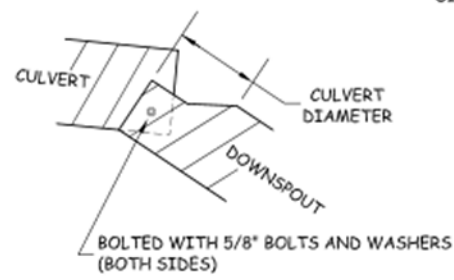
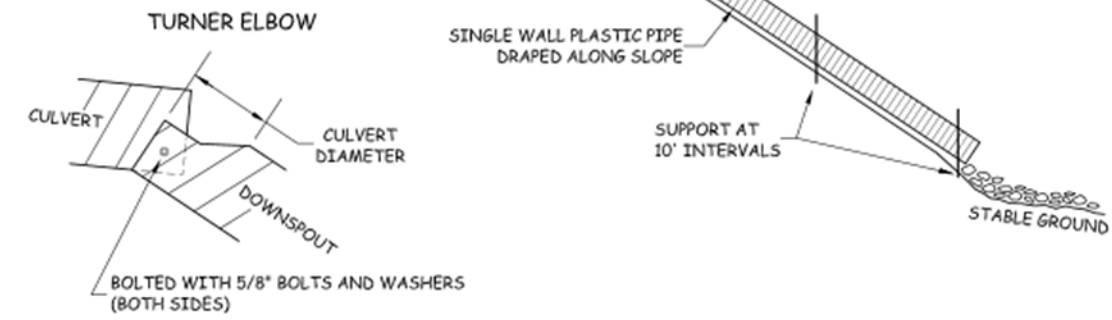
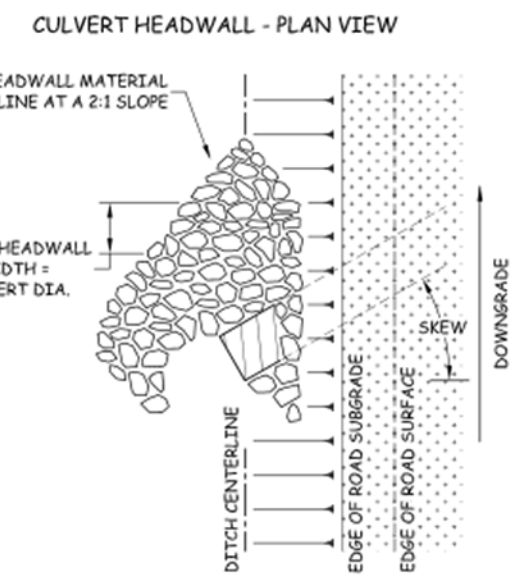
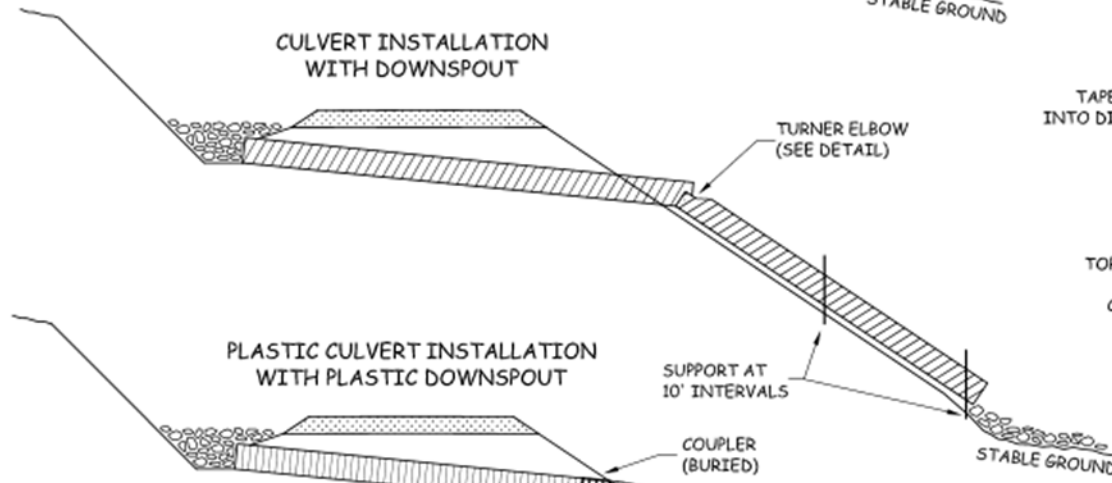
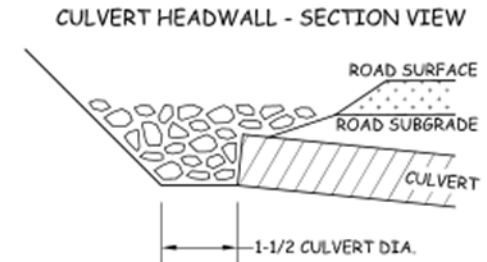
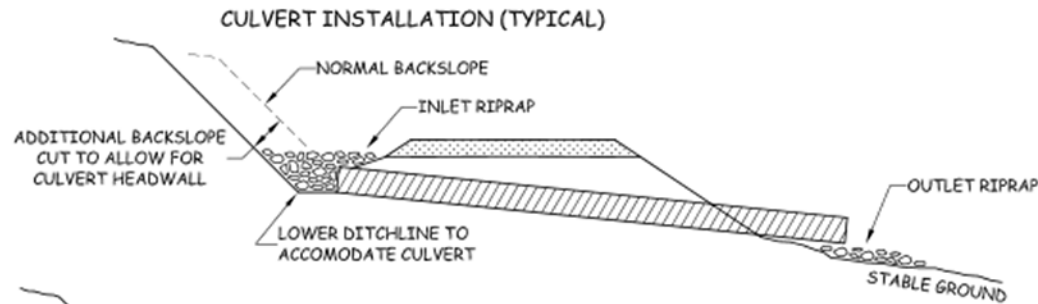
ROAD #		T-1240 B	T-1000 JCT	T-1000	T-1200	T-1240	LL-ML
REQUIRED / OPTIONAL		REQUIRED	REQUIRED	REQUIRED	REQUIRED	REQUIRED	REQUIRED
CONSTRUCT / RECONSTRUCT		CONSTRUCT	CONSTRUCT	MAINT.	MAINT.	MAINT.	MAINT.
TOLERANCE CLASS (A/B/C)		C	C	C	C	C	C
STATION TO STATION		0+00	0+00	0+00	0+00	0+00	0+00
		2+30	0+50	102+00	43+00	25+00	214+00
ROAD WIDTH	R	12	20	12			
CROWN (INCHES @ C/L)		3	3				
DITCH WIDTH	W	3		3			
DITCH DEPTH	D	1		1			
TURNOUT LENGTH	L	50		50			
TURNOUT WIDTH	T	10		10			
TURNOUT TAPER	P	25		25			
GRUBBING	G1	5		5			
	G2	5		5			
CLEARING	C1	10		10			
	C2	10		10			
ROCK FILLSLOPE	K:1	1½		1½			
BALLAST DEPTH ¹	B1	12		12			
CUBIC YARDS / STATION		44	74				
TOTAL CUBIC YARDS BALLAST ²		102	37				
SURFACING DEPTH ¹	B2						
CUBIC YARDS / STATION							
TOTAL CUBIC YARDS SURFACING ²							
TOTAL CUBIC YARDS ²		102	37	0	0	0	0
SUBGRADE WIDTH	S	15		15			
BRUSHCUT (Y/N)		N/A	N/A	N	N/A	Y	Y
BLADE, SHAPE & DITCH (Y/N)		N/A	N/A	N/A	N/A	N/A	N/A

