CITY OF UNION, OREGON

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SECTION 5

ROAD WORK

CITY OF UNION, OREGON

TECHNICAL SPECIFICATIONS

SECTION 5

ROAD WORK

PART 1 - GENERAL

1.1 Scope

These Specifications cover the construction, reconstruction and overlaying of streets and roads. Work shall include furnishing all equipment, materials, labor, etc., as required to complete the required improvements. Items specified in this Technical Specification are intended to be broad in scope and may not always apply to all items of work to be constructed. All applicable sections, as determined by the City Engineer, shall control the work.

PART 2 - MATERIALS

2.1 Water for Compaction

The Contractor shall be responsible for obtaining, transporting, and the application of the water.

2.2 Geotextile Fabric

Geotextile fabric shall be Mirafi 500X, Exxon GTF 200, or approved equal.

2.3 Aggregate Base and Base Rock

A. Aggregate Base

The aggregate base shall be a well-graded 4"-0 pit run angular basalt material mined from an approved rock quarry site. The fraction passing the No. 200 sieve shall not be greater than 8 percent of the total aggregate weight. Aggregate base shall meet the durability requirements for base rock. Other materials may be considered by the City Engineer; however, samples must be submitted for review.

B. Base Rock

Base rock shall conform to the requirements of Section 02630 - Base Aggregate, "Oregon Standard Specifications for Construction," current edition, for dense graded aggregate as modified hereafter. Acceptable gradation includes 1"-0 or 3/4"-0 as selected by the Contractor.

1. Fracture of Rounded Rock

   Fracture of rounded rock will be determined according to AASHTO TP 61. Provide at least two mechanically fractured faces based on 90 percent of particles retained on the 1/4-inch sieve.

C. Surface Rock

1. The surface rock shall be crushed stone, slag, or gravel meeting the following requirements:

   a. Liquid Limit (AASHTO T 89) 35 Maximum
   b. Plastic Index (AASHTO T 90) 2-9 Maximum
   c. Dust Ratio: $\frac{\%\text{ Passing No. 200}}{\%\text{ Passing No. 30}}$ 2/3 Maximum

Grading Requirements (AASHTO T 11 and T 27):

Sieve	Percent Passing
1"	100
3/4"	70-98
No. 4	36-60
No. 8	25-47
No. 30	12-31
No. 200	8-15

2. Surface rock shall have at least 70 percent by weight of the particles retained on the No. 4 sieve and shall have at least two fractured faces.

2.4 Soil Sterilant

The sterilant shall be Pramitol 5SP as manufactured by CIBA-GEIGY, Monobor-chlorate, or approved equal and shall be applied in accordance with the manufacturer's or suppliers recommendations to adequately sterilize the base.

2.5 Paving Fabric

The paving fabric used shall be non-woven, fabricated from polypropylene resin, and shall have the following properties:

Weight, oz./sq.yd.	4.0 Minimum
Grab Tensile Strength, lbs.	90 Minimum
Elongation at Break, percent	55 Minimum
Asphalt Retention, gals/sq.yd.	0.20 Minimum

2.6 Asphalt Tack Coat

A. The material is to be CRS-1 or CSS-1 emulsified asphalt unless otherwise approved.

B. Furnish emulsified asphalt meeting the requirements of ODOT's publication "Standard Specifications for Asphalt Materials." The Contractor shall submit an emulsified asphalt application plan for City Engineer review and approval one week prior to asphalt application.

2.7 Hot-Mix Asphalt Concrete

A. General

The asphalt concrete shall consist of a hot mixture of asphalt cement, well-graded high quality aggregate, mineral filler and adhesive as required. It shall be plant mixed into a uniformly coated mass, hot laid on a prepared foundation and compacted to the specified density.

B. Hot-Mix Asphalt Concrete

Materials shall be in accordance with "Section 00744 - Minor Hot Mix Asphalt Concrete (MHMAC) Pavement" and related sections and Special Provisions of the Oregon Standard Specifications for Construction, current edition, supplemented and modified as follows:

1. Add the following to subsection 00744.02:

The terms "MHMAC" and "HMAC" as well as "Agency," "Owner," and "City" may be used interchangeably in this Technical Specification.

2. Project Mix Requirements

a. Level 3 HMAC
b. 1/2-inch Dense Graded

c. Asphalt Cement PG 70-28
d. Lime Treated Aggregate Required

3. Delete subsection 00744.03 and replace with the following:

00744.03 Reclaimed Asphalt Pavement (RAP) Material - No RAP material shall be used on this project unless otherwise approved by the City Engineer.

