

# **2020 GENERAL SPECIAL PROVISIONS FOR PRIVATE CONTRACTS**



**CITY OF SPOKANE, WASHINGTON**  
January 2020

## FOREWORD

These General Special Provisions (GSPs) contain information and requirements for construction of City of Spokane (COS) public street, bridge, sanitary sewer, water and storm water facilities. This information has been developed over the course of many years, and represents methodologies, materials and standards common to the area, and to which the local construction community has had considerable input.

The City of Spokane General Special Provision for Private Contracts add, delete, or revise sections of the 2020 edition of the Washington State Department of Transportation (WSDOT) Standard Specifications for Road, Bridge, and Municipal Construction. The chapter and subsection numbering follow the same format as the numbering in the WSDOT Standard Specifications, except where an additional section is added and is denoted with a COS identifier. In the absence of any COS GSP, the WSDOT Standard Specification provides the controlling information and requirements for construction of City of Spokane public works facilities.

Potential errors or suggested revisions for amendments shall be addressed to Dan Buller, City of Spokane Engineering Services ([dbuller@spokanecity.org](mailto:dbuller@spokanecity.org)). All such suggested amendments must be in writing, and must identify the issue, provide supporting information as well as providing a suggestion for how to address the issue.

These GSPs for Private Contracts are available online at the City of Spokane Engineering Services Department website. <https://my.spokanecity.org/business/bid-and-design/private-gsps/> The following GSPs are made a part of the standards for construction and supersede any conflicting provisions of the 2020 WSDOT Standard Specifications for Road, Bridge and Municipal Construction.

Several types of Special Provisions are included in this contract; General, Region, Bridges and Structures City of Spokane, and Project Specific. Special Provisions types are differentiated as follows:

(Date)	General Special Provision
(*****)	Notes a revision to a WSDOT General Special Provision and also notes a Project Specific Special Provision.
(Date APWA GSP)	American Public Works Association General Special Provision
(***** APWA GSP)	Notes a revision to an APWA General Provision
(Date COS GSP)	City of Spokane General Special Provision
(***** COS GSP)	Notes a revision to a City of Spokane General Special Provision

**General Special Provisions** are similar to Standard Specifications in that they typically apply to many projects, usually in more than one Region. Usually, the only difference from one project to another is the inclusion of variable project data, inserted as a “fill-in”.

**Project Specific Special Provisions** normally appear only in the contract for which they were developed.

**UPDATE NOTES:**

Updates made herein from the preceding 10-14-19 edition are identified by a “January 1, 2020” date in the GSP header.

**CITY OF SPOKANE GENERAL SPECIAL PROVISIONS FOR PRIVATE  
CONTRACTS**

**SUPPLEMENT to the  
WSDOT STANDARD SPECIFICATIONS FOR  
ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION 2020 EDITION**

**TABLE OF CONTENTS**

<b>Item</b>	<b>Page</b>
<b>1-01 DEFINITIONS AND TERMS .....</b>	<b>1-1</b>
1-01.3 Definitions.....	1-1
<b>1-04 SCOPE OF THE WORK .....</b>	<b>1-2</b>
1-04.2 Coordination of Contract Documents, Plans, Special Provisions, Specifications, and Addenda .....	1-2
<b>1-05 CONTROL OF WORK .....</b>	<b>1-3</b>
1-05.4 Conformity With and Deviations From Plans and Stakes .....	1-3
1-05.7 Removal of Defective and Unauthorized Work.....	1-5
1-05.10 Guarantees .....	1-5
1-05.11 Final Inspections and Operational Testing.....	1-6
1-05.15 Method of Serving Notices.....	1-8
1-05.18 Record Drawings.....	1-8
<b>1-07 LEGAL RELATIONS AND RESPONSIBILITIES TO THE PUBLIC .....</b>	<b>1-10</b>
1-07.5 Environmental Regulations.....	1-10
1-07.6 Permits and Licenses .....	1-10
1-07.22 Use of Explosives .....	1-11
1-07.23 Public Convenience and Safety .....	1-11
1-07.24 Rights of Way.....	1-15
1-07.100 Survey Monument Perpetuation .....	1-16
<b>1-08 PROSECUTION AND PROGRESS.....</b>	<b>1-18</b>
1-08.0 Preliminary Matters .....	1-18
1-08.4 Prosecution of the Work.....	1-19
<b>1-10 TEMPORARY TRAFFIC CONTROL .....</b>	<b>1-20</b>
1-10.2 Traffic Control Management .....	1-20
1-10.3 Traffic Control Labor, Procedures, and Devices .....	1-23
<b>2-01 CLEARING, GRUBBING AND ROADSIDE CLEANUP .....</b>	<b>2-1</b>
2-01.1 Description.....	2-1
2-01.3 Construction Requirements .....	2-2
<b>2-02 REMOVAL OF STRUCTURES AND OBSTRUCTIONS .....</b>	<b>2-8</b>
2-02.1 Description .....	2-8
2-02.3 Construction Requirements.....	2-8
<b>2-03 ROADWAY EXCAVATION AND EMBANKMENT .....</b>	<b>2-11</b>
2-03.1 Description .....	2-11
2-03.2 Materials.....	2-12

2-03.3 Construction Requirements .....	2-12
<b>2-06 SUBGRADE PREPARATION .....</b>	<b>2-14</b>
2-06.1 Description .....	2-14
2-06.3 Construction Requirements .....	2-14
<b>2-07 WATERING .....</b>	<b>2-15</b>
2-07.1 Description .....	2-15
2-07.3 Construction Requirements .....	2-15
<b>2-09 STRUCTURE EXCAVATION .....</b>	<b>2-15</b>
2-09.3 Construction Requirements .....	2-15
<b>4-04 BALLAST AND CRUSHED SURFACING .....</b>	<b>4-1</b>
4-04.3 Construction Requirements .....	4-1
<b>4-90 CEMENT TREATED BASE .....</b>	<b>4-3</b>
4-90.1 Description .....	4-3
4-90.2 Materials .....	4-4
4-90.3 Construction Requirements .....	4-4
<b>5-01 CEMENT CONCRETE PAVEMENT REHABILITATION .....</b>	<b>5-1</b>
5-01.3 Construction Requirements .....	5-1
<b>5-02 BITUMINOUS SURFACE TREATMENT .....</b>	<b>5-5</b>
5-02.3 Construction Requirements .....	5-5
<b>5-04 HOT MIX ASPHALT .....</b>	<b>5-5</b>
5-04.2 Materials .....	5-5
5-04.3 Construction Requirements .....	5-8
<b>5-05 CEMENT CONCRETE PAVEMENT .....</b>	<b>5-33</b>
5-05.1 Description .....	5-33
5-05.3 Construction Requirements .....	5-34
<b>6-02 CONCRETE STRUCTURES .....</b>	<b>6-1</b>
6-02.3 Construction Requirements .....	6-1
<b>6-13 STRUCTURAL EARTH WALLS .....</b>	<b>6-4</b>
6-13.2 Materials .....	6-4
6-13.3 Construction Requirements .....	6-7
<b>7-01 DRAINS .....</b>	<b>7-1</b>
7-01.2 Materials .....	7-1
7-01.3 Construction Requirements .....	7-1
<b>7-02 CULVERTS .....</b>	<b>7-2</b>
7-02.2 Materials .....	7-2
<b>7-04 STORM SEWERS .....</b>	<b>7-2</b>
7-04.2 Materials .....	7-2
7-04.3 Construction Requirements .....	7-3
<b>7-05 MANHOLES, INLETS, CATCH BASINS AND DRYWELLS .....</b>	<b>7-6</b>
7-05.2 Materials .....	7-6
7-05.3 Construction Requirements .....	7-6
<b>7-07 CLEANING EXISTING DRAINAGE STRUCTURES .....</b>	<b>7-14</b>
7-07.3 Construction Requirements .....	7-14
<b>7-08 GENERAL PIPE INSTALLATION REQUIREMENTS .....</b>	<b>7-14</b>
7-08.1 Construction Requirements .....	7-14
7-08.3 Construction Requirements .....	7-14
<b>7-09 WATER MAINS .....</b>	<b>7-23</b>

7-09.1 Description.....	7-23
7-09.2 Materials.....	7-23
7-09.3 Construction Materials .....	7-24
<b>7-12 VALVES FOR WATER MAINS.....</b>	<b>7-31</b>
7-12.1 Description .....	7-31
7-12.2 Materials .....	7-31
7-12.3 Construction Requirements.....	7-31
<b>7-14 HYDRANTS.....</b>	<b>7-32</b>
7-14.2 Materials .....	7-32
7-14.3 Construction Requirements.....	7-32
<b>7-15 SERVICE CONNECTIONS.....</b>	<b>7-33</b>
7-15.1 Description .....	7-33
7-15.2 Materials .....	7-33
7-15.3 Construction Requirements.....	7-34
<b>7-17 SANITARY SEWERS.....</b>	<b>7-35</b>
7-17.2 Materials.....	7-35
7-17.3 Construction Requirements.....	7-36
<b>7-18 SIDE SEWERS .....</b>	<b>7-40</b>
7-18.2 Materials .....	7-40
7-18.3 Construction Requirements .....	7-40
<b>7-19 SEWER CLEANOUTS .....</b>	<b>7-42</b>
7-19.1 Description .....	7-42
7-19.3 Construction Requirements.....	7-42
<b>7-100 VALVE CHAMBERS .....</b>	<b>7-42</b>
7-100.1 Description.....	7-42
7-100.2 Materials .....	7-42
7-100.3 Construction Requirements .....	7-43
<b>8-01 EROSION CONTROL AND WATER POLLUTION CONTROL.....</b>	<b>8-1</b>
8-01.3 Construction Requirements .....	8-1
<b>8-02 ROADSIDE RESTORATION.....</b>	<b>8-4</b>
8-02.1 Description .....	8-4
8-02.2 Materials .....	8-5
8-02.3 Construction Requirements.....	8-5
<b>8-03 IRRIGATION SYSTEMS.....</b>	<b>8-12</b>
8-03.1 Description .....	8-12
8-03.3 Construction Requirements.....	8-12
<b>8-04 CURBS, GUTTERS AND SPILLWAYS .....</b>	<b>8-15</b>
8-04.1 Description .....	8-15
8-04.2 Materials .....	8-15
8-04.3 Construction Requirements.....	8-15
<b>8-06 CEMENT CONCRETE DRIVEWAY ENTRANCES.....</b>	<b>8-16</b>
8-06.1 Description .....	8-16
8-06.3 Construction Requirements.....	8-17
<b>8-10 GUIDE POSTS.....</b>	<b>8-17</b>
8-10.1 Description.....	8-17
8-10.2 Materials.....	8-18
8-10.3 Construction Requirements .....	8-18

<b>8-11 GUARDRAIL .....</b>	<b>8-19</b>
8-11.1 Description .....	8-19
<b>8-12 CHAIN LINK FENCE AND WIRE FENCE .....</b>	<b>8-19</b>
8-12.3 Construction Requirements .....	8-19
<b>8-13 MONUMENT CASES .....</b>	<b>8-19</b>
8-13.1 Description .....	8-19
8-13.2 Materials .....	8-19
8-13.3 Construction Requirements .....	8-20
<b>8-14 CEMENT CONCRETE SIDEWALKS .....</b>	<b>8-20</b>
8-14.1 Description .....	8-20
8-14.2 Materials .....	8-20
8-14.3 Construction Requirements .....	8-21
<b>8-20 ILLUMINATION, TRAFFIC SIGNAL SYSTEMS AND ELECTRICAL ..</b>	<b>8-26</b>
8-20.1 Description .....	8-26
8-20.3 Construction Requirements .....	8-27
8-20.3(100) Communication Cables and Interfaces .....	8-40
8-20.3(101) Video, Voice, and Data Transmission and Distribution Systems .....	8-48
8-20.3(102) Closed Circuit Television System .....	8-48
8-20.3(103) Permanent Variable Message Sign .....	8-50
8-20.3(104) Pedestrian Crossing Beacon System .....	8-51
8-20.3(105) Temporary Intersection Lighting System .....	8-51
<b>8-21 PERMANENT SIGNING .....</b>	<b>8-52</b>
8-21.1 Description .....	8-52
8-21.2 Materials .....	8-52
8-21.3 Construction Requirements .....	8-52
<b>8-22 PAVEMENT MARKING .....</b>	<b>8-54</b>
8-22.2 Materials .....	8-54
8-22.3 Construction Requirements .....	8-54
<b>8-24 ROCK AND GRAVITY BLOCK WALL AND GABION CRIBBING ....</b>	<b>8-57</b>
8-24.2 Materials .....	8-57
8-24.3 Construction Requirements .....	8-57
<b>8-90 CEMENT CONCRETE STAIRWAYS, LANDINGS AND STEPS .....</b>	<b>8-59</b>
8-90.1 Description .....	8-59
8-90.2 Materials .....	8-60
8-90.3 Construction Requirements .....	8-60
<b>8-91 TRAFFIC ISLANDS .....</b>	<b>8-62</b>
8-91.1 Description .....	8-62
8-91.2 Materials .....	8-62
8-91.3 Construction Requirements .....	8-62
<b>8-92 CEMENT CONCRETE INTEGRAL CURB AND SIDEWALK .....</b>	<b>8-64</b>
8-92.1 Description .....	8-64
8-92.2 Materials .....	8-64
8-92.3 Construction Requirements .....	8-64
<b>9-03 AGGREGATES .....</b>	<b>9-1</b>
9-03.8 Aggregates for Hot Mix Asphalt .....	9-1
9-03.9 Aggregates for Ballast and Crushed Surfacing .....	9-2
9-03.12 Gravel Backfill .....	9-2

9-03.15	Native Material for Trench Backfill.....	9-3
9-03.21	Recycled Material .....	9-3
<b>9-04</b>	<b>JOINT AND CRACK SEALING MATERIALS.....</b>	<b>9-5</b>
9-04.5	Flexible Plastic Gaskets.....	9-5
<b>9-05</b>	<b>DRAINAGE STRUCTURES, CULVERTS AND CONDUITS.....</b>	<b>9-5</b>
9-05.0	Acceptance and Approval of Drainage Structures, and Culverts .....	9-5
9-05.1	Drain Pipe .....	9-6
9-05.2	Underdrain Pipe.....	9-6
9-05.9	Steel Spiral Rib Storm Sewer Pipe.....	9-6
9-05.10	Steel Storm Sewer Pipe .....	9-6
9-05.11	Aluminum Storm Sewer Pipe .....	9-6
9-05.12	Polyvinyl Chloride (PVC) Pipe .....	9-6
9-05.15	Metal Castings .....	9-7
9-05.17	Aluminum Spiral Rib Storm Sewer Pipe.....	9-8
9-05.19	Corrugated Polyethylene Culvert Pipe, Couplings and Fittings .....	9-8
9-05.20	Corrugated Polyethylene Storm Sewer Pipe, Couplings and Fittings.....	9-8
9-05.21	Steel Rib Reinforced Polyethylene Culvert Pipe .....	9-8
9-05.22	Steel Rib Reinforced Polyethylene Storm Sewer Pipe.....	9-8
9-05.24	Polypropylene Culvert Pipe, Polypropylene Storm Sewer Pipe, and Polypropylene Sanitary Sewer Pipe .....	9-9
9-05.50	Precast Concrete Drainage Structures.....	9-9
9-05.100	Cast Iron Pipe.....	9-11
<b>9-06</b>	<b>STRUCTURAL STEEL AND RELATED MATERIALS.....</b>	<b>9-11</b>
9-06.5	Bolts and Rods .....	9-11
9-06.16	Roadside Sign Structures .....	9-11
<b>9-09</b>	<b>TIMBER AND LUMBER.....</b>	<b>9-11</b>
9-09.2	Grade Requirements .....	9-11
<b>9-12</b>	<b>MASONRY UNITS .....</b>	<b>9-12</b>
9-12.2	Concrete Brick .....	9-12
<b>9-13</b>	<b>RIPRAP, QUARRY SPALLS, SLOPE PROTECTION, AND ROCK FOR EROSION AND SCOUR PROTECTION AND ROCK WALLS.....</b>	<b>9-12</b>
9-13.7	Rock for Rock Wall .....	9-12
<b>9-14</b>	<b>EROSION CONTROL AND ROADSIDE PLANTING .....</b>	<b>9-13</b>
9-14.2	Topsoil .....	9-13
9-14.4	Fertilizer.....	9-14
9-14.5	Mulch and Amendments .....	9-15
9-14.7	Plant Materials.....	9-15
9-14.8	Stakes, Guys and Wrapping .....	9-15
<b>9-15</b>	<b>IRRIGATION SYSTEM .....</b>	<b>9-15</b>
9-15.1	Pipe, Tubing and Fittings.....	9-15
9-15.7	Control Valves .....	9-16
9-15.8	Quick Coupling Equipment .....	9-16
<b>9-17</b>	<b>FLEXIBLE GUIDE POSTS.....</b>	<b>9-16</b>
9-17.100	Channelizing Devices .....	9-17
<b>9-23</b>	<b>CONCRETE CURING MATERIALS AND ADMIXTURES .....</b>	<b>9-18</b>
9-23.2	Liquid Membrane-Forming Concrete Curing Compounds.....	9-18
9-23.6	Chemical Admixtures for Concrete.....	9-18

<b>9-29 ILLUMINATION, SIGNAL AND ELECTRICAL.....</b>	<b>9-18</b>
9-29.1 Conduit, Innerduct, and Outerduct.....	9-18
9-29.2 Junction Boxes, Cable Vaults, and Pull Boxes.....	9-19
9-29.3 Fiber Optic Cable, Electrical Conductors, and Cable .....	9-21
9-29.6 Light and Signal Standards.....	9-24
9-29.9 Ballasts, Transformers .....	9-26
9-29.10 Luminaires.....	9-27
9-29.11 Control Equipment .....	9-30
9-29.12 Electrical Splice Materials .....	9-30
9-29.13 Control Cabinet Assemblies .....	9-31
9-29.16 Vehicular Signal Heads, Displays, and Housing.....	9-50
9-29.17 Signal Head Mounting Brackets and Fittings .....	9-50
9-29.24 Service Cabinets .....	9-50
9-29.25 Amplifier, Transformer, and Terminal Cabinets.....	9-52
9-29.100 Pre Formed Loops.....	9-52
9-29.101 Magnetometers .....	9-53
9-29.102 Non-Intrusive Vehicle Detection System.....	9-54
9-29.104 Fiber Optic Patch Cords .....	9-54
9-29.105 Fiber Optic Connectors .....	9-54
9-29.106 Fiber Optic Splice Closures .....	9-55
9-29.107 Fiber Optic Patch Panels .....	9-55
9-29.108 Racks and Cable Management.....	9-56
9-29.109 Video & Data Transmission and Distribution Systems .....	9-56
9-29.110 Closed Circuit Television Systems.....	9-57
9-29.111 Permanent Variable Message Sign.....	9-59
9-29.112 Fiber Optic Cleaning Kit .....	9-63
9-29.113 Driver Feedback Sign System .....	9-64
9-29.114 Rectangular Rapid Flashing Beacon.....	9-64
<b>9-30 WATER DISTRIBUTION MATERIALS .....</b>	<b>9-65</b>
9-30.1 Pipe .....	9-66
9-30.2 Fittings .....	9-66
9-30.3 Valves .....	9-68
9-30.5 Hydrants.....	9-72
9-30.6 Water Service Connections (2 Inches and Smaller).....	9-74
<b>9-33 CONSTRUCTION GEOSYNTHETIC.....</b>	<b>9-75</b>
9-33.4 Geosynthetic Material Approval and Acceptance.....	9-75
<b>9-34 PAVEMENT MARKING MATERIAL .....</b>	<b>9-75</b>
9-34.3 Plastic .....	9-75
<b>9-35 TEMPORARY TRAFFIC CONTROL MATERIALS .....</b>	<b>9-75</b>
9-35.4 Sequential Arrow Signs .....	9-75
<b>9-100 CHANNELIZING DEVICES .....</b>	<b>9-76</b>
9-100.1 Materials .....	9-76

Division 1

## **SPECIAL PROVISIONS**

### **SECTION 1-01 DEFINITIONS AND TERMS**

#### **1-01.3 Definitions**

**(February 14, 2018 COS GSP)**

Supplement this Section with the following:

All references in the Standard Specifications, Amendments, or WSDOT General Special Provisions, to the terms “State”, “Department of Transportation”, “Washington State Transportation Commission”, “Commission”, “Secretary of Transportation”, “Secretary”, “Headquarters”, and “State Treasurer” shall be revised to read “City of Spokane”.

All references to the terms “State” or “state” shall be revised to read “City of Spokane” unless the reference is to an administrative agency of the State of Washington, a State statute or regulation, or the context reasonably indicates otherwise.

All references to “State Materials Laboratory” shall be revised to read “City of Spokane designated location”.

All references to “Standard Plans” or “COS Standard Plans” shall be revised to read “City of Spokane Standard Plans, most current amendment”.

The venue of all causes of action arising from the advertisement, award, execution, and performance of the contract shall be in the Superior Court of the County where the Contracting Agency’s headquarters are located.

#### **Business Day**

A business day is any day from Monday through Friday except holidays as listed in Section 1-08.5.

#### **Contract Bond**

The definition in the Standard Specifications for “Contract Bond” applies to whatever bond form(s) are required by the Contract Documents, which may be a combination of a Payment Bond and a Performance Bond.

#### **Contract Documents**

See definition for “Contract” in the Standard Specifications except delete “subsurface boring logs (if any)” from that definition.

**Contract Time**

The period of time established by the terms and conditions of the Contract within which the Work must be physically completed.

**Final Acceptance Date**

The date on which the City accepts the work as complete.

**Notice to Proceed**

The written notice from the City of Spokane or Engineer to the Contractor authorizing and directing the Contractor to proceed with the Work and establishing the date on which the Contract time begins.

**Traffic**

Both vehicular and non-vehicular traffic, such as pedestrians, bicyclists, wheelchairs, and equestrian traffic.

**SECTION 1-04 SCOPE OF THE WORK****1-04.2 Coordination of Contract Documents, Plans, Special Provisions, Specifications, and Addenda**

**(February 14, 2018 COS GSP)**

**Revise** the second paragraph to read:

Any inconsistency in the parts of the contract shall be resolved by following this order of precedence (e.g., 1 presiding over 2, 2 over 3, 3 over 4, and so forth):

1. Addenda,
2. Proposal Form,
3. General Special Provisions for Private Contracts (this document),
4. Contract Plans,
5. Amendments to Division 1 of the Standard Specifications,
6. Standard Specifications,
7. City of Spokane Standard Plans, and
8. WSDOT/APWA Standard Plans for Road, Bridge, and Municipal Construction.

## **SECTION 1-05 CONTROL OF WORK**

### **1-05.4 Conformity With and Deviations From Plans and Stakes**

Add the following new Sections:

#### **1-05.4(1) Roadway and Utility Surveys** **(August 1, 2010 COS GSP)**

The Engineer shall furnish to the Contractor one time only all principal lines, grades, and measurements the Engineer deems necessary for completion of the work. These shall generally consist of one initial set of:

1. Slope stakes, offset stakes for Clearing and Grubbing, and/or rough grading stakes for establishing grading;
2. Curb grade stakes;
3. Centerline subgrade hubs and centerline top of crushed rock hubs. When road width deems necessary or there is a quarter crown in the street, quarter subgrade hubs and quarter top of crushed rock hubs may be placed, as necessary;
4. Finished grade curb marks;
5. Offset points to establish line and grade for underground utilities such as water, sewers, and storm drains.

On alley construction projects with minor grade changes, the Engineer shall provide only centerline offset hubs on one side of the alley to establish the alignment and grade.

The Contractor shall be responsible for setting and maintaining reference points to structures within the project area. Should the reference points be subsequently lost or destroyed, and the Contractor desires the City to relocate the structures, said relocation shall be at the Contractor's own expense.

Survey work shall be within the following tolerances:

Top of Curb	±.03 foot
Finished Grade Pavement	±.02 foot

#### **1-05.4(2) Bridge and Structure Surveys**

##### **Bridge and Structure Surveys** **(July 23, 2015 APWA GSP, Option 2)**

For all structural work such as bridges and retaining walls, the Contractor shall retain as a part of Contractor's organization an experienced team of surveyors.

The Contractor shall provide all surveys required to complete the structure, except the following primary survey control which will be provided by the Engineer:

1. Centerline or offsets to centerline of the structure.

2. Stations of abutments and pier centerlines.
3. A sufficient number of bench marks for levels to enable the Contractor to set grades at reasonably short distances.
4. Monuments and control points as shown in the Plans.

The Contractor shall establish all secondary survey controls, both horizontal and vertical, as necessary to assure proper placement of all project elements based on the primary control points provided by the Engineer. Survey work shall be within the following tolerances:

Stationing	± 0.01 foot
Alignment	± 0.01 foot (between successive points)
Superstructure Elevations	± 0.01 foot (from plan elevations)
Substructure Elevations	± 0.05 foot (from plan elevations)

During the progress of the work, the Contractor shall make available to the Engineer all field books including survey information, footing elevations, cross sections and quantities.

The Contractor shall be fully responsible for the close coordination of field locations and measurements with appropriate dimensions of structural members being fabricated.

Section 1-05.4 is supplemented with the following:

**(April 2, 2018)**

#### **Contractor Surveying – ADA Features**

##### **ADA Feature Staking Requirements**

The Contractor shall be responsible for setting, maintaining, and resetting all alignment stakes, and grades necessary for the construction of the ADA features. Calculations, surveying, and measuring required for setting and maintaining the necessary lines and grades shall be the Contractor's responsibility. The Contractor shall build the ADA features within the specifications in the Standard Plans and contract documents.

##### **ADA Feature As-Built Measurements**

The Contractor shall be responsible for providing electronic As-Built records of all ADA feature improvements completed in the Contract.

The survey work shall include but not be limited to completing the measurements, recording the required measurements and completing other data fill-ins found on the ADA Measurement Forms, and transmitting the electronic Forms to the Engineer. The ADA Measurement Forms are found at the following website location:

<http://www.wsdot.wa.gov/Design/ADAGuidance.htm>

In the instance where an ADA Feature does not meet accessibility requirements, all work to replace non-conforming work and then to measure, record the as-built measurements, and transmit the electronic Forms to the Engineer shall be completed at no additional cost to the Contracting Agency, as ordered by the Engineer.

**1-05.7      Removal of Defective and Unauthorized Work**  
**(October 1, 2005 APWA GSP)**

**Supplement** this Section with the following:

If the Contractor fails to remedy defective or unauthorized work within the time specified in a written notice from the Engineer, or fails to perform any part of the work required by the Contract Documents, the Engineer may correct and remedy such work as may be identified in the written notice, with Contracting Agency forces or by such other means as the Contracting Agency may deem necessary.

If the Contractor fails to comply with a written order to remedy what the Engineer determines to be an emergency situation, the Engineer may have the defective and unauthorized work corrected immediately, have the rejected work removed and replaced, or have work the Contractor refuses to perform completed by using Contracting Agency or other forces. An emergency situation is any situation when, in the opinion of the Engineer, a delay in its remedy could be potentially unsafe, or might cause serious risk of loss or damage to the public.

Direct or indirect costs incurred by the Contracting Agency attributable to correcting and remedying defective or unauthorized work, or work the Contractor failed or refused to perform, shall be paid by the Contractor. Payment will be deducted by the Engineer from monies due, or to become due, the Contractor. Such direct and indirect costs shall include in particular, but without limitation, compensation for additional professional services required, and costs for repair and replacement of work of others destroyed or damaged by correction, removal, or replacement of the Contractor's unauthorized work.

No adjustment in contract time or compensation will be allowed because of the delay in the performance of the work attributable to the exercise of the Contracting Agency's rights provided by this Section.

The rights exercised under the provisions of this section shall not diminish the Contracting Agency's right to pursue any other avenue for additional remedy or damages with respect to the Contractor's failure to perform the work as required

**1-05.10      Guarantees**  
**(February 14, 2018 COS GSP)**

**Replace** this Section in its entirety with the following:

All work performed by the Contractor, either under public or private contract for Public Improvements shall maintain a warranty. The warranty period shall be established by the Contract Documents. When not specified in the Contract Documents, the warranty period shall be two years.

Neither the final certificate of payment nor any provisions in the Contract Documents, nor partial or entire occupancy of the premises by the Owner, shall constitute an acceptance of work not done in accordance with the Contract Documents, or relieve the Contractor of liability in respect to any express warranties or responsibility for faulty materials or workmanship.

**FOR ALL PROJECTS**, if within two years after the date of Final Acceptance of the Work by the Owner, defective and unauthorized Work is discovered, the Contractor shall promptly, upon written request by the Owner, return and in accordance with the Engineer's instructions, either correct such Work, or if such Work has been rejected by the Engineer, remove it from the Project Site and replace it with non-defective and authorized Work, all without cost to the Owner. If the Contractor does not promptly comply with the written request to correct defective and authorized Work, or if an emergency exists, the Owner reserves the right to have defective and unauthorized Work corrected or rejected, and replaced pursuant to the provisions of Section 1-05.7 of these Specifications. The Owner will pursue payment for the incurred costs from the project Performance Bond.

The Contractor agrees the above two year warranty shall not exclude or diminish the Owner's right under any law to obtain damages and recover cost resulting from defective and unauthorized Work discovered after two years but prior to the expiration of the legal time period set forth in RCW 4.16.040 limiting actions upon a Contract in writing or liability, expressed or implied, arising out of a written agreement.

The Contract bond shall remain in effect throughout the above stated two year guaranty period.

**1-05.11 Final Inspection**  
**(April 1, 2006 COS GSP)**

**Replace** this Section in its entirety with the following:

**1-05.11 Final Inspections and Operational Testing**

**1-05.11(1) Substantial Completion Date**

When the Contractor considers the work to be substantially complete, the Contractor shall so notify the Engineer and request the Engineer establish the Substantial Completion Date. The Contractor's request shall list the specific items of work that remain to be completed in order to reach physical completion. The Engineer will

schedule an inspection of the work with the Contractor to determine the status of completion. The Engineer may also establish the Substantial Completion Date unilaterally.

If, after this inspection, the Engineer concurs with the Contractor that the work is substantially complete and ready for its intended use, the Engineer, by written notice to the Contractor, will set the Substantial Completion Date. If, after this inspection the Engineer does not consider the work substantially complete and ready for its intended use, the Engineer will, by written notice, so notify the Contractor giving the reasons therefore.

Upon receipt of written notice concurring in or denying substantial completion, whichever is applicable, the Contractor shall pursue vigorously, diligently and without unauthorized interruption, the work necessary to reach Substantial and Physical Completion. The Contractor shall provide the Engineer with a revised schedule indicating when the Contractor expects to reach substantial and physical completion of the work.

The above process shall be repeated until the Engineer establishes the Substantial Completion Date and the Contractor considers the work physically complete and ready for final inspection.

#### **1-05.11(2) Final Inspection and Physical Completion Date**

When the Contractor considers the work physically complete and ready for final inspection, the Contractor by written notice, shall request the Engineer to schedule a final inspection. The Engineer will set a date for final inspection. The Engineer and the Contractor will then make a final inspection and the Engineer will notify the Contractor in writing of all particulars in which the final inspection reveals the work incomplete or unacceptable. The Contractor shall immediately take such corrective measures as are necessary to remedy the listed deficiencies.

If action to correct the listed deficiencies is not initiated within 7 calendar days after receipt of the written notice listing the deficiencies and pursued vigorously, diligently, and without interruption until physical completion of the listed deficiencies, the Engineer may, upon written notice to the Contractor, take whatever steps are necessary to correct those deficiencies pursuant to Section 1-08.10.

The Contractor will not be allowed an extension of contract time because of a delay in the performance of the work attributable to the exercise of the Engineer's right hereunder.

Upon correction of all deficiencies, the Engineer will notify the Contractor and the Contracting Agency, in writing, of the date upon which the work was considered physically complete. That date shall constitute the Physical Completion Date of the contract, but shall not imply acceptance of the work or that all the obligations of the Contractor under the contract have been fulfilled.

### **1-05.11(3) Operational Testing**

It is the intent of the Contracting Agency to have at the Physical Completion Date a complete and operable system. Therefore when the work involves the installation of machinery or other mechanical equipment; street lighting, electrical distribution or signal systems; irrigation systems; buildings; or other similar work it may be desirable for the Engineer to have the Contractor operate and test the work for a period of time after final inspection but prior to the physical completion date. Whenever items of work are listed in the Contract Provisions for operational testing they shall be fully tested under operating conditions for the time period specified to ensure their acceptability prior to the Physical Completion Date. During and following the test period, the Contractor shall correct any items of workmanship, materials, or equipment which prove faulty, or that are not in first class operating condition. Equipment, electrical controls, meters, or other devices and equipment to be tested during this period shall be tested under the observation of the Engineer, so that the Engineer may determine their suitability for the purpose for which they were installed. The Physical Completion Date cannot be established until testing and corrections have been completed to the satisfaction of the Engineer.

The costs for power, gas, labor, material, supplies, and everything else needed to successfully complete operational testing, shall be included in the unit contract prices related to the system being tested, unless specifically set forth otherwise in the proposal.

Operational and test periods, when required by the Engineer, shall not affect a manufacturer's guaranties or warranties furnished under the terms of the contract.

### **1-05.15 Method of Serving Notices** **(March 25, 2009 APWA GSP)**

Revise the second paragraph to read:

All correspondence from the Contractor shall be directed to the Project Engineer. All correspondence from the Contractor constituting any notification, notice of protest, notice of dispute, or other correspondence constituting notification required to be furnished under the Contract, must be in paper format, hand delivered or sent via mail delivery service to the Project Engineer's office. Electronic copies such as e-mails or electronically delivered copies of correspondence will not constitute such notice and will not comply with the requirements of the Contract.

**Add** the following new Section:

### **1-05.18 Record Drawings** **(February 14, 2018 GSP)**

The Contractor shall maintain one set of full size plans for Record Drawings, updated with clear and accurate red-lined field revisions on a daily basis, and within 2 business

days after receipt of information that a change in Work has occurred. The Contractor shall not conceal any work until the required information is recorded.

This Record Drawing set shall be used for this purpose alone, shall be kept separate from other Plan sheets, and shall be clearly marked as Record Drawings. These Record Drawings shall be kept on site at the Contractor's field office, and shall be available for review by the City of Spokane at all times. The Contractor shall bring the Record Drawings to each progress meeting for review.

The preparation and upkeep of the Record Drawings is to be the assigned responsibility of a single, experienced, and qualified individual. The quality of the Record Drawings, in terms of accuracy, clarity, and completeness, is to be adequate to allow the City of Spokane to modify the computer-aided drafting (CAD) Contract Drawings to produce a complete set of Record Drawings for the City of Spokane without further investigative effort by the City of Spokane.

The Record Drawing markups shall document all changes in the Work, both concealed and visible. Items that must be shown on the markups include but are not limited to:

- Actual dimensions, arrangement, and materials used when different than shown in the Plans.
- Changes made by Change Order or Field Order.
- Changes made by the Contractor.
- Accurate locations of storm sewer, sanitary sewer, water mains and other water appurtenances, structures, conduits, light standards, vaults, width of roadways, sidewalks, landscaping areas, building footprints, channelization and pavement markings, etc. Include pipe invert elevations, top of castings (manholes, inlets, etc.).

When the Contract calls for the Contractor to do the surveying/staking, the applicable tolerance limits include, but are not limited to the following:

	Vertical	Horizontal
As-built sanitary & storm invert and grate elevations	± 0.01 foot	± 0.01 foot
As-built monumentation	± 0.001 foot	± 0.001 foot
As-built waterlines, inverts, valves, hydrants	± 0.10 foot	± 0.10 foot
As-built ponds/swales/water features	± 0.10 foot	± 0.10 foot
As-built buildings (fin. Floor elev.)	± 0.01 foot	± 0.10 foot
As-built gas lines, power, TV, Tel, Com	± 0.10 foot	± 0.10 foot
As-built signs, signals, etc.	N/A	± 0.10 foot

Making Entries on the Record Drawings:

- Use erasable colored pencil (not ink) for all markings on the Record Drawings, conforming to the following color code:
- Additions - Red
- Deletions - Green
- Comments - Blue
- Dimensions - Graphite
- Provide the applicable reference for all entries, such as the change order number, the request for information (RFI) number, or the approved shop drawing number.
- Date all entries.
- Clearly identify all items in the entry with notes similar to those in the Contract Drawings (such as pipe symbols, centerline elevations, materials, pipe joint abbreviations, etc.).

The Contractor shall certify on the Record Drawings that said drawings are an accurate depiction of built conditions, and in conformance with the requirements detailed above. The Contractor shall submit final Record Drawings to the *City of Spokane*. *City of Spokane* acceptance of the Record Drawings is one of the requirements for achieving Physical Completion.

## **SECTION 1-07      LEGAL RELATIONS AND RESPONSIBILITIES TO THE PUBLIC**

### **1-07.5      Environmental Regulations**

#### **1-07.5(4)    Air Quality** **(April 1, 2006 COS GSP)**

**Supplement** Section 1-07.5(4) with the following:

#### **Spokane Regional Clean Air Agency**

The local air pollution control authority is the Spokane Regional Clean Air Agency and the Contractor shall comply with the environmental provisions of SRCAA. Regulations I and II of the Spokane Regional Clean Air Agency are hereby made part of the Contract. A copy of the environmental provisions is available to the Contractor at the City's Engineering Services field office.

#### **1-07.6      Permits and Licenses** **(December 10, 2018 COS GSP)**

**Supplement** with the following:

Below is a list of local permits that may be required on typical projects, and where they may be obtained. The list is included for the Contractor's benefit, and is NOT considered exhaustive:

- Sewer Permit – Development Services Center 625-6300
- Obstruction Permit - Development Services Center 625-6300
- Hydrant Permit:
  - Hydrant Foreman 625-7800
  - Development Services Center 625-6300
- Water Service Application:
  - see section 7-15.3.6 Fees and Permits
- Electrical Permit – Development Services Center 625-6300
- City Business License - Taxes and Licenses 625-6070
  - <http://bls.dor.wa.gov/cities/spokane.aspx>
- Blasting Permit - Development Services Center 625-6300
- City Building Permit - Development Services Center 625-6300
- County Building Permit - Building and Safety 477-3675
- County Road Construction Permit:
  - County Engineering Division 477-3600
- County Road Obstruction Permit:
  - County Engineering Division 477-3600
- County Utility Main Permit:
  - County Engineering Division 477-3600
- County Utility Service Permit:
  - County Engineering Division 477-3600

**1-07.22 Use of Explosives**  
**(December 24, 2019 COS GSP)**

**Supplement** this Section with the following:

Pre-Blast Survey. When blasting is used, the Contractor shall conduct a pre-blast and post blast structure survey on the structures above and below ground within the affected work area which may be subject to blasting damage. 2-02.3(3)Y

**1-07.23 Public Convenience and Safety**

**1-07.23(1) Construction Under Traffic**  
**(November 5, 2018 COS GSP)**

**Revise** the second paragraph to read:

To disrupt public traffic as little as possible, the Contractor shall permit traffic to pass through the Work with the least possible inconvenience or delay. The Contractor shall maintain existing roads, streets, sidewalks, and paths within the project limits, keeping them open and in good, clean, safe condition at all times. Deficiencies caused by the Contractor's operation shall be repaired at the Contractor's expense. Deficiencies not caused by the Contractor's operations shall be repaired by the Contractor when directed by the Engineer. The Contractor shall also maintain roads, streets, sidewalks, and paths adjacent to the project limits when they are affected by the Contractor's operations. Snow and ice control will be performed by the Contractor. Clean up of snow and ice control debris will be at the Contractor's expense. The Contractor shall perform the following:

1. Remove or repair any condition resulting from the Work that might impede traffic or create a hazard.
2. Keep existing traffic signal and highway lighting systems in operation as the work proceeds. (The City will continue route maintenance on such system.)
3. Maintain the striping on the Roadway at the Contractor's expense. The Contractor shall be responsible for scheduling when to renew striping, subject to the approval of the Engineer. When the scope of the project does not require Work on the Roadway, the Contractor will be responsible for maintaining the striping.
4. Maintain existing permanent signing. Repair of signs will be at the Contractor's expense.
5. Keep drainage structures clean to allow for free flow of water. Cleaning of existing drainage structures will be at the Contractor's expense when approved by the Engineer.

**Supplement** this Section with the following:

Special Traffic Control Requirements. Specific control requirements are as follows:

The Contractor shall maintain at least two clear lanes of traffic (one in each direction of travel) on all streets, for all hours during all phases of this project. Minimum lane width shall be 10-feet for each lane.

Coordination with the Public. In order to keep local businesses informed of construction progress, the Contractor shall:

- Conduct a regular weekly meeting on the project site in order to provide interested parties and the Traffic Control Supervisor (TCS) with a hard copy of an up-to-date construction schedule for the following week and take questions/complaints from interested parties. Once the Contractor and the Engineer have determined a meeting day, the Engineer will communicate this info to businesses in the project area. The meeting will be held at a mutually agreeable time and location on a mutually agreeable day of the week.

- The Contractor shall also notify businesses 2 days in advance of work which will affect the business's driveway.

The Contractor shall notify residents and businesses a minimum of 48 hours prior to implementing road closures.

Local access must be provided to all businesses and residents during the project. Any access restrictions shall be coordinated with the Engineer and the business owner or resident whose access is affected.

The Contractor shall not create or allow abrupt transverse drop offs in the roadway driving lanes open to the traveling public. The Contractor shall construct wedges in the direction of traffic flow, at all transverse drop offs in the driving lanes in excess of 1-inch created by paving or grinding or other Contractor operations.

The Contractor shall construct the wedges prior to allowing traffic in the lanes with the drop off.

The Contractor shall use heavy paper to isolate asphalt wedges from any other asphalt or base material.