Chaplain Gap Timber Sale

MATERIAL LIST														
LOCATION		CULVERT			DOWNSPOUT		RIPRAP			FILL TYPE		TOLERANCE		REMARKS
ROAD #	STATION	DIAMETER (INCHES)	LENGTH (FEET)	TYPE	LENGTH (FEET)	TYPE	INLET (CUBIC YARDS)	OUTLET (CUBIC YARDS)	TYPE	FILL TYPE	TOLERANCE			
													<u>Diameter</u> 18" 24" – 48" 54" – 96" <u>Gage</u> 16 14 14 <u>Corrugation</u> 2½" x ½" 2½" x ½" 3" x 1"	
1A	0+10	18	40	XX	/	/	2	3	L	NT	C		Excavation – Cut and fill on side slope.	
	3+10-5+00	/	/	/	/	/	/	/	/	/	/			
	7+20	18	30	XX	/	/	2	3	L	NT	C			
1B	0+10	18	40	XX	/	/	2	3	L	NT	C			
3C	0+22	18	40	XX	/	/	2	3	L	NT	C			
4A	0+16	18	40	XX	/	/	2	3	L	NT	C			
5A	0+35	18	40	XX	/	/	2	3	L	NT	C			
7A	10+00	18	30	XX	/	/	2	3	L	NT	C			
7C	0+40	18	40	XX	/	/	2	3	L	NT	C			
7D	0+15	18	40	XX	/	/	2	3	L	NT	C			
10A	4+50	18	30	XX	/	/	2	3	L	NT	C			
T-1240	1+41	18	30	XX	/	/	2	3	L	NT	C			
	13+17	18	30	XX	/	/	2	3	L	NT	C			
T-1240 B	0+20	18	40		/	/	2	3	L	NT	C			
HB-ML	0+19	18	40	XX	/	/	2	3	L	NT	C			
C-1330	0+70	18	40	XX	/	/	2	3	L	NT	C			
	4+90	18	30	XX	/	/	2	3	L	NT	C			
C-1300	0+15	18	60	XX	/	/	2	3	L	NT	C			
D-1460	5+00	24	30	XX	/	/	5	7	L/H	NT	C			