4. Replace the first two paragraphs of subsection 00744.11 with the following:

(a) Asphalt Cement - Provide asphalt cement conforming to the requirement of ODOT's publication "Standard Specifications for Asphalt Materials." Copies of the publication are available from ODOT's Pavement Services Engineer. The applicable specifications are those contained in the current publication on the date the project is advertised.

Testing of the asphalt cement used on this project will be in accordance with the "Quality Control" section of the General Requirements.

5. Replace the first paragraph of subsection 00744.13 with the following:

00744.13 Job Mix Formula (JMF) Requirements - Previously prepared JMF will be allowed, provided adequate test data are available to document the suitability of the mix, the Contractor can document that the same materials are being used, the JMF was prepared within the last 12 months, and the JMF meets the requirements of these Specifications. Copies of the results of tests made on the mix during production on previous projects shall also be submitted if any are available.

Do not begin production on the project until the JMF is reviewed by the City Engineer and written consent is provided to proceed. A new JMF is required if the asphalt cement grade, any additives, or the source of the aggregate change during production. Provide a JMF for the project meeting the following criteria:

- For dense graded Level 3 wearing course mixes, the mix design submittal shall include the results of performance testing as outlined in the latest ODOT Contractor Mix Design Guidelines for Asphalt Concrete.

2.8 Street Monument Boxes

The monument boxes shall be equal to Model Number 3680 as cast by East Jordan Iron Works, equivalent Olympic Foundry, or approved equal, and shall have the letters MON cast in the cover.

2.9 Culverts

A. Culverts shall be galvanized corrugated steel pipe and shall be 14-gauge with 2-2/3" x 1/2" corrugations. Fabrication of pipe shall conform to AASHTO 218 Specifications. Coating shall be minimum 2-ounce zinc per square foot. Joints shall be made with corrugated steel culvert bands over 3/8-inch neoprene gaskets. Culvert bands shall be 12 inches wide.

B. Bedding and backfill material, unless otherwise shown on the Drawings, shall consist of select native material free of particle sizes greater than 1-1/2-inch in diameter.

2.10 Drainage Trenches

A. Geotextile fabric for drainage trenches shall be Mirafi 140N or equal approved by the Engineer.

B. Drain rock shall be clean washed round river gravel, 1/2-inch to 2-inch size.

PART 3 - EXECUTION

3.1 Earthwork

A. Clearing and Grubbing

1. Clearing and grubbing shall include the removal and disposal of any obstructions, such as existing curbs, sidewalks, pavement, culverts, fences, etc., and organic material such as trees, tree stumps, brush, hedges, vegetation, roots, rubbish, posts, fences, topsoil, and any other obstacles or materials in the construction area which would prevent completing the project, and which are unsuitable for road work construction.

2. All vegetation and rubbish shall be removed and disposed of by the Contractor in conformance with the requirements of local authorities controlling air pollution and solid waste disposal.

B. Roadway Excavation

Prior to any excavation, the area to be excavated shall be cleared and grubbed. Roadway excavation shall consist of the excavation, haul, and satisfactory disposal of all materials taken from within the right-of-way for the construction of embankments, subgrade, shoulders, intersections, ditches, waterways, entrances, approaches (including excavation at private entrances outside the right-of-way), curbs, sidewalks, and incidental work, in accordance with the Specifications and the lines, grades, and cross sections shown on the Drawings, and as required by the City Engineer.

C. Embankments

1. Prior to construction of any embankment, the area beneath the embankment and the areas from which embankment material will be obtained shall be cleared and grubbed. The existing soil beneath the embankment shall then be compacted to 90 percent of maximum density as determined by ASTM D 698 for a minimum of 6 inches below ground surface. Any unsuitable material shall be removed prior to placement of any embankment.

2. Upon completion of the embankment foundation, embankment material shall be placed in horizontal lifts and compacted to 95 percent of ASTM D 698. Embankment lift depth shall not exceed the capability of compaction equipment being used to achieve the required compaction for the full depth of each lift. The embankment material shall be native or import free of vegetative or organic matter, boulders 6 inches or larger in diameter, or frozen material and shall be at or below optimum moisture content at the time of placement.