The Contractor shall be responsible for construction and maintenance of the wedges. If the wedge is displaced or compacted leaving a drop off at any point in the transverse joint greater than 0.5-inch, then the Contractor shall immediately repair the wedge. Construction and maintenance of asphalt wedges is included in the paving or grinding bid items, and no special payment shall be made therefore.

The Contractor shall construct and maintain asphalt wedges with the following ratios:

- Drop offs less than 3-inches: 1 vertical to 12 horizontal
- Drop offs greater than or equal to 3-inches: 1 vertical to 30 horizontal.

The Contractor may construct the wedges such that the top 3-inches of the wedge is cold or hot mix asphalt and any additional depth needed, be constructed of well compacted crushed surfacing top course.

On lower volume streets (under 1000 AWDT), the Contractor shall construct and maintain asphalt wedges with a ratio of 1 vertical to 12 horizontal. At the Engineer's discretion, the Contractor may construct wedges at the same ratio out of well compacted crushed surfacing top course.

### **(January 2, 2012)**

#### **Work Zone Clear Zone**

The Work Zone Clear Zone (WZCZ) applies during working and nonworking hours. The WZCZ applies only to temporary roadside objects introduced by the Contractor's operations and does not apply to preexisting conditions or permanent Work. Those

work operations that are actively in progress shall be in accordance with adopted and approved Traffic Control Plans, and other contract requirements.

During nonworking hours equipment or materials shall not be within the WZCZ unless they are protected by permanent guardrail or temporary concrete barrier. The use of temporary concrete barrier shall be permitted only if the Engineer approves the installation and location.

During actual hours of work, unless protected as described above, only materials absolutely necessary to construction shall be within the WZCZ and only construction vehicles absolutely necessary to construction shall be allowed within the WZCZ or allowed to stop or park on the shoulder of the roadway.

The Contractor's nonessential vehicles and employees private vehicles shall not be permitted to park within the WZCZ at any time unless protected as described above.

Deviation from the above requirements shall not occur unless the Contractor has requested the deviation in writing and the Engineer has provided written approval.

Minimum WZCZ distances are measured from the edge of traveled way and will be determined as follows:

<b>Regulatory Posted Speed</b>	<b>Distance From Traveled Way (Feet)</b>
35 mph or less	10 *
40 mph	15
45 to 55 mph	20
60 mph or greater	30

\* or 2-feet beyond the outside edge of sidewalk

### **Minimum Work Zone Clear Zone Distance**

**(January 5, 2015)**

Lane closures are subject to the following restrictions:

If the Engineer determines the permitted closure hours adversely affect traffic, the Engineer may adjust the hours accordingly. The Engineer will notify the Contractor in writing of any change in the closure hours.

### **1-07.23(2) Construction and Maintenance of Detours** **( March 1, 2014 COS GSP)**

**Add** the following after Item 3:

In the event revisions to the detour plan are required due to construction events, the Contractor shall submit a revised detour plan to the Engineer, for approval, not less than 5 working days before effecting said revisions.

**1-07.24 Rights of Way**  
**(February 14, 2018 COS GSP)**

Delete this section and replace it with the following:

Street Right of Way lines, limits of easements, and limits of construction permits are indicated in the Plans. The Contractor's construction activities shall be confined within these limits, unless arrangements for use of private property are made.

Whenever any of the work is accomplished on or through property other than public Right of Way, the Contractor shall meet and fulfill all covenants and stipulations of any easement agreement obtained by the Contracting Agency from the owner of the private property. Copies of the easement agreements may be included in the Contract Provisions or made available to the Contractor as soon as practical after they have been obtained by the Engineer.

Whenever easements or rights of entry have not been acquired prior to advertising, these areas are so noted in the Plans. The Contractor shall not proceed with any portion of the work in areas where right of way, easements or rights of entry have not been acquired until the Engineer certifies to the Contractor that the right of way or easement is available or that the right of entry has been received. If the Contractor is delayed due to acts of omission on the part of the Contracting Agency in obtaining easements, rights of entry or right of way, the Contractor will be entitled to an extension of time. The Contractor agrees that such delay shall not be a breach of contract.

Each property owner shall be given 48 hours notice prior to entry by the Contractor. This includes entry onto easements and private property where private improvements must be adjusted.

The Contractor shall be responsible for providing, without expense or liability to the Contracting Agency, any additional land and access thereto that the Contractor may desire for temporary construction facilities, storage of materials, or other Contractor needs. However, before using any private property, whether adjoining the work or not, the Contractor shall file with the Engineer a written permission of the private property owner, and, upon vacating the premises, a written release from the property owner of each property disturbed or otherwise interfered with by reasons of construction pursued under this contract. The statement shall be signed by the

private property owner, or proper authority acting for the owner of the private property affected, stating that permission has been granted to use the property and all necessary permits have been obtained or, in the case of a release, that the restoration of the property has been satisfactorily accomplished. The statement shall include the parcel number, address, and date of signature. Written releases must be filed with the Engineer before the Completion Date will be established.

**Add** the following new Section:

**1-07.100 Survey Monument Perpetuation**  
**(February 1, 2013 COS GSP)**

Survey monument s shall be perpetuated in accordance with RCW Chapters 58.09 & 58.24 and as set forth in WAC Chapter 332-120.

The Contractor shall employ the services of a State of Washington Registered Professional Land Surveyor (PLS) for the purpose of perpetuating survey monuments within the limits of the project. **The Contractor shall provide the Professional Land Surveyors name(s) and registration number in writing to the Engineer. The PLS shall attend the Preconstruction Conference to discuss status of survey monument review, referencing, and permitting for destruction in support of the intended start date of the project.**

**1-07.100(1) Definitions**  
**(February 1, 2013 COS GSP)**

Survey Monument: The physical structure with any references or accessories used to mark the location of a land boundary survey corner, geodetic control point, or local control point.

Local Control Point: Point established to mark horizontal or vertical control positions that are part of a permanent government control network other than the National Geodetic Survey Network.

Land Boundary Survey Corners: A point on the boundary of any easement, right of way, lot, tract, or parcel of real property; a controlling point for a plat; or a point which is a General Land Office or Bureau of Land Management survey corner.

Geodetic Control Point: Points established to mark horizontal or vertical control positions that are part of the National Geodetic Survey Network.

Reference Point: A permanent supplementary point near a survey monument to which it is related by an accurately measured distance and/or direction and/or elevation for the purpose of being able to relocate the survey monument.

**Add** the following new Section:

**1-07.100(2) Description of Work**  
**(February 14, 2018 COS GSP)**

All existing survey monuments within the project limits and all existent or obliterated survey monuments within the project limits which have two or more existing reference points with locations and distances recorded shall be reestablished prior to completion of the project. In locations where a single reference point is all that remains, the single reference point shall be reestablished to its original position prior to completion of the project.

The known survey points and their references are shown on the plans.

It is the Contractor's responsibility to protect, preserve, and perpetuate survey monuments and their references within the project limits. The Contractor shall employ a Professional Land Surveyor (PLS) to perform the following work:

1. Search the records and project limits to confirm the completeness of the identified survey points. Determine which survey points are obviously not survey monuments and do not require perpetuation. Provide the Engineer with a complete list of survey points found within the project limits and indicate the survey monuments that will be perpetuated and the survey points will not be perpetuated. The list shall be stamped, signed, dated, and be accompanied by a letter stating that the listed survey monuments have been referenced. This item of work shall be completed before construction activities may begin.
2. Where the Contractor's activities will require survey monument removal or destruction, the PLS shall complete and submit an APPLICATION FOR PERMIT TO REMOVE OR DESTROY A SURVEY MONUMENT to the Department of Natural Resources. A copy of the approved permit(s) shall be forwarded to the Engineer. All survey monuments not permitted for destruction shall be protected.
3. Prior to physical completion of the project the PLS shall reestablish survey monuments to their original positions and reference their locations. The PLS shall complete and submit a COMPLETION REPORT FOR MONUMENT REMOVAL OR DESTRUCTION to the Department of Natural Resources. A copy of the acceptance report(s) shall be forwarded to the Engineer. In addition, the PLS shall prepare, stamp, sign, date, and submit a written declaration to the Engineer stating that all survey monuments within the project limits have been perpetuated.
4. The PLS shall update the City of Spokane's reference files located in the Construction Management office at 1225 E Marietta Avenue. Formatting of the updated file shall be compatible the City of Spokane's filing system.

The Contractor's PLS is allowed to perform necessary work to establish a list of monuments, apply for permits to destroy monuments, and install flagging and other means of protecting monuments prior to the start of working days. Start of this work prior to the notice to proceed may be allowed if approved by the Engineer.

## **SECTION 1-08 PROSECUTION AND PROGRESS**

**Add** the following new Section:

### **1-08.0 Preliminary Matters**

#### **1-08.0(1) Preconstruction Conference**

**(February 14, 2018 APWA GSP)**

Prior to the Contractor beginning the work, a preconstruction conference will be held between the Contractor, the Engineer and such other interested parties as may be invited. The purpose of the preconstruction conference will be:

1. To review the initial progress schedule;
2. To establish a working understanding among the various parties associated or affected by the work;
3. To establish and review procedures for progress payment, notifications, approvals, submittals, etc.;
4. To establish normal working hours for the work;
5. To review safety standards and traffic control; and
6. To discuss such other related items as may be pertinent to the work.

The Contractor shall prepare and submit at the preconstruction conference the following:

1. A preliminary schedule of working drawing submittals; and
2. A list of material sources for approval if applicable.

**Add** the following new Section:

### **1-08.0(2) Hours of Work**

**(February 14, 2018 COS GSP)**

Except in the case of emergency or unless otherwise approved by the City, the normal straight time working hours for the project shall be any consecutive 8-hour period between 7:00 a.m. and 6:00 p.m. of a working day with a maximum 1-hour lunch break and a 5-day work week. The normal straight time 8-hour working period for the project shall be established at the preconstruction conference or prior to the Contractor commencing the work.

Written permission from the Engineer is required, if a Contractor desires to perform work on holidays, Saturdays, or Sundays; before 7:00 a.m. or after 6:00 p.m. on any

day. The Contractor shall apply in writing to the Engineer for such permission, no later than noon on the working day prior to the day for which the Contractor is requesting permission to work.

Permission to work between the hours of 10:00 p.m. and 7:00 a.m. during weekdays and between the hours of 10:00 p.m. and 9:00 a.m. on weekends or holidays may also be subject to noise control requirements. Approval to continue work during these hours may be revoked at any time the Contractor exceeds the City's noise control regulations or complaints are received from the public or adjoining property owners regarding the noise from the Contractor's operations. The Contractor shall have no claim for damages or delays should such permission be revoked for these reasons.

Permission to work Saturdays, Sundays, holidays, or other than the agreed upon normal straight time working hours Monday through Friday may be given subject to certain other conditions set forth by the Engineer. These conditions may include but are not limited to:

- The Engineer may require designated representatives to be present during the work. Representatives who may be deemed necessary by the Engineer include, but are not limited to: survey crews; personnel from the City's material testing lab; inspectors; and other City employees when in the opinion of the Engineer, such work necessitates their presence.
- Requiring the Contractor to reimburse the City for additional costs in accordance with SMC 08.02.0655.

#### **1-08.4 Prosecution of the Work** **(February 14, 2018 COS GSP)**

**Delete** this Section in its entirety, and replace it with the following:

Notice to Proceed will be given after the Design Acceptance Letter has been executed, the Obstruction and/or other required permits have been obtained by the Contractor, and required bonding and evidence of insurance have been filed and approved by the City. The Contractor shall not commence work on the project until the Notice to Proceed has been given by the Engineer. The Contractor shall commence construction activities on the project site within 10 days of the Notice to Proceed Date, unless otherwise approved in writing. The Contractor shall diligently pursue the work to physical completion within the time specified. Voluntary shutdown or slowing of operations by the Contractor shall not relieve the Contractor of the responsibility to complete the work within the time(s) specified.

When shown in the Plans, required as a condition of the Permit, or as directed by the Engineer, the first order of work shall be the installation of high visibility fencing to delineate all areas for protection or restoration, as described in the plans and specifications. Installation of high visibility fencing adjacent to the roadway shall occur

after the placement of all necessary signs and traffic control devices in accordance with 1-10.1(2). Upon construction of the fencing, the Contractor shall request the Engineer to inspect the fence. No other work shall be performed on the site until the City has accepted the installation of high visibility fencing.

## **SECTION 1-10     TEMPORARY TRAFFIC CONTROL**

### **1-10.2     Traffic Control Management**

#### **1-10.2(1)     General** **(January 3, 2017)**

Section 1-10.2(1) is **supplemented** with the following:

Only training with WSDOT TCS card and WSDOT training curriculum is recognized in the State of Washington. The Traffic Control Supervisor shall be certified by one of the following:

The Northwest Laborers-Employers Training Trust  
27055 Ohio Ave.  
Kingston, WA 98346  
(360) 297-3035

Evergreen Safety Council  
12545 135<sup>th</sup> Ave. NE  
Kirkland, WA 98034-8709  
1-800-521-0778

The American Traffic Safety Services Association  
15 Riverside Parkway, Suite 100  
Fredericksburg, Virginia 22406-1022  
Training Dept. Toll Free (877) 642-4637  
Phone: (540) 368-1701

#### **1-10.2(1)B     Traffic Control Supervisor** **(February 14, 2018   COS GSP)**

The last paragraph is **revised** to read:

The TCS may perform the work described in Section 1-10.3(1)A Flaggers or in Section 1-10.3(1)B Other Traffic Control Labor, provided that the duties of the TCS are accomplished.

**1-10.2(2) Traffic Control Plans**  
**(February 14, 2018 COS GSP)**

**Supplement** this Section with the following:

The Contractor shall submit traffic control plans required for the Contractor operations to the Engineer for review and acceptance. The Contractor shall prepare traffic control plans to address each phase of construction work.

Traffic control plan(s), detour plan(s), or any proposed modifications to the traffic control plan(s) shall be submitted to the Engineer at least 10 working days prior to the expected construction.

Failure to submit the traffic control plan(s) in a timely manner does not justify suspension of working days.

The submitted traffic control plan(s) shall be in accordance with the established Standards for plan development as shown in the MUTCD, Part VI.

The Contractor shall not begin any phase of construction until the traffic control plan(s) is approved by the Engineer, for that particular phase. If the traffic control plan(s) submittal is incomplete, the entire traffic control plan(s) will be rejected.

All flaggers are to be shown on the traffic control plan(s) except for emergency situations.

The traffic control/detour drawings shall be done in accordance with reasonable drafting standards (i.e. legible printing, lines drawn with drafting tools, etc.).

Each traffic control/detour drawing shall contain a title including the project's name, all associated City's project numbers, and the phase number. The drawings shall include a north arrow, a legend that identifies each type of traffic control device to be used, including the various types of signs to be used.

The plan(s) shall show sign information that shall include wording and symbols designation (MUTCD, WSDOT, or City) identification number, how each sign will be mounted (i.e. pole, tri-legged stand, barricade, etc.) the shape, size, and direction facing of each sign.

The plan(s) shall show other traffic control devices (including signs, cones, delineators, channelizing devices, barricades, sequential arrow signs, etc.) including the size, type/style, color, and shape of each traffic control device.

The plan(s) shall include all signs, hardware and any other traffic control devices to be used. If the traffic control devices are signs, then the plan(s) shall also provide the sign's designation (MUTCD, WSDOT, or other).

The plan(s) shall include a list of removals to be completed by the Contractor, causing conflicting or misleading information with construction signing, within the construction zone and within an adjacent area of influence (as determined by the Engineer). The Contractor shall include a schedule of when each item will be removed and reinstalled by the Contractor.

The plan(s) shall include a detailed description of any parking restrictions to be temporarily imposed or suspended due to construction and shall include all the street and applicable block numbers and time of changes to the parking restrictions.

The plan(s) shall show all streets expected to be affected (including construction zone and/or detour routes) plus at least 1 block from any point around the construction zone. The streets shall be labeled with the complete name for each street.

The plan(s) shall show the location of the construction site (both the work area and work zone needed for spoil, construction vehicles, etc.), in relation to the existing striping, for each street and cross-street.

The plan(s) shall show the location and identification, within the construction zone and within 300-feet of the construction zone, of all existing traffic control devices.

The plan(s) shall show the clear width of all roadway sections (curb/edge to curb/edge) reduced to less than the preconstruction width, any vehicular travel lane restricted to less than preconstruction width and any pedestrian way restricted to less than preconstruction width due to the construction.

The plan(s) shall clearly identify all proposed locations, with dimensioning, that parking restrictions are to be temporary imposed or suspended.

### Detours

If a vehicle or pedestrian detour is allowed by the City as indicated in Section 1-07.23(2), the plan(s) shall show the following:

- A clear indication of where the detour begins and the proposed route to the detour's end.
- The proposed directions of travel of vehicular traffic for each street identified on the traffic control/detour plan(s).
- Material and condition of the roadway on which the vehicular traffic is detoured.
- Material and condition of the walkway that the pedestrian traffic is detoured on.
- The clear width of any roadway (curb-edge to curb-edge) and all vehicular travel lanes along a detour route.

- The location of all bus stops and identify the applicable route numbers and the normal routing of each Spokane Transportation Authority (STA) bus within the construction zone and within 600-feet of any point of the construction zone and detour route.
- Arterial traffic shall not be detoured through residential streets.

### **1-10.3 Traffic Control Labor, Procedures, and Devices**

#### **1-10.3(3)A Construction Signs** **(February 14, 2018 COS GSP)**

**Revise** the first sentence of the first paragraph with the following:

All construction signs required by the approved traffic control plan, as well as any other appropriate signs directed by the Engineer shall be furnished and installed by the Contractor.

**Revise** the third sentence of the first paragraph with the following:

Post mounted signs shall be installed as shown in the WSDOT Standard Plans.

**Add** the following after the third paragraph:

Permanent traffic signs removed during any phase of the construction process are the Contractor's property and are to be disposed of by the Contractor. These signs shall not be reused. The signs shall be replaced with new signs by the Contractor.

The Contractor shall furnish, install, and maintain temporary stop signs at locations where permanent stop signs are removed, mounted on temporary supports capable of providing 7-feet of clear space below the sign.

#### **1-10.3(3)B Sequential Arrow Signs** **(February 14, 2018 COS GSP)**

**Supplement** this Section with the following:

The Contractor shall use a "Sequential Arrow Sign" when the Contractor's operations close one or more lanes in the same direction on an arterial with two or more lanes in the same direction.

#### **1-10.3(3)D Barricades** **(April 1, 2006 COS GSP)**

**Add** the following:

Type III Barricades shall be constructed in accordance with the details shown in the MUTCD and the WSDOT Standard Plans. The barricade width shall be 8-feet unless otherwise specified in the contract plans.

As may be indicated in the Signing Plan(s) or Traffic Control Plan(s) the Contractor may be required to install signs, warning lights, or both on barricades.

**1-10.3(3)K Portable Temporary Traffic Control Signal**  
**(February 14, 2018 COS GSP)**

**Add** the following:

Portable temporary traffic control signals on this project shall provide the following functions:

- Capable of operating four pedestrian phases and four vehicular phases
- Capable of programming a minimum of two rings
- Capable of operating in a NEMA TS 1 or NEMA TS 2 Type 2 environment
- Clocks shall not drift more than 1 second in a 24 hour period
- Clocks shall be synchronized by remote command a minimum of once every 24 hours
- Transitions between timing plans shall not exceed three cycles to establish and maintain coordination
- Capable of maintaining coordination with a specified group of signals
- Capable of operating programmed flash
- Capable of working with various modes of detection systems including inductive loops, radar, magnetometers and video detection
- Supporting personnel capable of mitigating system issues shall be physically on site within 30 minutes of a request for support

Timing plan revisions for events shall be programmed within 1 hour of initial request

**CITY OF SPOKANE GENERAL SPECIAL PROVISIONS - Technical**

**SECTION 2-01 CLEARING, GRUBBING AND ROADSIDE CLEANUP**

**2-01.1 Description**

**(February 14, 2018 COS GSP)**

**Replace** first paragraph with the following:

The entire area of the roadway section (together with the areas covered by approaches, sidewalks, walls, and slopes) shall be cleared of brush, trees, stumps, logs or other unsuitable material as required for construction of the improvement as shown on the Plans. The removal and disposal methods shall meet the requirements of Section 2-01.2. The disposal method used shall be subject to prior approval of the Engineer.

**Add** the following at the end of the Section:

Tree classification is determined by the trunk diameter as measured at 4.5-feet above average ground level. The classification is as follows:

<b>Diameter</b>	<b>Determination</b>
≤4 inches	"Un-classed"
>4 inches	"Classed"

City of Spokane's street tree ordinance requires street tree permits for pruning, removal, and planting street trees within the City of Spokane. *The Contractor is responsible for obtaining a street tree permit and an obstruction permit (if required). The Contractor is also responsible for coordinating street tree issues and inspections with the City Urban Forester prior to work on or adjacent to a street tree.*

Contractor shall provide the Engineer with a minimum of 10 days notice prior to excavation or other potentially damaging operations adjacent to existing trees. The Contractor shall make every effort possible to protect and preserve the shade trees within the project or that border the limits of the improvement and shall use whatever means (i.e. establishing a temporary construction netting barrier, wood chip bedding over the roots, bracing, hand backfill and tamping etc.) as indicated in the Plans, the Contract Provisions or as directed by the Engineer to effect such preservation. In accordance with Section 1-07.16(2), the Contractor shall be liable for damage to existing trees and vegetation as a result of those activities

## **2-01.3 Construction Requirements**

### **2-01.3(1) Clearing**

**(August 1, 2010 COS GSP)**

**Replace** this section in its entirety with the following:

The Contractor shall:

1. Remove un-classed trees within the area to be cleared.
2. Leave standing and protect from damage any classed trees or native growth indicated by the Engineer.
3. Remove all stumps and tree roots > 1 inch in diameter.
4. Thin clumps of native growth as the Engineer may direct.
5. Protect in accordance with Section 2-01.1 and Section 2-03 all trees or native growth from damage due to construction activities.

### **2-01.3(4) Roadside Cleanup**

**(March 29, 2012 COS GSP)**

**Delete** Items 1,2 and 5

**Replace** item 3 with the following:

3. Filling holes, and smoothing and contouring the ground including removal of excess material and import of backfill.

**Add** the following new Subsection:

### **2-01.3(100) Tree Removal, Pruning and Root Treatment**

**(January 1, 2020 COS GSP)**

#### **General**

The City of Spokane's street tree ordinance requires that a company with a commercial tree license perform any and all tree work within the right-of-way and on public land. Additionally, all pruning (crown or root) and removal work be performed by an ISA certified arborist in good standing.

The subcontracted licensed tree company shall:

- be an experienced tree service firm that has successfully completed tree protection and pruning work similar to that required for this project,
- be licensed to perform commercial tree work by the City under Spokane Municipal Code 10.25.010 and

- assign an experienced, certified arborist to the project site as required by Owner during execution of the work.
- Attend a pre-construction conference with the Contractor, Engineer and Urban Forestry representative to set project expectations

The term “Contracted Arborist” shall be used in the remainder of this document to refer to the licensed tree company

All equipment to be used and all work to be performed must be in full compliance with the most current revision of the American National Standards Institute Standard Z-133.1-1988, or as amended.

The Contracted Arborist shall use safe practices; any hazardous practice shall be immediately discontinued by the Contracted Arborist upon receipt of either written or oral notice from the Urban Forestry representative.

### **Tree Protection Zone (TPZ)**

The tree protection zone (TPZ) will either be determined in the field by Urban Forestry staff or established by the Contracted Arborist for approval by Urban Forestry staff prior to any excavation or work by the following method. The TPZ shall be equal to the Critical Root Zone (CRZ) as defined by the International Society of Arboriculture (ISA): an area equal to 1 foot radius from the base of the tree’s trunk for each 1 inch of the tree’s diameter at 4.5 feet above grade (referred to as diameter at breast height or dbh). Modifications will be made due to construction objectives and infrastructure only with prior authorization by Urban Forestry staff

Temporary Fencing: Install temporary fencing, 3’ tall minimum, orange plastic construction fencing per manufacturer’s specifications, located as indicated or outside the TPZ of trees to protect remaining vegetation from construction damage. Fencing must be maintained at all times during construction.

Protect tree root systems from damage due to noxious materials caused by runoff or spillage while mixing, placing, or storing construction materials. Protect root systems from flooding, eroding, or excessive wetting caused by dewatering operations.

Do not store construction materials, debris, or excavated material within the TPZ of remaining trees. Do not permit vehicles or foot traffic within the TPZ; prevent soil compaction over root systems.

### **Tree Removal**

Tree removal shall consist of cutting down each tree in a safe manner to a point four (4) inches above the adjacent ground level. The Contractor or Contracted Arborist shall remove all tree limbs and tree trunks from the site. After removal operations are complete from the site, dispose of these limbs and trunks in accordance with applicable ordinances and regulations of the City of Spokane, Spokane County, and the State of

Washington. Logs and other debris shall not be left on the public streets. The Contractor shall not leave logs, chips or other materials on private property unless the property owner provides written consent and the Contractor forwards this written consent to the Engineer. If any tree removed harbors infectious diseases or is thought to possibly be harboring vector of infectious diseases, the logs and chips shall be removed from the site. It shall be the General Contractor's responsibility to ensure destruction of the diseased or dead wood and chips in accordance with the State statutes and local ordinances. Under **NO** circumstances shall logs and chips from infectious diseased trees be left for private property owners.

The Contracted Arborist shall refrain from the practice of felling whole trees. The Contracted Arborist shall not drop or deposit any materials on private property. Private property, sidewalks, curbs, streets, and manhole structures shall always be protected from the impact of falling wood by use of the tree or limb ground supports. Ropes or other mechanical devices shall be used to lower all limbs and stems of sufficient size that may cause damage to other trees or surrounding public or private property.

The Contracted Arborist shall take the necessary precautions to eliminate damage to adjacent trees and shrubs, lawns, curbs, walks, or other real or personal property. Holes made in lawns, regardless of size, shall be filled with top soil restored with surfacing that existed prior to hole formation.

The Contractor or Contracted Arborist shall clean up the site and remove and dispose of debris at the end of each day's operation. Site cleanup shall include removal of sawdust, small twigs, chip, leaves, trunks and limbs from the street, curb, parkway, sidewalk, private lawns and driveways with appropriate tools for the job. The Contractor shall return the site to the same state it existed in prior to the removal.

In areas where overhead electric, telephone, and cable television facilities exist, the Contractor shall protect all utilities from damage, shall immediately contact the appropriate utility if damage should occur, and shall be responsible for all claims for damage due to his operation. The Contractor or Contracted Arborist shall make arrangement with the utility for removal of all necessary limbs, and branches which may conflict with or create a hazard in conducting the operations of this contract.

### **Stump Removal**

Stump grinding shall be performed immediately following tree removal or as allowed by the City. The Contractor shall remove tree stumps and buttress roots to a point six (6) inches below the adjacent ground level. Additionally, the Contractor shall remove sufficient subsurface roots to as may be necessary to eliminate "humps" adjacent to the stump. The area then shall be restored with topsoil and sod in existing sodded areas to the level of the adjoining grade in accordance with Section 8-02.

When the stump is in the proposed traveled way stump grinding will not be allowed. The Contractor shall completely remove the stump and all large roots from the subgrade

in a manner that minimizes damage to adjacent improvements including underground utilities.

Within twenty-four (24) hours after grinding (removal) of a tree stump and buttress roots, the Contractor shall remove all stump grindings and associated debris from the site and legally disposed of. Grinding debris generated by work described in this contract will be the responsibility of the Contractor. Stumps, grindings, and debris shall be placed away from the curb and gutter, street, sidewalk and private property immediately to eliminate hazards to the motoring public and pedestrians and to eliminate damage to private property.

### **Tree Removal Locations**

In general, specific trees to be removed are indicated on the plans and tree permits included in the Appendix.

**Add** the following new Subsection:

### **Tree Root Treatment**

All root treatments shall be performed using either air or hydro evacuation techniques currently being used with in the arboriculture industry by a certified arborist.

All equipment to be used and all work to be performed must be in full compliance with the most current revision of the American National Standards Institute Standard Z-133.1-1988, or as amended.

The Contracted Arborist shall use safe practices; any hazardous practice shall be immediately discontinued by the Contracted Arborist upon receipt of either written or oral notice from the Urban Forestry staff

With air evacuation, a water source or other means of controlling dust must be available and in use during root treatment procedures.

Where excavation for new construction is required within the TPZ, only use air or hydro-evacuation to minimize damage to root systems.

Relocate roots in backfill areas where possible. If encountering large, main lateral roots, expose roots beyond excavation limits as required to bend and relocate them without breaking. If encountered immediately adjacent to location of new construction and relocation is not practical, prune roots approximately 3 inches back from new construction. Do not prune roots larger than 2 inch in diameter or larger without prior approval from Urban Forestry staff.

Do not allow exposed roots to dry out before placing permanent backfill. Provide temporary earth cover or pack with peat moss and wrap with burlap. Water and maintain in a moist condition. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.

Where utility trenches are required within the TPZ, tunnel under or around roots by air or hydro-evacuation, directional drilling, auger boring, or pipe jacking,

Where new finish grade deviates from existing grade around trees, slope grade beyond the TPZ. Maintain existing grades within the TPZ.

### **Tree Pruning**

All pruning shall be performed by an ISA certified arborist.

All equipment to be used and all work to be performed must be in full compliance with the most current revision of the American National Standards Institute Standard Z-133.1-1988, or as amended.

The Contractor shall use safe practices; any hazardous practice shall be immediately discontinued by the Contractor upon receipt of either written or oral notice from the Urban Forestry staff.

The intent of this work is for the Contracted Arborist to prune tree limbs designated by the Urban Forestry Department that may interfere with construction of the project due to clearance issues (typically eight feet on the sidewalk or pedestrian area and fourteen feet on the street). Attention is to be given to the health, structure and final appearance of the trees. Appropriate pruning shall be done in order to maintain a tree form typical of the species of the tree being pruned. The Contracted Arborist shall under no circumstance remove more than 5 percent of the live foliage from any tree or remove limbs 6 inches or larger without prior approval from Urban Forestry staff.

Pruning cuts shall be in accordance with ANSI A300-2000 pruning standards. All final cuts shall be made sufficiently close to the trunk or parent limb, without cutting into the branch collar or leaving a protruding stub, so that closure can readily begin under normal conditions. Excessively deep flush cuts that produce large wounds or weaken the tree at the cut shall not be made. Sharp pruning tools shall be used so that clean cuts will be made at all times. All pruning tools and saws shall be kept sharpened to result in final cuts with smooth wood surface and secure bark remaining intact. Trees 6 inches or less in diameter shall be pruned with hand tools only. It is necessary to use the three step cutting technique on branches that are too heavy to handle to prevent splitting or peeling the bark. To prevent tree or property damage, branches shall be lowered to the ground by proper ropes or equipment. On trees known to be diseased, tools are to be disinfected with isopropyl alcohol at 70 percent (isopropyl alcohol diluted appropriately with water) or 10 percent bleach solution after each cut and between trees where there is known to be a danger of transmitting the disease on tools.

Equipment that will damage the bark and cambium layer shall not be used on or in any tree. Climbing spurs shall not be used when climbing trees, except to climb a tree to be removed or to perform an aerial rescue of an injured worker. Ropes shall not come in direct contact with the crotch of the tree when tied into the tree. Friction or cambium

savers are to be used when accessing and climbing the tree with rope and saddle. Rope injury from loading heavy limbs should be avoided. Natural or mechanical rigging techniques shall be used to lower all limbs of sufficient size that may cause damage to other trees or surrounding public or private property.

The Contracted Arborist shall clean up the site and remove and dispose of debris at the end of each day's operation. Site cleanup shall include removal of dust, organic debris, chips, leaves, roots, and limbs from the street, curb, parkway, sidewalk, private lawns, and driveways with the appropriate tools for the job. The site shall be returned to the same state it existed in prior to pruning.

The Contracted Arborist shall take the necessary precautions to eliminate damage to adjacent trees and shrubs, lawns, curbs, walks, or other real or personal property. Equipment shall not enter upon private property unless the property owner provides written consent and the Contractor forwards this written consent to the Engineer. Vegetation surrounding a tree being pruned shall be disturbed as little as possible.

### Tree Pruning Locations

Trees to be pruned shall be indicated on plans and in the task list provided in **the** Appendix.

The Contracted Arborist shall be responsible to prune tree limbs damaged during construction. If the Engineer deems the tree limbs were damaged due to negligence by the General Contractor during construction, all costs associated with pruning damaged tree limbs shall be paid by the Contractor as well as any decrease in value as determined by adjusting the appraised value in relation to a decrease in condition rating. If the damage is beyond repair and Urban Forestry staff determines that the tree will need to be removed then the contractor will be responsible for triple damages per state law. Triple damages will be determined based upon the appraised value of the tree before the damage occurred. See **\$\$**Appendix E for the appraised value of all of the public trees associated with this project

### Crew Requirements

The pruning crew shall meet, but is not limited to the following requirements:

- Aerial lift equipment such as a bucket truck or similar equipment
- Log and/or chip disposal truck
- Large limb/brush chipper
- Crane (if required)
- All small tools, equipment, ropes, scaffolding, ladders, saws, and safety equipment required to perform the work
- Certified Arborist, Equipment Operator, Laborer, and Spotter (if required)

## **SECTION 2-02 REMOVAL OF STRUCTURES AND OBSTRUCTIONS**

### **2-02.1 Description**

**(August 1, 2008 COS GSP)**

**Replace** this Section in its entirety with the following:

The work shall consist of the removal and disposal of existing street improvements where indicated on the Plans or as directed by the Engineer, including, but not limited to, structures, pipe, gutters, curb, ramps, and integral curb and gutter. Removal of paving, walks, steps, drives, and other items shall be neatly and accurately cut to the prescribed limits. The work also includes the backfilling of trenches, holes or pits that result from such removal.

### **2-02.3 Construction Requirements**

**(February 14, 2018 COS GSP)**

**Add** the following at the end of this section:

Sawcutting shall be to full pavement depth unless otherwise designated by the Engineer. The cuts shall be neat and true with no shatter outside the removal area. For rigid pavement, removal to expansion joints may substitute for sawcutting, but no additional quantities or payments will be allowed for removal and subsequent replacement of the additional area.

Sawcutting may be designated for flexible pavement or for rigid pavement. Rigid pavement includes Portland cement concrete structures, such as curbs, curb and gutter, sidewalks, roadways, and driveways.

### **2-02.3(2) Removal of Bridges, Box Culverts, and other Drainage Structures**

**(February 14, 2018 COS GSP)**

**Add** the following after the last paragraph:

Abandoning existing drainage structures shall meet the requirements of Section 7-05.3(2).

Existing drainage structures shall be removed or abandoned where shown on the Plans or as designated by the Engineer. The Contractor shall plug the pipe openings watertight with commercial class concrete, mortar and masonry blocks or brick.

Where structures and pipes are removed, the Contractor shall backfill the voids with suitable material and compacted as designated by the Engineer.

**2-02.3(3) Removal of Pavement, Sidewalks, Curbs, and Gutters**  
**(August 1, 2010 COS GSP)**

In part 1, **delete** the words “into the Roadway embankment or”.

**Replace** part 2 with the following: Any removed material to be incorporated into the project must meet the materials specifications as applicable for the proposed use.

**Add** the following after part 4:

- Flexible pavement removal shall include removal of hot mix asphalt pavements only.
- Rigid pavement removal shall include removal of non-reinforced cement concrete pavement and/or non-reinforced cement concrete which have been overlaid with hot mix asphalt pavement. Dowel and tie bars shall not be considered reinforcement.

**Add** the following new Subsection:

**2-02.3(3)W Removal of Granite Curbs**  
**(May 6, 2015 COS GSP)**

Existing granite curbing shall be removed at the locations shown on the Plans or as designated by the Engineer. Granite curbing removed as part of this project shall become the property of the Contractor.

**Add** the following new Subsection:

**2-02.3(3)X Removal of Curb and Gutter**  
**(August 1, 2008 COS GSP)**

Existing curb and gutter may be composed of cement concrete or a cement concrete curb with a brick gutter on a cement concrete base or of other combinations of rigid materials. Regardless of the material composition, the Contractor shall remove the full curb and gutter section.

**Add** the following new Subsection:

**2-02.3(3)Y Removal of Cement Concrete Sidewalks and Driveways**  
**(April 22, 2019 COS GSP)**

Removal of concrete slabs averaging 6-inches or less in thickness shall be measured and paid as sidewalk and driveway removal. A thickened pavement edge shall not be included in the calculation for the average slab thickness. Sidewalk, driveway aprons

and private walks on street grading and paving projects shall be removed to the extent necessary to provide for construction of pavements and curbs. After the curbs and pavement have been constructed, the Contractor shall remove the additional sidewalk and driveway required to provide proper integration, including grades, as determined by the Engineer.

Contractor to provide a minimum of 2 working days advanced notice to property owners/residences that they will have limited, to no access, to their driveways during demolition and replacement.

**Add** the following new Subsection:

**2-02.3(100) Trolley Rails**  
**(February 14, 2018 COS GSP)**

The Contractor shall remove and dispose of trolley rails and ties which may interfere with the proposed improvements and provide, place and compact embankment sufficient to replace removed material. The Contractor shall remove and dispose of trolley rails, *ties and concrete pads at the locations shown on the plans or as directed by the engineer.*

**Add** the following new Subsection:

**2-02.3(101) Guardrail**  
**(August 1, 2008 COS GSP)**

The Contractor shall remove guardrail at the location(s) listed in Section 2-02.3 or as shown on the Plans. The Contractor shall remove guardrail in accordance with Section 8-11.3.

If directed by the Engineer, the guardrail is to be salvaged. The Contractor shall carefully remove the guardrail and components and shall either reuse the guardrail at the project location or transport the guardrail and components to the North City Maintenance Yard at 5100 N. Florida Street (near Florida Street and Queen Avenue).

**Add** the following new Subsection:

**2-02.3(102) Fences**  
**(February 14, 2018 COS GSP)**

The Contractor is required to notify owners of fences obstructing the proposed improvements of the removal or to remove said fences prior to construction of the project. If the owners have not removed their fences by the required time, the Contractor shall remove the fences and lay them back on the adjoining property, outside the construction area. Additional notification or requirements may be added as part of the Obstruction Permit process or as required by the Engineer.

Fence construction and reconstruction shall also be in accordance with Section 8-12.

**Add** the following new Subsection:

**2-02.3(103) Mailboxes**  
**(February 14, 2018 COS GSP)**

In accordance with Section 8-18, the Contractor shall be responsible for removing and replacing mailboxes left in the construction area. Care shall be taken by the Contractor when removing the mailboxes in order to minimize damage to the posts or boxes. The posts and boxes shall be ultimately reset beyond the pavement or sidewalk limits, in a location designated by or agreed to by the Engineer.

During construction, the Contractor shall maintain the mailboxes in an operable condition outside the construction area, so their usefulness to the appropriate property owner(s) will not be impaired. Additional notification, coordination with the Postal Service, or requirements may be added as part of the Obstruction Permit process or as required by the Engineer.

**Add** the following new Subsection:

**2-02.3(104) Shrubs and Landscaping**  
**(February 14, 2018 COS GSP)**

The Contractor is required to notify owners of shrubs and landscaping obstructing the proposed improvements of the removal or to remove said shrubs and landscaping prior to construction of this project.

If the owners have not removed their shrubs and landscaping by the required time, the Contractor shall remove and dispose of the shrubs and landscaping in an approved manner. Existing shrubs and landscaping shall be removed ONLY if they interfere with the construction and then ONLY if approved by the Engineer. Additional notification or requirements may be added as part of the Obstruction Permit process or as required by the Engineer.

**SECTION 2-03 ROADWAY EXCAVATION AND EMBANKMENT**

**2-03.1 Description**  
**(August 1, 2008 COS GSP)**

**Add** the following sentence after the last paragraph:

The street profile grade shown on the Plans will indicate the top of the curb unless specifically noted otherwise.

**2-03.2 Materials**  
**(October 16, 2009 COS GSP)**

**Replace** Section 2-03.2 with the following:

Materials shall meet the requirements of the following sections:

Sand Drainage Blanket	9-03.13(1)
Borrow	9-03.14

**2-03.3 Construction Requirements**

**2-03.3(2) Rock Cuts**  
**(January 1, 2020 COS GSP)**

**Add** the following after the “Scaling and Dressing” subsection:

**Pre & Post Blast Survey and Monitoring** - When blasting is approved the Contractor shall conduct pre-blast and post-blast structure survey and vibration monitoring on the structures above and below ground within the affected work area which may be subject to blasting damage. The survey and use of explosives shall conform to the requirements set forth in Section 1-07.22.

**2-03.3(3) Excavation Below Subgrade**  
**(February 14, 2018 COS GSP)**

**Add** the following after the second paragraph:

On roadways or alleys with a right-of-way width  $\geq 16$  feet, material shall be considered rock when, at the discretion of the Engineer, the Contractor is unable to progress with a Caterpillar 330D L hydraulic excavator equipped with a 30-inch rock bucket and new rock teeth (or equal) or a D-8T Caterpillar equipped with a single tooth ripper and new rock tooth (or equal). On roadways or alleys with a right-of-way width  $< 16$  feet, material shall be considered rock when, at the discretion of the Engineer, the Contractor is unable to progress with a Caterpillar 315D hydraulic excavator equipped with a 24-inch rock bucket and new rock teeth (or equal). The Engineer shall determine equipment equivalence.

**Add** the following after the last paragraph:

**Curb, Curb and Gutter, Sidewalk, and Driveway Excavation.** Excavation below profile grade to a depth even with the base of concrete structures or surfaces or the base of the crushed surfacing if required, which is necessary for the installation of curbing, curb and gutter, sidewalks, curb ramps, driveway, transitions behind the driveway, and in traffic island shall be incidental to the item “*CSTC for Sidewalks and Driveways*”, and no separate payment will be made. Where such excavation occurs in existing lawn or

planting areas, care shall be exercised to not damage the areas adjacent to the new construction in accordance to Section 1-07.16.