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

CULVERT AND DRAINAGE SPECIFICATIONS



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

CITY OF EVERETT
 CHAPLAIN BRIDGE INSTALLATION DETAILS, SPECIFICATIONS, AND REQUIREMENTS

**SPECIAL PROVISIONS FOR
 4.25-INCH STEEL BRIDGE DECKED MODULAR BEAM BRIDGE(S)**

1.0 BRIDGE LOCATION AND GENERAL REQUIREMENTS

On the following road, the Purchaser shall design, fabricate, deliver and install each bridge, listed below, in accordance with this road plan and attached bridge site construction drawings.

Road	Station	Length ¹ (ft.)	W.B.S.R. ² (ft.)	Loading/ Deflection Ratio	Type
Diversion Dam- D- 1000	1+00 to 2+00	45'8''*	14'	1/500	Modular Steel Bridge: Shop assembled, steel, two-piece, portable, modular bridge superstructure complete with a curb or rail system and precast concrete footings. Design must include a full width, continuous deck with no gaps that allow water and sediment to drain from the bridge to the stream. See installation and construction details on project bridge site construction drawings.

¹The total length of the superstructure shall be measured from out to out including sills and end angles.

²W.B.S.R. = Width between shear rails.

1.1 Scope of Bridge Structure

These specifications are for fully engineered multi-piece modular bridge(s) of steel construction with Big R 4.25-Inch Steel Bridge Deck and shall be regarded as minimum standards for design and construction. The work included under this item shall consist of design, fabricating, finishing and transporting the steel modular beam bridge superstructure(s) including bearings. These specifications are based on products designed and manufactured by Big R Bridge.

1.2 Definitions

Owner: City of Everett, Everett, Washington
 Engineer: Gael Fisk, P.E. - Associate Engineer
 Contractor: Entity who will install and/or purchase the bridge.
 Bridge Manufacturer: Firm supplying the bridge in accordance with these Special Provisions.

1.3 Qualification of Bridge Manufacturer

Each Contractor is required to identify their intended supplier as part of the bid submittal. Qualified Bridge Manufacturers must have at least 5 years' experience fabricating these types of structures and shall have an up to date certification by AISC as a Certified Bridge Fabrication - Intermediate (Major) with Fracture Critical Endorsement. All suppliers shall fabricate their

CITY OF EVERETT
CHAPLAIN BRIDGE INSTALLATION DETAILS, SPECIFICATIONS, AND REQUIREMENTS

product, no brokers are allowed.

Pre-Approved Bridge Manufacturer:

Big R Bridge
P.O. Box 1290
Greeley, CO 80632
1-800-234-0734
E-mail: dmyers@bigrbridge.com

Bridge Manufacturers, other than those listed above, may be used provided the Engineer receives a written request at least 10 days prior to the bid. The written request shall accompany the following information:

- Bridge Manufacturer's Product Literature,
- Name and resume of Bridge Manufacturer's design professional who will be signing and sealing the engineering submittals,
- Copy of current AISC certification,
- Representative copies of detailed drawings, field procedures, calculations, quality control manual, welder's certifications,
- Listing of projects including owner, location, size, year of fabrication, contact person.

The above will be evaluated by the Engineer for accuracy and ability to provide a bridge in accordance with these specifications. Bridge Manufacturers other than those listed above may only be used if the Engineer provides written approval 5 days prior to the bid. The Engineer's ruling shall be final.

1.4 Bridge Manufacturer's Design Professional and Submittals

The Bridge Manufacturer shall have as a direct employee, an engineer who is experienced in bridge design to perform all engineering related task and design. The engineer shall have a minimum of 10 years of experience in bridge design and be a currently licensed civil or structural engineer in the State of Washington.

Engineering drawings shall be prepared and submitted to the Contractor and to the City of Everett for their review after receipt of the order. Submittal drawings shall be unique drawings, prepared to illustrate the specific portion of the bridge being fabricated. All relative design information such as member size, ASTM/AASHTO material specification, dimension necessary to fabricate and required welding shall be clearly shown on the drawings. Drawings shall have cross referenced details and sheet numbers. All drawings shall be stamped, signed and dated by the Bridge Manufacturer's Design Professional.

Structural calculations for the design of the bridge superstructure shall be prepared and submitted to the City of Everett after receipt of the order. Calculations shall include complete design, analysis and code checks for the controlling member, connectivity and support conditions, deck design, deflection checks, bearings and all splices.