3. The embankment shall be brought to the lines and grade required on the Drawings . Any unsuitable material which may have been used in constructing the embankment shall be removed and replaced with suitable material and compacted at no cost to the City.

D. Roadbed Cuts

1. In roadbed cuts, the subgrade material shall be compacted to 95 percent of maximum density as determined by ASTM D 698 for a minimum of 6 inches below the top of the subgrade.

2. Depending on the type of material encountered, the Contractor may have to scarify, aerate or water, over-excavate, or take other actions as necessary to achieve the required compaction.

E. Finishing of Subgrade

1. All roadbeds, ditches, and other excavations and embankments shall be trimmed accurately to the lines, grades, and cross sections as shown on the Drawings and shall be finished in a thoroughly workmanlike manner to within plus or minus 0.05 foot of the required grade. They shall be in neat and well finished condition at the time the project is completed. The entire right-of-way area shall be cleaned up and made free of debris and foreign matter of all kinds. Accumulations of dirt and/or other materials shall be disposed of in a satisfactory manner.

2. Upon completion of the subgrade and prior to placement of base rock, the Contractor shall load test the finished subgrade surface. The load test shall consist of slowly driving a loaded dump truck over the road surface. The dump truck shall have a minimum capacity of 10 cubic yards. All soft areas shall be noted. City staff and the Contractor shall note any soft areas. The Contractor shall excavate out and either replace unsuitable material or properly compact all soft areas in order to provide a firm base that conforms to the Specifications. Any soft areas that occur as part of the project because of over-watering, improper compaction, weather, etc., shall be replaced.

F. Dust and Mud Control

1. The Contractor shall be responsible for controlling dust and mud caused by his operations. This shall include, but not be limited to, street work, trench work, shoulder work, sidewalk work, driveways, connecting streets, etc. The Contractor shall be responsible for controlling dust on the roadway surface until the time asphalt pavement is placed.

2. Dust and mud control performed by the Contractor is considered a normal part of the construction project. If the Contractor fails to properly control the dust and mud, the City may request him to do so in writing. If, after 24 hours from this request, the Contractor has not corrected the dust or mud problem, the City may elect to have the corrective work performed, bill the Contractor for the work, and withhold final acceptance of the project until the bill is paid.

3.2 Geotextile Fabric

A. Scope

This work consists of furnishing and placing geotextile fabrics in underdrains, under embankments, over roadbed subgrade, and at other locations as shown on the Drawings or directed by the City Engineer.

B. Construction

1. Geotextile fabric shall be installed as shown on the Drawings or as directed by the City Engineer.

2. Fabric placed for subgrade stabilization under embankments or over roadbed subgrade shall be placed parallel to the centerline of the roadway, with placement starting at the low side of the super elevation or crown. The fabric shall either be sewn together at all longitudinal and transverse edges or overlapped a minimum of two feet at all edges. Transverse overlaps shall be made in the direction of base material placement.

3.3 Aggregate Base and Base Rock

A. Scope

Aggregate base and base rock shall be placed to the lines, depths, and grades shown on the Drawings. Prior to placement of the materials, each succeeding lift, i.e., subgrade, aggregate base, base, etc., shall be properly constructed and reviewed by the City Engineer.

B. Construction

1. The construction procedure here described shall be understood to apply to each of the courses and/or layers of which the road base is to be constructed. The construction of the road base shall not be limited to the construction of the main roadway, but shall include the construction of base on approach roads, driveways, connecting roads and connecting streets as shown on the Drawings.

2. After the subgrade is brought to the proper line, cross section and compaction, the aggregate materials shall be spread and shaped as required. The spreading and shaping of the aggregate materials shall be so performed as to prevent

separation of the coarser material from the finer materials including the use of adequate water.

3. The aggregate materials shall be brought to proper moisture content as required for compaction and compacted to 90 percent of maximum density as determined by ASTM D 1557, as appropriate.

4. The finished surface when tested with a 10-foot straightedge shall not vary from the testing edge by more than 0.05 foot at any point.

5. Following construction of each lift, the Contractor shall do such blading, brooming, watering, and other work as necessary to prevent raveling and rutting. These operations are to be continued as required until the lift is covered by a following lift or until all work to be done under the Contract is completed. If the required compacted depth of the base exceeds 8 inches, it shall be constructed in two or more lifts, each lift not exceeding 8 inches in depth.