If construction methods fail to yield an acceptable surface the edge of the remaining pavement shall be trimmed by sawcutting.

#### Removal of Underlying Cement Concrete Pavement

Cement concrete pavement is expected to underlay the asphalt on all portions of this job. The extents of the individual concrete panels are generally visible due to reflective cracking through the asphalt. The Contractor shall layout the work to minimize surface disturbance. In general, if less than 4 feet of a concrete panel will remain, the whole panel shall be removed. Refer to the drawings.

#### **2-03.3(14)C      Compacting Earth Embankments** **(August 1, 2010 COS GSP)**

**Replace** the last sentence of the first paragraph in Method B with the following:

The materials below the 2-foot level shall be compacted to 92 percent of the same maximum density.

**Add** the following after the second paragraph in the Section titled Method B:

Backfilling in ditches and depressions, under sidewalks, and in other areas outside the traveled way shall be in accordance with Section 2-03.3(14), provided that compaction in areas outside the traveled way shall be to 92 percent of maximum density. In grass swales or other planting areas the Engineer may waive the 92 percent compaction requirement and allow a lesser compaction effort.

#### **2-03.3(14)D      Compaction and Moisture Control Tests** **(August 1, 2008 COS GSP)**

**Replace** this Section in its entirety with the following:

The maximum density and optimum moisture content shall be determined in accordance with AASHTO T-180, Method A or D as appropriate, with correction for rock according to AASHTO T-224. The following modifications to the specified test procedures apply:

##### AASHTO T-180

- a) Note 8 (Method D). Rock will not be replaced with soil as part of the laboratory determination for maximum dry density and optimum moisture content.
- b) Oven drying or direct heating will be the only acceptable methods of moisture content determination.
- c) Oven drying to dry back saturated or very wet soils, at temperatures above 140 degrees Fahrenheit will be permitted only with frequent mixing.

2. AASHTO T-224

- a) Specific gravity for rock will be determined in the laboratory. The fraction of  $\frac{3}{4}$ -inch material in the backfill may be determined in the field by sieving the sample in a wet or moist condition. In-place density will be determined as per AASHTO T-238. Moisture content will be determined as per AASHTO T-239.

**Add** the following new Subsection:

**2-03.3(100) Protection of Sewers and Appurtenances**  
**(August 1, 2008 COS GSP)**

In order to prevent soil or debris entering sewer manholes during construction, the Contractor shall locate and uncover by hand work the existing manholes on grading and paving improvements and shall place a shield over the manhole. This shield shall remain in place until the final utility adjustments are completed. The Contractor shall take care to insure that no soil or debris falls into the sewer channel. Any debris that falls into the manhole shall be removed immediately. The incident shall be reported to the Engineer and the approximate type and quantity of material will be recorded. No separate payment will be allowed for the work described in this paragraph. Locating, uncovering, and shielding sewer manholes shall be incidental to the project.

**SECTION 2-06 SUBGRADE PREPARATION**

**2-06.1 Description**  
**(August 1, 2008 COS GSP)**

**Add** the following after the first sentence:

The street profile grade shown on the Plans will indicate the top of the curb unless specifically noted otherwise.

**2-06.3 Construction Requirements**

**2-06.3(1) Subgrade for Surfacing**  
**(February 14, 2018 COS GSP)**

**Add** the following at the end of this section:

Subgrade Proof Roll Testing. In addition to standard compaction testing, the subgrade shall be tested by proof rolling with a single axle, dual wheel, truck loaded to a minimum of 25,000 GVW. The Contractor shall provide the truck. Truck weight shall be verified by a certified scale ticket and the tires shall be 11-inch width or less. The tests shall be directed, observed and approved by the Engineer prior to placing crushed surfacing. Soft areas or areas showing non-uniform support shall be corrected. If unsuitable material is discovered by proof roll testing then that unsuitable material shall be

removed and replaced with suitable material. Replacement of materials that subsequently fail the proof roll testing shall be at the Contractor's own expense.

## **SECTION 2-07 WATERING**

### **2-07.1 Description** **(August 1, 2008 COS GSP)**

**Add** the following after the first paragraph:

Water for dust control shall be applied by the Contractor as specified to adequately control dust throughout the entire construction period to the satisfaction of the Engineer.

### **2-07.3 Construction Requirements** **(February 14, 2018 COS GSP)**

**Add** the following before the first paragraph:

The Contractor shall be responsible for obtaining the necessary water hydrant permit and shall provide a copy of the permit to the Engineer. The Contracting Agency will supply the necessary wrenches to operate the fire hydrants. The Contractor shall only use hydrant wrenches to open hydrants

The Contractor shall use only those hydrants designated by the City responsible for water distribution (water utility) in strict accordance with its requirements for hydrant use. The Contractor shall make certain that the hydrant valve is open "full", since "cracking" the valve causes damage to the valve. An approved auxiliary valve shall be provided on the outlet line for control purposes. Fire hydrant valves must be closed slowly to avoid a surge in the system which creates undue pressure on water lines. The Contractor shall carefully follow these directions for opening and closing hydrant valves.

Upon completing the use of the hydrants, the Contractor shall notify the water utility. The hydrants may be inspected for possible damage and damage resulting from the negligent use of the hydrants by the Contractor shall be repaired by the water utility. The cost of repair shall be paid by the Contractor or shall, if necessary, be withheld from the final payment to the Contractor.

## **SECTION 2-09 STRUCTURE EXCAVATION**

### **2-09.3 Construction Requirements**

#### **2-09.3(1)E Backfilling** **(August 1, 2010 COS GSP)**

**Replace** the fourth paragraph with the following:

**Controlled Density Fill (CDF) or Controlled Low-Strength Material (CLSM).**

CDF is self compacting, cementitious, flowable material requiring no subsequent vibration or tamping to achieve consolidation. The Contractor shall provide a mix design in writing to the Engineer on WSDOT For 350-040 and utilize ACI 229 as a guide to develop the CDF mix design. No CDF shall be placed until the Engineer has reviewed and approved the mix design. CDF mixes not pre-approved shall be removed and replaced as directed by the Engineer. Spoon-excavatable CDF shall be designed to have a 28-day unconfined compressive strength between 50 PSI and 65 PSI. Hand-excavatable CDF shall be designed to have a 28-day unconfined compressive strength between 65 PSI and 100 PSI. Machine-excavatable CDF shall be designed to have a 28-day unconfined compressive strength between 150 PSI and 200 PSI. CDF shall have a minimum 1-day penetration resistance of 650 PSI. The CDF consistency shall be flowable (approximate slump 5 to 10-inches).

**Replace** the fifth paragraph with the following:

The following test methods shall be used by the Contractor to develop CDF mix designs:

28-day compressive strength – ASTM D 4832  
Unit weight, yield, and air content – ASTM D6023  
Slump – WSDOT FOP for AASHTO T 119  
Penetration resistance – ASTM C 403

**Add** the following after the eighth paragraph:

For areas such as narrow trenches, voids under existing pavements, areas around buildings or other structures where it is not practical to compact backfill to the required density, the Contractor may use free flowing CDF in lieu of “native backfill” or “gravel borrow” upon receiving written approval from the Engineer.

CDF placed within 2-feet of utilities; including but not limited to valves, fittings, and pipes, shall be spoon-excavatable. The Contractor shall use hand-excavatable CDF in all other locations unless directed otherwise by the Engineer.

In areas of high ground water tables, CDF mixes shall be designed permeable to maintain pre-development subterranean drainage patterns, as designated by the Engineer. As an alternate to permeable CDF, other provisions for drainage continuity may be used, as approved by the Engineer.

Backfilling over or placing any material over CDF shall not commence until 4 hours after the CDF has been placed. Traffic contact with CDF shall be prevented for at least 24 hours after placement. Backfilling and traffic loading over “early strength CDF” will be in accordance with the manufacturer’s recommendations.

The Contractor shall take the necessary measures to prevent pipes from floating during initial trench backfilling. Pipes shall be restrained with blocking, tie downs or methods approved by the Engineer. Piles of low slump material may be placed at approved intervals along the pipe to prevent floating as approved by the Engineer.

CDF shall not be placed on frozen ground, nor shall it be allowed to freeze while bleed water is present. No site batching of CDF shall be permitted.

**2-09.3(2) Classification of Structure Excavation**  
**(August 1, 2008 COS GSP)**

**Replace** the first sentence under numbered paragraph 1. with the following:

**Class A.** Excavation necessary for placing concrete structures shall be classified as “Structure Excavation Class A”.

**2-09.3(3)C Preparation for Placing Foundations**  
**(October 19, 2009 COS GSP)**

**Add** the following after the first paragraph:

For retaining walls, the Contractor shall place 6-inches of crushed surfacing top course meeting the requirements of Section 9-03.9(3), for the width of the retaining wall. Crushed surfacing material shall be compacted to provide a level hard surface on in-situ soils. Crushed surfacing material shall be compacted to 95 percent of maximum density as provided by Section 2-03.3(14)D herein.

Division 3

**Division left intentionally blank.**

Division 4

## **SECTION 4-04 BALLAST AND CRUSHED SURFACING**

### **4-04.3 Construction Requirements**

#### **4-04.3(2) Subgrade**

**(August 1, 2010 COS GSP)**

**Add** the following after the last paragraph:

If rock is encountered, a 6-inch minimum layer of crushed surfacing shall be placed over the solid rock subgrade in accordance with COS Standard Plan W-101A.

#### **4-04.3(3) Mixing**

**(February 26, 2015 COS GSP)**

**Add** the following to the end of the last paragraph:

Surfacing that has been contaminated with subgrade material during the mixing process will be rejected. No level of contamination is allowed; the Contractor shall remove the contaminated material and replace with clean uncontaminated surfacing at the Contractor's own expense.

#### **4-04.3(5) Shaping and Compaction**

**(February 26, 2015 COS GSP)**

**Replace** the first sentence of the first paragraph with the following:

Immediately following spreading and final shaping, each layer of surfacing shall be compacted to at least 95 percent of the maximum density determined by WSDOT FOP for AASHTO T-180/T-224 and modified test procedures outlined in Section 2-03.3(14)D before the next succeeding layer of surfacing or pavement is placed.

**Add** the following after the last paragraph:

Compaction of crushed surfacing blended with recycled HMA or concrete shall be the responsibility of the Contractor. Evidence of proper compaction on the crushed surfacing blended with recycled HMA or concrete shall be determined by proof rolling and accepted by satisfactory nuclear densometer gauge reading of the clean non-blended crushed surfacing material placed directly above the blended material. The method and equipment used to haul, spread, mix, and add water to and compact the blended material shall be approved by the Engineer prior to full-scale production placement. Approval will be based on the capability of the equipment and method used

to place and compact the crushed surfacing blended with recycled HMA or concrete in a manner which will result in a well-compacted, dense, well-graded, and uniform lift of material as determined by the Engineer.

**4-04.3(7) Miscellaneous Requirements**  
**(January 1, 2020 COS GSP)**

**Add** the following after the last paragraph:

Dust Control. Roads which are to have crushed rock only surfacing shall receive one treatment of the dust control soil stabilizer magnesium chloride over the total width and length of the crushed rock surface.

Materials. The magnesium chloride solution shall be a minimum of 30 percent concentrate by weight. The magnesium chloride dust control soil stabilizer shall be supplied by one of the following manufacturers, or approved equal:

<u>Product Name</u>	<u>Manufacturer</u>	<u>Phone number</u>
Dust Guard	Compass Minerals	913-344-9334
Dust-Off	Cargill Salt Division	800-553-7879
Chlor-tex	Soil-Tech	702-873-2023

Work Prior to Application. The area to be treated shall be permeable, compacted, and shaped for drainage prior to the application of the magnesium chloride. All ruts, washboarding, and potholes shall be leveled prior to application.

All areas to be treated shall be thoroughly pre-watered to a depth of 1-inch to 2-inches prior to application. This should be done several hours prior to application.

Application. The product shall be applied at the rate of 0.50 gallons per square yard using calibrated application equipment. The application shall be made in multiple applications to ensure even coverage. Care shall be taken not to overspray any areas or objects. Any areas inadvertently sprayed shall be rinsed off with clean water immediately.

The Contractor shall adhere to manufacturer's recommendations on minimum application rate, compaction, and curing time prior to allowing traffic.

**\$\$** Dust Palliative. When required by the Plans, the Special Provisions or when directed by the Engineer, completed crushed rock surfacing courses or roadways shall be given one or more applications of dust palliative oil to the limits specified. Dust palliative shall be a cutback asphalt, MC-30 or an EPA approved substitute as approved by the Engineer. The dust palliative shall be uniformly applied by an approved pressure-type distributor at the rate of 0.25 gallons of oil per application per square yard of surface to be treated. Before succeeding applications of dust palliative are applied, the preceding application shall have thoroughly dried, as approved by the Engineer.

**\$\$** Dust palliative shall not be applied upon a wet surface nor when the temperature is below 60 degrees Fahrenheit.

**\$\$** When and where as directed by the Engineer, the Contractor shall furnish and place Type No. 6 sand on newly oiled streets to prevent tracking of oil onto adjacent existing concrete pavement. Sand shall also be used where, in the opinion of the Engineer, the oil penetration is unsatisfactory.

**\$\$** The Contractor shall furnish and apply dust palliative to the final graded roadway surface or as directed by the Engineer. Dust palliative shall not be required or used in areas which receive asphalt concrete pavement.

CSTC / CSBC: A minimum of 2-inches of clean non-blended crushed surfacing top course shall be placed and compacted as the top lift of crushed rock beneath HMA. Additional thickness of crushed surfacing top course may be used as follows:

Total Crushed Rock Section Depth	Allowable thickness of Top Course
4-inches or less	100%
Greater than 4-inches	The top 50%

Asphalt Grinding: The Contractor may propose a cost reduction incentive proposal (CRIP) in accordance with Section 1-04.4 to substitute a portion of the crushed surfacing section with recycled HMA. The Contractor shall follow the process as outlined in Section 1-2.4C(1)(IV) of the WSDOT Construction Manual when submitting a CRIP. For the purpose of bidding, the Contractor shall assume the Engineer will not allow the substitution of recycled HMA for crushed surfacing. However, blending recycled products in accordance with Section 9-03.21 with crushed surfacing is allowed.

**Add** the following new Section:

## **SECTION 4-90 CEMENT TREATED BASE**

### **4-90.1 Description** **(August 1, 2008 COS GSP)**

Where identified on the Plans, the subgrade shall be a soil-cement mixture. The terms soil-cement, soil-cement mixture, and cement treated base (CTB) are used interchangeably hereafter.

The cement treated base course shall consist of native subgrade material (screened if required), Portland cement, and water uniformly mixed, graded, compacted, finished, and cured in accordance with these specifications. It shall conform to the lines, grades, thicknesses, and typical cross section shown on the Plans.

Following the establishment of the subgrade profile, the roadway shall then be mixed to the proposed depth, length, and width of the CTB shown on the typical section for the project unless otherwise authorized by the Engineer.

#### **4-90.2 Materials** **(August 1, 2008 COS GSP)**

Portland Cement. Portland cement shall be Type II and shall be provided in accordance with Section 9-01.

Water. Water shall be provided by the Contractor and shall be free from substances deleterious to the hardening of the soil-cement. The Contractor may obtain water from a hydrant as designated by the City Water Department. The Contractor will be responsible obtaining a hydrant use permit and associated permit fees and metered water charges (currently \$0.64/750 gal). Such costs shall be considered incidental.

Soil Material. Soil material shall consist of native sub grade material, of selected excavation material or of a combination of these materials proportioned as directed by the Engineer. The soil shall not contain roots, topsoil or any material deleterious to its reaction with cement. Material for use in the CTB zone shall be screened such that it does not contain material retained on a 2-inch sieve.

Curing Compounds. Curing compounds shall be CMS-2 in accordance with Section 9-02.

Sand Blotter. Sand used for the prevention of pickup of curing materials shall be clean, dry, and non-plastic.

#### **4-90.3 Construction Requirements** **(February 14, 2018 COS GSP)**

Equipment. Mixing shall be accomplished by equipment that will produce soil-cement mixing meeting the requirements for soil pulverization, cement and water application, mixing, transporting, placing, compacting, finishing and curing as specified herein. Agricultural disks or motor graders shall not be acceptable mixing equipment.

The equipment shall have the ability to supply metered water and have the ability to adjust the supply of water to the material during the mixing procedure. While moving, the water supply shall deliver water evenly across the full width of the machine. If, in the opinion of the Engineer, the equipment is not equal to the above, the Contractor shall remove said equipment from the jobsite and replace it with equipment meeting the requirements above.

Cement shall be spread by equipment that includes the following:

- In-cab water application rate meter
- In-cab cement application rate meter

Weight scales on product tank with display in cab.  
In-cab foot per minute meter  
Spread rate capability from 0 to 250 pounds per square yard.  
Or equal as approved by the Engineer.

The Contractor shall utilize two water trucks, each with the proper fittings for connection of the water truck to the pulverizing and mixing equipment, so that progress is not delayed while the water truck is refilled.

Pre-CTB Construction Requirement. Before soil-cement processing begins, the area to be paved shall be graded and shaped to lines and grades as shown in the Plans or as directed by the Engineer. During this process any unsuitable soil or material shall be removed and replaced with acceptable material. The subgrade shall be firm and able to support, without yielding or subsequent settlement, the construction equipment and the compaction of the soil-cement hereinafter specified. Soft or yielding sub grade shall be corrected and made stable before construction begins.

Pre-CTB Construction Meeting. Also, at least 24 hours before soil-cement processing begins, the Engineer, Contractor, and the CTB subcontractor shall have a pre-surfacing meeting at which the following shall occur:

- The Engineer will inform the Contractor when/where he will perform soil moisture testing both before and after soil-cement processing begins.
- The Contractor shall inform the Engineer the rate at which water is to be applied to bring soil moisture from its current level, as reported by the Engineer, to optimal levels (including supporting calculations, if requested by the Engineer).
- The Contractor shall inform the Engineer the rate at which cement is to be applied to achieve the design cement content (including supporting calculations, if requested by the Engineer).
- The Contractor and the Engineer shall jointly inspect the CTB equipment to ensure conformance with these Specifications including the ability of such equipment to properly meter, apply, and mix water and cement at the correct rates.

Cement Spreading and Mixing – General. Mixing of the soil material, cement, and water shall be accomplished by the mixed-in-place method. Cement shall be per a geotechnical engineer's design, approved by the City Engineer. The cement shall be spread at the rate in accordance that design. The moisture content shall be at or not less than 2 percent below the optimum moisture content as determined by the geotechnical engineer's design for the duration of the spreading, mixing, and compaction operation.

No cement shall be spread or soil-cement mixture mixed when the soil or subgrade is frozen or when the air temperature is less than 40 degrees Fahrenheit in the shade. No cement shall be spread more than 500 feet beyond the mixing operation, unless approved by the Engineer. The mixing operation shall not exceed more than 500 feet beyond the grading, shaping, and compaction operation.

The operation of cement application, mixing, spreading, compacting and finishing shall be continuous and completed within 4 hours from the start of mixing. Any soil-cement mixture that has not been compacted shall not be left undisturbed for longer than 30 minutes.

The operations of cement spreading, water application, and mixing shall be continuous and completed in daylight. No cement spreading shall be allowed during high winds as determined by the Engineer.

The Contractor shall hire an independent materials testing lab for field testing and verification of the water and cement ratios prior to placement, spreading, and compaction of the CTB at no cost to the City. The Contractor is responsible for supplying reports from the independent lab testing to the Engineer prior to acceptance. The Engineer may require removal or replacement of CTB that fails to meet the mix design requirements solely at the Contractor's own expense.

Cement Spreading and Mixing Methods. The water shall be applied evenly across the width of the machine and metered through the mixing machine by approved pressure-distributing equipment that is operated while the machine is moving. The soil material and cement shall be mixed sufficiently to prevent cement balls from forming when water is added. Mixing shall be continued until the mixture is uniform in color and at the required moisture content throughout. Operations of cement spreading, water application, mixing, and grading mixed material shall result in a uniform soil, cement, and water mixture for the full depth and width.

The cement shall be uniformly distributed and mixed with the pulverized material and any existing underlying material or imported material as specified. The mixing operation may be accomplished by using either the same machine used for the pulverizing operation or a separate machine designed for in-place continuous mixing as approved by the Engineer. Regardless of which method is used, a control system capable of metering or measuring the cement application rate to an accuracy of plus/minus one pound per square yard shall be used. The equipment used to spread the cement shall have weighing scales, a foot per minute gauge, and a RPM vane feeder in order to provide control of the cement distribution process. The Engineer may accept other quantity and quality control equipment after review and approval.

The metering system shall include a totalizer, so that the amount of water used during any given period can be read directly, and a gauge to indicate the instantaneous application rate during the mixing operation.

The application rate of the cement will be expressed in terms of pounds per square yard. This rate shall be calculated from the designated percent of cement based on the dry unit weight of the unmixed in-place material as determined by the Engineer.

The mixing operation shall be completed in continuous full width segments unless otherwise approved by the Engineer. Each segment must be processed and compacted by the end of each day and opened to traffic.

Special Edge Area Grading & Mixing Requirement. To ensure cement is mixed with native material in edge areas (i.e., in areas immediately adjacent to undisturbed paved areas), the native material within 2 feet of the undisturbed paved area shall be graded toward the center prior to cement soil mixing. Following soil-cement mixing, the area shall be regraded flat to the edges. This grading may require a special “boot” on the grader or other methods approved by the Engineer.

Shaping and Compaction. The mixed material shall be shaped by a road grader to the line, grade, and width shown on the Plans. The cement-stabilized base will be uniformly compacted to a minimum of 98 percent of maximum density based on a moving average of 5 consecutive tests with no individual test below 96 percent. Field density of compacted soil-cement shall be determined by the nuclear method in the direct transmission mode (ASTM D 2922, AASHTO T 238).

At the start of compaction, the percentage of moisture in the mixture shall be at or not more than 2 percentage points below the specified optimum moisture content. The specified optimum moisture content and maximum density shall be determined prior to the start of construction and also in the field by a moisture-density test, AASHTO T134, on representative samples of soil-cement mixture obtained from the area being processed at the time compaction begins. The test will be provided by the City.

The soil-cement shall be compacted by a vibratory roller to the specified density.

Finishing. When initial compaction is nearing completion, the surface of the soil-cement will be shaped to the required lines, grades, and cross section. The moisture content of the surface material shall be maintained at or not less than 2 percent below but not above the specified optimum moisture content during finishing operation.

If necessary, the surface will be lightly scarified to remove any tire imprints or smooth surfaces left by equipment. Compaction shall then be continued until uniform and adequate density is obtained. Rolling shall be supplemented by broom dragging if required.

Compaction and finishing shall be done in such a manner as to produce, in not longer than 2 hours, a smooth, dense surface free of compaction planes, cracks, ridges or loose material.

Curing. After the soil-cement has been finished as specified herein, it shall be protected against drying by applying an asphalt fog seal over the entire treated area. The finished soil-cement shall be kept continuously moist following completion of compaction until the fog seal is applied. Fog seal shall be applied within 24 hours of completion of compaction.

The fog seal shall be CMS-2 applied at the rate of 0.25 gal/s.y.

Finished portions of soil-cement that are traveled on by equipment used in constructing an adjoining section will be protected in such a manner as to prevent equipment from damaging completed work.

Sufficient protection from freezing shall be given the soil-cement for 7 days after its construction and until it has hardened.

Pre-Cracking. 36 hours after application of the fog coat, the Contractor shall make 3 passes over the cement treated base with a vibrating roller to pre-crack the subgrade material.

Construction Joints. At the beginning of each day's construction a straight transverse construction joint shall be formed by cutting back into the completed work.

Soil-cement for large, wide areas shall be built in a series of parallel lanes of convenient length and width meeting approval of the Engineer. Straight longitudinal joints shall be formed at the end of each day's construction by cutting back into completed work to form a true vertical face free of loose or shared material.

Special attention shall be given to joint construction to ensure a vertical joint, adequately mixed material, and compaction up against the joint. On mixed-in-place construction using transverse shaft mixers, a longitudinal joint constructed adjacent to partially hardened soil-cement built the preceding day may be formed by cutting back into the previously constructed area during mixing operations.

Guide stakes or control method as approved by the Engineer, shall be set by the Contractor for cement spreading and mixing.

Workmanship. Faulty work shall be replaced for the full depth of treatment rather than by adding a thin layer of soil-cement to the completed work.

Traffic. Completed portions of soil-cement can be opened immediately to low speed local traffic and to construction equipment provided the curing material or moist curing operations are not impaired, and provided the soil-cement is sufficiently stable to withstand marring or permanent deformation.

Should it be necessary for construction equipment or other traffic to use the bituminous covered surface before the bituminous material has dried sufficiently to prevent pickup, sufficient blotter cover shall be applied before such use.

Surfacing. Subsequent asphalt pavement layers can be placed any time after finishing, as long as the soil-cement is sufficiently stable to support the required construction equipment without marring or permanent distortion of the surface.

Division 5

**SECTION 5-01 CEMENT CONCRETE PAVEMENT REHABILITATION**

**5-01.3 Construction Requirements**

**5-01.3(2)B Portland Cement Concrete**  
**(January 1, 2020 COS GSP)**

**Replace** the third paragraph with the following:

The Engineer will perform acceptance testing for air content, slump, temperature, and 28-day compressive strength from samples obtained according to FOP for WAQTC TM-2. Air content shall be determined by conducting WAQTC FOP for AASHTO T-152. If the Contractor fails to provide the Aggregate Correction Factor per WAQTC FOP for AASHTO T-152 with the mix design, one will not be applied. Compressive strength shall be determined by WSDOT FOP for AASHTO T-22 and WSDOT FOP for AASHTO T-23. The lower Specification limit for air content shall be 3 percent, and the upper Specification limit for air content shall be 7 percent. The lower Specification limit for compressive strength shall be 4,000 psi.

The 28-day compressive strength will determine whether a full or reduced payment will be made for the respective concrete bid items. If the 28-day concrete compressive strength does not reach the value that correlates to the flexural strength of 600 PSI, then either the respective penalty percentage will be assessed towards payment; or the concrete will be rejected based upon the flexural strength value as specified in the table below:

Correlation Graph Value for Flexural Strength (PSI)	Correlation Graph Value for Compression Strength (PSI)	Penalty Percentage (%) for Non-Conforming Compressive Strength
$\geq 600$		0
591 – 599		3
583 – 590		7
574 – 582		10
565 – 573		13
556 – 564		17
550 – 555		19
$\leq 549$		Rejected

If the placed concrete is rejected based upon the flexural strength value in the table above, then the concrete pavement shall be removed and replaced by the Contractor at no additional expense to the Contract.

The penalty percentage will be applied to the Unit Bid Price for the item “Replace Cement Concrete Panel” as a payment deduction.

**Replace** the second sentence of the fourth paragraph with the following:

All costs associated with providing cure boxes shall be incidental to cement concrete pavement work and no separate payment will be made.

**5-01.3(2)B1            Rejection of Concrete**  
**(February 14, 2018 COS GSP)**

**Replace** the fourth sentence of the second paragraph with the following:

If the Contractor elects to have rejected materials tested, a sample will be taken and the Slump, Temperature, Air Content, and Strength will be tested by an independent lab at the Contractor’s expense.

**Replace** the second and third sentences of the third paragraph with the following:

The Contractor shall supply documentation from the independent lab testing to the Engineer for review and acceptance. If the rejected material fails any of the tests, the Contractor shall be solely responsible for removal, disposal, and replacement of the rejected material. The Contractor shall be responsible for the cost of sampling and testing the replacement materials.

**5-01.3(4)            Replace Portland Cement Concrete Panel**

**5-01.3(4)C            Dowel Bars and Tie Bars**  
**(January 1, 2020 COS GSP)**

**Replace** the sixth paragraph with the following:

Dowel bars and tie bars shall be placed as shown on the Plans, COS Standard Plans, or as directed by the Engineer.

**Replace** the seventh paragraph with the following:

All dowel bars shall be lubricated with paraffin based lubricant or grease prior to placement such that the maximum pull out resistance is 200 pounds per dowel.

**5-04.3(4)H            Opening to Traffic**  
**(January 1, 2020 COS GSP)**

**Replace** this section with the following:

The pavement may be opened to traffic when the concrete has developed a compressive strength of 3000-PSI or the compressive strength that correlates to the flexural strength of 550-PSI (whichever value is greater) as determined from cylinders, made at the time of placement, cured under comparable conditions, and tested in accordance with AASHTO T-22.

Fabrication, curing, and testing of cylinders to measure strength prior to opening pavement to construction equipment and/or traffic shall be the responsibility of the Contractor. The Contractor shall obtain the services of an independent Laboratory pre-approved by the Engineer to perform these activities. The Contractor shall submit the test results to the Engineer for approval prior to opening the concrete pavement to construction equipment and/or traffic. All costs associated with the testing required for opening the pavement to construction equipment and/or traffic shall be the responsibility of the Contractor.

The operation of construction equipment on the new pavement will not be allowed until the pavement has developed a compressive strength of 3000-PSI or the compressive strength that correlates to the flexural strength of 550-PSI (whichever value is greater) as determined from cylinders, made at the time of placement, cured under comparable conditions, and tested in accordance with AASHTO T-22.

Where accelerated pavement construction is required the Contractor may use concrete patching materials for panel replacement as specified in Section 9-20 and if approved by the Engineer.

### **5-01.3(9) Cement Concrete Pavement Grinding**

#### **5-01.3(9)A Surface Finish**

**(April 1, 2006 COS GSP)**

**Add** the following after the first paragraph:

Expansion and contraction joints shall be constructed to match the existing pavement or as directed by the Engineer. The surface shall be finished to match the adjacent surface. Approved curing compound shall be placed on the finished concrete immediately after finishing in accordance with Section 5-05.3(13).

#### **5-01.3(10) Pavement Smoothness**

**(January 1, 2020 COS GSP)**

**Replace** this section with the following:

Perform the Work described in Section 5-05.3(12), and the following:

Where the pavement is ground, calculation of the profile index shall exclude dips and depressions in the existing Roadway. The profilograph generated reports shall be provided to the Engineer prior to payment. The smoothness perpendicular to the

centerline will be measured with a 10-foot straight edge within the lanes. There shall be no vertical differences of more than 1/4 inch between lanes.

**5-01.3(9)A Surface Finish**  
**(April 1, 2006 COS GSP)**

**Add** the following after the first paragraph:

Expansion and contraction joints shall be constructed to match the existing pavement or as directed by the Engineer. The surface shall be finished to match the adjacent surface. Approved curing compound shall be placed on the finished concrete immediately after finishing in accordance with Section 5-05.3(13).

**Add** the following new Subsection:

**5-01.3(100) Temporary Patching**  
**(February 14, 2018 COS GSP)**

*Pavement patching shall be in accordance with the approved Plans, City Standard Plans, the current City adopted Pavement Cut Policy, or as directed by the Engineer.*

A temporary patch will be required by the Engineer if the road must be opened to traffic before a permanent patch can be made. The temporary patch shall consist of 2-inches of crushed surfacing under 2-inches of cold mix asphalt pavement. Crushed base and cold mix asphalt pavement shall be furnished and stockpiled on the project site by the Contractor for constructing temporary patches. Where a temporary patch is required for more than 3 months or where the Average Weekday Daily Traffic (AWDT) is greater than 4,000 vehicles per lane, the 2-inches of cold mix asphalt shall be substituted with 2-inches of hot mix asphalt. 4-inches of portland cement concrete may be substituted to construct the temporary patch if hot mix asphalt is unavailable. The Contractor shall construct and maintain the temporary patches until the Engineer approves the construction of the permanent patch.

The temporary patch shall be maintained such that the top surface of the patch shall not deviate more than 1-inch from final grade at any time.

When the construction of the permanent patch is approved by the Engineer, the temporary patch shall be removed, the exposed face of the existing pavement thoroughly cleaned, and a permanent patch constructed according to appropriate parts of this section.

## **SECTION 5-02 BITUMINOUS SURFACE TREATMENT**

### **5-02.3 Construction Requirements**

#### **5-02.3(2)A New Construction**

**(August 1, 2008 COS GSP)**

**Add** the following after the third paragraph:

The grade shall be shaped so the frame castings for manholes, monument boxes, valve boxes, catch basins, etc. within the roadway section to be treated will extend above the prepared surface in accordance with Section 7-05.3(1), such that the castings will be flush with the final surface.

#### **5-02.3(3) Application of Asphalt Emulsion and Aggregate**

**(August 1, 2008 COS GSP)**

**Add** the following after the fifth paragraph:

Castings shall be covered with building paper and weighted down. Where concrete curb or curb and gutter exist, the distributor shall be equipped with a splash board of such design as to prevent spraying.

## **SECTION 5-04 HOT MIX ASPHALT**

### **5-04.2 Materials**

**(August 1, 2010 COS GSP)**

**Add** the following item to the Materials List:

Herbicides	9-14.100
------------	----------

**Replace** the fifth paragraph with the following:

The Contractor may request the use of Warm Mix Asphalt (WMA) processes in lieu of HMA. The request shall be submitted in writing to the Engineer and shall include the WMA process proposed, mix design, verification, cost savings analysis, and location WMA will be used on the project. Upon receiving written permission from the Engineer, the Contractor may use WMA in lieu of HMA. If at any time the Engineer is unsatisfied with the WMA product, such permission may be revoked, and the Contractor shall complete the project using standard HMA at no additional cost to the Contracting Agency.

#### **5-04.2(1) How to Get an HMA Mix Design on the QPL**

**(April 1, 2018 COS GSP)**

**Delete** this Section.

**5-04.2(1)A1            Low RAP/No RAS – Mix Design Submittals for Placement on QPL**

**(January 1, 2020 COS GSP)**

**Delete** this Section and refer to Section 5-04.2(2) for Low RAP/No RAS acceptance requirements.

**5-04.2(1)A2            High RAP/Any RAS – Mix Design Submittals for Placement on QPL**

**(April 1, 2018 COS GSP)**

**Replace** this section with the following:

High RAP/Any RAS mixes shall not be allowed for use in the City of Spokane.

**5-04.2(1)B            Commercial HMA – Mix Design Submittal for Placement on QPL**

**(January 1, 2020 COS GSP)**

**Delete** this Section and refer to Section 5-04.2(2) for Commercial HMA acceptance requirements.

**5-04.2(1)C            Mix Design Resubmittal for QPL Approval**

**(January 1, 2020 COS GSP)**

**Delete** this Section and refer to Section 5-04.2(2) for Mix Design Resubmittal requirements.

**5-04.2(2)            Mix Design – Obtaining Project Approval**

**(January 1, 2020 COS GSP)**

**Replace** this Section in its entirety with the following:

The Contractor shall develop a mix design prior to the initial production of HMA. Mix designs shall be submitted to the City of Spokane Materials Engineer on WSDOT Form 350-042 EF. The mix design aggregate structure asphalt binder content, anti-strip additive and indirect tensile strength shall be determined in accordance with WSDOT Standard Operating Procedure 732, WSDOT FOP for AASHTO T 324 and WSDOT FOP for ASTM D 6931 and meet the requirements of Section 9-03.8(2) and 9-03.8(6).

The Contractor shall submit representative samples of the materials proposed for use in the HMA production to the WSDOT, WCAT, or other City approved verification laboratory. The Contractor shall be responsible for all mix design and verification costs. The laboratory will use these samples to conduct verification testing of the mix design in accordance with WSDOT Standard Operating Procedure 732 and to determine anti-strip requirements, if any, in accordance with WSDOT test method T-718. Verification testing of the HMA mix designs proposed by the Contractor that include RAP shall be completed with the inclusion of the RAP. Submittal of RAP samples to the City of Spokane is not required. The Contractor shall submit a fully verified mix design to the City of Spokane Field Engineering Office a minimum of 14 days prior to paving. Paving is not allowed prior to approval of the mix design and issuance of a City of Spokane JMF number. The Contractor shall submit a RAM with the proposed JMF to the Engineer a minimum of 2 working days prior to scheduled paving. The City of Spokane JMF number shall be printed on each delivery ticket. If the JMF is not printed on a delivery ticket, that truck load of HMA will be rejected and will not be approved for installation, no exceptions.

Verified mix designs that have been reviewed and approved by the City of Spokane will be accepted for 12 months. The City of Spokane may extend the 12 month listing provided the contractor submits a certification letter to the City's Materials Engineer verifying that the aggregate source and job mix formula (JMF), gradation, and asphalt binder crude source and formulation have not changed. Changes to asphalt binder that may require a new mix design include the source of the crude petroleum supplied to the refinery, the refining process, and additives or modifiers in the asphalt binder. The maximum duration for approval of a mix design will be 24 months from the date of initial approval or as approved by the Engineer.

If applicable, the Contractor shall include the brand and type of anti-stripping additive in the mix design submittal and provide certification from the asphalt binder manufacture that the anti-stripping additive is compatible with the crude source and formulation of asphalt binder proposed in the mix design.

**5-04.2(2)A Changes to the Job Mix Formula**  
**(January 1, 2020 COS GSP)**

**Replace** the first paragraph with the following:

The approved mix design will be considered the starting job mix formula (JMF) and shall be used as the initial basis for acceptance of HMA mixture, as detailed in Section 5-04.3(9). Only one JMF per project bid item will be allowed unless approved by the Engineer.

**5-04.2(2)B Using HMA Additives**  
**(January 1, 2020 COS GSP)**

**Add** the following to this Section:

If at any time the Engineer is unsatisfied with the JMF including HMA Additives, such permission may be revoked, and the Contractor shall complete the project using standard HMA at no additional cost to the Contracting Agency.

**5-04.3 Construction Requirements**  
**(January 1, 2020 COS GSP)**

**Add** the following to this Section:

A minimum of 2 working days prior to the anticipated HMA paving date, the contractor shall complete and submit the Hot Mix Asphalt Paving Plan form found in Appendix “A” to the Engineer for review and approval. All necessary parties must sign the form before paving can commence.

Apply a uniform coat of asphalt (tack coat) to all surfaces on which any course of HMA is to be placed or abutted. A double application of tack coat shall be applied to concrete surfaces and exposed iron and is considered incidental to HMA installation.

**5-04.3(2) Paving Under Traffic**  
**(April 1, 2018 COS GSP)**

**Replace** the third paragraph with the following:

During paving or grinding operations, temporary pavement markings shall be maintained throughout the project. The Contractor shall apply the temporary pavement markings prior to opening to traffic. The temporary pavement markings shall be maintained in serviceable condition by the Contractor until permanent markings are installed. The layout required for the temporary pavement marking shall be the Contractor's responsibility. Temporary pavement markings shall be in accordance with Section 8-23.

**5-04.3(3)D Material Transfer Device or Material Transfer Vehicle**  
**(January 1, 2020 COS GSP)**

**Delete** this Section in its entirety.

**5-04.3(4) Preparation of Existing Paved Surfaces**  
**(January 1, 2020 COS GSP)**

**Add** the following before the first paragraph:

Whenever the existing surfaces are too high to accommodate the prescribed curb exposure as shown on the typical section or when directed by the Engineer, the existing surfaces shall be removed by chipping or by burning and planing. Bituminous pavement shall be planed in accordance with Section 5-04.3(14).

The Contractor shall thoroughly flush and broom the entire surface of the existing roadway and perform necessary hand cleaning when and as directed by the Engineer.

Where driveways are lower than the grade, the approach shall be tacked and built up with Hot Mix Asphalt of a type specified by the Engineer to provide proper drainage.

**Replace** the second sentence of the fourth paragraph with the following:

The CSS-1 and CSS-1h may be diluted with water at a rate not to exceed one part water to one part emulsified asphalt by the emulsified asphalt supplier.

**Add** the following after the last paragraph:

Feathering with a suitable class of Hot Mix Asphalt shall be required wherever grade conditions do not permit full course depths in bringing the work to the required section or grade. The actual class of Hot Mix Asphalt utilized for feathering shall be pre-approved by the Engineer. The work of feathering shall be executed by hand raking in which the largest pieces of aggregate shall be progressively removed before rolling to ensure compaction and smooth proper joints.

#### **5-04.3(4)A      Crack Sealing**

##### **5-04.3(4)A1      General** **(January 1, 2020 COS GSP)**

**Replace** the Section with the following:

Cracks shall be defined as pavement gaps which are less than 6-inches in width and which are identified by the Engineer as such. Gaps 6-inches and wider shall be treated as patches as directed by the Engineer.

When the proposal includes a pay item for crack sealing, the Contractor shall apply contact herbicide to actively growing vegetation sufficiently in advance of the crack cleaning operation. When vegetation has been killed the Contractor shall clean cracks using wire wheel, crack hoe, pavement router, air lance, vacuum system or combination thereof. When cleaning cracks, it is the Contractors responsibility to comply with applicable air quality standards. Cracks must be clean, debris free, and dry prior to filling. The Contractor shall apply a pre-emergence herbicide in and to the cracks prior to filling. Herbicide shall be applied as recommended by the manufacturer for use under asphalt and as directed by the Engineer. The Contractor shall furnish and apply herbicide in accordance to Section 5-04.3(5)B and Section 8-02.3(2)B and submit WSDOT form 540-509.

**\$\$**Cracks and joints 1-inch or less in width shall not be filled.

\$\$Cracks and joints 1-inch or less in width shall be cleaned and filled with premium grade rubberized crack sealant to a depth of 1-inch. The premium grade rubberized crack sealant shall be applied in accordance with the manufacturer's recommendations. These recommendations shall be furnished to the Engineer prior to the start of work and shall include recommended heating time and temperature, allowable storage time and temperatures after initial heating, allowable reheating criteria, and application temperature range. Filling shall be controlled to confine the material within the crack or joint. After the rubberized crack sealant is placed, the sealant shall be squeegeed flush with the existing pavement surface and allowed to cure. The following day, the cracks or joints that are not completely filled shall be topped off with additional sealant. If, in the Engineer's opinion, the Contractor's method of filling results in an excessive amount of sealant on the pavement surface, filling shall be stopped and the method changed at the Contractor's own expense. Overflow shall be cleaned from the pavement surface at the Contractor's own expense.