1.5 Drawing and Calculation Review for Acceptance

The Purchaser shall prepare and submit three sets of complete modular bridge design drawings and calculations for the superstructure and substructure. All drawings and calculations shall be prepared, stamped, and signed by a Registered Professional Engineer. The superstructure shall be designed by a Professional Engineer licensed in the state of Washington. Drawings can be in either electronic or hard copy form and shall be no smaller than 11" X 17" sheets.

CITY OF EVERETT
CHAPLAIN BRIDGE INSTALLATION DETAILS, SPECIFICATIONS, AND REQUIREMENTS

Submittals shall be sent to:

Roots Forestry Consulting, LLC
Attn.: Travis J. Miranda
16102 4th Ave NW Arlington, WA 98223
360-631-7606
TMiranda@everettwa.gov

Reports and plans will be accepted or rejected within 30 working days of receipt. Delays in work because of the possibility of rejection, revision, and resubmittal of documents are deemed a risk of the Purchaser and shall not be the basis for claims of additional compensation. Within 15 working days of final acceptance, Purchaser shall submit two complete sets of finalized plans to the Project Engineer (Gael Fisk) and one to the Contract Administrator (Travis Miranda). Any omissions to the plans shall be the responsibility of the Purchaser to correct and resubmit a finalized set of plans.

1.6 Structure Acceptance

The City's engineer, or designee, will inspect the structure after it has been fabricated and delivered in accordance with the specifications contained herein and after all required certifications have been furnished.

2.0 APPLICABLE CODES AND STANDARDS

2.1 Governing Specifications

Bridge(s) shall be designed in compliance with the LRFD Bridge Design Specifications, latest edition, by AASHTO. Calculations shall be in accordance with this document, and formulas shall reference the appropriate sections.

2.2 Other Reference Codes, Specifications and Standards

AISC, Steel Construction Manual, Latest Edition

American Welding Society, Structural Welding Code, D1.5, Latest Edition

ASCE/SEI 7 Min. Design Loads for Buildings and Other Structures, Latest Ed.

National Design Specification for Wood Construction, ANSI NDS-Latest Edition

3.0 BRIDGE GEOMETRY

3.1 Span Length

3.1.1 The bridge span shall be configured so as to provide a clear span dimension from the inside face to inside face of sill of 35'-0" (straight line dimension). The bridge manufacturer shall determine final out-to-out of the bridge span. See attached construction site plans and sections for general layout of bridge deck and dimensions.

3.2 Width

3.2.1 The bridge width shall be 14'-0" and shall be as measured from the inside face to inside face of rail.

CITY OF EVERETT
CHAPLAIN BRIDGE INSTALLATION DETAILS, SPECIFICATIONS, AND REQUIREMENTS

3.3 Lower Steel Clearance

The distance from the top of the deck (measured from the highest point of the deck) to the bottom of any steel member shall not exceed 2'-8".

3.4 Rail Height

3.4.1 Top of rail shall be a minimum 2'-7" above the top of the wearing surface for vehicular traffic only.

3.5 Camber

3.5.1 A single simple-span bridge shall have a vertical camber dimension at the mid-span equal to 100% of the anticipated full dead load deflection. If beam mill camber is adequate to accommodate full dead load deflection, then indicate so on drawings.

3.6 Elevation Difference

3.6.1 The top of the decks at each end of the bridge shall be constructed with a vertical elevation difference of 0'-6".

4.0 STRUCTURAL DESIGN LOADS

4.1 Dead Load

4.1.1 The bridge structure shall be designed for the total bridge weight plus an additional allowance of 80 pounds per square foot total wearing surface.

4.2 Vehicle Load (VL)

4.2.2 Bridge shall be designed for one lane of traffic, supporting HL-93 vehicle plus Dynamic Load Allowance.

4.2.3 The design ADTT (Average Daily Truck Traffic) shall be as determined during design by Bridge Supplier's Engineering Department.

4.3 Owner Specified Vehicle (OVL)

4.3.2 Bridge shall also be designed for a U-80 Off-Road Logging Truck Overload.

4.4 Wind Load (WS)

4.4.1 Bridge shall be designed for a 50 pounds per square foot wind load applied horizontally against the height of the stringer plus the side dam.

4.5 Fatigue Load (FL)

4.5.1 The fatigue loading shall be as specified in AASHTO LRFD Bridge Design Specifications, current edition.

4.6 Railing Loads (RL)

4.6.1 Traffic rail shall be designed in accordance with AASHTO LRFD Bridge Design

CITY OF EVERETT
CHAPLAIN BRIDGE INSTALLATION DETAILS, SPECIFICATIONS, AND REQUIREMENTS

Specifications, current edition, Appendix A13.2. Traffic rail has not been physically crash-tested.