6. Upon completion of the aggregate materials and prior to placement of asphalt concrete pavement, the Contractor shall load test the finished base surface. The load test shall consist of slowly driving a loaded minimum 10 yard dump truck over the road surface. All soft areas shall be noted. The Contractor shall excavate and/or compact all soft areas in order to provide a firm base that conforms to the requirements of the Technical Specifications.

7. Gravel shoulders when required shall be constructed as a part of construction of the base and are not to be added on after completion of asphalt paving. The finished gravel shoulder shall be graded, trimmed and compacted to the required lines, grades and cross sections in a neat manner leaving the gravel shoulder flush with the edge of the asphalt pavement. Coarse segregated aggregate shall not be used in the construction of gravel shoulders. All such non-specification material shall be removed and replaced with specification material.

3.4 Soil Sterilant

A. Upon completion of the base and prior to placement of asphalt concrete, the Contractor shall apply a soil sterilant to the surface of the base.

B. The Contractor shall supply the City Engineer with a description of the sterilant and the name of the supplier prior to application in order that the suitability of the proposed product may be verified. The applicator shall be licensed by the State of Oregon for the

class of herbicide utilized. Any damage to adjacent areas caused by the sterilant shall be repaired by the Contractor.

3.5 Pre-paving Conference

At least one week before paving is scheduled to begin, the Contractor will set up a pre-paving meeting between the Contractor and the City Engineer. If a paving Subcontractor is being used they shall also be present. The intent of the meeting is to allow the City Engineer and the Contractor to jointly review the proposed method of operation, equipment, personnel, mix, schedule, etc., along with the project specifications.

3.6 Overlay Preparation

A. Asphalt Concrete Patching

1. The City Engineer will mark all unstable or unsuitable areas. The Contractor shall then remove all material from the designated areas to a depth as detailed on the Drawings or as required by the City Engineer.

2. The area shall then be backfilled with base rock as detailed on the Drawings, or as required by the City Engineer. All materials shall be properly placed and compacted as outlined in this Technical Specification.

B. Asphalt Crack Sealing

1. All cracks and joints shall be routed and cleaned of all loose material and vegetation. Cleaning shall be accomplished by using a hook or other similar device to loosen the material and either blowing, brooming or flushing the material from the crack. After all cracks are cleaned, the entire paved surface shall be cleaned of foreign material. Care shall be taken not to refill the cracks with foreign material.

2. Filling of cracks and voids shall not commence until they are clean and dry.

    a. Voids in the base below the pavement shall be filled with clean sand and compacted. Cracks 1-inch and less in width shall be completely filled to the pavement surface with hot liquid rubberized asphalt conforming to ASTM D 3405.

b. Cracks greater than 1-inch in width shall be filled with a mixture of 50 percent 1/4-0 aggregate and 50 percent CSS-1 asphalt emulsion or other approved mixture to within 1/4 inch of the pavement surface and topped off with hot liquid rubberized asphalt.

c. The following day, any cracks which are not completely full shall be topped off with additional rubberized asphalt. After sealing, the filler shall be broomed or squeegeed flush with the existing pavement surface and allowed to cure prior to constructing the asphalt concrete overlay.

d. All sealed cracks shall be flush with the existing pavement after sealing is complete.

C. Cleaning

The existing surface of all areas to be overlaid shall be thoroughly cleaned of all loose material, dirt, debris, or other undesirable materials by brooming, flushing with water, or other methods acceptable to the City.

D. Asphalt Concrete Preleveling

1. All areas with irregular grades to be preleveled will be marked by the City and/or City Engineer and preleveled by the Contractor with 3/8-inch dense graded asphalt concrete.

2. The preleveling will be performed while the street is clean and thoroughly dry and will be accomplished by applying a tack coat of CRS-1 or CSS-1 emulsified asphalt at a rate of 0.05 to 0.15 gallons per square yard and then placing and compacting the asphalt mix. The actual rate of tack coat application will be determined in the field by the Contractor and the City Engineer.

3. The compaction of the asphalt concrete shall be accomplished with a pneumatic-tired roller. The rolling shall follow directly behind the placement and be performed in such a manner that the entire surface receives at least four coverages of the roller. The pneumatic-tired roller shall be capable of exerting at least 80 pounds per square inch ground pressures and shall not be operated at speeds in excess of 5 mph. Finish rolling shall be accomplished with a steel-wheeled roller and shall continue until all roller marks are eliminated.