- Premium grade rubberized crack sealant material shall conform to the following requirements:

<u>TEST REQUIREMENTS</u>	<u>TEST RESULTS</u>	<u>TEST PROCEDURE</u>
Cone penetration @ 77 deg. F	75 dmm Max.	ASTM D5329
Cone Penetration @ 122 deg. F	120 dmm Max.	ASTM D5329
Elongation @ 0 deg. F	500% Min.	ASTM D412
Elongation @ 77 deg. F	1000% Min.	ASTM D412
Flexibility 90 deg. Bend 1" mandrel, Min. 10 sec. test/sample 1/8" max.	Pass at -20 Deg. F	ASTM D3111 Modified
Resilience	50% Min	ASTM 5329
Softening Point	200 Deg F. Min.	ASTM D36
Flash Point c.o.c.	Min. 450 Deg. F	ASTM D92
Weight per gallon at 380 deg F	8.5 lbs/gal. Max.	ASTM D70
Application Temperature	380 deg. F to 400 deg. F	Per Manufacture Recommendation
Curing Time	60 minutes Max	Non-Tracking to moving traffic

At the Engineer's discretion the contractor shall provide independent tests on any lots used to assure the premium grade rubberized crack sealant meets test requirements as stated in the table above.

Cracks and joints greater than 1-inch and less than or equal to 3-inches shall be cleaned and filled with sand slurry to a depth of 2-inches. The sand slurry shall consist of approximately 20 percent CSS-1 emulsified asphalt, approximately 2 percent Portland cement, water (if required), and the remainder clean U.S. No. 4 - 0 paving sand. The components shall be thoroughly mixed and then poured into the cracks and joints until

full. The following day, the cracks or joints that are not completely filled shall be topped off with additional sand slurry. After the sand slurry is placed, the filler shall be squeegeed flush with the existing pavement surface and allowed to cure. The HMA overlay shall NOT be placed until the slurry has fully cured. If, in the Engineer's opinion, the Contractor's method of filling results in an excessive amount of sealant on the pavement surface, filling shall be stopped and the method changed at the Contractor's own expense. Overflow shall be cleaned from the pavement surface at the Contractor's own expense.

Cracks greater than 3-inches and less than 6-inches shall be excavated, cleaned, filled, and hand tamped with asphalt to a depth equal to or greater than the existing pavement depth (3-inch min.). The HMA fill shall be Commercial 3/8-inch, PG 64S-28 or PG 64H-28. CSBC or CSTC shall not be required. The Contractor is expected to investigate and satisfy itself of these existing conditions in accordance with Section 1-02.4(1).

The Contractor shall thoroughly clean the surface of the street and dispose of all debris prior to apply the surface treatment or overlaying the street.

**5-04.3(4)A2      Crack Sealing Areas Prior to Paving**  
**(April 1, 2018 COS GSP)**

**Delete** this Section in its entirety.

**5-04.3(4)A3      Crack Sealing Areas Not to be Paved**  
**(April 1, 2018 COS GSP)**

**Delete this Section in its entirety 5-04.3(4)B      Soil Residual**  
**Herbicide**  
**(January 1, 2020 COS GSP)**

**Replace** the first paragraph with the following:

The Contractor shall furnish and apply an approved soil residual herbicide for new roadway or alley areas with existing vegetation and for additional areas specified by the Engineer, in accordance with these Special Provisions and Section 8-02.3(3)B. The Contractor shall ensure that only an area scheduled for surfacing in any one day is treated with herbicide. In no case shall treated subgrade be left overnight.

**Add** the following after the first paragraph:

Areas that have not been paved within the time limit or have been rained on shall be treated again at the Contractor's own expense. The herbicide shall be applied uniformly in accordance with the manufacturer's recommendations.

The Contractor shall exercise care when applying the herbicide so that adjacent foliage areas, especially lawns, gardens, trees, and shrubs are not adversely affected by the overspray. Suspected root systems shall be assessed and properly accounted for.

The Contractor shall not apply herbicide during adverse weather conditions, such as wind or rain. The Contractor shall not apply herbicide in areas where the herbicide is reasonably expected to affect a desired plant's root system. The Engineer may waive the wind requirement if the Contractor determines that an adequate coverage may be achieved and there is no desirable foliage within the limits of overspray.

Herbicide shall be applied to the surface of the prepared subgrade prior to the application of the prime coat or pavement base course. The application shall be in accordance with the recommendations of the manufacturer for use under asphalt and as directed by the Engineer.

In grind and overlay projects, the Contractor shall furnish and apply a contact herbicide to existing vegetation in the cracks and along the gutters of streets on the project that will be overlaid with HMA. The Contractor shall remove the dead vegetation from the cracks and along the gutters. Prior to paving the Contractor shall furnish and apply a pre-emergence herbicide to the cracks and along the gutters. Herbicide shall be applied as recommended by the manufacturer for use under asphalt and as directed by the Engineer. The Contractor shall furnish and apply herbicide in accordance to Section 5-04.3(5)B and Section 8-02.3.

**5-04.3(4)C      Pavement Repair**  
**(January 1, 2020 COS GSP)**

**Replace** this Section with the following:

**\$\$** For this project, the patch width is wide enough to permit the use of standard hot mix asphalt pavers. Consequently, patching shall be treated as mainline paving and pavement construction is subject to the appropriate specifications herein.

The Contractor shall excavate pavement repair areas to the lines marked in the field and to the depths shown in the plans and/or as specified herein. The Contractor shall conduct excavation operations in a manner that will protect the pavement that is to remain. Pavement not designated for removal that is damaged as a result of the Contractor's operations shall be repaired by the Contractor to the satisfaction of the Engineer at no cost to the Contracting Agency.

Pavement cutting and patching shall be scheduled to accommodate the demands of traffic and shall be performed as rapidly as possible to provide maximum safety and convenience to public travel. On projects where streets are opened to traffic at the end of each shift, the Contractor shall not excavate more area than can be completely patched during the same shift.

The minimum width of any pavement repair area shall be 3-feet unless shown otherwise in the Plans. Before excavation, the existing pavement shall be saw cut or removed by a pavement grinder if approved by the Engineer. All excavated materials including pavement will become the property of the Contractor and shall be legally disposed of off site. This work will be paid for under the item *“Pavement Repair Excavation Incl. Haul”*.

The Contractor shall protect the saw cut edges of pavement repair areas. If saw cut edges are damaged as a result of the Contractor’s operations, the Contractor shall re-saw pavement edges to the satisfaction of the Engineer at no cost to the Contracting Agency. Asphalt for tack coat shall be required as specified in Section 5-04.3(4). A heavy application of tack coat shall be applied to the surfaces and edges of existing pavement prior to patching. All pavement overcuts shall be sealed full depth, flush with the pavement surface. The contractor is required to use a crack sealant approved by the Engineer. All finished grade patch joints shall be sealed with an approved rubberized crack sealant meeting section 5-04.3(4)A1.

The Contractor shall place and compact the specified class of HMA and crushed surfacing top course to the depths specified, over a compacted subgrade. Placement of the HMA shall be accomplished in lifts. Base and leveling courses shall not exceed 4-inches compacted depth and wearing courses shall not exceed 2-inches compacted depth. Each lift shall be thoroughly compacted by a mechanical tamper or a roller or as approved by the Engineer.

In some cases, removal of the existing pavement for patching purposes may leave a void whose depth is greater than that required for the intended patching section. In this event, the void shall be backfilled with crushed surfacing top course and compacted in accordance with Section 4-04.3(5).

Rigid pavement patching shall be in accordance with Section 5-01.3(4).

## **1. Patching Rigid Type Pavements Overlaid With HMA**

Streets which have rigid type pavements overlaid with HMA shall be patched in accordance with subsection Full Width Pavement Patches and as shown on the COS Standard Plans in the ‘W’ series.

Rigid pavement shall be replaced in-kind to the depths specified on the COS Standard Plans in the ‘W’ series.

Asphalt for tack coat shall be required over the rigid patch and shall be applied to the edges of the existing pavement in the repair area then overlaid with a wearing course of HMA Class 1/2” to complete the patch, so as to be flush with the surrounding pavement surface.

## **2. Patching Full Course HMA**

Streets which have full course HMA shall be patched in accordance with subsection Full Width Pavement Patches and as shown on the COS Standard Plans in the 'W' series. The patch shall consist of HMA and crushed surfacing (if required) over a prepared subgrade.

HMA shall be furnished and compacted to the depths specified. HMA Class 1/2" shall first be placed and compacted, and then overlaid with a wearing course of Class 1/2" to complete the patch so as to be flush with the surrounding pavement surface.

### **3. Full Width Pavement Patches**

These pavement cut requirements apply to full depth HMA and HMA over PCCP roadways in compliance with the Regional Pavement Cut Policy. The Regional Pavement Cut Policy is available in Engineering Services on the 2<sup>nd</sup> floor of the City of Spokane City Hall or at the following link: <https://my.spokanecity.org/business/bid-and-design/pavement-cut-policy/>.

- a. Full Width Pavement Patches. The intention is to construct patches such that edges of the patch lie outside of the wheel paths of the traveled lanes and to provide a longitudinally straight patch that does not vary in width nor has edges that wander in the lanes.
- b. Pavement Patch Seam Locations. The Contractor shall construct the pavement patch such that the seams for the pavement patch are either in the center of a lane or along the lane line. If the edge of a pavement patch falls between center of the lane and the lane line, the Contractor shall extend the width of the pavement patch to the next lane line or the center of lane outside the trenched area.
- c. Undermined Existing Pavement. The Contractor shall fix undermined pavement by widening the patch by sawcutting and removing or grinding the section around the undermined area. The portions of this section: Pavement Edges and Pavement Patch Seam Locations apply to removing the areas around undermined existing pavement. With prior written approval by the Engineer, the Contractor may fix undermined pavement by placing Controlled Density Fill (CDF) in the trench area.

If the edge of the pavement is undermined due to Contractor's operations, then the Contractor shall fix the undermined pavement at no cost to the Contracting Agency.

### **4. Transition Work**

The Contractor shall place 2-inches of HMA behind the traveled way or sidewalks as directed by the Engineer as a transition to meet existing improvements. The existing improvements shall be neatly and accurately cut to provide a smooth edge for mating with the 2-inches of HMA.

## **5. Temporary Patching**

A temporary patch will be required by the Engineer if the road must be opened to traffic before a permanent patch can be made. The temporary patch shall consist of 2-inches of cold mix asphalt pavement over 2-inches of crushed surfacing. Crushed base and cold mix asphalt pavement shall be furnished and stockpiled on the project site by the Contractor for constructing temporary patches. Where a temporary patch is required for more than 3 months or where the Average Weekday Daily Traffic (AWDT) is greater than 4,000 vehicles per lane, the 2-inches of cold mix asphalt shall be substituted with 2-inches of hot mix asphalt. 4-inches of portland cement concrete may be substituted to construct the temporary patch if hot mix asphalt is unavailable. The Contractor shall construct and maintain the temporary patches until the Engineer approves the construction of the permanent patch.

The temporary patch shall be maintained such that the top surface of the patch shall not deviate more than 1/2-inch from final grade at any time.

When the construction of the permanent patch is approved by the Engineer, the temporary patch shall be removed, the exposed face of the existing pavement thoroughly cleaned, and a permanent patch constructed according to appropriate parts of this section.

## **6. Brick Patches**

Brick pavements shall be patched using only brick. The Contractor shall remove brick for trenching operations or street repair and replace the brick in the same manner as the original construction. The Contractor shall not saw the brick during the removal process. The brick required to complete the replacement shall be of similar size and design as approved by the Engineer. After the subgrade for the pavement has been properly compacted and constructed to line and grade, the brick pavement patch shall be placed to match the grade of the adjacent pavement. The finished pavement surface shall match the existing pavement. A similar section to Standard Plan W-109 applies.

Where brick is overlaid with HMA, replacement of the pavement shall be with HMA in accordance with Standard Plan W-108. Where a portion of the brick roadway has been replaced with HMA, replacement will be as to match the existing surface.

### **5-04.3(6)                      Mixing** **(January 1, 2020 COS GSP)**

**Replace** the first paragraph with the following:

The asphalt supplier shall introduce anti-stripping additive, in the amount designated on the JMF for the mix design, into the asphalt binder prior to shipment to the asphalt mixing plant.

**Replace** the sixth paragraph with the following:

After the required amount of mineral materials, RAP and new asphalt binder have been introduced into the mixer, mix the HMA until complete and uniform coating of the particles and thorough distribution of the asphalt binder throughout the minerals and RAP is ensured.

**5-04.3(7) Spreading and Finishing**  
**(January 1, 2020 COS GSP)**

**Replace** Table 6 with the following:

HMA Class 1/2-inch	wearing course	2-inches
	other courses	3-inches
HMA Class 3/8-inch	all courses	2-inches

Exception: On streets where the total asphalt thickness is to be 3-inches, the maximum wearing course lift thickness shall be 3-inches.

**Add** the following after the last paragraph:

In order to preserve the approved smooth, tight, uniform surface true to line, grade and cross section as specified in Section 4-04.3(5) Shaping and Compaction and to establish grade, drainage and ride of the mainline roadway the following methods shall be followed;

When placing HMA on approved crushed surfacing at intersections, mainline panel paving shall be spread compacted and finished prior to HMA placement on the intersecting street header. HMA shall be spread by hand in the fillet areas of the header. In the main area of the header, mechanical equipment used for spreading and finishing of HMA shall proceed from the edge of the new HMA mainline panel to the edge of existing asphalt of the intersecting street.

**5-04.3(8) Aggregate Acceptance Prior to Incorporation in HMA**  
**(January 1, 2020 COS GSP)**

**Replace** the Section in its entirety:

Aggregate incorporated into HMA shall be from an approved source listed on the Washington State Department of Transportation (WSDOT) Aggregate Source Approval (ASA) list. The aggregate properties of sand equivalent, uncompacted void content and fracture will be evaluated in accordance with Section 3-04. Sampling and testing of aggregates for HMA accepted by non-statistical and visual evaluation will be at the option of the Engineer.

**5-04.3(9) HMA Mixture Acceptance**  
**(January 1, 2020 COS GSP)**

**Replace** this Section with the following:

Acceptance of HMA shall be as provided under nonstatistical, or visual evaluation. Nonstatistical evaluation will be used for the acceptance of HMA unless visual evaluation is specified.

Commercial HMA will be accepted by Visual Evaluation when placed in the following locations:

- ditches
- slopes
- gores
- prelevel
- temporary pavement
- pavement repair
- Other non-structural application of HMA as approved by the Engineer.

Sampling and testing of HMA accepted by Visual Evaluation will be at the option of the Engineer.

**5-04.3(9)A Test Sections**  
**(April 1, 2018 COS GSP)**

**Delete** this Section in its entirety.

**5-04.3(9)A1 Test Section – When Required, When to Stop**  
**(April 1, 2018 COS GSP)**

**Delete** this Section in its entirety.

**5-04.3(9)A2 Test Section – Evaluating the HMA Mixture in a Test Section**  
**(April 1, 2018 COS GSP)**

**Delete** this Section in its entirety.

**5-04.3(9)B Mixture Acceptance-Statistical Evaluation**  
**(January 1, 2020 COS GSP)**

**Delete** this Section in its entirety and all Subsections B1 through B7.

**Add** the following new Section:

**5-04.3(9)C Mixture Acceptance – Nonstatistical Evaluation**  
**(July 18, 2018 APWA GSP)**

HMA mixture which is accepted by Nonstatistical Evaluation will be evaluated by the Contracting Agency by dividing the HMA tonnage into lots

**Add** the following new Section:

**5-04.3(9)C1 Mixture Nonstatistical Evaluation – Lots and Sublots**  
**(January 1, 2020 COS GSP)**

A lot is represented by randomly selected samples of the same mix design that will be tested for acceptance. A lot is defined as the total quantity of material or work produced for each Job Mix Formula placed. Only one lot per JMF is expected. A subplot shall be equal to one day's production up to 1000 tons, except the Engineer may allow up to 1200 tons.

All of the test results obtained from the acceptance samples from a given lot shall be evaluated collectively. If the Contractor requests a change to the JMF that is approved, the material produced after the change will be evaluated on the basis of the new JMF for the remaining sublots in the current lot and for acceptance of subsequent lots. For a lot in progress with a CPF less than 0.75, a new lot will begin at the Contractor's request after the Engineer is satisfied that material conforming to the Specifications can be produced.

Sampling and testing for evaluation shall be performed on the frequency of a minimum of one sample per subplot.

Unless otherwise specified, the maximum CPF for HMA mixture shall be 1.00.

**Add** the following new Section:

**5-04.3(9)C2 Mixture Nonstatistical Evaluation Sampling**  
**(January 1, 2020 COS GSP)**

Samples for acceptance testing shall be obtained by the Contractor when ordered by the Engineer. The Contractor shall sample the HMA mixture in the presence of the Engineer and in accordance with AASHTO R97-19. A minimum of three samples should be taken for each class of HMA placed on a project. If used in a structural application, at least one of the three samples shall to be tested.

Sampling and testing HMA in a Structural application where quantities are less than 400 tons is at the discretion of the Engineer.

For HMA used in a structural application and with a total project quantity less than 1000 tons, a minimum of one acceptance test may be performed. A minimum of 3 samples may be obtained at the point of acceptance, a minimum of one of the three samples will be tested for conformance to the JMF:

- If the test results are found to be within specification requirements, additional testing will be at the Engineer's discretion.
- If test results are found not to be within specification requirements, additional testing of the remaining samples to determine a Composite Pay Factor (CPF) shall be performed.

**Add** the following new Section:

**5-04.3(9)C3 Mixture Nonstatistical Evaluation –Acceptance Testing**  
**(January 1, 2020 COS GSP)**

Testing of HMA for compliance of Va will at the option of the Contracting Agency. If tested, compliance of Va will use WSDOT SOP 731.

Testing for compliance of asphalt binder content will be by WSDOT FOP for AASHTO T 308.

Testing for compliance of gradation will be by FOP for WAQTC T 30/T 11.

**Add** the following new Section:

**5-04.3(9)C4 Mixture Nonstatistical Evaluation –Pay Factors**  
**(January 1, 2020 COS GSP)**

For each lot of material falling outside the tolerance limits in 5-04.3(9), the Contracting Agency will determine a Composite Pay Factor (CPF) using the following price adjustment factors:

<b>Table of Price Adjustment Factors</b>	
<b>Constituent</b>	<b>Factor “f”</b>
All aggregate passing: 1½”, 1”, ¾”, ½”, ⅜” and No.4 sieves	2
All aggregate passing No. 8 sieve	15
All aggregate passing No. 200 sieve	20
Asphalt binder	40
Air Voids (Va) (where applicable)	20

Each lot of HMA produced under Nonstatistical Evaluation and having all constituents falling within the tolerance limits of the job mix formula per section 9-03.8(7) shall be accepted at the unit Contract price with no further evaluation. When one or more constituents fall outside the nonstatistical tolerance limits in the Job Mix Formula shown in Table of Price Adjustment Factors, the lot shall be evaluated

in accordance with Section 1-06.2(2) to determine the appropriate CPF. The nonstatistical tolerance limits will be used in the calculation of the CPF and the maximum CPF shall be 1.00. When less than three sublots exist, backup samples of the existing sublots or samples from the Roadway may be tested to provide a minimum of three sets of results for evaluation.

**Add** the following new Section:

**5-04.3(9)C6 Mixture Nonstatistical Evaluation –Price Adjustments**  
**(January 1, 2020 COS GSP)**

For each HMA mixture lot, a Job Mix Compliance Price Adjustment will be determined and applied, as follows:

$$\text{JMCPA} = [0.60 \times (\text{CPF} - 1.00)] \times Q \times \text{UP}$$

Where

JMCPA = Job Mix Compliance Price Adjustment for a given lot of mixture (\$)

CPF = Composite Pay Factor for a given lot of mixture (maximum is 1.00)

Q = Quantity in a given lot of mixture (square yards)

UP = Unit price of the HMA Bid Item

If a constituent is not measured in accordance with these Specifications, its individual pay factor will be considered 1.00 in calculating the Composite Pay Factor (CPF).

**Add** the following new Section:

**5-04.3(9)C7 Mixture Nonstatistical Evaluation –Retests**  
**(July 18, 2018 APWA GSP)**

The Contractor may request a subplot be retested. To request a retest, the Contractor shall submit a written request within 7 calendar days after the specific test results have been received. A split of the original acceptance sample will be retested. The split of the sample will not be tested with the same tester that ran the original acceptance test. The sample will be tested for a complete gradation analysis, asphalt binder content, and, at the option of the agency, Va. The results of the retest will be used for the acceptance of the HMA in place of the original subplot sample test results. The cost of testing will be deducted from any monies due or that may come due the Contractor under the Contract at the rate of \$500 per sample.

**5-04.3(9)D1 Mixture Visual Evaluation-Lots, Sampling, Testing, Price Adjustments**  
**(January 1, 2020 COS GSP)**

**Replace** the fourth sentence with the following:

The engineer will test one of the samples for all constituents in Section 5-04.3(9)C3.

**Replace** the sixth sentence and Table 13 with the following:

When one or more constituents fall outside those tolerance limits, the other samples will be tested for all constituents in Section 5-04.3(9)C3, and a Job Mix Compliance Price Adjustment will be calculated in accordance with Table 13.

<b>Table 13 Visual Evaluation-Out of Tolerance Procedures</b>	
<b>Comply with the Following</b>	
Pay Factors <sup>1</sup>	Section 5-04.3(9)C4
Composite Pay Factors <sup>2</sup>	Section 5-04.3(9)C4
Price Adjustment	Section 5-04.3(9)C6

<sup>1</sup>The Visual Evaluation tolerance limits in Section 9-03.8(7) will be used in the calculation of the PF

<sup>2</sup>The Maximum CPF shall be 1.00

#### **5-04.3(9)E Mixture Acceptance – Notification of Acceptance Test Results**

**(January 1, 2020 COS GSP)**

**Replace** this section in its entirety with the following:

The results of all acceptance testing and the Composite Pay Factor will be available to the Contractor by means as determined by the Engineer.

#### **5-04.3(10) HMA Compaction Acceptance**

**(April 1, 2018 COS GSP)**

**Add** the following to the column “Statistical Evaluation of HMA Compaction is Required for” in Table 14:

- Pedestrian, bike, or mixed use trails which will support maintenance vehicle traffic.

#### **5-04.3(10)A HMA Compaction – General Compaction Requirements**

**(April 1, 2018 COS GSP)**

**Add** the following to the end of the second sentence of the first paragraph:

...or as established by the Engineer.

**Add** the following after the third sentence of the second paragraph:

...at no additional cost to the Contracting Agency.

**Replace** the second sentence of the third paragraph with the following:

If requested by the Engineer, the Contractor shall use pneumatic tired rollers to compact the wearing course beginning October 1<sup>st</sup> of any year through March 31<sup>st</sup> of the following year at no additional cost to the Contracting Agency.

**5-04.3(10)C1      HMA Compaction Statistical Evaluation – Lots and Sublots**

**(January 1, 2020 COS GSP)**

**Replace** the second paragraph with the following:

A lot is represented by randomly selected samples of the same mix design placed during a single day of production that will be tested for acceptance, with a maximum of 15 sublots per lot; the final lot each day may be increased to 25 sublots. If a single day's production is less than 500 tons, the lot will be divided into 5 equal sublots for compaction acceptance.

**Delete** the fourth paragraph from this Section.

**5-04.3(10)C2      HMA Compaction Statistical Evaluation – Acceptance Testing**

**(January 1, 2020 COS GSP)**

**Replace** the second sentence of the third paragraph:

HMA cores shall be taken or nuclear density testing shall occur after completion of the finish rolling and prior to opening to traffic.

**Add** Note 5 to supplement Table 16:

5 The Contracting Agency may elect to perform AASHTO T331 in lieu of T166 when determining core density.

**5-04.3(10)C3      HMA Statistical Compaction – Price Adjustments**

**(January 1, 2020 COS GSP)**

**Delete** the first paragraph.

**Replace** the section paragraph with the following:

Each HMA compaction lot that is accepted by Statistical Evaluation shall be evaluated in accordance with Section 1-06.2(2)D5 to determine the appropriate Composite Pay Factor (CPF). All of the test results obtained from the acceptance samples from a given compaction lot shall be evaluated collectively. Testing by either a nuclear density gauge or cores will be completed per section 5-04.3(10)C1.

**Replace** the following definitions after the table with the following:

CPA = Compaction Price Adjustment for the compaction lot (\$)

CPF = Composite Pay Factor for the compaction lot (maximum is 1.05)

Q = Quantity in the compaction lot (square yard)

UP = Unit price of the HMA in the compaction lot (\$/square yard)

**5-04.3(10)C4 HMA Statistical Compaction – Request for Retesting**  
**(January 1, 2020 COS GSP)**

**Replace** the last sentence of the first paragraph with the following:

When the CPF for the compaction lot based on the results of the cores is less than 1.00, the Contracting Agency will deduct the cost for the coring from any monies due or that may become due the Contractor under the Contract at the rate of \$500 per core and the Contractor shall pay for the cost of the traffic control

**5-04.3(11)B Rejection by the Contractor**  
**(August 1, 2010 COS GSP)**

**Supplement** this Section with the following:

Rejected material shall become the property of the Contractor and no additional payment will be made for removal and disposal of rejected material.

**5-04.3(12)A HMA Joints**  
**(January 1, 2020 COS GSP)**

**Add** the following to this section:

The Contractor shall install Joint adhesive to all joints of wearing course lifts that are not hot lapped or as designated by the Engineer. Prior to the application of the joint adhesive the face of the joint shall be thoroughly dry and free from any loose material, dust, or other debris that would inhibit adhesion. Application of the joint adhesive shall be in a continuous over the entire vertical face of the joint. Joint adhesive shall be applied concurrent with HMA placement and application shall be limited to the surfaces that will be paved during the same working shift.

Joint adhesive material may be one of the following options or an approved equal:

1. Double application of CSS-1 Tack coat
2. Joint adhesive joint tape shall conform to the following requirements:
  - Test Specification
  - Softening Point, 225° F (107) min.
  - Flexibility 90 degree Bend, 1" (25mm) mandrel (ASTM D311), Pass at 30° F (-34° C)
  - Cone Penetration 77° F (25° C) (ASTM 5329), 50 max
  - Elongation 77° F (25° C), 1,000% min

- Installation: Install according to manufacturer specifications.
3. Hot applied joint adhesive meeting the requirements in the table below.

<u>TEST REQUIREMENTS</u>	<u>TEST RESULTS</u>	<u>TEST PROCEDURE</u>
Cone penetration @ 77 deg. F	75 dmm Max.	ASTM D5329
Cone Penetration @ 122 deg. F	120 dmm Max.	ASTM D5329
Elongation @ 0 deg. F	500% Min.	ASTM D412
Elongation @ 77 deg. F	1000% Min.	ASTM D412
Flexibility 90 deg. Bend 1" mandrel, Min. 10 sec. test/sample 1/8" max.	Pass at -20 Deg. F	ASTM D3111 Modified
Resilience	50% Min	ASTM 5329
Softening Point	200 Deg F. Min.	ASTM D36
Flash Point c.o.c.	Min. 450 Deg. F	ASTM D92
Weight per gallon at 380 deg F	8.5 lbs/gal. Max.	ASTM D70
Application Temperature	380 deg. F to 400 deg. F	Per Manufacture Recommendation
Curing Time	60 minutes Max	Non-Tracking to moving traffic

**5-04.3(12)A1 Transverse Joints**  
**(January 1, 2020 COS GSP)**

**Replace** the first sentence in the second paragraph with the following:

The Contractor shall construct and maintain asphalt wedges with the following ratios:

- Drop offs less than 3-inches: 1 vertical to 12 horizontal
- Drop offs greater than or equal to 3-inches: 1 vertical to 30 horizontal.

**Add** the following to the end of the second paragraph:

The Contractor shall maintain the wedges as needed or when directed by the Engineer. If the wedge is displaced or compacted leaving a drop off at any point in the transverse joint greater than 0.5-inch, then the Contractor shall immediately repair the wedge. Construction and maintenance of asphalt wedges is included in the paving or grinding bid items, and no special payment shall be made therefore.

**Supplement** this section with the following:

The Contractor shall not create or allow abrupt transverse drop offs in the roadway driving lanes open to the traveling public. The Contractor shall construct wedges in the

direction of traffic flow, at all transverse drop offs in the driving lanes in excess of 1-inch created by paving or grinding or other Contractor operations.

The Contractor shall construct the wedges prior to allowing traffic in the lanes with the drop off.

The Contractor shall use heavy paper to isolate asphalt wedges from any other asphalt or base material.

The Contractor may construct the wedges such that the top 3-inches of the wedge is cold or hot mix asphalt and any additional depth needed, be constructed of well compacted crushed surfacing top course.

On lower volume streets (under 1000 AWDT), the Contractor shall construct and maintain asphalt wedges with a ratio of 1 vertical to 12 horizontal. At the Engineer's discretion, the Contractor may construct wedges at the same ratio out of well compacted crushed surfacing top course.

#### **5-04.3(12)A2      Longitudinal Joints** **(January 1, 2020 COS GSP)**

**Supplement** this Section with the following:

**\$\$** Special Requirements: Attention must be paid to the location of cold joints in the hot mix asphalt wearing course.

Only one cold joint shall be allowed in the wearing course on Arterials (including collector arterials); it shall be located at the centerline of the roadway.

On local access streets, up to two cold joints will be allowed in the wearing course if pre-approved by the Engineer.

**\$\$** The nature of this project is such that no cold joints between gutter lines will be needed or allowed.

The Contractor shall pave the side street approaches as defined in Section 5-04.3(16) within 1 working day following mainline paving, unless otherwise approved by the Engineer. In addition, the Contractor will insure that installed lane striping be protected from all forms of damage, including tack coat tracking or other marking that obliterates or partially obliterates the lane striping.

#### **5-04.3(13)      Surface Smoothness** **(January 1, 2020 COS GSP)**

**Delete** the sixth paragraph.

**5-04.3(14) Planing Bituminous Pavement**  
**(February 14, 2018 COS GSP)**

**Supplement** this Section with the following:

To avoid having excessive dirt and debris accumulate in the grooves neither the taper grind or full width grind can be started until water trench and the full depth repair areas have been completed including base course paving in the adjacent areas.

Removal of the bituminous pavement by planing shall be flush to the face of the curbs and to the limits shown on the Plans or specified by the Engineer.

The planing operation shall be performed in such a manner to be not hazardous to the traveling public. The Contractor shall construct asphalt wedges in accordance with Section 1-07.23(1).

If the Engineer determines the remaining pavement is not sound or suitable for resurfacing, the Contractor shall remove the remaining pavement in a manner acceptable to the Engineer.

The use of vacuum sweepers or similar is recommended. The Contractor is notified that in the past the use of compressed air, open brooming, and rotary street sweepers has failed to comply with the Spokane County Air Pollution Regulations.

**5-04.3(16) HMA Road Approaches**  
**(April 22, 2019 COS GSP)**

**Add** the following after the last sentence:

HMA headers shall be constructed to a nominal depth of 3-inches unless otherwise specified on the Plans, Special Provisions or by the Engineer. Class of HMA shall be the same as the adjacent pavement wearing course, unless otherwise specified within these Specifications or by the Engineer.

**Add** the following new Subsection:

**5-04.3(100) Pavement Overlay Fabric and Strip Membrane**  
**(January 1, 2020 COS GSP)**

**Add** the following after the last sentence:

HMA approach limits shall be from the existing asphalt side street match line to the outermost end of radius from mainline paving or as determined by the Engineer. HMA approaches shall be constructed to a nominal depth of 3-inches unless otherwise specified on the Plans, Special Provisions or by the Engineer. Class of HMA shall be the same as the existing approach pavement wearing course, unless otherwise specified within these Specifications or by the Engineer.

Add the following new Subsection:

**5-04.3(100) Pavement Overlay Fabric and Strip Membrane**  
**(April 1, 2006 COS GSP)**

**Pavement Overlay Fabric**

Prior to resurfacing or application of the pavement wearing (top) course, the Contractor shall furnish and install pavement overlay fabric of the type specified, where shown on the Plans or as directed by the Engineer.

Fabric Specifications: The fabric shall be a needle punched; non-woven fabric recommended by the manufacturer for resurfacing applications and shall have the following properties:

PROPERTY	TEST METHOD	VALUE (MINIMUM)
<b>Tensile Strength (either direction)</b>	<b>(ASTM D-1682-64, Grab Method)</b>	<b>90 lbs.</b>
Elongation at Break (either direction)	(ASTM D-1682-64, Grab Method)	50% - 85%
Mullen Burst Strength	(ASTM D-751)	200 PSI
Weight, ounce/square yard	(ASTM D-1910)	4.0 +/- 0.5
Asphalt Retention by fabric	(Army Corps of Engineers procedure)	0.20 GSY residual

Surface Preparation: The Contractor shall thoroughly flush and broom the entire surface of the existing roadway and perform necessary hand cleaning as directed by the Engineer.

Crack Sealing: The Contractor shall prepare and treat cracks in a manner meeting the requirements Section 5-04.3(5)C.

Preleveling: On resurfacing projects, the roadway surface shall be preleveled with HMA in order to smooth the surface and fill cracks.

Areas showing excessive bleeding of asphalt shall be treated by the Contractor by blotting the area with sand, by burning off, or otherwise removing the excess to the satisfaction of the Engineer. Blotter sand, if used, shall be free of wood, bark, or other deleterious materials and shall exhibit a gradation acceptable to the Engineer.

Application of Sealant: The surface area to receive the fabric shall be sprayed with in accordance with the fabric manufacturer's recommendations at a basic rate of  $0.25 \pm 0.03$  gallons per square yard of retained asphalt, which may be modified by the Engineer in accordance with the fabric manufacturer's recommendations, as conditions may warrant.

Asphalt shall be applied with distributor equipment (reference Section 5-02.3(1)) where possible, with hand spraying kept to minimum.

Application temperatures shall be a minimum of 290 degrees Fahrenheit and preferably greater than 325 degrees Fahrenheit. The width of asphalt application shall be the fabric width, plus 4-inches.

Fabric Placement: Ambient conditions shall meet the fabric manufacturer's recommendations. The fabric shall overlap 2-inches to 6-inches at the longitudinal joints and no more than 2-inches at the transverse joints. No joints shall be lapped with more than three layers of fabric. Transverse joints shall be shingled in the direction of the paving to prevent edge pickup by the pavers. Extra asphalt binder shall be applied to laps at a rate of approximately 0.20 gallons of retained asphalt per square yard.

The fabric shall be placed into the asphaltic binder in a timely manner, with a minimum of wrinkles, and broomed or squeegeed to remove bubbles. Time is of the essence for this phase of work. If the asphalt binder cools too much, the fabric will not adhere to it. The equipment for placing the fabric shall be mechanized and capable of handling full rolls of fabric. The test for determining if a localized wrinkled or bubbled area is a candidate for cutting shall be made by gathering together the affected fabric into one wrinkle. If the height of the doubled portion of extra fabric is 1/2-inch or more, the fabric should be slit to remove the wrinkle, and allowed to lay flat. In no case should wrinkles large enough to cause laps or folds be permitted.

### **Strip Membrane**

The Contractor shall furnish and install a strip membrane.

Material: The nonself-adhesive strip membrane shall consist of a flexible high density asphaltic membrane laminated between a nonwoven polyester geotextile and a woven polyester geotextile meeting or exceeding the physical properties listed below. A self-adhesive version may be used.

The self-adhesive heavy-duty strip membrane material shall consist of a flexible high density asphaltic membrane laminated between a nonwoven polyester geotextile and a woven polyester geotextile. The self-adhesive backing shall consist of a modified asphalt containing 15 percent SBS polymer adhered to a film release liner.

Nonself-adhesive and self-adhesive strip membrane shall be supplied in \$\$-inch wide rolls.

#### **Nonself - Adhesive Strip Membrane**

Specifications		
Cold Flex	No cracking or separation of fabric.	ASTM D146 (modified)
Tensile Strength (Peak)	2,000 PSI min.	ASTM D412 (modified)

Elongation (@ Peak Tensile)	10 percent min.	ASTM D412 (modified)
Weight	0.9 lbs./ft <sup>3</sup> typical	N/A
Density (mastic)	80 lbs./ft <sup>3</sup> min.	ASTM D70
Thickness	0.135-inches (typ.)	ASTM D1777
Thickness Retention	75 percent min. retained after loading	ASTM D395 (modified)
Absorption (mastic)	1 percent min.	ASTM D517
Brittleness	Passes	ASTM D517
Softening Point (Mastic)	210 deg. F-230 deg. F	AASHTO D36

Evidence must be presented to show that the material submitted has been used successfully for 5 years as a heavy-duty crack reduction/stress relief interlayer with documented field performance results in a minimum of 6 similar applications and/or over a wide geographic area and a variety of substrates equal to or exceeding those under consideration.

### **Nonsel - Adhesive Strip Membrane Installation Procedure**

**Surface Preparation:** The surface upon which the material is to be placed shall be prepared as specified.

**Material Placement:** The strip membrane must be dry prior to installation. The material shall be placed into the tack prior to the time the asphalt has cooled and lost its tackiness. The woven polyester side of the material should be placed up (exposed to traffic), with the nonwoven polyester side worked into the tack. The material shall be applied when the ambient temperatures are 45 degrees Fahrenheit and rising. The material shall be cut (when necessary) with a razor knife from the woven polyester side.

The strip membrane must be placed such that at least 5-inches of material extends beyond the edges of the crack, joint or distressed area.

It is critical that the edges of the mat are securely bonded to the pavement surface. Walk or roll in the edges of the mat to ensure a good bond.

Placement of the material should be made 24 hours in advance of paving operations when possible. The strip membrane can be opened to traffic as soon as the tack has cooled sufficiently to lose its stickiness. If the material must be applied immediately ahead of the paving operation, it may be necessary to use rubberized crack filler (such as Premier hot pour rubberized asphalt sealer) as a tack to bond the material to the pavement surface. Material should be rolled in a manner to ensure that an adequate bond is made between the material and the pavement surface.

**Tack:** The strip membrane is adhered to the existing surface with the use of a tack coat. The tack applied to the pavement surface shall meet the following requirements:

<b>Material</b>	<b>Grade</b>
Asphalt Cement	PG 64-28

The tack coat should be applied at a rate of approximately 0.1 gallons/square yard over existing surfaces and approximately 0.25 gallons/square yard over milled surfaces. In high temperature conditions a fog coat may be all that is needed; colder temperatures may require a heavier spray. In no case should the tack coat application rate exceed 0.25 gallons/square yard. Application of the tack coat in excess of recommendations may cause slippage of the mat when the heat of the hot-mix re-liquefies the binding agent.

The minimum recommended application temperature for the tack is 350 degrees Fahrenheit.

The maximum width of the tack coat applications shall be such that the tack extends a maximum of 1.5-inches on both sides of the strip membrane strip and shall not be applied any further in advance of material placement than can be accomplished without losing the adhesion qualities of the tack. The weather conditions will be the determining factor; for example, in cold weather this distance might be no more than 5-feet.

The strip membrane shall be placed and rolled IMMEDIATELY after the asphalt cement tack is applied to the existing surface.

The use of emulsified asphalts and/or cutbacks is not allowed for use as a tack to bond the stress relief membrane to the pavement.

It is critical that the edges of the membrane be securely bonded to the pavement surface. This is best accomplished by rolling with a pneumatic type roller.

Where transverse and longitudinal joints meet, the mat must be butted (See Detail).

Where material is damaged, the Contractor shall remove and replace the material. The Contractor shall cut and replace the damaged material 3-feet in either direction of the damaged area at no cost to the contracting agency.

Asphalt Overlay: Paving operations can only begin when the strip membrane is adequately bonded to the pavement. Adequate bonding is a function of the temperature of the pavement, tack at application and the ambient temperature. The recommended tack over the membrane prior to placement of the new overlay is emulsified asphalt (such as CSS1) at a rate specified by the Engineer. Material installed in cold weather should be overlaid as soon as possible. The combination of cold brittle tack and traffic may cause some breaking loose of the mat from the pavement surface. The minimum required asphalt overlay thickness is 1.5-inches compacted. When using a vibratory roller for compaction, care must be taken to avoid the use of excessive amplitude. Compaction procedures should be in accordance with acceptable asphalt paving

standards and practices. Use of excessive amplitude during the compaction process may result in an undesirable riding surface.

Sand: When directed by the Engineer, small amounts of washed sand may be used to blot excess asphalt if necessary to facilitate movement of traffic or construction equipment over material prior to the placement of the asphalt overlay. If the proper amount of tack coat was used this should not be required. Hot mix asphalt can be broadcast over the strip membrane ahead of the pavers if material is sticking to tires of trucks, or paving equipment to eliminate such problems.

### **Self Adhesive Strip Membrane**

<b>Property</b>	<b>Test Method</b>	<b>Requirements</b>
Thickness	ASTM D1777	0.135 inches (3.4mm) min.
Weight		0.8 lb/sf (3.7 kg/m <sup>2</sup> ) min.
Mastic Density	ASTM D70	80 PCF (1.28g/cc) min.
Cold Flexibility	ASTM D146 (modified)	Pass at 32°F(0°C)
Tensile Strength	ASTM D412, Die C	2000 PSI (13.3MPa) min.
Elongation	ASTM D412, Die C	20 percent min.
Brittleness	ASTM D517	Pass
Heat Stability	2" x 5" (5.1 x 12.7 mm) specimen hung vertically for 2 hr at 190°F (88°C)	No dripping or delamination.
Mastic Softening Point	ASTM D36	210°F (99°C) min.
Puncture Resistance	ASTM E154	450 lb (2202N) min.
Absorption	ASTM D517	1 percent max.
Thickness Retention	ASTM D395 (modified)	75 percent min.