4.6.2 Traffic rail shall meet the force requirements for a TL-1 rating.

4.7 Other Loads

4.7.1 None

4.8 Combination of Loads

4.8.1 The load combinations and load factors to be used shall be as per specified in AASHTO LRFD Table 3.4.1-1.

5.0 STRUCTURAL DESIGN CRITERIA

5.1 Deflections

5.1.1 Per AASHTO LRFD Bridge Design Specifications, vehicle load deflection limits are not required. However, the Bridge Manufacturer will typically try to provide an anticipated vehicle load deflection of approximately $L/500$, expressed as the ratio of span length to deflection.

5.2 Fracture

5.2.1 The main beams shall meet CVN values of 20 ft-lbs @ 40-degrees Fahrenheit.

5.3 Wheel Load Distribution

5.3.1 Deck shall be designed to support the maximum wheel load from the design vehicle.

6.0 MATERIALS OF CONSTRUCTION

6.1 Structural Steel

6.1.1 For weathering steel bridges, all structural steel shall be ASTM A588.

6.2 Deck Material

6.2.1 Decking to be 4.25-inch Big R Steel Bridge Deck (or approved equivalent), 7-gage, placed transverse across the width of the bridge. The height of the deck shall be 4.25" from top of the lower trough to top of the profile. Width of the plank shall be 12-13/16" with one 13/16" overlapping leg. Decking shall be manufactured from pre-galvanized steel, ASTM A653 Grade 50 Class with a minimum 2 oz galvanized coating, $F_y=50$ ksi. Decking is to be welded to top flange of stringers and to adjoining sheets. Welds to be treated with organic zinc-rich coating meeting the material and performance requirements of ASTM A 780 (Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings).

6.3 Wearing Surface

6.3.1 Gravel

CITY OF EVERETT
CHAPLAIN BRIDGE INSTALLATION DETAILS, SPECIFICATIONS, AND REQUIREMENTS

6.3.1.1 Top of side dam shall be 3.5" above top of 4.25-inch steel bridge deck for gravel wearing surface.

6.4 Fasteners

6.4.1 Structural bolts used to field splice, or connect; all main members shall be ASTM A325, in accordance with the *Specification for Structural Joints using ASTM A325 or A490 Bolts*. The nuts for these structural bolts shall be ASTM A563. One flat hardened washer meeting ASTM F436 shall be supplied with all bolts. All bolts, nuts and washers shall be galvanized and shall be furnished in an amount of 5% in excess of the number required for each size and length.

6.4.2 Non-structural bolts shall be ASTM A307, 1/4" diameter carriage bolts, zinc plated or galvanized.

6.4.3 Self-drilling fasteners shall be #14 x 1" Zinc Plated Hex Washer Head Tek Screws.

6.4.4 Power Actuated fasteners shall be Hilti sheet metal nail X-ENP-19 fastener.

6.5 Traffic Rail

6.5.1 Rail to be galvanized steel Thrie-Beam Rail, 10-gage thickness, with flared ends at each end of bridge. A 2-sided crystal reflector tab shall be provided to be placed 6'-3" on center.

7.0 FINISH

7.1 Blast Cleaning

7.1.1 Exposed surfaces of structural steel shall be blast cleaned in accordance with the Steel Structures Painting Council (SSPC), Surface Preparation Specification No. 7, latest edition, (SSPC-SP7), Brush-Off Blast. Exposed surfaces of steel shall be defined as those surfaces seen from the deck or from the outside and bottom of the structure.

8.0 ATTACHMENTS

8.1 None Requested

9.0 BEARINGS

9.1 Bearing Plates

9.1.1 Bearing plates shall be used under the stringers at both ends of the bridge and shall be designed to support the anticipated reactions and thermal movement. Bearing plate material shall be ASTM A572 Grade 50 or A588 for painted, metalized and galvanized bridges or ASTM A588 for weathering steel bridges. The Bridge Manufacturer should design the bearing plates such that one end of the bridge is fixed and the other end allows for expansion. All bearing plates should have a minimum of two holes to receive anchor rods (one on each side of the stringer). For the expansion base plates, holes shall be slotted with a minimum of 3" in the slot to allow for expansion and contraction. All bearing plates shall be shipped loose for field installation by others; field welded to the stringers by an AWS D1.5 certified welder.

9.1.2 If the longitudinal grade of the bridge is equal to or greater than 1.5%, then the bearing

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plates shall be beveled across their width in order to provide a level bearing condition on the elastomeric pads.

9.2 Elastomeric Pads

- 9.2.1 The Bearing plates will be placed on top of elastomeric pads. Elastomeric pads shall be designed in full accordance with AASHTO LRFD Bridge Design Specifications. The temperature range shall be site specific and shall be obtained from the Tables in AASHTO Section 3.12.2.2 Temperature Range.