E. Paving Fabric

Once the street is clean and all repair work is completed, the paving fabric shall be installed where called for on the Drawings or as required by the City Engineer. The following procedures and materials are to be used.

1. Tack Coat Application

   a. Apply a tack coat of AR4000W graded asphalt cement at the rate of 0.15 to 0.25 gallons per square yard. This can only be done with the ambient temperatures above 60°F. The actual rate will be determined in the field by the City Engineer to suit the existing surface.

   b. The tack material shall be between 275° and 325°F at the time of application and shall be applied with a single pass of distributor truck.

   c. An accessory hand sprayer shall be used on patches, lap sections and areas where truck spraying is impractical. It is extremely important that the tack coat be uniformly applied. Application will not be allowed unless the distributor equipment is operating properly.

2. The paving fabric, when required, shall be placed directly behind the distributor with the use of equipment that will provide automatic tensioning capabilities to assure fast wrinkle-free unrolling.

   a. Any minor wrinkles or air bubbles shall be brushed out with a stiff-bristle push broom. Wrinkles that won't brush out shall be cut out and a patch of fabric layered at least 6 inches in all directions be installed.

   b. The fabric shall be cut into sections to match curves and corners. Overlap these sections and the start of all new rolls at least 6 inches and apply approximately 0.20 gallons per square yard tack coat to the seams.

   c. If any blistering of the fabric arises a 4-ton tandem roller shall be used to restore the fabric adhesion prior to the overlay application.

3. The overlay work shall begin as soon after laydown of the paving fabric as practical.

F. Asphalt Tack Coat

1. An asphalt tack coat shall be applied to existing pavement surfaces to be overlaid with new asphalt concrete, except where paving fabric has been placed. All pavement repair work and surface cleaning shall be completed prior to application of tack coat.

2. All surfaces must be clean and dry at the time of the tack coat application and at a temperature of at least 50°F. Remove all loose material from the surface. The tack coat shall only be constructed far enough in advance as is appropriate to ensure a tacky, sticky condition at the time the asphalt concrete is placed on it.

3. A tack coat will not be required between pavement lifts if paving of succeeding lifts occurs within 24 hours and the pavement surface is kept clean. If the pavement surface is not clean, as determined by the City Engineer, a tack coat will be required between lifts.

3.7 Hot-Mix Asphalt Concrete Pavement

A. Scope

After completion of the base, the Contractor shall place and compact the hot-mix asphalt concrete to the lines, grades, thicknesses, and cross-sections shown on the Drawings and as established by the Engineer.

B. Construction

Construction shall be performed in accordance with applicable "Section 00744 - Minor Hot Mix Asphalt Concrete (MHMAC) Pavement" and related sections and Special Provisions of the Oregon Standard Specifications for Construction, current edition, supplemented and modified as follows:

1. Delete subsection 00744.16 and replace with the following:

00744.16 MHMAC Acceptance - Perform sampling and testing according to the "Quality Control" section of the General Requirements.

2. Replace Section 00744.40 with the following:

00744.40 Season and Temperature Limitations - Place MHMAC when the temperature of the surface that is to be paved is not less than the temperature indicated, unless approved by the City Engineer:

Nominal Compacted Thickness of Individual Lifts and Courses as shown on the typical section of the plans	**All Levels**
	Surface Temperature*
Dense Graded Mixes	
Less than 2 inches	60°F
2 inches - 2-1/2 inches	50°F
Greater than 2-1/2 inches	40°F
Temporary	40°F

* If placing MHMAC between March 15 and September 30, temperature requirement may be lowered 5°F.

** Do not use field burners or other devices to heat the pavement surface to the specified minimum temperature.

3. Add the following to the end of subsection 00744.44:

Treat all paved surfaces on and against which MHMAC is to be placed with an asphalt tack coat, according to Section 00730. Immediately before applying the tack coat, clean and dry the surface to be tacked. Remove all material, loose or otherwise, that will reduce adhesion of the tack by brooming, flushing with water, or other approved methods.

4. Add the following subsection:

00744.45 Control of Line and Grade - Use a floating beam device of adequate length and sensitivity to control the grade of the paver. Where this method is impractical, manual control of grade will be allowed when approved.

5. Add the following subsection:

00744.48 Hauling, Depositing, and Placing - Haul, deposit, and place MHMAC as follows:

(a) Hauling - Cover MHMAC if rain or cold air temperatures are encountered any time between loading and placement.