### **Self Adhesive Strip Membrane Installation Procedure**

Surface Preparation: The surface upon which the material is to be placed shall be prepared as specified.

The self adhesive strip membrane shall be applied when the ambient temperature is 70 degrees Fahrenheit and rising. An emulsified prime coat will be required in temperatures cooler than 70 degrees Fahrenheit. No installation will be allowed in temperatures cooler than 45 degrees Fahrenheit.

Milled surfaces must be thoroughly cleaned. For all milled surfaces a tack coat (such as RS 1, SS-1, or SS-1h) will be required. Emulsified tack coats shall be applied at a rate of 0.1 gallons per square yard using a hand held spray wand.

Placement Procedure: Remove release liner and place adhesive side to pavement.

Material should be laid smooth, free of wrinkles, and with no uplifted edges. Material should be rolled (pneumatic type roller) to ensure adequate adhesion to the pavement surface.

The seams shall be butt seams.

Material may be opened to traffic immediately after placement.

Remove and replace material that is damaged after placement. Cut and replace the damaged material 3-feet in either direction of the damaged area per above installation recommendations.

Prior to placement of new overlay, install paving tack over the self-adhesive membrane (CSS1) at a rate specified by the Engineer.

Storage: Material shall be stored inside and not exposed to moisture or rain prior to installation. Exposure to moisture and/or rain may affect the ability to bond the material to the pavement surface. Inside storage temperature shall not exceed 120 degrees Fahrenheit.

.

**Add** the following new Subsection:

**5-04.3(101) Asphalt Seal Coating**  
**(February 14, 2018 COS GSP)**

Asphalt seal coating materials shall meet the requirements of Section 9-02.100.

Equipment: The bituminous distributor is to be designed and equipped as to distribute the seal coat uniformly at even heat on variable widths of surface at readily determined and controlled rates from 0.08 to 0.12 gallons per square yard and with an allowable variation from any specified rate not exceeding 5 percent. Distributor equipment shall include full-circulation spray bars, tachometer, pressure gauges, volume-measuring devices, a thermometer for reading the temperature of tank contents, and a hose attachment suitable for applying seal coating manually to area or patches inaccessible to the distributor. The distributor shall have a mechanism for spreading sharp grain sand at a rate of 0.1 to 0.25 pounds per square yard on top of the freshly applied seal coating.

Weather Limitations: The seal coating shall be applied only when the existing surface is dry for a period of 48 hours prior to application and weather temperature is above 50 degrees Fahrenheit.

Preparation of Surface: Immediately before applying the seal coating, loose material, dirt, clay, or other objectionable material shall be removed from the surface to be treated with a power broom or blower supplemented with hand brooms, as directed by the Engineer.

Application: Immediately following the preparation of the surface, the seal coating shall be applied by means of a bituminous distributor at a temperature of 65 degrees Fahrenheit to 100 degrees Fahrenheit, as directed by the Engineer. The seal coating shall be applied so that uniform distribution is obtained on the surfaces to be treated.

Unless the distributor is equipped to obtain satisfactory results at the junction of previous and subsequent applications, building paper shall be spread on the surface for a sufficient distance back from the ends of each application so that flow through the sprays may be started and stopped on the paper and the sprays will be operating at the proper pressure on the surface to be treated. Immediately after the application, the building paper shall be removed and destroyed. Spots missed by the distributor shall be properly treated with seal coating material. Normal drying time shall be from 1 hour to 4 hours.

Blotter sand shall be placed on top of the seal coat in a manner that promotes adherence of the blotter sand to the roadway surface. The blotter sand application process shall follow the bituminous seal coat material application process by a distance not to exceed 20-feet.

Aggregate for blotter sand shall be free of wood, bark, or other deleterious materials and shall exhibit a gradation acceptable to the Engineer. The proposed blotter sand material shall be approved by the Engineer before the Contractor commences with application of the seal coating.

The quantities of material to be applied shall be 0.08 to 0.12 gallon per square yard. The exact quantities or materials may be varied as directed by the Engineer to meet specific field conditions without adjustments to contract unit prices.

Copies of waybills and delivery tickets shall be submitted during the progress of the work. Before the final statement is allowed the Contractor shall file with the Engineer certified waybills and delivery tickets for the materials used in the construction of the seal coat. The Contractor shall not remove seal coating material from the tank car or storage tank until the initial outage and temperature measurements have been taken, nor shall the Contractor release the car or storage tank until the final outage has been taken.

## **SECTION 5-05 CEMENT CONCRETE PAVEMENT**

### **5-05.1 Description** **(August 1, 2008 COS GSP)**

**Add** the following after the first paragraph:

The Contractor shall construct cement concrete pavement intersections in accordance with these Special Provisions and as shown on the Plans.

Staging Plan: After award of the contract, the City will provide intersection drawings to aid in the preparation of the Contractor's staging plan. The staging plan shall indicate the pouring sequence for the segments of the intersection.

**Along with the Contractor's proposed schedule, the Contractor shall provide the Staging Plan of Construction for each of the concrete intersections and submit the plans to the Engineer at the Pre-Construction Conference.**

The staging plan shall be incorporated into the Contractor's traffic control plan after review and approval by the City.

**5-05.3 Construction Requirements**  
**(January 1, 2020 COS GSP)**

**Add** the following to this section:

Transverse drop offs must adhere to Section 5-04.3(12)A1.

**5-05.3(1) Concrete Mix Design for Paving**  
**(January 1, 2020 COS GSP)**

**Delete** the third sentence of the first paragraph.

**Replace** the third sentence of the fourth paragraph of "1. Materials" with the following:

The minimum cementitious material for any mix design shall be 750-pounds per cubic yard when Type I-II cement is used or 705-pounds when Type III cement is used.

**Replace** the first paragraph of "2. Submittals" with the following:

The Contractor's submittal shall include the mix proportions per cubic yard, test results from beams and cylinders, and the proposed sources for all ingredients including the flyash. The cement concrete pavement shall be designed with a minimum ~~\$\$\$~~3-day flexural strength of 600 PSI and a minimum 28-day compressive strength of 4000 PSI when tested in accordance with AASHTO-T97 (Third-Point Flexural Loading) and AASHTO-T22. Evaluation of strength shall be based on statistically analyzed results of 5-beam specimens made according to WSDOT T808 and tested according to AASHTO-T97 (Third-Point Flexural Loading) that demonstrate a quality level of not less than 80-percent when analyzed in accordance with Section 1-06.2(2)D. In addition the Contractor shall fabricate, cure, and test 5-sets of cylinders for evaluation of 28-day strength according to AASHTO-T22 and FOP for AASHTO-T23 using the same mix design as used in fabrication of the beams. The Contractor shall submit a concrete pavement mix design on WSDOT Form 350-040EF with the above information included for evaluation by the Engineer. The 28-day compressive strength data will be used by the Engineer for strength acceptance testing.

**Add** the following to "2. Submittals" after the first paragraph:

The Contractor shall provide test results and a correlation graph for 12-beam specimens made according to WSDOT T808 and tested according to AASHTO-T97 (Third-Point Flexural Loading) and 12-cylinders made according to WSDOT FOP's for AASHTO-T22 and AASHTO-T23 using the same mix design and batch as used in fabrication of the beams. 2-beams and 2-cylinders shall be tested concurrently at six evenly spaced time intervals. The beams and cylinders shall be tested at \$18, 36, 54, 72, 90 and 108 hours after the beams and cylinders are made for cement concrete pavement designed with a minimum \$3-day flexural strength of 600 PSI. The correlation graph shall reflect a data point plot of the compressive and flexural strength values of the concrete mix. The data points shall be placed on a single graph with the units of TIME along a scaled horizontal axis; and the units of COMPRESSIVE and FLEXURAL STRENGTH along a scaled vertical axis. The Contractor shall supply this graph to the Engineer in a legible correct format. The Engineer will review the graph when correlating the compressive to the flexural strength values. The test data and graph will be utilized during construction to determining the time requirements for protection and opening of the concrete pavement to traffic.

**Supplement** this Section with the following:

Contractor may use the following pre-approved mix design for patching cement concrete pavement:

- |                                  |                |
|----------------------------------|----------------|
| • Cement (Type III)              | 705 lbs/cy     |
| • Fine Aggregate (Class 1)       | 1000 lbs/cy    |
| • Coarse Aggregate (AASHTO #467) | 1930 lbs/cy    |
| • Entrained Air                  | 4.5% to 6.5%   |
| • Slump                          | 3-inch maximum |
| • Water/Cement Ratio             | 0.44 maximum   |
| • Calcium Chloride               | Prohibited     |

If the Contractor elects to use the pre-approved mix design, the Contractor shall provide test results and a correlation graph for 12-beam specimens made according to WSDOT T808 and tested according to AASHTO-T97 (Third-Point Flexural Loading) and 12-cylinders made according to WSDOT FOP's for AASHTO-T22 and AASHTO-T23 using the mix as used in fabrication of the beams. 2-beams and 2-cylinders shall be tested concurrently at six evenly spaced time intervals. The beams and cylinders shall be tested at \$18, 36, 54, 72, 90 and 108 hours after the beams and cylinders are made. The correlation graph shall reflect a data point plot of the compressive and flexural strength values of the concrete mix. The data points shall be placed on a single graph with the units of TIME along a scaled horizontal axis; and the units of COMPRESSIVE and FLEXURAL STRENGTH along a scaled vertical axis. The Contractor shall supply this graph to the Engineer in a legible correct format for review. The Engineer will utilize the test data and graph during construction to determining the following items:

- Time requirements for protection and opening of the concrete pavement to traffic.

- Payment penalties for non-conforming compressive strength.

**5-05.3(2) Consistency**  
**(November 1, 2012 COS GSP)**

**Delete** the second sentence in the first paragraph.

**Replace** the second paragraph with:

The material shall have a maximum slump of 3-inches and the water/cementitious material ratio, by weight, shall not exceed 0.44. When slip form paving equipment is used, the Contractor shall further control concrete consistency to ensure that edge slump conforms to the requirements of Section 5-05.3(11).

**5-05.3(3)C Finishing Equipment**  
**(August 1, 2008 COS GSP)**

**Replace** the third sentence with the following:

Hand screeding and float finishing of cement concrete pavement shall only be used on areas less than 50-square yards or as allowed by the Engineer.

**5-05.3(4)A Acceptance of Portland Cement or Blended Hydraulic Cement Concrete Pavement**  
**(January 1, 2020 COS GSP)**

**Add** the following before the first paragraph:

The Maturity Meter method shall not be approved for use in determining concrete strength for this project.

**Replace** the ninth paragraph with the following:

The Contractor shall provide cure boxes for curing concrete cylinders made by the Contractor. The Contractor shall protect the concrete cylinders from excessive vibration and shock during the cure period in accordance with Section 6-02.3(6)D. All costs associated with providing cure boxes shall be incidental to cement concrete pavement work and no separate payment will be made.

**Replace** the last sentence, of Item 2 - Rejection Without Testing, of the tenth paragraph with the following:

If the Contractor elects to have the rejected material tested, a sample will be taken and tested for compliance with slump, temperature, air content, and strength requirements.

**Replace** the second and third sentences of the eleventh paragraph with the following:

If the rejected material fails any of the requirements for the above mentioned tests, no payment will be made for the rejected material; in addition, the cost of sampling and testing at the rate of \$500 per sample shall be borne by the Contractor. If the rejected passes all testing requirements, the Contractor will be compensated for the invoiced cost of the mix plus disposal costs and the cost of sampling and testing will be borne by the Contracting Agency.

**Replace** the second and third sentences of the thirteenth paragraph with the following:

The lower Specification limit for Air Content shall be 3.5-percent, and the upper Specification limit for Air Content shall be 6.5-percent. The lower Specification limit for compressive strength shall be 1,200-PSI less than that established in the mix design as the arithmetic mean of the 5-sets of 28-day compressive strength cylinders, or 4000-PSI, whichever is higher.

**Replace** the second and third sentences of the sixteenth paragraph with the following:

The lower Specification limit for Air Content shall be 3.5-percent, and the upper Specification limit for Air Content shall be 6.5-percent. The lower Specification limit for compressive strength shall be 1,200-PSI less than that established in the mix design as the arithmetic mean of the 5-sets of 28-day compressive strength cylinders, or 4000-PSI, whichever is higher.

**5-05.3(6) Surface Preparation**  
**(April 1, 2018 COS GSP)**

**Add** the following after the last paragraph:

The subgrade may be trimmed by equipment other than automatically controlled machine using reference lines.

Where thickened edges for pavements are required, the subgrade shall be excavated and shaped to provide for the section shown on the Plans.

Wherever possible, vehicles shall be kept off the finished subgrade. If vehicles must travel on the subgrade ahead of the paving, a power drag shall be carried immediately ahead of placing concrete. Irregularities in the subgrade caused by trucks during the placement of concrete shall be smoothed out and compacted immediately ahead of placing the concrete.

Preformed Traffic Induction Loops shall be installed in the subgrade or crushed surfacing, in accordance with Section 8-20, prior to placement of Portland cement concrete pavement. The Contractor shall mark the location of the induction loops and lead-ins after placement to prevent damage to the loops from construction activities such as dowel bar basket placement.

Surface Preparation. The required depth of compacted crushed surfacing top course shall be placed atop the subgrade prior to placing the concrete. Crushed surfacing shall be placed in accordance with Section 4-04.

**5-05.3(7) Placing, Spreading, and Compacting Concrete**  
**(March 28, 2016 COS GSP)**

**Replace** the entire Section with the following:

The provisions relating to the frequency and amplitude of internal vibration shall be considered the minimum requirements and are intended to ensure adequate density in the hardened concrete. The Engineer may increase the minimum requirements for vibration if it appears the Contractor is not achieving adequate consolidation of the freshly place cement concrete pavement. At the option of the Engineer, the Contractor shall employ additional vibrating units or use whatever means deemed necessary by the Engineer to achieve adequate consolidation of the freshly placed cement concrete pavement.

**5-05.3(7)B Stationary Side Form Construction**  
**(August 1, 2008 COS GSP)**

**Replace** the sixth, seventh, and eighth paragraphs with the following:

In advance of placing concrete and after all subgrade operations are completed, side forms shall be trued and maintained to the required line and grade for a distance sufficient to prevent delays in placing concrete. The top of the side forms shall not deviate from the proposed grade by more than .02-feet and the alignment of the side forms shall be within .03-feet of the proposed alignment.

The side forms may be removed the day after the concrete has been placed if the concrete is sufficiently set to withstand removal without danger of chipping or spalling. The edges of the concrete shall be protected with moist earth or sprayed with curing compound immediately after the forms are removed.

The forms shall be thoroughly cleaned, oiled, and examined for defects each time they are used and before concrete is placed against them. The Contractor shall repair all defects or replace the defective forms with non-defective forms.

**Add** the following new Subsection:

**5-05.3(7)W Irregular Curbs**  
**(August 1, 2008 COS GSP)**

1. Irregular Curb Adjoining New Pavement. An existing curb with irregular below grade surfacing, which would create undesirable bonding of the curb to new concrete pavement shall be removed and disposed of in a legal manner by the Contractor or shall be trimmed to the satisfaction of the Engineer. Integral sidewalk and driveway

approaches would likewise be removed and disposed of by the Contractor or shall be trimmed to the satisfaction of the Engineer. The Engineer will determine which areas require replacement and which areas require trimming. Areas removed without the Engineer's approval will be replaced by the Contractor at no additional expense to this Contracting Agency.

2. Additional Pavement Forming at Irregular Curb Areas. At removed irregular curb locations, if construction sequencing requires placing concrete pavement before the curbing is replaced, forming along the outside roadway edge shall be utilized for retaining the pavement concrete. All costs associated with providing and placing such forms shall be incidental to cement concrete pavement work and no separate payment will be made.

**5-05.3(8)A            Contraction Joints**  
**(August 1, 2008 COS GSP)**

**Add** the following after the fifth paragraph:

Joints between concrete pavement and concrete curbing shall have a tar-paper (bond-breaker) material of 30 pound felt applied to the full common height between the two concrete surfaces.

**5-05.3(8)C            Construction Joints**  
**(April 1, 2006 COS GSP)**

**Add** the following after the first paragraph:

The Contractor shall construct a thickened concrete transition section wherever concrete pavement transitions to asphalt concrete at transverse joints. The transition section shall be constructed as shown on the Plans.

**5-05.3(10)           Tie Bars and Corrosion Resistant Dowel Bars**  
**(August 1, 2010 COS GSP)**

**Replace** this Section in its entirety with the following:

Tie bars shall be epoxy coated and placed as shown on the Plans, COS Standard Plans, or as directed by the Engineer. Baskets or chairs used for holding and supporting the tie bars are NOT required to be epoxy-coated and may be composed of non-metallic materials. Prior to purchasing the baskets or chairs, the Contractor shall submit a sample and obtain the Engineer's approval for their use in the project. The use of baskets is required at the locations shown on the Plans except where construction joints are required or where the use of baskets would cause the tie bars to be misaligned with pavement centerlines.

Individually placed tie bars shall be located at the required elevation and spaced as shown in the Plan and in a manner such that the vertical edge of the concrete is not deformed or otherwise damaged during the placement of the tie bars.

Placement tolerances for tie bars shall be within 1-inch of the middle of the concrete slab and within 1-inch of being centered lengthwise over the joint. Tie bars located out of compliance with these tolerances shall be cut off or removed and new tie bars shall be drilled and epoxy grouted into place at no additional cost to the Contracting Agency.

Dowel bars shall be epoxy coated and placed as shown on the Plans, COS Standard Plans, or as directed by the Engineer. All dowel bars shall be lubricated with paraffin based lubricant or grease prior to placement such that the maximum pull out resistance is 200 pounds per dowel.

Baskets or chairs used for holding and supporting the dowel bars are NOT required to be epoxy-coated and may be composed of non-metallic materials. Baskets shall allow for movement of the dowel bars within the cage. Cutting the cage to allow for movement is not allowed. Prior to purchasing the baskets or chairs, the Contractor shall submit a sample and obtain the Engineer's approval for their use in the project. The use of baskets is required at the locations shown on the Plans except where construction joints are required or where the use of baskets would cause the dowel bars to be misaligned with pavement centerlines.

Individually placed dowel bars shall be located at the required elevation and spaced as shown in the Plan and in a manner such that the vertical edge of the concrete is not deformed or otherwise damaged during the placement of the dowel bars.

Placement tolerances for dowel bars shall be within 1-inch of the middle of the concrete slab and within 1-inch of being centered lengthwise over the joint. Dowel bars located out of compliance with these tolerances shall be cut off or removed and new dowel bars shall be drilled and epoxy grouted into place at no additional cost to the Contracting Agency.

For dowel bars and tie bars, the Contractor shall furnish a Manufacturer's Certificate of Compliance in accordance with Section 1-06.3, including mill test report verifying conformance to the requirements of Section 9-07.5(2) as well as written certification identifying the patch material, when applicable, used at cut dowel bar and tie bar ends.

When new cement concrete pavement is to be placed against existing cement concrete pavement, dowel bars and tie bars shall be drilled and grouted into existing pavement with epoxy resin as shown on the Plans and within the tolerances specified above. The epoxy-bonding agent shall be either Type I or IV epoxy resin as specified in Section 9-26. The Contractor may use any method for drilling the holes, provided the method selected does not damage the existing concrete. Any damage caused by the Contractor's operations shall be repaired by the Contractor at no cost to the Contracting Agency and the repair shall be to the satisfaction of the Engineer.

Dowel bar and tie bar holes shall be brushed and blown clean with compressed air to the satisfaction of the Engineer before grouting. Dowel and tie bars shall be centered in the hole for the full length of embedment before grouting. Grout shall then be pumped into the hole around the bar in a manner that the back of the hole will be filled first.

Blocking or shimming shall not impede the flow of the grout into the hole. Dams, if needed, shall be placed at the front of the holes to confine the grout. The dams shall permit the escape of air without leaking grout and shall not be removed until the grout has cured in the hole.

When dowel bars are epoxied into drill holes, the free ends of the dowel bars shall be lubricated with paraffin based lubricant or grease prior to placement of cement concrete pavement.

**5-05.3(11)                      Finishing**  
**(November 1, 2012 COS GSP)**

**Add** the following after the second paragraph:

Before the final finishing is completed and before the concrete has taken the final set, the pavement shall be edged as indicated below:

<b>Location</b>	<b>Radius</b>
Edge of Pavement	1/2 inch
Contraction Joints	1/4 inch
Isolation (Expansion) Joints	1/2 inch

Particular attention shall be given to edge at the appropriate time. The concrete shall have attained a partial set and free water shall have disappeared so the edged joints will be clearly defined with no tearing or slump of the edges.

**Replace** the fifth paragraph with:

On small irregular areas such as curb returns, the Contractor shall true the surface in the orientation directed by the Engineer.

**Delete** the last paragraph of this section.

**5-05.3(16)                      Protection of Pavement**  
**(August 1, 2008 COS GSP)**

**Replace** the second paragraph with the following:

The operation of construction equipment on the new pavement will not be allowed until the pavement has developed a compressive strength of 3000-PSI or the compressive strength that correlates to the flexural strength of 550-PSI (whichever value is greater) as determined from cylinders, made at the time of placement, cured under comparable conditions, and tested in accordance with AASHTO T-22. Fabrication, curing, and testing

of cylinders to measure strength prior to opening pavement to construction equipment shall be the responsibility of the Contractor. The Contractor shall obtain the services of an independent Laboratory pre-approved by the Engineer to perform these activities. The Contractor shall submit the test results to the Engineer for approval prior to opening the concrete pavement to construction equipment. All costs associated with the testing required to open the pavement to construction equipment shall be the responsibility of the Contractor.

Exceptions would be one track from a slip form-paving machine when paving adjacent lanes or light vehicles required for sawing operations, coring operations, and joint sealing operations.

When concrete is being placed adjacent to an existing pavement or sidewalk, that part of the equipment which is supported on the existing pavement or sidewalk shall be equipped with protective pads on crawler tracks or rubber-tired wheels on which the bearing surface is offset to run a sufficient distance from the edge of the pavement or sidewalk to avoid breaking the pavement or sidewalk edge.

**5-05.3(17) Opening to Traffic**  
**(August 1, 2008 COS GSP)**

**Replace** this Section in its entirety with the following:

The pavement may be opened to traffic when the concrete has developed a compressive strength of 3000-PSI or the compressive strength that correlates to the flexural strength of 550-PSI (whichever value is greater) as determined from cylinders, made at the time of placement, cured under comparable conditions, and tested in accordance with AASHTO T-22.

Fabrication, curing, and testing of cylinders to measure strength prior to opening pavement to traffic shall be the responsibility of the Contractor. The Contractor shall obtain the services of an independent Laboratory pre-approved by the Engineer to perform these activities. The Contractor shall submit the test results to the Engineer for approval prior to opening the concrete pavement to traffic. The Contractor shall not use the maturity meter test to determine strength correlations of the concrete pavement. Maturity meter testing may only be used to monitor the development of in-place concrete strength. However, the maturity strength value shall be verified with the compressive strength testing of concrete cylinders prior to the opening to traffic.

The pavement shall be thoroughly cleaned and all sawed joints shall be sealed prior to opening to traffic.

All costs associated with the testing required to open the pavement to traffic shall be the responsibility of the Contractor.

**5-05.3(22) Repair of Defective Pavement Slabs**  
**(August 1, 2008 COS GSP)**

**Replace** the second paragraph with the following:

Cracks in cement concrete pavement shall be repaired by removal and replacement of entire concrete pavement panels as follows:

- 1) Removal shall be accomplished by saw-cutting full depth around the perimeter of the area to be removed such that removal will not damage adjacent concrete.
- 2) New holes drilled into the adjacent remaining panels shall be drilled by use of a core drill or rotating drill to prevent damage to remaining concrete. Use of Hammer drills is prohibited.
- 3) No dowel holes shall be drilled nearer than 15 inches from the edge of panels. The outer dowel bars may be omitted to accomplish this.

The Engineer may allow replacement of half panels provided;

1. The new joint created by the half panel is transverse to the direction of traffic. This joint shall be constructed with tie bars in accordance with the specifications for other tied joints in the concrete roadway.
2. The minimum dimension of the remaining portion of the panel is no less than 6 feet.
3. The remaining portion of the panel has no cracking or other deficiencies.
4. Joints that do not align with a joint in an adjacent panel must terminate with a 3" core hole or formed hole to prevent sympathy cracking.
5. Tie bars and dowel bars shall be replaced at the interface with remaining concrete by drilling and reinstalling in accordance with Section 5-05.3(10).

Use of epoxy injection to repair cracks or allowing cracks to remain as the working joint is not allowable.

**Add** the following new Subsection:

**5-05.3(100) Finishing and Cleanup**  
**(August 1, 2008 COS GSP)**

In addition to the "Finish and Cleanup" specified in Section 1-04.11 and Section 2-11, the Contractor shall, before final acceptance of the Work, sweep the pavement clean and remove all construction debris. The Contractor shall also clean out the open culverts and drains, inlets, catch basins, manholes, and water main valve chambers within the limits of the project of dirt and debris which is the result of the Contractor's operations.

The Contractor shall thoroughly sweep the entire surface of the new concrete pavement prior to the opening to traffic. The Contractor shall perform necessary hand cleaning as directed by the Engineer. The use of compressed air, open brooming, and rotary street sweepers have failed in the past for compliance with Spokane County Air Pollution Regulations. The use of vacuum sweepers or a similar approved method is recommended.

The Contractor shall prevent collection of concrete waste material in catch basins when cleaning the new concrete pavement. Filter fabric shall be placed into catch basins during the construction and cleaning of the concrete pavement. Additional methods may be used to increase the effectiveness of preventing collection of waste material into the catch basins. Once construction and cleaning is completed satisfactory, the filter fabric and other miscellaneous materials shall be removed and disposed of in a legal manner. To the extent possible, the Contractor shall prevent migration of concrete dust and other cementitious materials outside the project area.

Division 6

**SECTION 6-02 CONCRETE STRUCTURES**

**6-02.3 Construction Requirements**

**6-02.3(2)A Contractor Mix Design**  
**(March 1, 2016 COS GSP)**

**Replace** the first sentence with the following:

The Contractor shall provide a mix design in writing to the Engineer for all classes of concrete specified in the plans.

**6-02.3(2)B Commercial Concrete**  
**(March 7, 2016 COS GSP)**

**Add** the following after the second paragraph:

Coarse aggregate for commercial concrete shall conform to Sections 9-03.1(4). The nominal maximum size aggregate shall be no less than  $\frac{3}{4}$ -inch and no more than 1  $\frac{1}{2}$ -inches.

**The use of mobile mixers that measure material by volume shall not be allowed unless pre-authorized in writing by the Engineer.**

**6-02.3(2)D Lean Concrete**  
**(August 1, 2008 COS GSP)**

**Add** the following after the first sentence:

Lean concrete shall not be used as backfill in conjunction with underground utility construction. Controlled Density Fill (CDF) shall meet the requirements of Section 2-09.3(1)E or as amended by this document.

**6-02.3(4)C Consistency**  
**(August 1, 2008 COS GSP)**

**Replace** Item 3. in the first paragraph with the following:

3. 5-inches for non-vibrated concrete

**Add** the following after the last paragraph:

Slump tests shall be performed in accordance with WSDOT Test Method No. 804.

For commercial class concrete, the MAXIMUM allowable slump (before the addition of water-reducing admixtures as provided for below) shall be 5-inches.

**6-02.3(5)B            Certification of Compliance**  
**(March 7, 2016 COS GSP)**

**Replace** the last paragraph with the following:

For commercial concrete, the Certificate of Compliance shall include, all of the above except for the Mill Certification No.

**Add** the following new Subsection:

**6-02.3(5)W            Conditional Acceptance of Deviant Material for Curbs,  
Sidewalks, and Driveways**  
**(August 1, 2008 COS GSP)**

A load of Ready-Mix concrete may be conditionally accepted having minor deviations from the Specification limits. After notification of exceeding the Specification limits, any further loads of concrete out of Specification will be rejected and shall be removed for a given strength class placed during a 24 hour day. Minor deviations limits are  $\pm 0.5$  percent for air entrainment and  $\frac{1}{2}$ -inch for slump.

**Add** the following new Subsection:

**6-02.3(100)           Retaining Walls**  
**(February 2, 2012 COS GSP)**

The Contractor shall construct reinforced concrete retaining walls, concrete curb walls, and concrete gravity walls at the locations and of the types shown on the Plans and detail sheets in accordance with the COS Standard Plans in the 'D' series.

Concrete used for reinforced concrete retaining walls shall be as specified on the plans; if not specified on the plans air-entrained Class 3000 concrete shall be used. Steel used shall be Grade 40/Grade 60 as indicated on the Plans and shall meet the requirements of Section 9-07.

Concrete used for concrete curb walls and concrete gravity walls shall be air-entrained 6-sack commercial concrete conforming to the requirements of 6-02.3(2)B.

Mortar shall meet the requirements of ASTM C-270, for Type "M" mortar. The mortar shall be colored dark gray to approximate the basalt stone color, using pre-approved methods and materials.

When used, gravel backfill behind walls shall be in accordance with Section 9-03.12(2).

In addition, at each weep hole a minimum of 1 cubic foot of drainage rock meeting the requirements of Section 9-03.12(4) "Gravel Backfill for Drains" shall be placed at the back of the wall, covering each weep hole inlet.

Structure excavation required for installation of retaining walls shall be performed, measured, and paid for in accordance with Section 2-09.

The Contractor shall cure the walls in accordance with Section 6-02.3(11).

The Contractor shall produce a Class 1 surface finish on the exposed surfaces, in accordance with Section 6-02.3(14)A. Rusticated areas shall be subject to the finish requirements but shall minimally have undesired lips and edgings removed and rock pockets filled with mortar and smoothed in such manner as to match the general rustication treatment.

Concrete Curb Wall. The base of the curb wall shall be in accordance with the COS Standard Plans in the 'D' series.

Curb walls shall be separated from abutting cement concrete slabs or structures by using pre-molded joint filler at least 3/8-inch thick for expansion joints, meeting the requirements of Section 9-04.

Surface Rustications. Where shown on the Plans or designated by the Engineer, the exposed face of the retaining wall shall be rusticated in accordance with the wall details.

Rock facing shall consist of natural basalt stone 4-inches nominal thickness and shall be tied to the concrete wall by a method selected by the Contractor and pre-approved by the Engineer.

## **SECTION 6-13     STRUCTURAL EARTH WALLS**

### **6-13.2     Materials** **(August 3, 2015)**

Section 6-13.2 is **supplemented** with the following:

#### **Concrete Block Faced Structural Earth Wall Materials** **General Materials**

##### **Concrete Block**

Acceptability of the blocks will be determined based on the following:

1. Visual inspection.
2. Compressive strength tests, conforming to Section 6-13.3(4).
3. Water absorption tests, conforming to Section 6-13.3(4).
4. Manufacturer's Certificate of Compliance in accordance with Section 1-06.3.
5. Freeze-thaw tests conducted on the lot of blocks produced for use in this project, as specified in Section 6-13.3(4).
6. Copies of results from tests conducted on the lot of blocks produced for this project by the concrete block fabricator in accordance with the quality control program required by the structural earth wall manufacturer.

The blocks shall be considered acceptable regardless of curing age when compressive test results indicate that the compressive strength conforms to the 28-day requirements, and when all other acceptability requirements specified above are met.

Testing and inspection of dry cast concrete blocks shall conform to ASTM C 140, and shall include block fabrication plant approval by WSDOT prior to the start of block production for this project.

##### **Mortar**

Mortar shall conform to ASTM C 270, Type S, with an integral water repellent admixture as approved by the Engineer. The amount of admixture shall be as recommended by the admixture manufacturer. To ensure uniform color, texture, and quality, all mortar mix components shall be obtained from one manufacturer for each component, and from one source and producer for each aggregate.

##### **Geosynthetic Soil Reinforcement**

Geogrid reinforcement shall conform to Section 9-33.1, and shall be a product listed in Appendix D of the current WSDOT Qualified Products List (QPL). The values of  $T_{al}$  and  $T_{ult}$  as listed in the QPL for the products used shall meet or exceed the values required

for the wall manufacturer's reinforcement design as specified in the structural earth wall design calculation and working drawing submittal.

The minimum ultimate tensile strength of the geogrid shall be a minimum average roll value (the average test results for any sampled roll in a lot shall meet or exceed the values shown in Appendix D of the current WSDOT QPL). The strength shall be determined in accordance with ASTM D 6637, for multi-rib specimens.

The ultraviolet (UV) radiation stability, in accordance with ASTM D 4355, shall be a minimum of 70 percent strength retained after 500 hours in the weatherometer. The longitudinal (i.e., in the direction of loading) and transverse (i.e., parallel to the wall or slope face) ribs that make up the geogrid shall be perpendicular to one another. The maximum deviation of the cross-rib from being perpendicular to the longitudinal rib (skew) shall be no more than 1 inch in 5 feet of geogrid width. The maximum deviation of the cross-rib at any point from a line perpendicular to the longitudinal ribs located at the cross-rib (bow) shall be 0.5 inches.

The gap between the connector and the bearing surface of the connector tab cross-rib shall not exceed 0.5 inches. A maximum of 10 percent of connector tabs may have a gap between 0.3 inches and 0.5 inches. Gaps in the remaining connector tabs shall not exceed 0.3 inches.

The Engineer will take random samples of the geogrid materials at the job site. Approval of the geogrid materials will be based on testing of samples from each lot. A "lot" shall be defined as all geogrid rolls sent to the project site produced by the same manufacturer during a continuous period of production at the same manufacturing plant having the same product name. The Contracting Agency will require 14 calendar days maximum for testing the samples after their arrival at the WSDOT Materials Laboratory in Tumwater, WA.

The geogrid samples will be tested for conformance to the specified material properties. If the test results indicate that the geogrid lot does not meet the specified properties, the roll or rolls which were sampled will be rejected. Two additional rolls for each roll tested which failed from the lot previously tested will then be selected at random by the Engineer for sampling and retesting. If the retesting shows that any of the additional rolls tested do not meet the specified properties, the entire lot will be rejected. If the test results from all the rolls retested meet the specified properties, the entire lot minus the roll(s) which failed will be accepted.

All geogrid materials which have defects, deterioration, or damage, as determined by the Engineer, will be rejected. All rejected geogrid materials shall be replaced at no expense to the Contracting Agency.

Except as otherwise noted, geogrid identification, storage and handling shall conform to the requirements specified in Section 2-12.2. The geogrid materials shall not be exposed to temperatures less than -20F and greater than 122F.

## Drainage Geosynthetic Fabric

Drainage geosynthetic fabric shall be a non-woven geosynthetic conforming to the requirements in Section 9-33.1, for Construction Geotextile for Underground Drainage, Moderate Survivability, Class B.

## Proprietary Materials

### Allan Block Wall

Wall backfill material placed in the open cells of the precast concrete blocks and placed in the one to three foot zone immediately behind the precast concrete blocks shall be crushed granular material conforming to Section 9-03.9(3).

### KeyGrid Wall

KeyStone connection pins shall be fiberglass conforming to the requirements of Keystone Retaining Wall Systems, Inc.

### Landmark Retaining Wall

Lock bars shall be made of a rigid polyvinyl chloride polymer conforming to the following requirements:

Property	Value	Specification
Specific Gravity	1.4 minimum	ASTM D 792
Tensile Strength at yield	2,700 psi minimum	ASTM D 638

Lock bars shall remain sealed in their shipping containers until placement into the wall. Lock bars exposed to direct sunlight for a period exceeding two months shall not be used for construction of the wall.

### Mesa Wall

Block connectors for block courses with geogrid reinforcement shall be glass fiber reinforced high-density polypropylene conforming to the following minimum material specifications:

<b><u>Property</u></b>	<b><u>Specification</u></b>	<b><u>Value</u></b>
<i>Polypropylene</i>	<i>ASTM D 4101</i>	
	<i>Group 1 Class 1 Grade 2</i>	<i>73 ± 2 percent</i>
<i>Fiberglass Content</i>	<i>ASTM D 2584</i>	<i>25 ± 3 percent</i>
<i>Carbon Black</i>	<i>ASTM D 4218</i>	<i>2 percent minimum</i>
<i>Specific Gravity</i>	<i>ASTM D 792</i>	<i>1.08 ± 0.04</i>
<i>Tensile Strength at yield</i>	<i>ASTM D 638</i>	<i>8,700 ± 1,450 psi</i>
<i>Melt Flow Rate</i>	<i>ASTM D 1238</i>	<i>0.37 ± 0.16 ounces/10 min.</i>

Block connectors for block courses without geogrid reinforcement shall be glass fiber reinforced high-density polyethylene (HDPE) conforming to the following minimum material specifications:

<b><u>Property</u></b>	<b><u>Specification</u></b>	<b><u>Value</u></b>
HDPE	ASTM D 1248	
	Type III Class A Grade 5	68 ± 3 percent
Fiberglass Content	ASTM D 2584	30 ± 3 percent
Carbon Black	ASTM D 4218	2 percent minimum
Specific Gravity	ASTM D 792	1.16 ± 0.06
Tensile Strength	ASTM D 638	
at yield	8,700 ± 725 psi	
Melt Flow Rate	ASTM D 1238	0.11 ± 0.07 ounces/10 min.

### **6-13.3 Construction Requirements** **(August 3, 2015)**

6-13.3 is **supplemented** with the following

#### **Concrete Block Faced Structural Earth Wall**

*Concrete block faced structural earth walls shall be constructed of only one of the following wall systems. The Contractor shall make arrangements to purchase the concrete blocks, soil reinforcement, attachment devices, joint filler, and all necessary incidentals from the source identified with each wall system:*

##### *Allan Block Wall*

*Allan Block Wall is a registered trademark of the Allan Block Corporation*

*Allan Block Corporation  
7424 W 78th Street  
Bloomington, MN 55439  
(800) 899-5309  
FAX (952) 835-0013  
[www.allanblock.com](http://www.allanblock.com)*

##### *Redi-Rock Positive Connection System*

*Redi-Rock Positive Connection System is a registered trademark of Redi-Rock International, LLC*

*Redi-Rock International, LLC  
05481 US 31 South  
Charlevoix, MI 49720  
(866) 222-8400  
FAX (231) 237-9521  
[www.redi-rock.com](http://www.redi-rock.com)*

*Mesa Wall*

*Mesa Wall is a registered trademark of Tensar Corporation*

*Tensar Corporation  
2500 Northwinds Parkway Suite 500  
Atlanta, GA 30009*

*(770) 334-2090  
FAX (678) 281-8546  
[www.tensarcorp.com](http://www.tensarcorp.com)*

*Landmark Retaining Wall System*

*Landmark Retaining Wall System is a registered trademark of Anchor Wall Systems, Inc.*

*Anchor Wall Systems, Inc.  
5959 Baker Road, Suite 390  
Minnetonka, MN 55345-5996*

*(877) 295-5415  
FAX (952) 979-8454  
[www.anchorwall.com](http://www.anchorwall.com)*

*KeyGrid Wall*

*KeyGrid is a registered trademark of Keystone Retaining Wall Systems, Inc.*

*Keystone Retaining Wall Systems, Inc.  
4444 West 78<sup>th</sup> Street  
Minneapolis, MN 55435  
(800) 747-8971  
FAX (952) 897-3858  
[www.keystonewalls.com](http://www.keystonewalls.com)*

**6-13.3(3) Excavation and Foundation Preparation**  
**(January 1, 2020 COS GSP)**

6-13.3(3) Excavation and Foundation Preparation is **supplemented** with the following:

The Contractor shall excavate as necessary for wall construction or as otherwise required by the Specifications. Over-excavation will not be paid for and replacement with compacted fill and/or wall system components will be required at the Contractor's own expense.

**Replace** the second paragraph with:

Base leveling pad material shall consist of crushed surfacing top course in accordance with Section 9-03.9(3). The leveling pad shall be as recommended by the manufacturer but the pad thickness shall not be less than 6-inches thick compacted nor less than 24-inches in width. Footing materials shall be installed on undisturbed in-situ soils. Material

shall be compacted to provide a level hard surface on which to place the first course of units. Material shall be compacted to 90 percent modified proctor. Leveling pad shall be prepared to ensure full contact to the base surface of the concrete units.

### **6-13.3(5) Precast Concrete Facing Panel and Concrete Block Erection** **(April 2, 2012)**

Section 6-13.3(5) is **supplemented** with the following:

#### **Specific Erection Requirements for Precast Concrete Block Faced Structural Earth Walls**

##### **Landmark Retaining Wall**

*When placing each course of concrete blocks, the Contractor shall pull the blocks towards the front face of the wall until the male key of the bottom face of the upper block contacts and fits into the female key of the top face of the supporting block below.*

*A maximum gap of 1/8-inch is allowed between adjacent concrete blocks, except for the base course set of concrete blocks placed on the leveling pad. A maximum gap of 1-inch is allowed between adjacent base course concrete blocks, provided geosynthetic reinforcement for drains is in place over the gap at the back face of the concrete blocks.*

*Lock bars shall be installed in the female key of the top face of all concrete block courses receiving geogrid reinforcement. Gaps between adjacent lock bars in the key shall not exceed 3-inches. The lock bar shall be installed flat side up, with the angled side to the back of the concrete block, as shown in the shop drawings.*

*Geogrid reinforcement shall be placed and connected to concrete block courses specified to receive soil reinforcement. The leading edge of the geogrid reinforcement shall be maintained within 1-inch of the front face of the supporting concrete blocks below. Geogrid panels shall be abutted for 100 percent backfill coverage with less than a 4-inch gap between adjacent panels.*

*Backfill shall be placed and compacted level with the top of each course of concrete blocks, and geogrid reinforcement placed and connected to concrete block courses specified to receive soil reinforcement, before the Contractor may continue placing the next course of concrete blocks.*

##### **Mesa Wall**

*For all concrete block courses receiving geogrid reinforcement, the fingers of the block connectors shall engage the geogrid reinforcement apertures, both in the connector slot in the block, and across the block core. For all concrete block courses with intermittent geogrid coverage, a #3 steel reinforcing bar shall be placed, butt end to butt end, in the top block groove, with the butt ends being placed at a center of a concrete block.*

**(December 28, 2008 COS GSP)**

Face batter for segmental walls on this project shall NOT exceed 5 degrees from the vertical.