10.0 PRECAST CONCRETE SILLS & ANCHOR PLATES

10.1 Precast Concrete Sills

- 10.1.1 Precast concrete sills shall be designed and supplied by the Bridge Manufacturer. The precast concrete sills shall be cast by a plant which carries the National Precast Concrete Association (NPCA) certification. The precast concrete sill(s) shall be 2'-2" deep by 5'-0" wide by 18' long. The precast concrete sill shall be reinforced with stirrups and longitudinal reinforcing bars (minimum Grade 40), and have a minimum concrete strength of 4000psi. A 2" minimum concrete cover shall be maintained for all reinforcing. Lifting lugs shall be installed to aid in the unloading and placement of the precast concrete sills.

10.2 Anchor Plates

- 10.2.1 On top of the precast concrete sill, an ASTM A588 plate (1/2" thick by 6" wide and running the entire length of the sill) shall be embedded into the concrete with shear studs. This top plate will be used to attach the anchor plates via field welding by the Contractor. Corner embed angles shall be installed in the sills to allow for the field welding together of the multiple sections prior to the installation of the full bridge superstructure. Anchor plates will consist of two 1.25" diameter by 5" long fully-threaded zinc plated rods welded to the surface and spaced to match the hole spacing in the bridge bearing plates and elastomeric pads. Two nuts and one washer (all galvanized) shall be supplied with each rod.

10.3 Allowable Soil Bearing Capacity for Sill

- 10.2.2 The soil onto which the precast concrete sills are to be set has a maximum allowable bearing pressure of 2,000 psf. Contractor and Owner are responsible for verifying the soil capacity and following all recommendations by the project Geotechnical Engineer to assure that the soil capacity is met.

11.0 BACK WALLS

- 11.1.1 The back wall system shall be comprised of two pieces of Big R Bridge sheet piling, or approved equivalent, extending 3'-4" in total height minimum. The sheet piling shall be of 10 gauge material. The length of the top piece of sheet pile shall be equal to the bridge width plus 5 feet. The length of the bottom piece of sheet pile shall be equal to the bridge width plus 10 feet. Back walls shall be designed to support the backfill and applied traffic loads.

- 11.1.2 The finish of the sheet pile shall be as follows: Galvanized.

12.0 FABRICATION

12.1 Welding

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12.1.1 Welding procedures and weld qualification test procedures shall conform to the provisions of AWS D1.5, Bridge Welding Code, latest edition. Filler metal shall be in accordance with the applicable AWS Filler Metal Specification, and shall match the corrosion properties of the base metal.

12.2 Welders

12.2.1 Welders shall be qualified for each process and position used while fabricating the bridge. Qualification tests shall be in accordance with AWS D1.1. All weld qualifications and records shall be kept in accordance with the Fabricator's Quality Assurance Manual which has been approved by AISC.

12.3 Bolted Splices

12.3.1 For shipping purposes, the bridge may be fabricated in sections. Sections shall be field assembled using bolted connections and or field welding as indicated on the drawings. Tightening of all structural bolts shall be by Turn-of-the-Nut Method.

13.0 QUALITY CONTROL

13.1 AISC Certification

13.1.1 The bridge shall be fabricated in a shop owned by the Bridge Manufacturer. This facility shall have up to date certification by AISC as a Certified Bridge Fabrication - Intermediate (Major) with Fracture Critical Endorsement.

13.2 Certified Weld Inspector

13.2.1 The bridge manufacturer shall employ a Certified Weld Inspector (CWI), with endorsement by AWS QC1. This CWI shall be present during the complete fabrication of the bridge. The CWI shall provide written documentation that the bridge has been fabricated in accordance with these specifications and the approved design drawings.

13.3 Documentation

13.3.1 Material Certifications shall be available for review for all materials within the bridge. Traceability of heat numbers is required for all steel.

13.3.2 Documentation showing the performance of all critical quality checks shall also be made available for review by the Engineer or Owner.

13.4 Non-Destructive Testing

13.4.1 All welds within the structure shall be visually inspected for conformance to size, under cut, profile and finish.

14.0 DELIVERY AND ERECTION

14.1 Delivery

14.1.1 Delivery shall be made via truck to a location nearest the site which is accessible to normal over-the-road equipment. All trucks delivering bridge materials will need to be unloaded at the time of arrival. If the erection Contractor needs special delivery or delivery is restricted they shall notify the Bridge Manufacturer prior to bid date. This includes site issues which may prevent over-the-road equipment from accessing the

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site. Steerable dollies are not used in the cost provided by the Bridge Manufacturer. Determining the length of bridge section which can be delivered is the responsibility of the Contractor, and shall be communicated to the Bridge Manufacturer prior to the bid date.