MHMAC will be rejected before placing if one or more of the following is found:

- Below specified placing temperature limit
- Slumping or separating
- Solidifying or crusting
- Absorbing moisture

Dispose of rejected loads at no cost to the City.

Deliver the mixture to the paving machine at a rate that provides continuous operation of the paving machine, except for unavoidable delay or breakdown. If excessive stopping of the paving machine occurs during paving operations, the City Engineer may suspend paving operations until the mixture delivery rate matches the paving machine operation.

(b) Depositing - Deposit MHMAC from the hauling vehicles so segregation is prevented. The Contractor shall consider delivering the MHMAC to the paving machine by either a windrow pick-up machine or an end-dump transfer machine where the continuous length of the panel is greater than 500 feet.

When MHMAC is windrowed, the pick-up equipment shall:

- Pick up substantially all of the MHMAC deposited on the roadway.
- Be self-supporting, not exerting any vertical load on the paving machine, or causing vibrations or other motions which could have a harmful effect on the riding quality of the completed pavement.

(c) Placing - Alternative equipment and means may be allowed by the Engineer if the use of a paver is impractical.

Do not place MHMAC during rain or other adverse weather conditions, unless allowed by the City Engineer. MHMAC in transit at the time adverse conditions occur may be placed if:

- It has been covered during transit.
- The MHMAC temperature is satisfactory.
- It is placed on a foundation free from pools or flow of water.
- All other requirements are met.

When leveling irregular surfaces and raising low areas, do not exceed 2 inches actual compacted thickness of any one lift, except the actual compacted thickness of intermittent areas of 1,000 square feet or less may exceed 2 inches, but not more than 4 inches. This may require portions of the mixture to be laid in two or more lifts.

Place the mixture in the number of lifts and courses, and to the compacted thickness for each lift and course, as shown. Place each course in one lift unless otherwise specified. Do not exceed a compacted thickness of 3 inches for any lift. Limit the minimum lift thickness to twice the maximum aggregate size in the mix.

Do not intermingle MHMAC produced from more than one JMF. Each base course panel placed during a working shift shall conform to a single JMF. The wearing course shall conform to a single JMF.

6. Replace subsection 00744.49 with the following:

00744.49 Compaction - Immediately after the MHMAC has been spread, struck off, and surface irregularities and other defects remedied, roll it uniformly with rollers meeting the requirements of 00744.24 until compacted to a minimum of 91% for the base course and 92% for the wearing course. Perform finish rolling and continue until all roller marks are eliminated.

Compaction to a specified density will not be required on temporary surfacing (see 00745.50), guardrail flares, mailbox turnouts, road approaches, pavement repair, and areas of restricted width (less than 8 feet wide) or limited length, regardless of thickness. Compact these surfaces according to 00749.45.

7. Add the following subsection:

00744.50 Preparation of Underlying Surfaces - All edges of manholes, valve boxes, curbs, existing pavement, etc., that are to be in contact with the new asphalt concrete shall be cleaned and painted or sprayed with a thin tack coat. This tack coat is to be applied only far enough in advance as is appropriate to

ensure a tacky, sticky condition at the time the asphalt concrete comes in contact with the structure. The application of the tack coat shall be done in a neat, workmanlike fashion. Any material inadvertently applied to surfaces outside the limits of the paving, such as on sidewalks, exposed sections of curbs, etc., shall be fully cleaned by the Contractor.

8. Add the following subsection:

00744.51 Paving Crew - Only trained and experienced personnel shall be used on the paving crew performing the work. The Contractor shall submit to the City, prior to the pre-paving conference, job assignments, experience history, and training background for all members of the paving crew. Untrained and inexperienced personnel may not be used. The City may request personnel be replaced if it cannot be demonstrated that they have the proper training and experience to be a part of an experienced crew. The paving superintendent and paving machine operator shall have at least five years' experience, and the roller operators shall have at least two years' experience.

9. Delete the following subsections:

a. 00744.80
b. 00744.90

3.8 Asphalt Fog Seal

A. After the construction of the asphalt concrete, the City Engineer will evaluate the surface to determine whether a fog seal is required. When test results and inspection shows that the Asphalt Concrete meets the minimum requirements of these Specifications, but a seal is still needed, then the Contractor shall apply a fog seal consisting of CSS-1 emulsified asphalt mixed with water at a rate of 1 to 1 and applied at a rate to be determined by the City Engineer. It is anticipated that this rate will be between 0.05 to 0.20 (0.03 to 0.10 residual) gallons per square yard.