**Replace** the last paragraph of 6-13.3(5) with the following:

Where cap units are used, the cap units and the top course of wall units shall be secured to underlying units with an adhesive recommended by the manufacturer.

**6-13.3(7) Backfill**

**(January 11, 2009 COS GSP)**

6-13.3(7) Backfill is **supplemented** with the following:

Unit fill (if utilized by the particular wall design) and drainage fill material shall meet the gradation of Section 9-03.12(4).

Filter fabric shall be installed at the interface between the compacted backfill and the drainage rock. Filter fabric shall be installed in accordance with manufacturer's recommendations and shall meet the requirements of Section 9-33.

Insitu materials shall be used for backfill in the reinforced zone (excluding the drainage fill zone) provided such materials can meet the wall manufacturer's specifications. If the material is unsuitable, then the reinforced zone shall be backfilled with imported material conforming to Section 9-03.14(1) and 9-03.14 (4), except that the maximum particle size for walls with geogrid reinforcement shall not exceed 1-1/4 inches. except that the top 8-inches shall be on-site soil.

Imported backfill for walls without geogrid reinforcement shall meet the requirements of 9-03.12(2) except that the top 8-inches shall be on-site soil.

Division 7

**SECTION 7-01 DRAINS**

**7-01.2 Materials**

**(August 1, 2008 COS GSP)**

**Delete** the following items from the Materials List:

Corrugated Polyethylene (PE) Drain Pipe, Couplings and Fittings (Up to 10-inch)	9-05.1(6)
---	-----------

Corrugated Polyethylene (PE) Drain Pipe, Couplings and Fittings (12-inch through 60-inch)	9-05.1(7)
---	-----------

Perforated Corrugated Polyethylene (PE) Underdrain Pipe (up to 10-inch)	9-05.2(7)
---	-----------

Perforated Corrugated Polyethylene (PE) Underdrain Pipe (12-inch through 60-inch)	9-05.2(8)
---	-----------

**Delete** “corrugated polyethylene (PE)” from the first and second paragraphs.

**7-01.3 Construction Requirements**

**7-01.3(1) Drain Pipe**

**(August 1, 2008 COS GSP)**

**Delete** the last sentence.

**7-01.3(2) Underdrain Pipe**

**(August 1, 2008 COS GSP)**

**Delete** the last sentence of the second paragraph.

## **SECTION 7-02 CULVERTS**

### **7-02.2 Materials**

**(November 1, 2012 COS GSP)**

**Delete** the following items from the Materials List:

Profile Wall PVC Culvert Pipe	9-05.12(2)
Corrugated Polyethylene Culvert Pipe	9-05.19
Steel Rib Reinforced Polyethylene Culvert Pipe	9-05.21
High-Density Polyethylene (HDPE) Pipe	9-05.23
Polypropylene Culvert Pipe	9-05.24

**Replace** the third paragraph with the following:

Thermoplastic culvert pipe includes solid wall PVC culvert pipe. Solid wall PVC culvert pipe is an acceptable alternate for Schedule A or B culvert pipe.

**Delete** references to PE, Profile Wall PVC and Polypropylene Culvert Pipe from the Culvert Pipe Schedules table on page 7-4.

## **SECTION 7-04 STORM SEWERS**

### **7-04.2 Materials**

**(January 29, 2020 COS GSP)**

**Delete** the following items from the Materials List:

Steel Spiral Rib Storm Sewer Pipe	9.05.9
Steel Storm Sewer Pipe	9-05.10
Aluminum Storm Sewer Pipe	9-05.11
Profile Wall PVC Storm Sewer Pipe	9-05.12(2)
Aluminum Spiral Rib Storm Sewer Pipe	9-05.17
Steel Rib Reinforced Polyethylene Culvert Pipe	9-05.21
High-Density Polyethylene (HDPE) Pipe	9-05.23
Polypropylene Culvert Pipe	9-05.24

**Add** the following items after the Materials List:

Ductile Iron Sewer Pipe	9-05.13
ABS Composite Sewer Pipe	9-05.14

Pipe used for gravity storm sewers outside of a building footprint including pipe for connection of catch basins shall be ductile iron if there is less than 3' of cover or PVC or

concrete pipe if there is 3' or more of cover. HDPE or ABS is not allowed for gravity storm sewer pipe outside the footprint of the building

The pipe used in conjunction with grate inlets shall be ductile iron for the full length of the connection.

Stormwater force mains shall be ductile iron for sizes 4" and larger. Force mains smaller than 4" may be HDPE SDR 11 (minimum) together with locating wire.

**Delete** the second and third paragraphs.

**Delete** the table titled Storm Sewer Pipe Schedules.

### **7-04.3 Construction Requirements** **(August 1, 2008 COS GSP)**

**Add** the following after the first paragraph:

Pavement Removal and Replacement for the Trench Excavation. Pavement removed for trenching shall become the property of the Contractor and shall be removed from the project limits. Pavement removal shall be in accordance with Section 2-02.3(3).

Pavement patching shall be scheduled to accommodate the demands of traffic and shall be performed as rapidly as possible to provide maximum safety and convenience to public travel. Patching shall be in accordance with Section 5-04.3(5)E.

Connection of new catchment drain lines directly into storm lines shall be performed only where shown on the Plans or where directed by the Engineer. IN NO CASE SHALL AN UNTRAPPED CATCHMENT BE CONNECTED DIRECTLY TO A STORM LINE. The connection shall be made at a 45 degree angle down into the receiving storm line using either a tee or a saddle. In order to facilitate future maintenance, the catchment drain line shall be installed with no horizontal bends. The vertical alignment shall be accomplished using only 22-1/2 degree bends with a minimum 3-foot (nominal) section of pipe between adjacent bends.

Plug Existing Sewer Pipe. The Contractor shall plug existing sewer pipes where shown on the Plans or as directed by the Engineer. The type of plugs to be constructed may vary to best suit the particular conditions encountered at each location. Each plug shall be so constructed as to be watertight when subjected to normal trench backfilling and potential groundwater.

Written approval shall be obtained from the Engineer for the proposed method of plugging existing pipes before plugs are actually installed.

Plugging Existing Manhole Connections. Existing manhole connections shall be plugged after new connections have been made to the proposed sewer system. Written

approval shall be obtained from the Engineer for the proposed method of plugging of manhole connections before plugs are actually installed.

Project Record Documents. The Contractor shall keep one record copy of the Specifications, drawings, addenda, modifications, and shop drawings at the site in good order and annotated by the Contractor to show the changes made during the construction process. These shall be available and delivered to the Engineer upon completion of the project.

**7-04.3(1)B Exfiltration Test – Storm Sewers**  
**(August 1, 2008 COS GSP)**

**Replace** this Section in its entirety with the following:

The test requirements of Section 7-17.3(2)B shall apply to storm sewers.

**7-04.3(1)C Infiltration Test – Storm Sewers**  
**(August 1, 2008 COS GSP)**

**Replace** this Section in its entirety with the following:

The test requirements of Section 7-17.3(2)C shall apply to storm sewers.

**7-04.3(1)D Other Test Allowance - Storm Sewers**  
**(July 1, 2014 COS GSP)**

**Add** the following after the first paragraph:

The lines connecting catch basins, drywells and inlets, including the connecting lines to manholes shall not be pressure tested. For these lines, a visual inspection will be performed and if required by the Engineer, the lines shall be cleaned by the Contractor, in accordance with Section 7-07.3.

**7-04.3(1)E Low Pressure Air Test for Storm Sewers Constructed of Air-Permeable Materials**  
**(August 1, 2008 COS GSP)**

**Replace** this Section in its entirety with the following:

The test requirements of Section 7-17.3(2)E shall apply to storm sewers.

**7-04.3(1)F Low Pressure Air Test for Storm Sewers Constructed of Non-Air-Permeable Materials**  
**(August 1, 2008 COS GSP)**

**Replace** this Section in its entirety with the following:

The test requirements of Section 7-17.3(2)F shall apply to storm sewers.

**7-04.3(1)W Deflection Test for Thermoplastic Pipe**  
**(August 1, 2008 COS GSP)**

The deflection test requirements of Section 7-17.3(2)G shall apply to storm sewers.

**7-04.3(1)X Television Inspection**  
**(August 1, 2008 COS GSP)**

Prior to acceptance of the completed project, the sewer lines will be subject to interior inspection via television camera by the Wastewater Maintenance Division of the COS, in accordance with Section 7-17.3(2)H.

**7-04.3(1)Y Pressure Test for Force Mains**  
**(August 1, 2008 COS GSP)**

The requirements for pressure test for force mains of Section 7-17.3(2)W shall apply to storm sewer force mains.

**7-04.3(1)Z Pipeline Marking Tape**  
**(August 1, 2008 COS GSP)**

Materials and procedures shall be in accordance with Section 7-08.3(2)B.

**7-04.3(100) Stormwater Force Mains**  
**(January 29, 2020 COS GSP)**

Stormwater force mains shall be constructed in accordance with section 7-08.3 and 7-09.3 except for the portions of 7-09.3 pertaining to disinfection, fire hydrants and connection to existing mains, which are not applicable, and testing, which is specified in COS 7-17.3(2)W. In addition, the following requirements shall apply:

- Stormwater force mains shall be installed with a minimum 3.5' cover unless provisions are made to drain the force main automatically after each pump cycle.
- Where the force main is constructed of a non-metallic materials (i.e., permissible only for force mains smaller than 4"), locating wire shall be installed alongside the force main
- Stormwater force mains shall be installed without intermediate high points. Where, in the opinion of the Engineer, an intermediate high point cannot be avoided, an air/vacuum release valve shall be installed in a vault
- Stormwater force mains shall terminate in a manhole with a smooth transition to gravity flow.

## **SECTION 7-05     MANHOLES, INLETS, CATCH BASINS AND DRYWELLS**

### **7-05.2        Materials**

**(August 1, 2010 COS GSP)**

**Add** the following:

Outlet traps shall conform to the requirements on the COS Standard Plans in the 'B' series. Outlet traps may be constructed of PVC using a 90 degree fitting.

### **7-05.3        Construction Requirements**

**(December 21, 2016 COS GSP)**

**Add** the following after the first paragraph:

Rock is not expected to be encountered during construction of drainage structures. If rock is encountered, the Engineer will evaluate whether the drainage structure will function properly in the design location and may determine that a change or adjustment to the design is necessary. The Engineer may direct the Contractor to remove the rock.

**Add** the following after the second paragraph:

Openings in manholes, catch basins, and similar structures shall be covered with a plate to protect the structure from debris, keep the roadway open to traffic, and ensure safe conditions, unless waived by the Engineer.

On projects where the asphalt surface is to be planed, rings, and frames shall be removed prior to planing and a metal plate and temporary asphalt patch placed over the structure opening. The Contractor shall provide drainage holes through the temporary plate overlaying each drainage catchment or provide other means of drainage as approved by the Engineer. Alternatively, with the Engineer's approval the Contractor may leave the drainage structure iron in place and after having planed as closely to the iron as possible, chip and remove the remaining asphalt concrete to the required depth for the proposed overlay.

**Replace** the third paragraph with the following:

The cover or grating of a manhole, drywell, catch basin, or inlet shall not be adjusted to grade until the final elevation of the pavement, gutter, ditch, or sidewalk in which it is to be placed has been established and until permission is given by the Engineer.

Manholes or catch basins that have an existing top section constructed of bricks shall be removed and replaced with a pre-cast cone section. There shall be at least two courses of cement concrete adjusting rings situated beneath the metal frame. The area excavated for the replacement of the brick cone section shall be properly backfilled and compacted with crushed rock or native material, which shall be approved by the Engineer prior to placement. Covers or grates shall be seated properly to prevent

rocking. The improved structure shall be considered an existing structure for the purpose of payment for connection.

Manhole covers shall differentiate between sewer and water manholes in accordance with the COS Standard Plans in the 'B' series.

The Contractor shall install bolt-down sewer manhole and drywell frames and covers on all arterials and where otherwise shown in the plans. Design of standard or bolt-down frames and covers shall conform to the requirements of the COS Standard Plans in the 'B' series and Section 9-05.15(1).

**Replace** the fourth paragraph with the following:

Channels shall be made to conform accurately to the sewer grade and shall be brought together smoothly with well-rounded junctions. Channel sides shall be carried up vertically to the crown elevation of the various pipes and the concrete shelf between channels shall be smoothly finished and warped evenly with slopes to drain. Refer to the COS Standard Plans in the 'Z' series.

**Replace** the fifth paragraph with the following:

Manhole steps shall be grouted in the precast walls. Steps shall be placed as required on the COS Standard Plans.

**Replace** the eighth paragraph with the following:

All tongue and groove joints of precast manhole elements shall be sealed with a rubber or preformed flexible plastic gasket with the properties as set forth in Sections 9-04.4 and 9-04.5 meeting the dimensional requirements as to size and shape as shown on the Plans or as specified by the Engineer. Completed joints shall show no visible leakage and shall conform to the dimensional requirements of ASTM C-478. Manhole tests shall be performed as designated by the Engineer in accordance with Section 7-05.3(102)-COS. Joints between precast manhole elements shall be similar to pipe joints conforming to ASTM C-443. Adjustment sections, other joints and openings cut through the walls shall be grouted to the satisfaction of the Engineer and shall be watertight. Resilient connectors conforming to ASTM C-923 may be used at the Contractor's option for holes through the walls of precast units.

**Add** the following to the eleventh paragraph:

Connections to existing structures shall be as required for new construction. Manhole connections shall meet the additional requirements of Section 7-05.3(3). For catch basins, the invert of the incoming pipe(s) shall not be lower in elevation than the invert of the outlet pipe.

Hubs extending from manholes for future connections shall be constructed where shown on the Plans, in accordance with Sections 7-05 and 7-17.

The Contractor shall exercise caution when excavating for and installing sewerage and drainage structures, or connecting pipes to existing structures, so as to not damage existing improvements or structures. Damage caused by the Contractors' operation shall be the Contractor's sole responsibility. The Engineer will be the sole judge as to the extent of the damage and as to what work shall be required by the Contractor to restore damaged improvements or structures to their original state.

**Replace** the fifteenth paragraph with the following:

Backfill compaction of manholes, inlets, and catch basins shall be done in accordance with Section 2-03.3(14)C 'Method B' provided that the minimum allowable compaction for non-traveled areas shall be 85 percent.

Backfill for drywells shall meet the requirements of Section 9-03.12(5) and shall be thoroughly consolidated by means of vibration or other Engineer-approved methods.

Crushed surfacing base course used above the seepage area shall meet the requirements of Section 9-03.9(3).

**Add** the following after the last paragraph:

Pipe adjacent to manholes shall be placed on compacted bedding.

When specified, resilient connections shall conform to ASTM C-923. At the Contractor's option, resilient connections may be substituted for connections described herein.

Trench Safety: The Contractor shall provide for trench safety in accordance with Section 7-08.3(1).

Invert Reconstruction: When sewer pipes are connected to existing structures having inverts, the inverts shall be reconstructed to accommodate the new connection, except as noted below.

EXCEPTION: When the (new) line being connected is a primary storm water catchment line, the pipe need not be brought in at invert elevation. Rather, the new pipe may be brought into the existing structure at the necessary elevation to accommodate the NECESSARY installation gradient of the catchment line, which elevation may be above invert, in the manhole wall or cone. The actual location shall be approved by the Engineer.

Cleaning: New structures shall be cleaned in accordance with Section 7-07.

**7-05.3(1) Adjusting Manholes and Catch Basins to Grade**  
**(December 21, 2016 COS GSP)**

**Replace** the first sentence with the following:

The Contractor shall adjust frames and covers or grates for manholes existing manholes, catch basins, inlets, drywells, monuments and the other items as shown on the Plans or as directed by the Engineer.

**Add** the following after the last paragraph:

All existing sanitary sewer or storm manholes, catch basins, drywells, inlets, frame and covers shall be adjusted to the current adjustment section shown on the COS Standard Plans.

All adjustments of manholes, drywells, catch basins, and other surface features shall be complete prior to placement of the final lift of ACP. Each adjustment made subsequent to the final lift of ACP shall be subject to a penalty of \$1,000.

Telescoping manhole frames and covers (pertains to concrete paving). Either boxouts or telescoping manhole frames and covers shall be used at manhole locations. Boxouts shall be used at catch basins and shall provide a minimum 1-foot edge distance between the catch basin corners and the boxout. The material used for the boxout shall be the full common height between the two concrete surfaces.

Telescoping manhole frames and covers shall have a minimum clear opening of 24-inches, a height that places the top of the bottom frame below the concrete pavement thickness and meet the requirements of Section 9-05.15(1).

Warping of grades in lieu of manhole frame adjustment shall not be allowed. Joints in the adjustment section shall be filled with grout. The castings shall be seated in grout placed on the top course. A 3/8-inch thick mortar lining shall be installed inside and out of the adjustment section to provide a smooth, watertight finish.

Rings and frames shall be placed on cement concrete adjusting rings, bound with mortar, and wedged up to the proper grade. Mortar alone shall not be used. Debris shall not be deposited in the sewer, drainage structure, valve vault, or other similar structure from this operation. Debris shall be removed at Contractor's own expense.

The metal ring or frame on manholes, catch basins, and similar structures within areas of asphalt pavement construction or resurfacing shall be adjusted prior to placing the top lift of asphalt (wearing course).

On multiple lift asphalt paving projects and resurfacing projects, after the leveling or preleveling course is placed and prior to paving the top lift of asphalt, previous lifts of asphalt shall be cut down to the level necessary to remove the protective plate and properly place the utilities casting. A jackhammer or other suitable device should be used to cut the asphalt without lifting or damaging the abutting pavement. The edge shall be uniform, vertical, and shall be cleaned of loose material. Disturbed crushed

rock or subgrade shall be recompacted to the satisfaction of the Engineer. The Contractor shall fill the area with either HMA or lean concrete. When HMA is used it shall be the same type used for the surrounding leveling course. The cut shall be a minimum of 12-inches and a maximum of 18-inches larger than the outermost portion of the casting. The edge of the pavement and the outside of the casting shall be tacked and the HMA shall be compacted in maximum 2-inch lifts. The HMA shall be the same depth and flush with the leveling course surrounding the adjustment. When lean concrete is used the cut shall be a minimum of 6-inches and a maximum of 18-inches larger than the outermost portion of the casting. The lean concrete mix shall have 3-sacks of cement per cubic yard of mix and the maximum aggregate size shall be 3/8-inch. A non-chloride accelerant may be added to decrease set time. The lean concrete mix shall be the same depth and flush with the surface of the surrounding leveling course. The Engineer will determine if the lean concrete has cured sufficiently to allow placement of the final lift of HMA. The Engineer may require the use of HMA around utility adjustments where the extents of the patch are more than 18-inches larger than the outermost portion of the casting.

Where Portland cement concrete pavement is to be constructed, the adjustment shall be made after forms have been placed and checked.

Adjustments of all utility castings shall be made in the same manner as manholes and catch basins.

New Castings. Where adjustment of existing manholes, catch basins, inlets, valve boxes, etc. are required, and where the existing castings are discarded or ordered to be salvaged by the Engineer, the Contractor shall provide new castings of the type specified and meeting the requirements of the Standard Plans, IF NOT OTHERWISE FURNISHED BY THE OWNER. The City reserves the right to reject any or all of the Contractor's bid amounts for new castings and furnish its own iron.

Water. When water castings are marked for salvage, they shall be carefully removed and protected for either reinstallation in the project or transported to the Water Maintenance Yard at E. 914 North Foothills Drive by the Contractor. The Contractor shall contact the City Water Department at (509) 625-7800 to schedule a time for delivery of the salvaged materials.

The Contractor shall replace the salvaged castings that are missing or damaged by purchasing replacement castings from the Water Maintenance Department at no additional cost to the Contracting Agency. Deteriorated water castings shall be removed and legally disposed of by the Contractor. The Water Maintenance Department will supply and deliver new castings to the project site to replace the castings which are discarded.

The Contractor shall provide a 24 hour prior notice to the Water Maintenance Department at (509) 625-7800 in order to begin the assembly of the new castings for the Department's delivery to the project site. The Contractor shall hold the City harmless from any perceived delay of the Department's delivery schedule.

Sewer. Existing sewer castings which are being replaced shall become property of the Contractor.

Vaned Grates. Where designated by the Engineer existing catch basin frames and grates shall be removed and replaced with round base frames and rectangular vaned grates. The catch basin frame and grate shall be as indicated on the standard plans in the B series.

Necessary curb removal and replacement will be paid for separately.

Combination Castings. Where designated by the Engineer, the Contractor shall replace existing curb and surface inlet catch basin frames and grates with (surface inlet) catch basin frames and grates. Installation of the catch basin frame and grate shall include patching of the resulting curb opening in a manner acceptable to the Engineer and final adjustment unless separate bid items are required.

Maintenance of Drainage During Construction - Drain Holes or Chipping. The Contractor shall provide drainage holes through the temporary patch overlying each catch basin and grate inlet for drainage structures whose iron shall be removed and the resulting void temporarily patched in preparation for a planing operation. The size and number of the holes shall be determined by the Engineer based upon the location of the drainage structure and other factors (i.e. gradient, area of drainage basin, number of structures in vicinity, experience, etc.).

Alternatively, where directed by the Engineer or requested by the Contractor and agreed to by the Engineer, drainage structure iron may be left in place during planing operations. After grinding as closely as possible to the iron, the Contractor shall then chip and remove the remaining asphalt concrete to the level of the surrounding planed pavement.

Retrofit Catch Basins and Grate Inlets. Materials and installation shall conform to the Standard Plan(s) including appropriate adjustment section material and dimensions. The entire area excavated for catch basins or grate inlets shall be backfilled with crushed rock or native material, which shall be approved by the Engineer prior to placement. The retrofit bid item(s) shall include all work necessary to reorient the opening to the gutter line and shall include the cost of an offset cone or concrete lid as necessary. In addition, retrofit bid item(s) shall include all locations as noted on the Plans requiring cone replacement.

.

#### **7-05.3(2) Abandon Existing Manholes** **(August 1, 2008 COS GSP)**

**Replace** the first sentence with the following:

Where it is required that an existing manhole or drainage structure be abandoned, the structure shall be broken down to a depth of at least 4-feet below the revised surface elevation, connections plugged, and the manhole filled with sand and compacted to the density specified in Section 2-03.3(14)C “Method B”.

**Add** the following new Subsection:

**7-05.3(100) Drywells**  
**(August 1, 2008 COS GSP)**

Drywells shall be constructed of a cast-in-place or precast base, precast seepage sections, and precast concrete cone in accordance with the COS Standard Plans in the ‘B’ series.

The Contractor shall install drywells in the swale(s) as shown on the Plans. Materials and installation shall meet the requirements of these Special Provisions and shall conform to the COS Standard Plans in the ‘B’ series.

**Add** the following new Subsection:

**7-05.3(101) Absorption Trench/French Drain**  
**(August 1, 2008 COS GSP)**

The Contractor shall construct an absorption trench or French drain where shown on the Plans or as directed by the Engineer and in conformance with the COS Standard Plans in the ‘B’ series.

Backfill for absorption trench or French Drain shall meet the requirements of Section 9-03.12(5).

The drainage rock seepage/collection area shall be enclosed in filter fabric, as indicated on the COS Standard Plans in the ‘B’ series, which shall meet the requirements of Section 9-33. Overlap filter fabric a minimum of 18-inches.

The excavated area above the seepage/collection area shall be backfilled with crushed surfacing base course, meeting the requirements of Section 9-03.9(3).

The pipe shall include 20-feet of solid wall (5-feet for the French Drain) and the remainder perforated pipe meeting the requirements of Section 9-05. A gasketless PVC 90 degree elbow trap shall be installed on the pipe inside the drywell wall (Absorption trench only). The pipe shall be laid on a minus 1/2 percent to minus 1 percent grade away from the drywell (Absorption trench only).

**Add** the following new Subsection:

**7-05.3(102) Manhole Tests**  
**(August 1, 2008 COS GSP)**

The Contractor shall use either the water exfiltration method or vacuum method described below:

Water Exfiltration Method. The Engineer will select the manholes designated for water exfiltration testing. Water exfiltration testing shall be performed in accordance with ASTM C-969 except as modified herein.

The manhole shall be completely constructed and the inlet and outlet pipes shall be plugged prior to testing. The Contractor shall fill the manhole with water to a depth of 6-feet above the highest pipe crown or to 1-inch below the top of the reducing slab or cone section, whichever is lower. Four hours after the manhole has been filled, the Contractor shall refill the manhole to the original water level and commence the test. The Contractor shall keep the water surface to the original water level for a 6 hour period. The average leakage rate shall not exceed 0.2 gallons per hour per foot of test head above the pipe crown elevation.

Manholes which fail the exfiltration test shall be repaired and re-tested until they pass with subsequent retests being borne by the Contractor.

Vacuum Method. The Engineer will select the manholes designated for vacuum testing. Vacuum tests shall be performed in accordance with ASTM C-1244-93, except as modified herein.

Manholes shall be vacuum tested after final assembly of the manhole and connecting pipes. Manholes shall not be backfilled. Manholes which have been backfilled shall be excavated to expose the entire exterior prior to vacuum testing or the manhole shall be tested for leakage using the water exfiltration test.

The Contractor shall plug the openings in the sides of the manhole and the pipes entering the manhole, taking care to securely brace the plugs from being drawn into the manhole. Lift holes and other openings shall be plugged with a non-shrink grout acceptable to the Engineer.

The test head shall be placed at the inside of the top of the cone section and the seal inflated in accordance with the manufacturer's recommendations.

A vacuum of 10-inches of mercury shall be drawn and the vacuum pump shall be then shut off. With the valves closed, the time shall be measured for the vacuum to drop to 9-inches. The manhole shall pass if the test time is in accordance with the following chart:

Depth of Manhole (feet)	Size of Manhole and Time in Seconds		
	48"	60"	72"
8	14	18	23
10	17	23	28
12	21	28	34

14	25	32	40
16	28	37	45
18	32	41	51
20	35	46	57
22	39	51	62
24	42	55	68
26	46	60	74
28	49	64	80
30	53	69	85

Manholes which fail the vacuum test shall be repaired and re-tested until they pass with subsequent retests being borne by the Contractor.

## **SECTION 7-07     CLEANING EXISTING DRAINAGE STRUCTURES**

### **7-07.3     Construction Requirements** **(February 14, 2018   COS GSP)**

Replace the first paragraph of this Section with the following:

All new catch basin sumps, manholes, inlet and outlet structures, and debris racks shall be kept free of dirt, rock, and other debris in accordance with Section 2-03.3(100). The Contractor shall clean all new pipes, drainage structures. In addition, the Contractor is required to clean all existing facilities that have been altered or impacted by the Contractor's operations, or as directed by the Engineer, prior to final acceptance of the work. Existing facilities shall be cleaned to the next manhole, located downstream of the project. The Contractor shall hydraulically flush the pipes and facilities by jet rodding and collect the debris using a vacuum truck.

## **SECTION 7-08     GENERAL PIPE INSTALLATION REQUIREMENTS**

### **7-08.1     Construction Requirements** **(March 1, 2016 COS GSP)**

**Replace** the first paragraph with the following:

This Work includes installing culverts, storm sewers, sanitary sewers, and water mains. The Contractor shall also follow Section 7-02 (culverts), 7-04 (storm sewer), 7-09 (water mains), or 7-17 (sanitary sewer), which will respectively take precedence as it applies to the specific kind of Work.

### **7-08.3     Construction Requirements**

**7-08.3(1)A Trenches**  
**(January 1, 2020 COS GSP)**

**Add** the following before the first paragraph:

For water mains, requirements of 7-09.3(7) Trench Excavation shall take precedence over 7-08.3 (1) A Trenches.

Rock excavation shall cover the removal and disposal of rock that requires systematic drilling and blasting or use of a Hoe-Ram for its removal and also boulders exceeding 1 cubic yard. Material should be considered rock when at the discretion of the Engineer; the Contractor is unable to progress with a Caterpillar 330D L hydraulic excavator equipped with a 30-inch rock bucket and new rock teeth (or equal) or a D-8T Caterpillar equipped with a single tooth ripper and new rock tooth (or equal). The Engineer shall determine equipment equivalence.

Hardpan, hard clay, glacial till, sandstone, siltstone, shale, or other sedimentary rocks, which are soft, weathered, or extensively fissured will not be classified as rock excavation.

Ledge rock, boulders, or stones shall be removed to provide a minimum clearance of 6-inches under the pipe. Materials removed shall be replaced with gravel backfill for pipe zone bedding, pipe zone backfill, or trench backfill as designated by the Engineer.

**Add** the following after the last paragraph:

Cut-off Walls: At locations to be determined in the field, cut-off walls shall be constructed as shown on the COS Standard Plans in the 'B' series to prevent water flow along the pipe after construction. The purpose is not to provide a water-tight seal or dam but to represent as close as practicable the pre-construction condition. The cut-off wall shall extend a minimum of 6-feet along the pipe, shall be the full width of the excavation, and shall have a height of 2-feet above the highest point of groundwater and/or top of rock as determined in the field.

When not placed in city right-of-way the cut-off wall may be constructed using naturally-occurring clay capable of being compacted to required density in the pipe zone or with a bentonite-pea gravel slurry. Utilization of naturally-occurring clay shall be subject to prior approval of the engineer. The engineer's decision to use the clay shall be final. Both sides of the cut-off wall shall be faced with a woven geotextile for separation per section 9-33. When CDF is utilized it shall follow the requirements of section 2-09.3(1)E.

**7-08.3(1)B Shoring**  
**(August 1, 2008 COS GSP)**

**Add** the following after the first paragraph:

The Contractor shall provide a trench safety system meeting the requirements of WAC 296-155 Part N, for trenches in excess of 4-feet in depth, regardless of whether the Contractor is subject to WISHA or not.

**7-08.3(1)C Bedding the Pipe**  
**(March 1, 2016 COS GSP)**

**Replace** the first sentence of the second paragraph with the following:

Bedding material shall be in accordance with Section 9-03.12(3), compacted to 92 percent in the pipe zone, including under the pipe haunches to provide support, with a hand operated mechanical tamper and be in accordance with the COS Standard Plans in the “B” series for Trench Bedding.

**Add** the following after the second paragraph:

Bedding and sidefill material for flexible pipe shall meet the requirements of Section 9-03.12(3) for sand or native material. If the pipe is to be installed where rock or ground water is present, the bedding material shall meet the requirements of Section 9-03.9(3) for crushed surfacing top course.

Bedding material for rigid pipe shall meet the requirements of Section 9-03.12(3) sand or native material. Sidefill material for sewer pipe may either be per Section 9-03.12(3) sand or native material or Section 9-03.14, gravel borrow, except that maximum material size shall be 1-inch per foot of pipe diameter up to a 2” max.

Pipe bedding shall be compacted from invert to top of pipe in 12-inch (maximum) lifts. If the Contractor can demonstrate the ability to achieve the proper compaction then a thicker lift layer may be approved by the Engineer.

If approved by the Engineer, the Contractor may use a hand operated mechanical tamper for lifts up to 12-inches and shall use a heavy compactor (sheepsfoot) for lifts greater than 12-inches, up to a maximum of 18-inches.

**7-08.3(2)B Pipe Laying – General**  
**(March 1, 2016 COS GSP)**

**Add** the following after the last paragraph:

**Pipeline Marking Tape- General:** The Contractor shall install a synthetic tape at mid-depth in the trench, directly over the pipe to mark the pipe location. Such tape shall be a blue pigmented inert polyethylene film specifically intended by the manufacturer for this purpose, and shall have a minimum thickness of 4 mils and a minimum width of 3-inches. The words, “CAUTION SEWER LINE BURIED BELOW” or similar warning as appropriate for the utility being installed shall be indelibly printed in large bold letters on at least one side of the tape, with a repeat pattern of no more than 30-inches. Tape shall be approved by the Engineer prior to installation.

Pipeline Marking Tape - Water: The Contractor shall install a synthetic tape at mid-depth in the trench, directly over the pipe to mark the pipe location. Such tape shall be a blue pigmented inert polyethylene film (detectable style not required) specifically intended by the manufacturer for this purpose, and shall have a minimum thickness of 4 mils and a minimum width of 3-inches. The words, "CAUTION WATER LINE BURIED BELOW" or similar warning referencing the appropriate utility shall be indelibly printed in large bold letters on at least one side of the tape, with a repeat pattern of no more than 30-inches. Tape shall be approved by the Engineer prior to installation.

**7-08.3(2)C            Pipe Laying – Concrete**  
**(August 1, 2008 COS GSP)**

**Add** the following after the first paragraph:

Concrete pipe shall provide sufficient ultimate strength to resist the factored "D" loads indicated in the plan/profile sheets or elsewhere herein. The factored "D" loads reflect a safety factor of 1.5 and a bedding (or load) factor commensurate with the class of bedding procedure specified.

For this project, Class B bedding and the corresponding bedding factor of 1.9 have been used for calculating the indicated "D" loads.

Concrete pipe shall provide sufficient ultimate strength to resist the anticipated earth and live loads for and at the required installation depth, assuming a wide trench condition, and shall reflect a safety factor of 1.5 and an assumed bedding (or load) factor of 1.9.

**7-08.3(3)    Backfilling**  
**(January 1, 2020 COS GSP)**

**Replace** this Section in its entirety with the following:

Placement of pipe zone backfill shall be performed in accordance with these requirements and the Standard Plan. Trenches shall be backfilled as soon after the pipe laying as possible.

Pipe zone backfill material shall be clean earth or sand, free from clay, frozen lumps, roots, or moisture in excess of that permitting required compaction and shall meet the requirements of section 9-03.12(3).

Pipe zone backfill shall be placed in loose layers and compacted in accordance with the COS Standard Plans in the 'B' series. Backfill shall be brought up simultaneously on each side of the pipe to the top of the pipe zone. The pipe shall then be covered to the top of the pipe zone and the materials compacted in a manner to avoid damaging or disturbing the completed pipe.

Backfill above the pipe zone shall be accomplished in such a manner that the pipe will not be shifted out of position nor damaged by impact or overloading. If pipe is being placed in a new embankment, backfill above the pipe zone shall be placed in accordance with Section 2-03.3(14)C.

Backfill shall be placed in lifts and each lift shall be compacted to in accordance with the COS Standard Plans in the 'B' series . Lift thickness shall meet the requirements of Section 2-03.3(14)C 'Method B'. At the request of the Contractor and approval of the Engineer, the specified lift thickness may be increased to a maximum of 18-inches PROVIDED the lift thickness shall be contingent on the Contractor's demonstrated ability to maintain the proper compaction throughout the entire depth of the lift, as verified by compaction test results.

In roadways or traveled areas, compaction above the pipe zone shall meet the requirements of Section 2-03.3(14)C 'Method B'. In non-traveled areas, trench backfill materials above the pipe zone shall be compacted to 92 percent of maximum density per AASHTO T-180/T-224 and Section 2-03.3(14)D. Backfill and compaction procedures above the pipe zone shall meet the requirements of Standard Plan B-18D.

All compaction above the pipe zone shall be in accordance with the compaction control test of section 2-03.3(14)D, except in the case that 100% Recycled Concrete Aggregate is used. When 100% Recycled Concrete Aggregate is used, the Contractor may submit a written request to use a test point evaluation for compaction acceptance. Test point evaluation shall be performed in accordance with SOP 738.

Compaction of backfill above PVC pipe shall not be done with impact compactors until 3-feet of pipe cover is in place. Within 3-feet, use vibratory compaction equipment. Care shall be taken to avoid contact between the pipe and mechanical compaction equipment.

Where it is not practical to compact backfill to the required density, the Contractor may elect to use free flowing Controlled Density Fill (CDF) in lieu of "native backfill" in accordance with Section 2-09.3(1)E. Such use shall be pre-approved by the Engineer.

All compaction shall be in accordance with the Compaction Control Test of Section 2-03.3(14)D.

Materials excavated from the trench shall be used for backfill if the materials meet the gradation requirements specified on the COS Standard Plan B-18D for trench backfill.

For cover more than 4-feet above the crown of the pipe, backfill material with a maximum dimension of 12-inches may be used.

The top 12-inches of trench backfill below the roadway section aggregate shall be well-graded granular material with a maximum particle size of 6-inches and with the voids filled.

Backfill material shall not have organic material, frozen lumps, and other materials capable of damaging the pipe. Materials determined by the Engineer to be unsuitable for backfill at the time of excavation shall be removed and replaced with suitable material from other parts of the job at no cost to the City or, if none exists, imported backfill material. Imported backfill material shall meet the requirements of Section 9-03.9(3) CSBC or Section 9-03.14(2) Select Borrow and, with either material Standard Plan B-18D.

Imported foundation material shall consist of screened gravel borrow as set forth above.

Backfilling of trenches in the vicinity of catch basins, manholes or other appurtenances will not be permitted until the cement in the masonry has become thoroughly hardened.

When it is required that a blanket of select material or bank run gravel is to be placed on top of the native backfill, the backfill shall be placed to the elevations shown in the Plans, or to the elevations specified by the Engineer. Compaction of the native material shall be as required by the Contracting Agency and shall be performed prior to placing the select material. Surface material shall be loosened to whatever depth is required to prevent bridging of the top layer, but shall in no case be less than 18-inches.

The Contractor shall not operate tractors or other heavy equipment over the top of the pipe until the backfill has reached a height of 2-feet above the top of the pipe.

Water settling or flood tamping may be used only in trenches that are excavated in soils which are determined suitable for water settling by the Engineer. Water-jetting is not permitted as a means to compact the backfill.

If using movable trench supports, care shall be exercised not to disturb the pipe location, jointing, or its embedment. Removal of trench protection below the top of the pipe and within 2-1/2 pipe diameters of each side of the pipe shall be prohibited after the pipe embedment has been compacted. Movable trench supports, where supports extend below the top of the pipe, shall only be used in wide trench construction. Use of movable trench supports supported on a shelf above the pipe with the pipe installed in a narrow, vertical wall sub-ditch is also acceptable.

Voids left in the embankment material by support removal shall be carefully filled with granular material and compacted to 92 percent of the maximum density as determined by the above referenced test methods. When advancing trench boxes or shield, there shall be no longitudinal pipe movement or disjointing.

If ground water is encountered, the Contractor shall take care in placing the bedding and haunching materials to prevent migration into the voids of the embedment or trench soils. In all cases, trench side support shall remain intact. The use of manufactured granular bedding and backfill material other than specified shall be at the discretion of the Engineer.

Damages resulting from improper shoring or failure to shore shall be the sole responsibility of the Contractor.

**Add** the following new Section:

**7-08.3(100) Temporary Adjacent Utility Support**  
**(August 1, 2008 COS GSP)**

Where indicated on the project or required by field conditions, the Contractor shall temporarily support and protect adjacent utilities which are exposed or affected as the utility under construction is installed. Prior to backfill, adjacent utilities shall be properly bedded with sand.

**Add** the following new Section:

**7-08.3(101) Encase Water/Sewer at Crossings**  
**(August 1, 2008 COS GSP)**

Where water pipes cross sewer pipes, including storm sewer pipes with other than standard separations as defined in the COS Standard Plans in the 'W' series, either the water or sewer shall be cased as defined in the COS Standard Plans in the 'W' series.

**Add** the following new Section:

**7-08.3(102) Protection of Existing Sewerage Facilities**  
**(March 1, 2016 COS GSP)**

Maintenance of Sewer Services. The Contractor shall maintain sewer service for existing sewer mains and live side sewers.

Provisions shall be made by the Contractor to prevent spillage, overflow, or seepage of sewage to either the Spokane River or local groundwater. In no case shall bypasses of untreated sewage to the Spokane River be permitted.

The Contractor is responsible for damage during construction to existing sanitary or storm sewer facilities, including those lying below the excavation. Payment for repairing or reconnecting the existing sanitary or storm sewers during construction will be made only if adjustment of the sewer was required for placement of the new line as determined by the Engineer.

The Contractor shall take care to avoid damage to those facilities below the excavation that could be damaged by backhoe teeth or the shoring system. The approximate locations of side sewers, sewer mains, catch basin lines, and other facilities that may be damaged by Contractor operations lying within 18-inches below the invert of the new line are shown on the Plans.

Side sewers. Shallow side sewers or side sewers within close proximity to construction activities constructed of clay, orangeburg or other materials susceptible to breakage will be video inspected as determined by the Engineer. The Engineer may require video inspection of additional side sewer lines if they determine there are other factors that may have caused damage. The Contractor shall contact and coordinate with each property owner to gain legal access to private property to perform this work. Permission to enter private property must be documented in writing prior to performing the work.

Locations shown on the Plans are for information use only. The City maintains copies of existing side sewer cards and the Contractor may review this information to help determine approximate locations and depths for existing side sewers. Side sewer card information may not represent the actual side sewer locations and depths. Side sewer card information is recorded at the time of installation (as an example, modifications of right-of-way or grading may invalidate records) and is provided only as an information aid in allowing the Contractor to determine approximate locations and depth of existing side sewers. The City of Spokane accepts no responsibility for the accuracy of information on the side sewer card.

The Contractor shall excavate the lines identified by the Engineer within 18-inches of the invert of the new water line to allow inspection of the integrity of the sewer line. The Contractor shall exercise necessary caution and care exposing the sewer line to include the use of hand tools as directed by the Engineer.