14.2 Installation & Lifting Procedures

14.2.1 The Bridge Manufacturer will provide a standard typical written procedures for lifting and splicing the bridge. All actual methods, equipment and sequence of erection used are the responsibility of the Contractor. Each section shall be lifted from the four lifting lugs provided. Attach rigging to lifting lugs with adequately sized rigging hardware. Rigging materials and methods are the responsibility of the Installer. Capacity of the lifting lug is 24,000 pounds at a 45-degree lift angle.

14.3 Loose Items

14.3.1 Post and Rails will be shipped loose for field installation.

14.3.2 Bearing Plate will be shipped loose for filed welding to the bottom flange of the stringers.

14.3.3 Field welding shall be performed by others, using an AWS Certified Welder.

15.0 WARRANTY

15.1 Warranty

15.1.1 The Bridge Manufacturer shall warrant their steel structure(s) to be free of design, material, and workmanship defects for a period of ten years from the earlier of the date of delivery or from 60 days after final fabrication. Wood is excluded under this warranty. This warranty shall not cover defects in the bridge caused by abuse, misuse, overloading, accident, improper maintenance, alteration, or any other cause not the result of defective materials or workmanship. This warranty shall be void unless Owner's records can be supplied which shall indicated compliance with the minimum guidelines specified in the inspection and maintenance procedures. Paint, galvanizing and other special coatings shall be warranted by the coating manufacturer and is not covered by the Bridge Manufacturer. Repair or replacement shall be the exclusive remedy for defects under this warranty. The Bridge Manufacturer shall not be liable for any consequential or incidental damages for breach of any express or implied warranty on their structures. Use of de-icing or dust prohibitive chemicals or salts to any part of the bridge structure will void this warranty.

BRIDGE INSTALLATION REQUIREMENTS

- A. Bridge installation shall be completed no later than September 30, 2022.
- B. Instream work is limited to the period between July 1 and September 30. If the stream is dry, operations may occur outside of this timing window if approved in writing by the Contract Administrator.
- C. The Contract Administrator shall be notified at least 6 weeks prior to road closure. The Contractor Administrator shall again be notified 48 hours prior to road closure.
- D. A prework meeting shall take place during the 48 hour notification period prior to the start of installation. Required attendees include: Contract Administrator, Project Engineer, Purchaser representative and Contractor who will be installing the bridge.

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- E. Staging of all materials, equipment, and the bridge shall only occur at the South Pit unless otherwise approved by the Contract Administrator in writing. Preauthorization of exact staging location within the South Pit shall be required by the Contract Administrator.
- F. Installation operations shall take place from both sides of the stream bank.
- G. Purchaser shall ensure safe operations under the powerlines at the bridge location. If purchaser is unable to work around overhead powerlines in proximity to bridge location, notification is required at least 6 weeks prior to road closure and bridge installation.
- H. Road shall be passable by vehicle traffic following closure within 3 business days, unless otherwise approved by the Contract Administrator in writing. Contract Administrator shall be notified as soon as the road is passable.
- I. Final inspections by a City engineer shall occur within 48 hours of final bridge installation operations.
- J. The Purchaser/Contractor/Agent/Employee installing the bridge must meet the following competency prerequisites: 1) Minimum of three years' experience implementing fish exclusion methods described below, and 2) documented experience having completed bridge installations of comparable size and complexity. The City reserves the right to request and receive documented proof of this experience.
- K. **REQUIRED MATERIALS SPECIFICATIONS-** Any substitutions must be approved in writing by Contract Administrator:
 - 1. Haul to site, place and compact the following materials (referenced to WSDOT Standard Specifications for Road, Bridge, and Municipal Construction M41-40, current edition).

MATERIALS AVAILABLE ON-SITE (AT NO COST TO PURCHASER):

- a. SILL FOUNDATION: FOUNDATION MATERIAL CLASS A, SECTION 9-03.17.
- b. CHANNEL RIPRAP: ROCK FOR EROSION AND SCOUR PROTECTION CLASS C (WSDOT STD SPEC 9-13.4(2)).
- c. GRAVEL FILTER LAYER: PERMEABLE BALLAST, SECTION 9-03.9(2). FOUNDATION MATERIAL CLASS A (WSDOT STD SPEC 9-13.4(2)).
- d. ROADWAY SUBGRADE BACKFILL: GRAVEL BORROW OR APPROVED EQUAL, SECTION 9-03.14(1),
- e. ROADWAY SURFACE AND GRAVEL SURFACE OVER BRIDGE: CRUSHED SURFACING BASE COURSE - 1-1/4" MINUS, SECTION 9-03.9(3),

MATERIALS REQUIRED FROM OFF-SITE (AT PURCHASER'S COST):

- f. CREEK BED ALLUVIAL MATERIAL: 12" STREAMBED COBBLES OR APPROVED EQUAL, SECTION 9-03.11(2).
- L. **REQUIRED MATERIAL QUANTITIES-** Any substitutions must be approved in writing by Contract Administrator:

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Material	Quantity (yd ³)
Sill Foundation	60
Channel Riprap	107
Gravel Filter Layer	18
Roadway Subgrade Backfill	72
Roadway/Bridge Surfacing	31
Streambed Cobble	110

- M. Approved fish exclusion and bypass methods shall be in place at all times during installation unless otherwise approved by the Contract Administrator in writing. The water flow rate while pumping around shall be consistent with natural flow rate at the time of bridge installation.
- N. Water bypass and fish exclusion methods during bridge installation must be preapproved by Contract Administrator. Except by written prior permission by the Contract Administrator, fish exclusion and bypass methods are restricted to one of the following methods:

Method 1: Passive bypass using existing 6-barrel crossing

In this method the bridge footings and abutments shall be installed in two phases, with one side being installed at a time. A coffer dam shall be built around the west half of the existing six-barrel crossing to prepare the site for installation of the bridge footings and abutments. Seines, minnow traps, dip nets, fish herding, or other approved fish exclusion methods shall be used to safely remove fish from the work area. A pump shall be placed in the work area to remove any water that enters the coffer dam. The sediment-laden water shall be pumped to an upland area where the sediment will settle out before the water re-enters the stream. The site shall be monitored to ensure fish do not re-enter the work area. Stream water shall flow through two or three culverts on the east end of the existing crossing, with the number of culverts depending on flow conditions at time of installation. The west end of the existing crossing shall then be removed, and the west bridge footing and abutment shall be installed. Once this is complete, the coffer dam shall be slowly repositioned on the east end of the six-barrel crossing. Stream flow shall divert to the west end of the crossing adjacent to the new abutment. The east bridge footing and abutment shall then be installed. Once this installation is complete, the bridge shall be set in place and the coffer dam shall be slowly removed to prevent turbidity.

Method 2: Passive bypass through coffer dam using flexible pipe

In this method a coffer dam is installed around the work site and flexible pipe shall be used to pass water through the work area. This pipe shall be installed within the coffer dam and may pass through two or three of the existing six-barrel culverts, depending on flow conditions at time of installation. Seines, minnow traps, dip nets, fish herding, or other approved fish exclusion methods shall be used to safely remove fish from the work area. A pump shall be placed in the work area to remove any water that enters the coffer dam. The sediment-laden water shall be pumped to an upland area where the sediment will settle out before the water re-enters the stream. The site shall be monitored to ensure fish do not re-enter the work area. One side of the six-barrel crossing shall then be removed and the bridge footing and abutment shall be installed. The flexible pipe shall then be relocated to allow removal of the other side of the existing crossing. After installation of the second bridge footing and abutment, the bridge shall be set in place and the coffer dam shall be slowly removed to prevent turbidity.

Method 3: Passive bypass by creating new channel around work site

In this method a new channel shall be dug approximately 70' east of the six-barrel crossing to bypass the work site. A coffer dam shall be installed on either side of the existing crossing to restrict water from entering the work site. Seines, minnow traps, dip nets, fish herding, or other approved fish exclusion methods shall be used to safely remove fish from the work area. A pump shall be placed in the work area

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to remove any water that enters the coffer dam. The sediment-laden water shall be pumped to an upland area where the sediment will settle out before the water re-enters the stream. The site shall be monitored to ensure fish do not re-enter the work area. Water shall be diverted to the new channel to passively bypass the work site. Upon completion of the bridge installation, the coffer dam shall be carefully removed to allow water to begin flowing under the bridge. This procedure shall be done slowly to prevent turbidity. Then the bypass channel shall be restored to its former condition.

Method 4: Active pumping to divert water around work area

In this method pumps shall be used to actively bypass around the work site. A coffer dam shall be installed around the crossing to restrict water from entering the work site. Seines, minnow traps, dip nets, fish herding, or other approved fish exclusion methods shall be used to safely remove fish from the work area. A pump shall be placed in the work area to remove any water that enters the coffer dam. The sediment-laden water shall be pumped to an upland area where the sediment will settle out before the water re-enters the stream. The site shall be monitored to ensure fish do not re-enter the work area. One or two additional pumps shall be used to divert water around the work site during construction; the number of pumps will depend on water levels at time of installation. An additional pump shall be placed on standby in case one of the pumps stops working; this results in a total of three to four pumps for the project. Upon completion of the bridge installation the coffer dam shall be slowly removed to prevent turbidity. The bridge installation is expected to take two days.

Method 5: If the contractor proposes an alternative method not listed above, the City shall discuss the proposed method with DNR to determine if it is an acceptable alternative that meets water quality and fish habitat protection objectives.

Concrete disposal: For all the above methods, concrete removed from the existing six-barrel crossing shall not be used for streambed restoration material. Concrete waste material shall be removed from City of Everett ownership.