B. The areas to be sealed shall be dry and free of dirt, dust, leaves, or other foreign matter at the time of placement. After application and initial cure of the emulsified asphalt the Contractor shall apply a light coat of clean fine sand. The sand shall be applied evenly and then broomed across the pavement surface. After approximately 5 days the Contractor shall sweep the street and remove the excess loose sand.

C. All of this work, a portion of it, or none of it may be performed, depending on the evaluation made by the City Engineer.

3.9 Construction Staking

The Contractor shall provide all construction staking necessary as described in the General Requirements.

3.10 Street Monument Boxes

The Contractor shall provide and install cast iron street monument boxes at all points shown on the Drawings and/or where required by the County Surveyor. Reference stakes for location of the monument boxes shall be provided by the City Engineer. Monument boxes shall be installed after placement of the asphalt concrete pavement. Holes in the pavement shall be neatly cut to a 24-inch diameter. After installation of a street monument box, the hole shall be backfilled with Portland Cement concrete (minimum 3000 psi compression strength). The asphalt concrete shall be patched to leave a smooth ride. Monuments within the boxes shall be installed by a Registered Professional Land Surveyor.

3.11 Adjustment of Utility Covers to Grade

The Contractor shall adjust the tops of all existing manholes, valve boxes and other utility covers as required to bring the covers or gratings of the structures to the grade required by the improvement involved. The method of adjustment shall be shown on the Drawings or as approved by the City Engineer. The Contractor shall repair any of these structures which are damaged during performance of the work at no cost to the City.

3.12 Culverts

A. General

Culverts shall be installed in the location as shown on the Drawings, in accordance with the details.

B. Installation

Culverts shall be bedded and backfilled uniformly on both sides of the pipe at the same time to prevent displacement or buckling of the pipe. Bedding material shall be worked carefully under the pipe haunches and then compacted.

C. All culverts to be extended shall be installed at the extended grade and slope of the existing CMP.

3.13 Drainage Trenches

Drainage trenches shall be constructed in the locations shown on the Drawings in accordance with the details and as specified herein.

3.14 Pavement Striping

A. General

Materials for painted traffic markings and striping shall meet or exceed the requirements for striping paint and glass beads of "Pavement Marking Materials" and "Oregon Standard Specifications for Construction," current edition. The paint color and type of markings shall be as shown on the Drawings or as required by the City Engineer. The Contractor shall lay out all pavement markings and striping, unless otherwise directed by the City or road authority.

B. Materials

Use materials conforming to the requirements of Section 00800 of the "Oregon Standard Specifications for Construction." Materials and suppliers for traffic paint and reflective beads shall be listed in the ODOT Qualified Products List as approved by the City Engineer for the intended use. Paint shall be standard waterborne traffic paint. Beads shall be virgin large reflective traffic beads.

C. Pavement Marking Placement

Pavement striping and markings shall be placed as shown on the Project Drawings according to the Manual on Uniform Traffic Control Devices, and the ODOT Traffic Line Manual. Apply the striping and markings according to the manufacturer's recommendations. Unless otherwise specified, apply pavement striping and markings before public traffic is allowed on the freshly paved surface.

Remove and replace striping and markings not conforming to these Specifications or not properly installed before continuing the operation.

D. Submittal

A detailed pavement striping plan, including materials to be utilized, application process, equipment to be used, application rates, placement tolerances, accommodations for public safety, disposal of waste, and repair procedures, shall be provided to the City a minimum of seven days before placing markings.

E. Warranty

The Contractor shall guarantee the paint markings and paint striping for a period of one year from the date of application against deterioration and/or delamination beyond normal wear.

3.15 Restoration, Finishing, and Cleanup

A. Prior to the final inspection of the work, the Contractor shall restore or replace all paved surfaces, graveled surfaces, curbing, sidewalks, trees and shrubbery, lawns, pastures and fences, or other existing facilities disturbed or damaged by his work.

B. The Contractor shall clean up and leave in a neat, orderly condition the right-of-way and other property occupied in connection with the work.

C. The Contractor shall reshape, clean out ditches, retrieve shoulders and slopes, and do all other work required to bring the project to the final lines, grades, and condition called for. The finished project shall be clean and neat in its final appearance.

D. See Technical Specifications - "Surface Restoration" for additional requirements.

END OF SECTION