Existing side sewers damaged or removed by the Contractor shall be reconnected as soon as possible to prevent contamination of the area. The Engineer must pre-approve the reconnection method using materials other than standard watertight fittings.

Existing side sewers are believed to be either 4-inches or 6-inches in diameter. The actual size of the side sewers is uncertain and the Contractor shall replace each side sewer with the same size pipe as removed. Installation shall conform to Sections 7-08, 7-17, and 7-18.

Catch Basin Lines. The designated catch basins shall be reconnected/connected to the existing structure/pipe or new storm sewer as shown on the Plans or required in the field.

Contractor shall verify the locations of drain lines from the catch basins to determine the location and conflicts with new water line installation. Where conflicts exist, the catch basin lines are to be relocated and reconnected as necessary to re-establish connection to the storm sewer system.

Existing catch basin laterals are either 6-inch or 8-inch diameter pipe. The actual size of the pipe is uncertain and the Contractor shall replace each lateral with the same size pipe as removed if connecting to existing pipe. New catch basin laterals shall use 8-inch pipe. The work, materials, and equipment involved shall be considered to be the same for both pipe sizes. Installation shall conform to Sections 7-04 and 7-08.

Where relocation of storm or sanitary sewer lines is required, the Contractor shall plug existing sewer pipes, manholes, drywells, or catch basin connections. The type of plugs to be constructed may vary to best suit the particular conditions encountered at each location. Each plug shall be so constructed as to be watertight when subjected to normal trench backfilling and potential groundwater. Written approval shall be obtained from the Engineer for the proposed method of plugging, before plugs are actually installed.

Pipe removed shall become the Contractor's property. The work, materials, and equipment involved shall be considered incidental to the project. Unless otherwise provided on the Plans, the Contractor shall provide the waste site for legal disposal of excess or unsuitable materials in accordance with Section 2-03.3(7).

Pipe material shall meet the requirements of Section 7-04.2 and/or Section 7-17.2, provided that the pipe used in conjunction with grate inlets shall be ductile iron for the full length of the connection.

Pipe used for reconnection of catch basins shall be either PVC or ductile iron, depending on depth-of-cover. In areas where the connecting pipe has less than 36-inches of cover in a traveled way, the Contractor shall provide ductile iron pipe for the entire length.

Bedding, backfill, and compaction shall be done in accordance with Section 7-08.

Connections to Existing Pipes or Structures. Connections to existing structures shall meet the requirements of Section 7-05.3. Connections to existing sewer pipes shall be made utilizing only pre-approved couplings or adapters and "standard" construction methods. The proposed fittings and methods must be submitted to the Engineer for approval prior to their use.

When joining similar or dissimilar sewer pipe, couplings shall be shielded stainless steel, as manufactured by Mission Rubber Company or approved equal.

Gaskets shall meet ASTM C-425-91 Table 2, 300 series stainless steel shear ring with a minimum thickness of 0.012-inches, 316 series stainless steel clamps with nut and bolt take up, shear ring and clamps to meet the requirements of ASTM A-167, transitional sizes to utilize a one piece gasket.

The Contractor shall abandon or remove existing structures as required for placement of new structures.

**Add** the following new Section:

**7-08.3(103)      Cleaning Existing Sanitary Sewers**  
**(August 1, 2010 COS GSP)**

All existing sanitary sewer pipes and manholes inside the project, including one reach downstream of the project limits require cleaning. They shall be cleaned by jetting, rodding, or whatever means necessary to provide unobstructed flow. The Contractor shall

collect the debris and dispose of in a legal manner. The existing sanitary sewer facilities shall be cleaned prior to final acceptance of the work; however this doesn't relieve the Contractor from the requirements of Section 2-03.3(100).

The Contractor shall clean new sanitary sewer facilities as specified herein.

**Add** the following new Subsection:

**7-08.3(104) Concrete Pipe Anchor**  
**(March 1, 2016 COS GSP)**

The Contractor shall construct concrete pipe anchors at the locations as shown on the Plans or as directed by the Engineer. Pipe anchors shall conform to the requirements on the COS Standard Plans in the 'B' series.

**SECTION 7-09 WATER MAINS**

**7-09.1 Description**  
**(May 20, 2019 COS GSP)**

**Replace** the first paragraph with the following:

The Contractor shall furnish and install water main pipe and fittings of the size indicated on the Plans or as directed by the Engineer.

Pipe shall be installed in accordance with the Standard Specifications, these Special Provisions, the manufacturer's printed specifications and instructions, and to the standards of the AWWA for installing the type of pipe used. The Contractor shall provide the tools and equipment, including special tools required for installing each particular type of pipe used.

**Add** the following:

Construction work on a transmission main or that affects water pressures and service on an active water transmission main is prohibited between May 15<sup>th</sup> and October 1<sup>st</sup>. The Contractor is responsible to schedule and coordinate work that affects any water transmission main with the Engineer and City of Spokane Water Department prior to the start of construction. Transmission mains are critical water infrastructure, necessary for health and public safety. The Engineer, at his sole discretion, may add restrictions deemed necessary to protect the main, maintain water pressure, and promote fire protection.

**7-09.2 Materials**  
**(August 1, 2008 COS GSP)**

**Add** the following before the first paragraph:

Unless pre-authorized in writing by the Director of Water and Hydroelectric Services or otherwise indicated on the Plans and Special Provisions, ONLY ductile iron pipe (push-on) and ductile iron mechanical joint fittings shall be used for water main installations within the service area of the City of Spokane Water Department.

Water mains shall be pressure class 350 (minimum) or a thickness class with an equal or greater wall thickness at the Contractor's option.

**Delete** the following items from the list titled "Pipe for Main Line:"

Steel Pipe (6-inches and over)	9-30.1(4)A
Polyvinyl Chloride (PVC) Pressure Pipe (4-inches and over)	9-30.1(5)A
Polyvinyl Chloride (PVC) Pressure Pipe (under 4-inches)	9-30.1(5)B
Polyethylene (PE) Pressure Pipe (4-inches and over)	9-30.1(6)

**Delete** the following items from the list titled "Fittings for Main Lines:"

Steel Pipe (6-inches and over)	9-30.2(4)A
Polyvinyl Chloride (PVC) Pipe (4-inches and over)	9-30.2(5)A
Polyvinyl Chloride (PVC) Pipe (under 4-inches)	9-30.2(5)B
Polyethylene (PE) Pipe (4-inches and over)	9-30.2(10)

**Delete** the following items from the list titled "Appurtenances:"

Concrete Blocking	6-02.3(2)B
Steel Pipe (4-inches and under)	9-30.1(4)B
Fittings for Steel Pipe (4-inches and under)	9-30.2(4)

### **7-09.3 Construction Requirements**

#### **7-09.3(6) Existing Utilities**

**(March 1, 2016 COS GSP)**

**Add** the following after the last paragraph:

All requirements of 7-08.3(102) apply.

#### **7-09.3(7) Trench Excavation**

**(March 1, 2016 COS GSP)**

**Add** the following before the first paragraph:

For water mains, the requirements of 7-09.3(7) shall take precedence over 7-08.3(1) A.

Trench excavation shall include excavation, backfill, import material from a borrow site, dewatering, bedding, compaction, haul, disposal of surplus and unsuitable material, and the other work incidental to the construction of trenches for water mains or taps.

The Contractor shall provide a trench safety system meeting the requirements of WAC 296-155 Part N, for trenches in excess of 4-feet in depth, regardless of whether the Contractor is subject to WISHA or not.

**7-09.3(7)B                      Rock Excavation**  
**(March 1, 2016 COS GSP)**

**Replace** this section in its entirety with the following:

Rock excavation shall be performed according to the requirements of 7-08.3(1)A.

**7-09.3(8)                      Removal and Replacement of Unsuitable Materials**  
**(August 1, 2010 COS GSP)**

**Delete** second paragraph.

**7-09.3(9)                      Bedding the Pipe**  
**(March 1, 2016 COS GSP)**

**Replace** this Section in its entirety with the following:

Bedding for water mains shall meet requirements of 7-08.3 (1)C.

**7-09.3(10)                      Backfilling Trenches**  
**(March 1, 2016 COS GSP)**

**Replace** this Section in its entirety with the following:

All backfill of trenches shall meet requirements of 7-08.3 (3).

**7-09.3(11)                      Compaction of Backfill**  
**(August 1, 2010 COS GSP)**

**Delete** this Section in its entirety.

**7-09.3(15)A                      Ductile Iron Pipe**  
**(February 14, 2018 COS GSP)**

**Add** the following after the last paragraph:

Deflections at pipe joints and fittings shall not exceed 75 percent of the manufacturer's recommended maximum.

**7-09.3(15)B          Polyvinyl Chloride (PVC) Pipe (4 Inches and Over)**  
**(August 1, 2008 COS GSP)**

**Delete** this Section in its entirety.

**7-09.3(17)    Laying Ductile Iron Pipe with Polyethylene Encasement**  
**(August 1, 2008 COS GSP)**

**Replace** this Section in its entirety with the following:

Where shown on the Plans or where directed by the Engineer, water main pipe shall be wrapped in 8 mil polyethylene film. Polyethylene film material and installation procedures shall meet the requirements of AWWA C-105 (latest version) and shall be pre-approved by the Engineer.

The areas to receive polyethylene film shall be designated on the Plans.

**7-09.3(19)A          Connections to Existing Mains**  
**(May 20, 2019 COS GSP)**

**Replace** this Section in its entirety with the following:

The Contractor shall furnish tees, crosses, saddles or other special fittings, and other materials needed and as shown on the Plans for connection to the existing main. The City Water Department will make the connection to the existing main. The Contractor shall make the necessary excavations to assure gradual transition between the new and existing water main and the Contractor shall perform the necessary backfilling and compaction. The Contractor shall cooperate and assist the City water Department during the tie in process. This work includes having the Contractor's operators and equipment lift, hold parts in place, and provide other assistance as needed.

Where the connection of new work to the existing system requires interruption of service and customers will be affected, the Director of Water/Hydroelectric Services and the Contractor shall mutually agree upon a date for connection which will allow ample time for assembling labor and materials and to notify the affected customers.

**7-09.3(20)          Detectable Marking Tape**  
**(March 1, 2016 COS GSP)**

**Replace** this Section in its entirety with the following:

Detectable marking tape shall meet requirements of 7-08.3(2)B.

**Add** the following new Section:

**7-09.3(20)W      Electrical Continuity**  
**(August 1, 2008 COS GSP)**

Electrical continuity shall be provided for the entire piping system. Where the joint provides continuous metal-to-metal contact such as in some restrained flexible fittings and flanged joints, no additional electrical continuity devices are required. However, for push on joints or mechanical joint fittings, where direct metal to metal contact is not made in the joint, continuity shall be effected by installing brass continuity wedges at each joint.

Brass continuity wedges shall be installed on each push-on joint, two per joint for pipe sizes under 12-inches and three per joint for pipe sizes 12-inches and larger.

**7-09.3(21)      Concrete Thrust Blocking**  
**(August 1, 2008 COS GSP)**

**Replace** this Section in its entirety with the following:

**7-09.3(21)      Restraint**  
**(August 1, 2008 COS GSP)**

Where indicated on the Plans and as directed by the Engineer, pipe restraint shall be installed at bends (vertical and horizontal), tees, crosses, plugs, end caps, and valves. Piping shall be properly stabilized at required locations in order to prevent joint separation. Unless otherwise provided for in these Special Provisions or directed by the Engineer, thrust blocking shall not be used for permanent pipe restraint. Rather, pipe restraint shall be accomplished by the use of suitably designed and fabricated pipe joint restraint systems.

Manufactured restraint joint systems shall be installed in accordance with the directions of the manufacturer.

The restraint shall be in the form of acceptable manufactured restraint joints per Section 9-30.2(6) and shall meet the following requirements:

For 12-inches and under ductile iron pipe where installing a push-on end plug into a push-on bell, the restraint shall be:

- Install a push-on end plug manufactured with two shackle lugs.
- Install one or more pipe clamp(s), as required, behind the bell and tie-rod the end plug to the pipe clamp(s) with two lengths of 3/4-inch threaded tie rods with double nutting.
- Pipe clamps shall be manufactured by the manufacturer as detailed in the COS Standard Plans in the 'Y' series.

- The pipe clamps shall be cleaned and coated with two coats of asphalt varnish or such other bituminous paint as may be approved by the Engineer, prior to installation.
- The tie rods shall be cleaned and coated with two coats of asphalt varnish or such other bituminous paint as may be approved by the Engineer, after installation.

Other approved mechanical restraint systems may be used. However, Field-Lok® gaskets shall not be installed on push-on end plugs or push-on end caps.

When restrained joint pipe is being used in lieu of Field-Lok gasket type restraint or Megalug (restrained joint harnesses) type restraint, custom lengths of pipe shall be used as appropriate to provide the proper spacing of valves, tees, or special fittings, which pipe shall be factory fabricated by the appropriate restrained joint pipe manufacturer.

### **7-09.3(22) Blowoff Assemblies**

**(August 1, 2008 COS GSP)**

**Replace** this Section in its entirety with the following:

The Contractor shall install blowoff assemblies on water transmission mains where shown on the Plans or as designated by the Engineer.

Blowoff assemblies shall meet the requirements of the COS Standard Plans in the 'Y' series. The work shall include, but not be limited to, furnishing and installing the complete valve chamber or drywell, transmission main tee or tapping sleeve, gate valve, necessary pipe and fittings, appurtenances, and other items necessary to complete the installation in a satisfactory manner. The 4-inch gate valve shall OPEN RIGHT and have the standard AWWA 2-inch nut.

### **7-09.3(23) Hydrostatic Pressure Test**

**(February 14, 2018 COS GSP)**

**Replace** the first nine paragraphs of this section (through "... the 15 minute test period.") with the following:

Water mains and appurtenances shall be tested in sections of convenient length under a hydrostatic pressure equal to the larger of:

1. One and one-half times the local operating pressure or
2. The local operating pressure plus surge pressure.

In no case shall the test pressure be less than 175 PSI. The differential pressure across valves shall not exceed pressures recommended by the valve manufacturer. Pumps, gauges, plugs, saddles, corporation stops, miscellaneous hose and piping, and measuring equipment necessary for performing the tests shall be furnished and operated by the Contractor.

The following combined pressure and leakage test shall be conducted at least TWICE on each individual section of installed pipe between valves.

The pipeline shall be filled with water provided by the City Water Department for a minimum of 24 hours before being tested, to allow the air to escape and to allow the pipe lining or gaskets to absorb water.

Under no circumstances will leakage be allowed for defective materials or installations. The pressure tests shall measure leakage over a continuous 2 hour time period, unless otherwise directed by the Engineer.

Initial Pressure Test. An initial pressure and leakage test shall be conducted as soon as possible but not until sufficient backfill has been placed or other effective means have been provided to prevent the movement of the pipe. Backfill shall be placed in such a manner that the couplings, fittings, valves and connections, including service connections, are completely exposed for visual inspection during the test except at locations such as road crossings where complete backfill may be allowed by the Engineer.

**NOTE:** The Contractor shall assess and quantify the requirements and provide adequate temporary lateral, longitudinal, and vertical restraint to the pipe, valves, and fittings during the first test.

During the initial test, the pipe joints, couplings, fittings, valves, and hydrants shall be examined by the Engineer and Contractor. The defective elements shall be replaced. Observed leakage, regardless of the amount shall be corrected. The amount of water pumped into the lines to maintain test pressure shall be accurately measured by the Contractor and shall not exceed the allowable leakage. The hydrostatic test shall be of at least a 2 hour duration.

Second Pressure Test. A second pressure and leakage test shall be conducted after the backfilling has been completed and before placement of permanent surfacing or structures, where possible.

During the second test, the amount of water pumped into the lines to maintain the test pressure shall be accurately measured by the Contractor and unless allowed otherwise by the Engineer, the amount of makeup water shall not exceed that measured in the initial test. If the test leakage in the pipeline is greater than the leakage measured during the initial test, the leakage source shall be located and repaired. The test shall be repeated until the leakage rate is at or below the rate measured in the initial test or at the discretion of the Engineer until the leakage is at least less than the allowable. The hydrostatic test shall be of at least a 2 hour duration.

Testing - Alternate Method. The Hydrostatic Pressure Test provisions shall apply provided the initial (visual) pressure test may be waived by the Engineer at the written request of the Contractor. In lieu of leaving the couplings, fittings, valves and

connections, including service connections completely exposed for visual inspection, the Contractor may bury the entire pipeline prior to testing. However, should the pipeline fail the test, the Contractor shall be responsible for the costs associated with locating the leak(s) and there will be no extra compensation made.

No pressure testing against closed butterfly valves will be allowed unless written approval is given by the Water Department.

**7-09.3(23)A      Testing Extensions From Existing Mains**  
**(August 1, 2008 COS GSP)**

**Replace** the last sentence with the following:

The final connection to the existing main shall be made by the City Water Department with Contractor furnished pre-tested, pre-chlorinated pipe.

**7-09.3(23)C      Testing Hydrants Installed on Existing Mains**  
**(August 1, 2008 COS GSP)**

**Replace** the first paragraph with the following:

Hydrants shall be installed and connected to an existing main in accordance with the COS Standard Plans in the 'Y' series and Section 7-14. The Contractor shall furnish the necessary components for the hydrant connection, including hydrant, hydrant base, tee, connection pipe, and auxiliary gate valves. The actual connection to the existing main shall be made by the City Water Department with the Contractor furnished pre-tested materials.

**7-09.3(24)      Disinfection of Water Mains**  
**(August 1, 2008 COS GSP)**

**Replace** this Section in its entirety with the following:

Disinfection of the pipeline shall be performed by the City Water Department before being placed into service. Taps required for chlorination purposes shall be provided by the Contractor, and installed before the pressure test. The Contractor shall assist the City Water Department as may be required during the disinfection process.

**7-09.3(24)O      Repetition of Flushing and Testing**  
**(August 1, 2008 COS GSP)**

**Replace** this Section in its entirety with the following:

Should the initial treatment result in an unsatisfactory bacteriological test, the original chlorination procedure will be repeated by the City until satisfactory results are obtained. Failure to get a satisfactory test shall be considered as failure of the Contractor to keep the pipe clean during construction, unless it can be established that

proper chlorination of the main was not achieved by the City. Rechlorination of the main due to failure of the Contractor to keep the pipe clean during construction shall be charged to the Contractor on a time and material basis.

## **SECTION 7-12 VALVES FOR WATER MAINS**

### **7-12.1 Description**

**(August 1, 2008 COS GSP)**

**Add** the following before the first paragraph:

The Contractor shall install valves of the type and size specified on the Plans or as directed by the Engineer.

**Replace** the second paragraph with the following:

Valves shall open CLOCKWISE (open right) and shall be equipped with a 2-inch square AWWA standard operating nut. Unless otherwise specified, valves shall be non-rising stem type. Valve boxes shall be installed on the buried valves. Cast iron valve boxes shall be manufactured as detailed on the COS Standard Plans in the 'Y' series.

### **7-12.2 Materials**

**(August 1, 2008 COS GSP)**

**Replace** the reference to gate valves (3-inches to 16-inches) with (3-inches to 12-inches).

### **7-12.3 Construction Requirements**

**(August 1, 2008 COS GSP)**

**Add** the following before the last paragraph:

Air Valve Installation. The City Water Department will furnish air valves, which shall be installed by the Contractor in accordance with these Special Provisions and the COS Standard Plans in the 'Y' series.

The Contractor shall furnish and install a standard 2-inch ball valve with a tee top operating nut, as shown, equal to McDonald Model 3131B Ball Valve.

The Contractor's work shall include, but not be limited to, furnishing and installing the complete valve chamber, transmission main tapping saddle, isolation ball valve, necessary pipe and fittings and other supplemental material necessary to complete the installation in a satisfactory manner.

The air valve assembly shall be installed in accordance to COS Standard Plan Y-102.

Adjust Valve Box. The Contractor shall adjust valve box(es) in accordance with Section 7-05.3(1).

## **SECTION 7-14     HYDRANTS**

### **7-14.2     Materials**

**(August 1, 2008 COS GSP)**

**Add** the following items at the end of the Materials List:

Operating Nuts	9-30.5(2)
6" D. I. Pipe	9-30.1(1)
6" Gate Valve	9-30.3(1)
Valve Boxes	9-30.3(4)

### **7-14.3     Construction Requirements**

#### **7-14.3(1)     Setting Hydrants**

**(August 1, 2008 COS GSP)**

**Replace** the first sentence with the following:

The hydrant assembly shall be connected, restrained, and constructed with the incidentals as shown on the Plans and COS Standard Plans in the 'Y' series.

**Add** the following after the first paragraph:

Hydrants installed at a corner shall be installed:

1. At the end of a radius (of the street the hydrant lead and tee are on).
2. Two feet inside Right-of-Way (not on private property).
3. At the back of sidewalks.
4. At the back of swales, **not in swales if possible.**

Hydrants shall not be installed within 3-feet of a traveled roadway or within 7-feet of a driveway.

**Add** the following after the last paragraph:

A hydrant in need of repair shall be identified by a white plastic disk, 8-inches in diameter, marked "OUT OF SERVICE", and placed on the port nozzle of the hydrant.

### **7-14.3(2) Hydrant Connections**

**(August 1, 2008 COS GSP)**

**Add** the following after the last paragraph:

Vertical hydrant-offsets shall be constructed where shown on the Plans and as directed by the Engineer. The hydrant piping, fittings, bends, valve, and the other component parts necessary to complete the installation of vertical offsets shall be restrained as shown on the COS Standard Plans in the 'Y' series.

### **7-14.3(3) Resetting Existing Hydrants**

**(August 1, 2008 COS GSP)**

**Delete** this Section in its entirety.

### **7-14.3(4) Moving Existing Hydrants**

**(August 1, 2008 COS GSP)**

**Delete** this Section in its entirety.

### **7-14.3(5) Reconnecting Existing Hydrants**

**(August 1, 2008 COS GSP)**

**Delete** this Section in its entirety.

### **7-14.3(6) Hydrant Extensions**

**(August 1, 2008 COS GSP)**

**Delete** this Section in its entirety.

## **SECTION 7-15 SERVICE CONNECTIONS**

**Replace** this Section in its entirety with the following:

### **7-15.1 Description**

**(August 1, 2008 COS GSP)**

This work consists of constructing domestic water service taps and 1-inch irrigation water service taps to serve the street scape drip systems where shown on the Plans. The installation(s) will also include water meters.

### **7-15.2 Materials**

**(August 1, 2008 COS GSP)**

Materials shall meet the applicable requirements of Section 9-30.6.

### **7-15.3 Construction Requirements**

**(August 1, 2008 COS GSP)**

Water service taps (hardware) will be supplied and installed by the City Water Department. The Contractor shall be required to excavate and backfill the trench for the City Water Department, as directed by the Engineer.

#### **7-15.3(1) Extending Water Service Taps Into Private Property.**

**(August 1, 2008 COS GSP)**

When the extension of a water service tap to the private property line will involve the future removal and replacement of a sidewalk, the water service tap may be extended if necessary into the private property in order to achieve a distance of 5-feet behind the sidewalk, at the Engineer's option and as indicated on the Plans, Specifications, and estimate, subject to the procurement of necessary permits.

#### **7-15.3(2) Removal and Replacement of Curbing and Sidewalk.**

**(August 1, 2008 COS GSP)**

When the installation of a water service involves routing beneath existing curbs, sidewalks, or both, the removal and replacement of the curbing and sidewalk shall be performed in accordance with Sections 2-02.3(3), 8-04.3, and 8-14.3, as appropriate. When specified herein, the removal and replacement of curbs, sidewalk, or both will be paid for separately from other water service bid items. Curb and sidewalk shall be in accordance to the applicable COS Standard Plans in the 'F' series.

#### **7-15.3(3) End Pipe Marker**

**(May 23, 2019 COS GSP)**

The location of water service pipe at the property line shall be marked by the Contractor with a 2 x 4 wooden stake buried in the ground from pipe invert to the ground elevation. The top of the 2 x 4 shall be painted blue and the depth to the water service to the tenths of a foot be indicated in black paint. A 1-foot section of #4 rebar shall be attached to the 2 x 4 with galvanized nails (top of the rebar shall be at ground elevation or below). In addition, a length of 12 gage galvanized wire shall be provided to extend from the plugged end of the water service. The upper end shall emerge at the stake but shall not be fastened to it.

#### **7-15.3(4) Trench Excavation**

**(August 1, 2008 COS GSP)**

The Contractor shall provide for trench safety in accordance with Section 7-09.3(7).

The Contractor shall provide a trench safety system meeting the requirements of WAC 296-155 Part N, for trenches in excess of 4-feet in depth, regardless of whether the Contractor is subject to WISHA or not.

Trench excavation shall be in accordance with Section 7-09.3(7). Trench excavation for water service taps shall be a minimum depth of 5 1/2-feet and a width of 2 1/2-feet for single taps or 4 1/2-feet for double taps.

**7-15.3(5) Rock Excavation**  
**(March 1, 2016 COS GSP)**

Rock excavation shall be defined in accordance with Section 7-08.3(1)A.

**7-15.3(6) Fees and Permits**  
**(February 14, 2018 COS GSP)**

The contractor shall obtain the required permit(s) as listed below and as required by Spokane Municipal Code :

(1) Water Tap Application Fee.

(2) Water Tap Installation Fee

(3) Water Service Application

and will be responsible for applicable fees.

**SECTION 7-17 SANITARY SEWERS**

**7-17.2 Materials**  
**(January 1, 2020 COS GSP)**

**Delete** the following item from the Materials List:

Profile Wall PVC Sanitary Sewer Pipe	9-05.12(2)
Polypropylene Sewer Pipe	9-05.24

**Add** the following after the last paragraph:

When pipe material is not specified in the Special Provisions, the Contractor may select appropriate material listed above, subject to the approval of the Engineer.

Flexible pipe shall provide sufficient strength to meet the deflection requirement of Section 7-17.3(2)G.

Sanitary force mains shall be ductile iron for sizes 4" and larger. Force mains smaller than 4" may be HDPE SDR 11.

**7-17.3 Construction Requirements**  
**(August 1, 2008 COS GSP)**

**Replace** this paragraph with the following:

Sanitary sewers shall be constructed in accordance with Section 7-08.3.

Pavement removal shall be in accordance with Section 2-02.3(3).

Pavement patching shall be scheduled to accommodate the demands of traffic and shall be performed as rapidly as possible to provide maximum safety and convenience to public travel. Patching shall be in accordance with Section 5-04.

The Contractor shall be responsible for removing and disposing the existing sewer pipe and manhole material from the site in accordance to Section 2-03.3(7)C.

**7-17.3(1) Protection of Existing Sewerage Facilities**  
**(August 1, 2008 COS GSP)**

**Add** the following after the last paragraph:

Sanitary Sewer Relays. Existing side sewers shall be reconnected as soon as possible to prevent contamination of the area. The Engineer must approve, in advance, the reconnection method using materials other than standard watertight fittings. Existing side sewers are believed to be either 4-inches or 6-inches in diameter. The actual size of the side sewers is uncertain and the Contractor shall replace each side sewer with the same size pipe as removed.

**7-17.3(2)A General**  
**(December 5, 2016 COS GSP)**

**Replace** the first sentence with:

Sewers and appurtenances shall be cleaned and tested after backfilling by either the exfiltration or low pressure air method (where permissible) at the option of the Contractor, except where the ground water table is such that the Engineer may require the infiltration test.

**Add** the following after the last paragraph:

After cleaning and testing, the Contractor shall perform a final flushing of the sewer line.

**7-17.3(2)D Other Test Allowance**  
**(February 14, 2018 COS GSP)**

**Add** the following after the first paragraph:

The lines connecting catch basins, drywells and inlets, including the connecting lines to manholes shall be pressure tested. The lines shall be cleaned by the Contractor, in accordance with Section 7-07.3.

**7-17.3(2)E Low Pressure Air Test for Sanitary Sewers Constructed of Air Permeable Materials**  
**(August 10, 2015 COS GSP)**

**Delete and Replace** the last paragraph with:

Joint testing is not allowed as an acceptance test for pipe constructed of air permeable materials. Air permeable pipe larger than 30" in diameter shall be tested using the exfiltration test except where the ground water table is such that the Engineer may require the infiltration.

**7-17.3(2)G Deflection Test for Thermoplastic Pipe**  
**(August 1, 2008 COS GSP)**

**Replace** this Section in its entirety with the following:

SEWERS CONSTRUCTED OF THERMOPLASTIC PIPE SHALL BE TESTED FOR VERTICAL DEFLECTION NO LESS THAN 30 DAYS AFTER TRENCH BACKFILL AND COMPACTION HAVE BEEN COMPLETED.

Maximum allowable deflection shall be governed by the mandrel requirements stated herein and shall nominally be 5 percent of the maximum average ID.

The maximum average ID shall be equal to the average OD per applicable ASTM Standard minus two times the minimum wall thickness per applicable ASTM Standard. Manufacturing and other tolerances shall not be considered for determining maximum allowable deflections.

Testing Procedure: Deflection tests shall be performed no later than 30 days after completion of placement and compaction of backfill. Testing shall be conducted on a manhole-to-manhole basis. The pipe shall be cleaned and inspected for offsets and obstructions prior to testing.

Pipes less than 24-inch ID, a mandrel shall be pulled through the pipe by hand to ensure that maximum allowable deflections have not been exceeded. (Pipe large enough to work inside of may be accepted on the basis of direct measurement). Prior to use, the mandrel shall be measured, inspected, and certified as being sound and accurate by the Engineer.

Use of an uncertified mandrel or a mandrel altered or modified after certification will invalidate the test. If the mandrel fails to pass, the pipe will be deemed overdeflected.

The mandrel shall:

1. Be a rigid, non-adjustable, 9-legged mandrel having an effective length not less than its nominal diameter.
2. Be fabricated of steel, be fitted with pulling rings at each end, be stamped or engraved on some segment other than a runner indicating the pipe material specification, nominal size, and mandrel OD (e.g. PVC, D3034-8"-7.28"); and be furnished in a suitable carrying case labeled with the same data as stamped or engraved on the mandrel.
3. Have a minimum mandrel diameter at any point along the full length as follows:

Pipe Material	Nominal Size (in.)	Min. Mandrel Diam. (in.)
PVC - ASTM D-3034 (SDR 35) and ASTM F-789	6	5.54
	8	7.28
	10	9.08
	12	10.79
	15	13.20
PVC - ASTM F-679 (T-1 Wall)	18	16.13
	21	19.01
	24*	21.36
	27*	24.06

\*For pipe ID's nominally 24-inch and larger, deflections shall be determined by a method submitted to and approved by the Engineer. If a mandrel is selected, the minimum diameter, length, and other requirements shall conform to the dimensions and requirements stated above.

**Overdeflected Pipe:** Unless otherwise permitted by the Engineer, overdeflected pipe shall be uncovered and, if not damaged, reinstalled. Pipe damaged due to overdeflection or from another cause shall be uncovered and removed from the project site. The damaged pipe shall be replaced with new pipe and re-tested at no cost to the Contracting Agency. Repairs to damaged pipe may be allowed on approval of the Engineer; the Contractor shall submit the Contractor's proposed method of repair in writing to the Engineer prior to making the repairs.

**7-17.3(2)H Television Inspection**  
**(February 14, 2018 COS GSP)**

**Replace** first paragraph with the following:

Sewer lines shall be subject to interior inspection via television (TV) camera BEFORE final acceptance. The Contractor may use the services of the City of Spokane Wastewater Management Division to complete the TV inspection for an hourly charge. Television inspection, as required to verify that deficiencies have been corrected, costs shall be borne by the Contractor at a predetermined hourly rate set by Wastewater Management for the TV Crew Services, with a minimum 1 hour charge.

Prior to the interior inspection of the sewer, the Contractor is expected to have inverts poured, manhole frames and covers installed, AND THE LINE CLEAN AND FREE OF DEBRIS. A minimum of 1 hour TV crew mobilization charge will be billed to the Contractor for failure to have a new sewer completed or cleaned to the satisfaction of the Wastewater Maintenance Division.

**Add** the following new Subsection:

**7-17.3(2)W Pressure Test for Force Mains**  
**(August 1, 2008 COS GSP)**

The Contractor shall test the new force main(s) for leakage in the manner prescribed for water mains, in accordance with Section 7-09.3(23) except the force mains shall be tested at a minimum of 100 psig or two times the operating pressure, whichever is greater for 1 hour without any drop in pressure. The test pressure shall be measured at the lift station as specified or as directed by the Engineer. The Contractor shall be responsible for providing the necessary water for the test and also for the legal disposal thereof.

**7-17.3(100) Sanitary Force Mains**  
**(January 29, 2020 COS GSP)**

**Sanitary** force mains shall be constructed in accordance with section 7-08.3 and 7-09.3 except for the portions of 7-09.3 pertaining to disinfection, fire hydrants and connection to existing mains, which are not applicable, and testing, which is specified in COS 7-17.3(2)W. In addition, the following requirements shall apply:

- **Sanitary** force mains shall be installed with a minimum 3.5' cover unless provisions are made to drain the force main automatically after each pump cycle.
- **Sanitary** force mains shall be installed without intermediate high points. Where, in the opinion of the Engineer, an intermediate high point cannot be avoided, an air/vacuum release valve shall be installed in a vault
- **Sanitary** force mains shall terminate in a manhole with a smooth transition to gravity flow.

## **SECTION 7-18     SIDE SEWERS**

### **7-18.2        Materials**

**(August 1, 2008 COS GSP)**

**Add** the following after the first sentence:

Joints shall normally be flexible gasketed. Flexible joint materials shall conform to the requirements of Section 9-04. Where directed by the Engineer, joints for PVC pipe shall be solvent cemented with a cement conforming to ASTM D-2564.

### **7-18.3        Construction Requirements**

**(February 14, 2018 COS GSP)**

**Add** the following:

The Contractor shall be required to obtain a sewer permit for each side sewer and pay the accompanying application fee. The Engineer will inspect the side sewers and the contractor shall complete the side sewer cards and submit to the Engineer prior to final acceptance. The side sewers are to be connected to tees or wyes constructed as part of the sewer main. In the event a tee or wye was not installed, a tapping saddle is to be used to make the connection.

#### **7-18.3(1)    General**

**(August 1, 2008 COS GSP)**

**Add** the following before the first sentence:

Excavation and construction shall be in accordance with Sections 7-08 and 7-17.

**Replace** the last paragraph with the following:

Pipe laying except as hereinafter provided, shall conform to the requirements of Section 7-08.3(2). Side sewers shall be laid to a line and grade between the main sewer tee branch or wye branch and the right of way margin, so as to best serve the property.

Side sewers shall be constructed with a maximum joint deflection of 75 percent of the manufacturer's recommendation. Larger changes in direction shall be made by use of standard 1/16 bends.

Side sewers shall have at least 3 1/2-feet of cover in public ways or other locations where the weight of vehicular traffic might crush the pipe and not less than 2-feet of cover in other areas. Deviations from the foregoing requirements must be as specifically authorized by the Engineer.

Connection of side sewers to the sewer lateral shall meet the requirements of the COS Standard Plans in the 'Z' series.

The Contractor shall place the tee or wye branch in the main sewer line at the location designated by the Engineer or as shown on the Plans. The Contractor shall stake and indicate the depth for the invert elevation of the pipe at the street margin or property line. The Contractor must obtain the approval of the Engineer of pipe depths prior to installation. Side sewers shall not be constructed prior to construction of sewer main.

Where side sewers are installed in areas of existing pavement, removal of existing pavement and replacement with appropriate patching shall be performed in accordance with Sections 2-02.3(3) and 5-04.3(5)E. Unless otherwise specified, patches and pavement sections/class shall be in accordance of the COS Standard Plans in the 'W' series.

When the installation of a side sewer involves routing beneath existing curbs, sidewalks, or both, the removal and replacement of the curbing and sidewalk shall be performed in accordance with Sections 2-02.3(3), 8-04, and 8-14, as appropriate. When specified herein, the removal and replacement of curbs, sidewalk, or both will be paid for separately from the side sewer bid item. Curb and sidewalk shall be in accordance of the COS Standard Plans in the 'F' series.

**7-18.3(2) Fittings**  
**(August 1, 2008 COS GSP)**

**Add** the following before the first sentence:

Fittings shall conform to the applicable requirements of Section 9-05.

**7-18.3(4) Extending Side Sewers Into Private Property**  
**(August 1, 2008 COS GSP)**

**Add** the following after the last paragraph:

When the extension of a side sewer stub to the private property line will involve the future removal and replacement of a sidewalk, the side sewer may be extended into the private property in order to achieve a distance of 10-feet behind the sidewalk at the Engineer's option and as indicated on the Plans, Specifications, and estimate, subject to the procurement of necessary permits.

**7-18.3(5) End Pipe Marker**  
**(May 23, 2019 COS GSP)**

**Replace** this Section in its entirety with the following:

The location of side sewers at the property line shall be marked by the Contractor with a 2 x 4 wooden stake buried in the ground from pipe invert to the ground elevation. The top of the 2 x 4 shall be painted green and the depth to the side sewer or tee to the tenths

of a foot be indicated in black paint. A 1-foot section of #4 rebar shall be attached to the 2 x 4 with galvanized nails (top of the rebar shall be at ground elevation or below). In addition, a length of 12 gage galvanized wire shall be provided to extend from the plugged end of the side sewer or tee. The upper end shall emerge at the stake but shall not be fastened to it.

## **SECTION 7-19 SEWER CLEANOUTS**

### **7-19.1 Description** **(August 1, 2008 COS GSP)**

**Replace** the words “sanitary sewer cleanouts” with “sanitary side sewer cleanouts”.

### **7-19.3 Construction Requirements** **(August 1, 2008 COS GSP)**

**Replace** the second paragraph with the following:

Side sewer cleanouts will not, as a matter of general policy, be located in the public right-of-way. Every effort will be made to terminate lateral and subtrunk lines at an appropriately sized manhole obviating the need for cleanouts in the public right of way. When required for the public necessity, cleanouts shall be brought to grade and conform to the COS Standard Plans in the ‘Z’ series.

**Add** the following new Section:

## **SECTION 7-100 VALVE CHAMBERS**

### **7-100.1 Description** **(August 1, 2008 COS GSP)**

The Contractor shall construct standard valve chambers and special valve chambers in accordance with the Plans and COS Standard Plans in the ‘Y’ series. No valve chamber shall be placed in a roadside ditch, drainage ditch, or channel, unless otherwise noted on the Plans.

### **7-100.2 Materials** **(August 1, 2008 COS GSP)**

Materials shall meet the requirements of the following sections:

Concrete	6-02
Concrete Brick	9-12.2
Frames and Covers for Valve Chambers	9-30.100(1)
Mortar	9-30.100(2)

### **7-100.3 Construction Requirements**

**(August 1, 2008 COS GSP)**

Valve chambers shall be either pre-cast or cast-in-place as specified on the Plans or as directed by the Engineer. Valve chambers over 3 1/2-feet in depth shall be equipped with steps or ladders.

#### **7-100.3(1) Precast Concrete Valve Chambers**

**(August 1, 2008 COS GSP)**

Precast concrete valve chambers shall conform to the requirements of Section 9-12.4, and the dimensions shall be as set forth in the COS Standard Plans in the 'Y' series.

Where indicated in the Standard Plans, barrels shall have semicircular saddle notches formed at the base, the radius of which shall be a minimum of 2-inches greater than the radius of the pipe on which it is to be seated.

Precast valve chambers for normal depth of cover from 2 1/2-feet to 3 1/2-feet shall be cast in one piece with slotted holes for placing over the main.

Precast valve chambers of nominal depth of cover from 4 1/2-feet to 6 1/2-feet shall be made in two sections.

The water main shall first be wrapped with 2-inch thick styrofoam material under the chamber walls. The remaining space shall be filled with cement mortar or mortared bricks, after setting the chamber. The chamber walls shall not rest on the pipe.

#### **7-100.3(2) Cast-in-Place Chambers**

**(August 1, 2008 COS GSP)**

Cast-in-place chambers shall be constructed by using forms and cast-in-place concrete. Finishing of walls is not required other than patching of porous spots (rock pockets) and bolt holes. Forms shall be removed for inspection of concrete.

#### **7-100.3(3) Cast Iron Frame and Cover**

**(August 1, 2008 COS GSP)**

The cast iron frame and cover will be furnished by the City Water Department and shall be set to grade by the Contractor. Adjustment of the ring or frame for valve chambers shall be done in the same manner as manholes, Section 7-05.3(1).

#### **7-100.3(4) Steps and Ladders**

**(August 1, 2008 COS GSP)**

Steps or ladders shall be installed such that the completed valve chamber will contain a continuous vertical ladder with rungs equally spaced at 12-inches  $\pm$  3/4-inch, as shown

on the COS Standard Plans in the 'Z' series. The lowest rung shall be not more than 16-inches above the bottom. The uppermost rung shall not be more than 18-inches below the street surface.

Division 8

**SECTION 8-01 EROSION CONTROL AND WATER POLLUTION CONTROL**

**8-01.3 Construction Requirements**

**8-01.3(1)B Erosion and Sediment Control (ESC) Lead**  
**(November 21, 2008 COS GSP)**

**Add** the following item after numbered paragraph 3.

3. Check the weather forecast for the following day on a daily basis.

**8-01.3(2) Seeding, Fertilizing, an Mulching**  
**(March 1, 2014 COS GSP)**

This Section is **supplemented** with the following:

A **Roadside Work Plan** as defined in Section 8-02.3(2) is required for all work described in this Section. At minimum; the plan for this work shall describe plant installation, plant establishment, weed control, and pest control.

**8-01.3(2)B Seeding and Fertilizing**  
**(March 17, 2017 COS GSP)**

This Section is **supplemented** with the following:

Seeding

Grass seed, of the following composition, proportion, and quality shall be applied at the rates shown below on all areas requiring roadside seeding within the project:

Kind and Variety of Seed in Mixture by Common Name and <i>(Botanical name)</i>	Pounds Pure Live Seed <i>(PLS) Per Acre</i>
Streambank Wheatgrass "Sodar" <i>(Agropyron riparium/Elymus lanceolatus)</i>	26.4
Bluebunch Wheatgrass "Goldar" <i>(Pseudoroegneria spicata)</i>	42.0
Thickspike Wheatgrass "Critana"	28.8

*(Agropyron dasystachyum)*

Sandberg Bluegrass “Canby” 8.4  
*(Poa sandbergii, var. canbar)*

\* Idaho Fescue “Winchester” 12.0  
*(Festuca idahoensis)*

Prairie Junegrass 2.4  
*(Koeleria cristata / Koeleria macrantha)*

Total Pounds PLS Per Acre 120.0

\* Source identified seed shall be fourth generation or earlier.  
Non-Source Identified seed shall meet or exceed Washington State Department of Agriculture Certified Seed Standards and be from within the Columbia Basin, Blue Mountain or Northern Rocky Ecoregions, as defined by the US Environmental Protection Agency (EPA) and shown at:  
[http://www.wsdot.wa.gov/eesc/design/roadside/images/eco\\_regions\\_v9.jpg](http://www.wsdot.wa.gov/eesc/design/roadside/images/eco_regions_v9.jpg)

Seeds shall be certified “Weed Free,” indicating there are no noxious or nuisance weeds in the seed.

### Fertilizer

Sufficient quantities of fertilizer shall be applied to supply the following amounts of nutrients:

Total Nitrogen as N - \*\*\* 105 \*\*\* pounds per acre.

Available Phosphoric Acid as P<sub>2</sub>O<sub>5</sub> - \*\*\* 30 \*\*\* pounds per acre.

Soluble Potash as K<sub>2</sub>O - \*\*\* 45 \*\*\* pounds per acre.

The fertilizer formulation and application rate shall be approved by the Engineer before use.

In order to comply with City regulations which seek to reduce PCBs reaching the Spokane River, when the value of hydroseeding in a project exceeds \$3,800, the Contractor shall, at his option, do one of the following:

- Use a hydroseed mixture (seed, tackifier and mulch) free of dyes and inks

- Use Rainier Fiber™ Premium Wood Fiber Mulch (green dyed) [PCB result 0.25 ppb without tackifier]

Use an alternate mulch from that indicated in the preceding bullet if the Contractor can provide testing data (EPA Method 1668 performed by a DOE accredited lab) documenting that the PCB levels of the proposed mulch are equal to or less than the PCB levels in the preceding bullet.

If the project is on steeper / tall slopes: this Section is **supplemented** with the following

In order to comply with City regulations which seek to reduce PCBs reaching the Spokane River, when the value of hydroseeding in a project exceeds \$3,800, the Contractor shall, at his option, do one of the following:

- Use a hydroseed mixture (seed, tackifier and mulch) free of dyes and inks
- Use Rainier Fiber™ Premium Wood Fiber Mulch (green dyed) [PCB result 0.25 ppb without tackifier]

Use an alternate mulch from that indicated in the preceding bullet if the Contractor can provide testing data (EPA Method 1668 performed by a DOE accredited lab) documenting that the PCB levels of the proposed mulch are equal to or less than the PCB levels in the preceding bullet.

### Seeding

Grass seed shall be applied at a rate of 120 lbs of pure live seed per acre as listed below:

Sheep Fescue (35%)	42 lbs
Hard Fescue (35%)	42 lbs
Canada Bluegrass (20%)	24 lbs
Perennial Ryegrass (10%)	12 lbs

### Fertilizer

Sufficient quantities of fertilizer shall be applied to supply the following amounts of nutrients:

Total Nitrogen as N - \*\*\* 105 \*\*\* pounds per acre.

Available Phosphoric Acid as P<sub>2</sub>O<sub>5</sub> - \*\*\* 30 \*\*\* pounds per acre.

Soluble Potash as K<sub>2</sub>O - \*\*\* 45 \*\*\* pounds per acre.

The fertilizer formulation and application rate shall be approved by the Engineer before use.

**8-01.3(2)D      Mulching**  
**(February 14, 2018    COS GSP)**

This Section is **supplemented** with the following:

Wood cellulose fiber mulch shall be applied at a rate of 2000 pounds per acre.

Hay or straw mulch shall be applied at a rate of 4000 pounds per acre

A mulch tackifier shall be used to tie down the mulch. The tackifier shall be, applied at the rates recommended by the manufacturer or an approved equal applied at the rate approved by the Engineer. 150 pounds per acre of wood cellulose fiber shall be added to the mixture as a tracer.

The tackifier shall be sprayed on the mulch after it is in place on the slopes. No other method of application will be permitted.

The mulch and tackifier shall comply with section 8-01.3(2)B.

If the project is on steeper / tall slopes, this Section is **supplemented** with the following

Bonded Fiber Matrix (BFM) made of wood fibers shall be applied using hydroseeding at a minimum rate of 3500 lbs per acre. WSDOT approved manufacturer's include Canfor, Mat Inc. and Conwed Fibers.

BFM shall be mixed and applied in accordance with the manufacturer's recommendations and application instructions. At a minimum the BFM shall be applied in two directions to avoid shadowing and assure 95% soil coverage. Application shall be accomplished in a two step process - 1) hydraulically apply seed and fertilizer along with 25% of the rate of BFM to covered a premeasured area. 2) apply the remaining 75% of BFM to cover the previously seeded area. Application of the BFM shall take place on dry to moderately moist soil and in dry weather conditions to assure a maximum 24 hour cure time. BFM shall be installed a minimum of 2 feet beyond the top of all cut slopes.

**SECTION 8-02    ROADSIDE RESTORATION**

**8-02.1      Description**  
**(August 1, 2008    COS GSP)**

**Add** the following after the last paragraph:

The Contractor shall construct bio-infiltration swales (208 swales) as shown in the Plans, in accordance with the Special Provisions, and as directed by the Engineer.

Tree and shrub planting shall be in accordance with the Plans and COS Standard Plans in the 'V' series.

**8-02.2 Materials**  
**(August 1, 2008 COS GSP)**

**Replace** the last paragraph with:

Botanical identification, growth habit, mature size, sun / shade tolerances, and nomenclature of the plant materials shall be based on descriptions by Fitzgerald, McCrea, Notske, Burt, Flott, and Terrell in "Landscape Plants for the Inland Northwest".

**8-02.3 Construction Requirements**

**8-02.3(4) Topsoil**  
**(August 1, 2008 COS GSP)**

**Replace** the last sentence of the first paragraph with the following:

After the topsoil has been spread, large clods, hard lumps, and rocks over 1-inch in diameter, along with sticks or other litter shall be raked up, removed, and legally disposed of by the Contractor.

**8-02.3(4)A Topsoil Type A**  
**(August 1, 2008 COS GSP)**

**Replace** the first sentence with the following:

Topsoil Type A shall be as specified in Section 9-14.1(1).

**8-02.3(4)B Topsoil Type B**  
**(August 1, 2008 COS GSP)**

**Delete** this Section in its entirety.

**8-02.3(4)C Topsoil Type C**  
**(August 1, 2008 COS GSP)**

**Delete** this Section in its entirety.

**8-02.3(5)A Seeding Area Preparation**  
**(January 1, 2020 COS GSP)**

**Replace** item one of the first paragraph with the following:

Excess material, debris, stumps, large clods, hard lumps, and rocks over 1-inch in diameter, along with sticks or other litter shall be raked up, removed, and legally disposed of by the Contractor.

**8-02.3(5)C                      Planting Area Preparation**  
**(February 23, 2011 COS GSP)**

**Replace** item three of the first paragraph with the following:

All areas shall be brought to a uniformed finished grade per Standard Plans for sidewalks, curbs, junction boxes, valve boxes, catch basins, and driveways unless otherwise specified.

This section is **supplemented** with the following:

Planting pits shall be excavated as shown on the Plans. Where the depth of the excavations is deeper than the cultivated depth of topsoil, the Contractor shall legally dispose of subsoil removed from planting excavations. The Contractor shall not mix the removed subsoil with planting soil or use as backfill.

**8-02.3(6)                      Mulch and Amendments**  
**(August 1, 2008 COS GSP)**

**Replace** this Section in its entirety with the following:

Soil amendments of the type, quality, and quantities specified by the soil tests shall be applied to the entire site or as shown on the Plans and shall be cultivated in to a depth of 12-inches.

**8-02.3(7)                      Layout of Planting, Lawn and Seeding Areas**  
**(August 1, 2008 COS GSP)**

**Replace** third and fourth paragraphs with the following:

The Engineer retains the right to further inspect trees for size, condition of root systems, insects, injuries, and latent defects. The Engineer may reject unsatisfactory or defective material at any time during the work. The Contractor shall remove rejected trees immediately from the project site. The Contractor shall replace the rejected trees with new Engineer-approved trees.

**8-02.3(8)                      Planting**  
**(August 1, 2008 COS GSP)**

**Replace** #1 in the second paragraph with the following:

1.        Non-irrigated Plant Material  
          October 1<sup>st</sup> to June 1<sup>st</sup>

**Replace** the remaining section after item #2 with the following:

Plant materials shall not be planted until the irrigation system is fully operational and has been inspected by the Engineer.

All planting shall be done in accordance with the details shown in the Plans.

**8-02.3(8)C                      Pruning, Staking, Guying, and Wrapping**  
**(August 1, 2008 COS GSP)**

**Replace** this Section in its entirety with the following:

Trimming shall be performed in conformance with nursery standards. Trim only dead or broken branches and double leaders at the time of planting.

Pruning shall be performed in conformance with the International Society of Arboriculture (ISA) guidelines.

Tree wrap shall not be used and shall be removed from the trees immediately upon planting.

Staking and guying shall only be used if specified in the details as shown in the Plans.

**8-02.3(10)C                      Lawn Establishment**  
**(August 1, 2008 COS GSP)**

**Revise** the first sentence of the second paragraph as follows:

“...end of four mowings or 45-working days which ever is longer.”

**8-02.3(10)D                      Lawn Mowing**  
**(August 1, 2008 COS GSP)**

**Replace** the first paragraph with the following:

Lawn mowing shall be the responsibility of the Contractor only during the lawn establishment period and shall not extend through the plant establishment period.

The initial mowing shall not be performed until the seed has reached an initial height of 3-inches.

**8-02.3(11)B      Bark or Wood Chip Mulch**  
**(August 1, 2008 COS GSP)**

**Replace** the second sentence of the fourth paragraph with the following:

Mulch shall be kept back to the edge of the root ball on tree plantings. Mulch shall be brought up to flush with top of curb, valve boxes, junction boxes, sidewalks, and pavement edges.

.

**8-02.3(13)      Plant Establishment**  
**(August 1, 2008 COS GSP)**

**Add** the following to the sixth paragraph:

Irrigation system adjustments shall be the Contractor's responsibility during this period, including but not limited to adjusting the height and angle of heads, height of valve boxes, and junction boxes. Filling in of areas that settle shall be completed prior to the end of this period.

**8-02.3(16)A      Lawn Installation**  
**(August 1, 2008 COS GSP)**

**Replace** the third paragraph with the following:

A seeded slurry shall be evenly applied with a hydraulic seeder at a rate, mix, and analysis specified on the Plans or as designated by the Engineer to those areas indicated on the Plans or where directed by the Engineer.

Seed shall not be sown immediately following rain, when the ground is too dry, or during windy periods. The Contractor shall not seed areas in excess of that which can be mulched on the same day.

The seeded area shall be watered with a light, fine spray immediately after each area has been mulched. Frequent, short duration watering periods are desired to provide moisture to the seed, while preventing water flow over the soil and "washing" of the seed.

**Replace** the sixth paragraph with the following:

Sod installation shall be in accordance with the following sequence of construction procedures:

- Before laying sod, the area shall be prepared as specified above. The finished grade before sod installation shall be 2-inches below curbs, sidewalks, and other appurtenances.
- Root-zone fertilizer shall be applied in accordance with Section 9-14.3. The soil shall be lightly watered to aid dissipation of fertilizer.
- Sod shall be well-established, mown lawn grass turf. Sod shall be vigorous, well-rooted, healthy turf free from disease, insect pests, weeds and other grasses, stones and other harmful or deleterious matter. Handling of sod shall be done so as to prevent tearing, breaking, drying or other damage. Sod shall be rolled or folded prior to lifting.
- End joints shall be staggered and sand shall be placed in joints between sod strips to allow for cross rooting. On sloped areas, the sod shall be laid with the long dimension parallel to the toe or top of the slope. Sod shall be installed in place on the site not more than 48-hours after cutting.
- Following placement, the sod shall be adequately rolled with a suitable smooth roller.
- After rolling, the Contractor shall heavily water the sod by automatic sprinkling.

**8-02.3(16)B      Lawn Establishment**  
**(August 1, 2008 COS GSP)**

**Revise** the first sentence of the second paragraph as follows:

“...end of four mowings or 45-working days which ever is longer.”

**8-02.3(16)C      Lawn Mowing**  
**(August 1, 2008 COS GSP)**

**Replace** the first paragraph with the following:

Lawn mowing shall be the responsibility of the Contractor only during the lawn establishment period and shall not extend through the plant establishment period.

The initial mowing shall not be performed until the seed has reached an initial height of 3-inches.

**8-02.3(100)      Bio-infiltration Swales and Associated Items**  
**(February 26, 2015 COS GSP)**

Bio-infiltration Swales (208 Swales): Bio-infiltration swales are defined as any roadside depression designed to collect and treat stormwater including bio-infiltration cells and storm gardens.

Rough excavation for the bio-infiltration swales shall be considered part of roadway excavation addressed elsewhere herein and quantities therefore are already contained in the roadway excavation bid item.

The final grading, shaping, and compaction of swales shall be performed as a distinct work phase and shall be payable under bid item, "Construct Bio-infiltration Swale", in accordance with these Special Provisions. Subgrade compaction in bio-infiltration swales shall be to at least 85 percent but not greater than 90 percent of the materials' maximum density as determined in accordance with Section 2-03.3(14)D.

Topsoil used in construction of Bio-infiltration Swales shall be placed as shown in the plans and shall meet the requirements of section 9-14.1(100). Compaction of topsoil shall be accomplished with hand equipment or light mechanical equipment to the satisfaction of the Engineer. Testing of swale topsoil after it has stabilized for two or more years indicates that topsoil stabilizes from environmental effects at 85 to 90 percent of the materials' maximum density as determined in accordance with Section 2-03.3(14)D. This information is provided to help the Contractor determine the best level of compaction to both limit erosion and establish healthy plant growth. Regardless of the compaction effort, the Contractor is responsible for repairs as specified in Section 8-02.3(100)A herein.

Drywells shall be constructed in accordance with Section 7-05 and COS Standard Plans in the 'B' series.

Swale Dams: This project is located in rolling terrain. The Contractor shall construct dams at appropriate intervals in order to maintain the required storm water storage capacity in accordance with the Plans or where directed by the Engineer.

Curb Drop Inlets: Curb drop inlets shall be constructed with 2 each No. 4 rebar dowels extending from the end of each apron and as detailed on the COS Standard Plans in the 'F' series. Cement concrete used for the pads shall meet the requirements for concrete used in sidewalks, Section 8-14.

Swale Drain Pad: Cement concrete drain/splash pads shall be constructed from the curb drop inlets to 1-foot up from the base of the swale slopes as detailed on the COS Standard Plans in the 'F' series. The drain pads shall be constructed to true line and grade. Cement concrete used for the pads shall meet the requirements for concrete used for curbs in accordance with Section 8-04.

Drainage Swale Seeding: The Contractor shall seed the new bio-infiltration swale areas and other appropriate areas as shown on the Plans or as designated by the Engineer. Seeding shall be accomplished by means of hydroseeding. The application, materials, and procedures shall meet the requirements of Sections 8-01.3(4) and 8-02.3(16).

Drainage Swale Sodding: The Contractor shall sod the new bio-infiltration swale areas and other appropriate areas as shown on the Plans or as designated by the Engineer. Sodding shall be accomplished in accordance with Section 8-02.3(16).

Submittals: The Contractor shall submit the following items to the Engineer:

- Certificates of inspection as required by governmental authorities
- Manufacturer's or vendor's certified analysis for topsoil, soil amendments, fertilizer, and any other substantiating data required by the Engineer prior to delivery to site
- A sample of top dressing mulch prior to delivery to site

**8-02.3(100)A Swale Establishment**  
**(February 26, 2015 COS GSP)**

Swale establishment consists of repairing all erosion and settlement of the swale areas located within the project limits. Repairs also include, but are not limited to reseeding, replanting, and replacing plant material damaged by erosion and settlement of swale areas. The Contractor is responsible for providing all equipment, labor, and materials necessary to repair all damage caused by erosion and settlement of swale areas.

The swale establishment period shall begin immediately after physical completion of the project. The duration of the swale establishment period shall be a minimum of one calendar year.

During the swale establishment period, the Contractor shall meet monthly with the Engineer for the purpose of joint inspection of the swales on a mutually agreed upon time and day. The Contractor shall repair all conditions deemed unsatisfactory to the Engineer within a 10-day period. Failure to comply with corrective steps as outlined by the Engineer shall constitute justification for the Contracting Agency to take corrective steps and to deduct all costs thereof from any monies due the Contractor.

**Add** the following new Section:

**8-02.3(101)Hand Watering of Plantings**  
**(August 6, 2015 COS GSP)**

Hand watering will follow a schedule established between the Engineer and the contractor, with frequency depending on weather conditions and time of year. Water shall be applied in a manner that does not wash away or disrupt the finished surface. The contractor shall notify the Engineer prior to each watering so an inspector can be present to verify these requirements have been met. Any watering, outside of the established schedule, which has been directed by the Engineer shall be completed within 72 hours of the direction. The minimum volume of water, per application, to be provided to each planting type shall be in accordance with the following table.

<b>Plant Watering Volumes</b>
-------------------------------

<b>Plant Type and Size</b>	<b>Water Volume</b>
Potted Plant or Shrub: Up to 6" & 1-3 Gal	3 Gallons
Potted Plant or Shrub: 4-5 Gallon	5 Gallons
Trees (All Calipers)	15 Gallons

## **SECTION 8-03 IRRIGATION SYSTEMS**

### **8-03.1 Description** **(August 1, 2008 COS GSP)**

**Add** the following after the last paragraph:

The installation of the irrigation and sprinkler systems shall be in accordance with the COS Standard Plans in the 'V' series.

### **8-03.3 Construction Requirements**

#### **8-03.3(2) Excavation** **(August 1, 2008 COS GSP)**

**Replace** the first paragraph with the following:

Pipe trenches shall be completed in accordance with the details shown in the Plans.

#### **8-03.3(3) Piping** **(February 14, 2018 COS GSP)**

**Add** the following after the last paragraph:

If pipe is larger than 2 1/2-inches in diameter, install pipe joint restraint systems wherever change of direction of more than 30-degrees occurs on PVC main pressure lines and 45 degrees on laterals. Pipe joint restraint systems shall be done in accordance with the details shown in the Plans

Grade piping so system can be completely drained. Slope pipe to drain to control valve box where possible. Where this is not possible, slope pipe to a minimum number of low points. At these low points, install a 3/4-inch brass ball valve for manual drain. If the low point is in middle of lawn area or other area where manual drain would be hard to find, then install a King Automatic Drain. Install 2-inch manual drain and cut at finish grade. Provide rubber valve cap marker.

Provide 1-cubic foot pea gravel sump at outlet of each manual or automatic drain.

Do not use automatic drain valves on pressure mains or in valve boxes.

Slope pipes under parking areas or driveways to drain outside these areas.

Provide and install quick-coupling valve or valves in location for easy blowout of entire system.

Install pipe in manner to provide for expansion and contraction as recommended by the manufacturer.

*PVC Irrigation Sleeve: When installing new sidewalk which creates planting strips, sleeves shall be shown on the plans and installed to every planting strip regardless of the apparent likelihood that the sleeve will be used. A single planting strip fronting two parcels shall get two sleeves. PVC pipe sleeve shall have a minimum diameter of 1-inch greater than the irrigation line it carries. Sleeves shall extend a minimum of 18-inches outside the limits of the asphalt or concrete structures, unless constrained by site conditions.*

Irrigation control wires shall be sleeved in the same locations as required for irrigation pipe. Contractor shall be required to place a separate PVC sleeve, sized adequately to carry the number of irrigation control wires to be installed. Empty sleeves installed for future irrigation needs shall be a minimum of 2-inches in diameter.

**8-03.3(4) Jointing**  
**(August 1, 2008 COS GSP)**

**Delete** the last paragraph.

**8-03.3(5) Installation**  
**(November 1, 2012 COS GSP)**

**Replace** the second and third paragraphs with the following:

Irrigation heads shall be installed in accordance with the Plans.

Set sprinkler heads and quick-coupling valves perpendicular to finish grade. Do not install sprinklers using side inlets. Irrigation heads shall be installed on triple swing risers. Triple swing risers may be component built in the field or manufactured.

**Replace** the fourth and fifth paragraphs with the following:

Electric valves, backflow preventers, gate valves, ball valves, valve boxes, and other irrigation equipment shall be installed in accordance with the Plans.

Install the valves, except King Automatic Drains, in plastic boxes with reinforced heavy-duty locking, plastic covers. Set valve boxes over valve so the parts of valve can be accessible for service. Group and set valve boxes level, flush with finish grade, and align them in evenly spaced, ordered rows so they are parallel to a nearby hard surface

(roadway, sidewalks, curbs). Do not install more than two valves in single box with 3 inches of clearance on all sides. Valve boxes shall be free from dirt and debris.

### **8-03.3(8) Adjusting System**

**(August 1, 2008 COS GSP)**

**Replace** the first sentence with the following:

Before final inspection, the Contractor shall adjust and balance the sprinklers to provide 100 percent head to head coverage for the landscaped areas.

### **8-03.3(9) Backfill**

**(June 23, 2009 COS GSP)**

**Replace** this Section in its entirety with the following:

Backfill shall not begin until all piping has been inspected, tested, and approved by the Engineer, after which backfilling shall be completed as quickly as possible. Cover pipe both top and sides with 2-inches of rock-free soil. Remainder of backfill to within 6-inches of finished grade to be native soil. Top 6-inches shall be approved topsoil.

### **8-03.3(11) System Operation**

**(August 1, 2008 COS GSP)**

**Replace** this Section in its entirety with the following:

The Contractor shall be responsible for the maintenance, repair, testing, inspecting, programming, and operation of the entire irrigation system until the end of the lawn establishment period, as defined in Section 8-02.3(16)B.

### **8-03.3(12) Cross Connection Control Device Installation**

**(August 1, 2008 COS GSP)**

**Delete** the second and third paragraphs.

### **8-03.3(100) Existing Sprinkler Heads and Lines**

**(March 3, 2011 COS GSP)**

The Contractor shall repair existing irrigation lines and/or heads within three (3) calendar days of impact. The immediate repair may be permanent or temporary depending on the nature of the remaining Contract work at the location. Landscaping damaged due to the lack of timely repair of an irrigation system will be the Contractor's liability. Temporary repairs made by the Contractor are for the convenience of the Contractor and at no additional cost to the Contracting Agency. All sprinkler systems shall be in permanent working order at the time of physical completion. Permanent irrigation repairs shall be made with the same size and type of pipe and the same brand

and model of irrigation head in the remainder of the system. Existing heads in serviceable condition may be reused if not damaged.

## **SECTION 8-04 CURBS, GUTTERS AND SPILLWAYS**

### **8-04.1 Description**

**(January 23, 2013 COS GSP)**

**Supplement** this Section with the following:

Work shall also comply with the COS Standard Plans and these Special Provisions.

### **8-04.2 Materials**

**(August 1, 2008 COS GSP)**

The first paragraph is supplemented with the following:

Crushed surfacing top course for traffic island fill	Section 9-03.9(3)
Admixture for Concrete	Section 9-23.6

### **8-04.3 Construction Requirements**

#### **8-04.3(1) Cement Concrete Curbs, Gutters, and Spillways**

**(January 2, 2019 COS GSP)**

**Replace** the first paragraph of this Section in its entirety with the following:

Cement concrete curb, curb and gutter, gutter, and spillway shall be constructed with air entrained 6 sack commercial concrete conforming to the requirements of Section 6-02 and in accordance with COS S tandard Plans.

Replace the first sentence of the fourth paragraph with the following:

Expansion joints in the curb or curb and gutter shall be spaced as shown in the COS Standard Plans, and placed at the beginning and ends of curb returns, drainage structures, bridges, and cold joints with existing curbs and gutters.

**Add** the following after the last paragraph:

Concrete not meeting the entrained air requirements in Section 6-02.3 will be rejected. The Contractor shall immediately make the changes necessary to comply with the entrained air requirements. The Contractor shall remove and replace the defective work at no cost to the Contracting Agency.

The finished curb, curb and gutter, and gutter shall not deviate from the established line and elevation in excess of plus or minus 0.02-foot. The surface of the top, face, and

gutter pan of the finished curb, curb and gutter, and/or gutter shall be planar and shall not vary greater than 1/8-inch when measured with a 10-foot straight edge. The cross-section dimensions of finished curb, curb and gutter, and gutter shall not vary greater than 1/4-inch from the cross-section dimensions published in the COS Standard Plans.

Finished concrete out of specification for line and elevation, surface planarity, or cross-sectional dimension shall be removed and replaced at no cost to the Contracting Agency.

The Contractor shall shape cement concrete curb and gutter to conform to drainage structure requirements.

The Contractor shall reuse, salvage, or disposal of the granite curbs as shown in the Plans or as directed by the Engineer.

Curb removal shall meet the requirements of Section 2-02.3(3).

Gutters shall be removed in accordance with Section 2-02.

**8-04.3(1)W Pedestrian Curb**  
**(April 1, 2013 COS GSP)**

Pedestrian curbs shown on the COS Standard Plans for curb ramps which are located behind, in front, or which enter into the ramp area from the street; shall be payable under bid item, "Cement Concrete Curb", in accordance with the provisions of this section. The pedestrian curb shall be constructed per the requirements of the COS Standard Plans.

**8-04.3(2) Extruded Asphalt Concrete Curbs and Gutters**  
**(January 23, 2013 COS GSP)**

**Add** the following after the last paragraph:

The newly laid curb shall be protected from traffic by barricade or other suitable means until the heat of the asphalt concrete mixture has been dissipated and the mixture has attained its proper degree of hardness.

**SECTION 8-06 CEMENT CONCRETE DRIVEWAY ENTRANCES**

**8-06.1 Description**  
**(January 23, 2013 COS GSP)**

**Replace** this Section in its entirety with the following:

This work shall consist of constructing the types of cement concrete driveway entrances, Pedestrian Access Routes (PARs) located within the limits of driveway entrances, and driveway transitions shown on the Plans in accordance with the Specifications, COS Standard Plans and these Special Provisions. Pedestrian Access Routes located within

the limits of driveway entrances shall also comply with the requirements of Section 8-14. When no width is noted in the Plans, the entrance shall be constructed to the width directed by the Engineer.

**8-06.3 Construction Requirements**  
**(February 14, 2018 COS GSP)**

**Replace** “concrete Class 4000” with “6 sack commercial concrete” in the first paragraph.

**Add** the following before the second paragraph:

The Contractor shall provide, place, and compact a 4-inch crushed surfacing top course layer beneath the driveway entrance, PARs located within the limits of the driveway entrance, and transition flatwork from the curb line to the back of sidewalk, regardless of whether the sidewalk abuts the curb or is separated from the curb or is constructed integral with the curb unless indicated otherwise on the Plans or by the Engineer.

The Contractor, at his own discretion, may substitute an equivalent concrete depth in place of the crushed surfacing top course but no additional payment will be made for such substitution.

Cement Concrete for Driveway Transition. Where shown on the Plans or directed by the Engineer, the Contractor shall place 4-inches of air-entrained 6 sack commercial concrete over 4-inches of compacted crushed surfacing top course or other thicknesses as specified by the Engineer. Existing improvements shall be neatly and accurately cut to provide a smooth edge for mating with cement concrete transitioning.

**Replace** “in a transverse direction” with “in a direction parallel to the curb line” in the third sentence of the second paragraph.

Add the following:

The Contractor shall be required to obtain an approach permit for each new, relocated, or modified driveway approach and pay the accompanying application fee.

**SECTION 8-10 GUIDE POSTS**

**8-10.1 Description**  
**(August 1, 2008 COS GSP)**

**Replace** this Section in its entirety with the following:

This work shall consist of furnishing and installing channelizing devices of color specified in Plans in accordance with these Specifications, the COS Standard Plans in

the 'G' series, and at the locations indicated in the Plans or where designated by the Engineer.

### **8-10.2 Materials**

**(March 23, 2009 COS GSP)**

**Add** the following after the last paragraph:

Channelizing devices shall meet the material requirements of Section 9-100.

Adhesives for channelizing devices shall meet the requirements of Sections 9-100. Other bonding agents may be approved by the Engineer.

### **8-10.3 Construction Requirements**

**(November 1, 2019 COS GSP)**

**Add** the following after the last paragraph:

#### **Type 1 - Surface Base**

The surface to which the channelizing device is applied, shall be clean, dry, and prepared in accordance with the manufacturer's recommendations.

#### **Type 2 – Island Embedded Base**

The sleeve shall be installed so that it is 1/4 inch below the top of the exposed surface. This may require core drilling at island installations to achieve the 8-1/4 inches of required embedment.

#### **Type 3 – Reactive Base**

The base shall be surface mounted with both the super bundy pad and the bolts according to the manufacturer's recommendations.

#### **Type 4 – Threaded Mount**

The threaded sleeve shall be installed after the concrete has cured according to the manufacturer's recommendations. The Contractor shall core drill the concrete and install the threaded sleeve plumb with the manufacturer's recommended epoxy procedure. Once the epoxy has set, the Contractor shall check plumb of each anchor by installing the channelizer. Channelizers installed out of plumb shall be removed and reinstalled at no cost to the contracting agency. After the sleeve installation is approved by the Engineer, the Contractor shall install the compatible plugs into the sleeves and deliver the channelizers to the City of Spokane Signs and Markings Foreman. The Contractor shall coordinate the delivery with the Signs and Markings Foreman a minimum of 3 City business days prior to the delivery at 232-8803. Deliveries are limited to the hours of 8 am to 2 pm.

## **SECTION 8-11     GUARDRAIL**

### **8-11.1        Description** **(August 1, 2008 COS GSP)**

**Replace** the first paragraph with the following:

The Contractor shall furnish and install guardrail where shown on the Plans or as directed by the Engineer. Refer to the WSDOT Standard Plan(s) Section C. Final placement shall be coordinated with and approved by the Engineer.

## **SECTION 8-12     CHAIN LINK FENCE AND WIRE FENCE**

### **8-12.3        Construction Requirements** **(February 14, 2018 COS GSP)**

**Add** the following after the last paragraph:

Fence removal shall be in accordance to Section 2-02.3.

## **SECTION 8-13     MONUMENT CASES**

**Replace** this Section in its entirety with the following:

### **8-13.1        Description** **(February 1, 2013 COS GSP)**

This work consists of furnishing and placing monument frames and covers, in accordance with the COS Standard Plan H-105 and these Specifications. New monument frames and covers are required at section corners, 1/4-section corners, existing locations where survey monuments are protected by frames and covers, and other appropriate original Public Land Survey System corners.

### **8-13.2        Materials** **(March 10, 2010 COS GSP)**

Materials shall meet the requirements of the following sections and the COS Standard Plans 'H'-series

Concrete	6-02
Monument Frames and Covers	9-22.1

The 2-inch iron pipe shall be schedule 40 hot dipped galvanized pipe meeting the ASTM A-53A Specification.

### **8-13.3 Construction Requirements**

**(February 1, 2013 COS GSP)**

The concrete base shall be placed on a well compacted foundation. The 2-inch HDG pipe shall be placed vertically in the concrete base in the horizontal position required to install the monument inside the pipe as shown in the COS Standard Plan H-105.

Monument frames and covers shall be placed adjusted to grade prior to placing the final course of surfacing in the same manner as manholes as specified in Section 7-05.3(1).

Where existing survey monuments are not to be destroyed, the Contractor shall remove and replace the existing monument frames and covers in a manner that will not disturb the existing survey monument.

## **SECTION 8-14 CEMENT CONCRETE SIDEWALKS**

### **8-14.1 Description**

**(January 23, 2013 COS GSP)**

**Replace** this Section in its entirety with the following:

This work shall consist of constructing cement concrete sidewalks, curb ramps, and pedestrian access routes within driveways in accordance with the COS Standard Plans, details shown in the Plans, the Standard Specifications, and these Special Provisions and in conformity to the lines and grades shown in the Plans or established by the Engineer.

This work shall include of sawcutting trip hazards from existing sidewalk panels as shown on the Plans.

### **8-14.2 Materials**

**(January 1, 2020 COS GSP)**

**Replace** the last paragraph with the following:

EJIW Duralast DWS “white”, ADA Solutions Tactile “white”, Armor-tile “pearl white” and Alertcast DWS “white” have been pre-approved by the City of Spokane. The Contractor shall use these products or an equivalent product approved by Engineering Services prior to installation. The detectable warning surface shall have the truncated dome shape shown on the plans and be a minimum of 2-foot-wide. The Contractor shall install the products according to the manufacturer’s recommended installation procedure. Any field modified panels need to follow all manufacture’s recommendations for installation, anchoring, and sealing or as approved by the Engineer.

**Add** the following:

The crushed base shall consist of crushed surfacing top course meeting the requirements of Section 9-03.9(3).

### **8-14.3 Construction Requirements**

**(February 14, 2018 COS GSP)**

**Replace** “concrete Class 3000” with “6 sack commercial concrete” in the first paragraph.

**Add** the following:

Concrete not meeting the entrained air requirements in Section 6-02.3 will be rejected. The Contractor shall immediately make the changes necessary to comply with the entrained air requirements. The Contractor shall remove and replace the defective work at no cost to the Contracting Agency.

Sidewalks and curb ramps shall be placed on 2-inches of compacted crushed surfacing top course. The Contractor may substitute 2-inches of concrete in lieu of the crushed surfacing top course, but no additional payment will be made for such substitution. Exception: CSTC thickness shall be in accordance with Section 8-06 for sidewalks located within driveway entrances.

Survey monuments and reference points may be located on existing curbs and sidewalks or within the limits of proposed new curbs, sidewalks, or curb ramps. The Contractor shall coordinate with the Professional Land Surveyor contracted to perform the monument perpetuation work specified in Section 1-07.100 prior to demolition of existing survey monuments and reference points. In the event that monuments and/or reference points are destroyed by the Contractor without employing perpetuation measures, the Contractor shall reestablish said monuments and reference points at no cost to the City.

Restoration of disturbed areas behind sidewalks shall meet the requirements of Section 8-02.

### **8-14.3(1) Excavation**

**(August 1, 2008 COS GSP)**

**Add** the following before the first paragraph:

Excavation shall be in accordance with Section 2-03.3(3).

### **8-14.3(3) Placing and Finishing Concrete**

**(January 23, 2013 COS GSP)**

**Replace** the second paragraph with the following:

After troweling and before jointing or edging, the surface of the walk shall be lightly brushed perpendicular to the direction of pedestrian travel with a stiff bristled broom.

**Add** the following to the third paragraph:

Joints and edges shall be tooled with a 1/2-inch radius edger. Contraction joints shall be tooled 1-inch deep, for the full width of the sidewalk.

Curb ramps shall be separated from abutting cement concrete slabs or structures by using 3/8-inch thick pre-molded joint filler.

**Supplement** this Section with the following:

The finished sidewalks and curb ramps shall not deviate from the established line and elevation in excess of plus or minus 0.02-foot. The surface of the flatwork shall be planar and shall not vary greater than 1/4-inch when measured with a 10-foot straight edge placed longitudinally nor vary greater than 1/8-inch when measured with a 4-foot straight edge placed transversely. The cross-section dimensions of finished sidewalk and curb ramps shall not vary greater than 1/4-inch from the cross-section dimensions published in the COS Standard Plans.

Finished concrete out of specification for line and elevation, surface planarity, or cross-sectional dimension shall be removed and replaced at no cost to the Contracting Agency.

The Contractor shall apply a historical pattern that matches the historical pattern on the existing sidewalk adjacent to the new cement conc. sidewalk.

**Add** the following new Section:

**8-14.3(3)W Pedestrian Circulation Paths**  
**(January 23, 2013 COS GSP)**

Pedestrian Circulation Paths (PCPs) are exterior or interior ways of passage provided for pedestrian travel. All PCPs are required to contain a continuous Pedestrian Access Route that connects to all adjacent pedestrian facilities. Pedestrian Access Routes (PARs) consist of one or more of the following pedestrian facilities: sidewalks, curb ramps (excluding flares), driveways (excluding flares and drops), landings, crosswalks, access ramps, pedestrian overpasses/underpasses, elevators, and platform lifts.

**8-14.3(3)W1 General Accessibility Requirements for PARs**  
**(January 23, 2013 COS GSP)**

The minimum continuous and unobstructed clear width of a PAR shall be 4-feet excluding the width of the curb. PARs that are less than 5-feet excluding the width of the curb shall provide passing spaces at intervals no further apart than 200-feet. Passing spaces shall be 5-feet wide by 5-feet long minimum.

The cross slope of a PAR shall be 2.0% maximum. The grade of a PAR contained within the right of way shall not exceed the general grade established for the adjacent roadway.

**8-14.3(3)W2      Cross Slope and Grade Requirements for Sidewalks**  
**(January 23, 2013 COS GSP)**

Sidewalks shall be sloped toward the roadway, contain a continuous Pedestrian Access Route, and be constructed in accordance with the COS Standard Plans. The minimum cross slope of PARs shall be 1.2% and the maximum cross slope of PARs shall be 2.0% when measured with a 4-foot smart level perpendicular to the direction of pedestrian travel. Exception: In the vicinity of curb ramps it may be impossible to comply with the minimum cross slope requirements. At these locations the Contractor shall notify the Engineer and request a deviation. If in agreement, the Engineer will provide a written deviation for each location establishing a new minimum cross slope, for extreme cases the deviation may allow reverse cross slopes. The 2% maximum cross slope shall not be exceeded in either direction.

Construction tolerances for PARs are established by the minimum and maximum cross slope requirements described above and as shown on the COS Standard Plans. Finished sidewalks containing PARs with cross slopes outside the minimum and maximum allowable cross slopes will be rejected. The Contractor is advised to target a cross slope between the minimum and maximum cross slope during construction.

Sidewalks shall not exceed the general grade established by the roadway. Exception: In the vicinity of curb ramps the grade of the sidewalk may be increased to match curb ramp elevations and described in the next Section.

Finished sidewalks not meeting cross slope and grade requirements shall be removed and replaced at no cost to the Contracting Agency. No allowances will be made for non-compliance.

**8-14.3(3)W3      Slope Requirements for Curb Ramps**  
**(January 23, 2013 COS GSP)**

Curb ramps are constructed using the following components: Ramps, landings, flares, and detectable warning surfaces. The surfaces of these components shall be firm, stable, slip resistant, planar, and utility free. The minimum clear width of ramps and landings shall be 4-feet. Grade breaks shall be perpendicular to the direction of pedestrian travel.

**Ramps**

The maximum running slope for ramps is 8.3% when measured with a 4-foot smart level in the direction of pedestrian travel. Exception: On steep roadway grades, the maximum ramp running slope shall not require the ramp length to exceed 15-feet. The ramp shall be 15-feet in length at the slope required to meet the sidewalk elevation.

The maximum cross slope for ramps is 2.0% when measured with a 4-foot smart level perpendicular to the direction of pedestrian travel. Exception: When the bottom of the

ramp intersects the back of a curb on an existing roadway that has a grade greater than 2.0%, the cross slope at the bottom of the ramp may exceed the 2.0% maximum. The ramp shall transition to the 2.0% maximum cross slope as near to the bottom of the ramp as possible and before the ramp reaches the landing.

Finished ramps exceeding the maximum running slope and cross slope requirements shall be removed and replaced at no cost to the Contracting Agency. No allowances will be made for exceeding these maximum slopes.

#### Landings

The maximum running slope for landings is 2.0% when measured with a 4-foot smart level in the direction of pedestrian travel. The maximum cross slope for landings is 2.0% when measured with a 4-foot smart level perpendicular to the direction of pedestrian travel. Exception: The cross slope for landings (running slope for the sidewalk) on midblock curb ramps may match the roadway grade.

Landings shall be constructed with a minimum length of 4-feet and a minimum width of 4-feet.

Finished landings exceeding the maximum running slope and cross slope requirements or landings that do not meet the minimum size requirements shall be removed and replaced at no cost to the Contracting Agency. No allowances will be made for exceeding these maximum slopes or for not meeting the minimum size requirements.

#### Flares

The maximum slope for flares is 10.0% when measured with a 4-foot smart level parallel to the back of curb. Exception: Slopes may exceed 10.0% when flares that are not within the PCPs.

Finished flares exceeding the maximum slope requirements shall be removed and replaced at no cost to the Contracting Agency. No allowances will be made for exceeding the maximum slope.

### **8-14.3(3)W4      Slope Requirements for PARs at Driveways** **(January 23, 2013 COS GSP)**

All driveways installed within PCPs shall be constructed with a continuous and unobstructed PAR. PARs at driveways are constructed using the following components:

#### Sidewalks

Sidewalks at driveway entrances shall be sloped toward the roadway and contain a continuous Pedestrian Access Route with a minimum width of 4-feet excluding the width of the curb. The minimum cross slope of the PAR shall be 1.2% and the maximum cross slope of the PAR shall be 2.0% when measured with a 4-foot smart level perpendicular to the direction of pedestrian travel. Sidewalk grades at driveway entrances shall not exceed the general grade established by the roadway.

Construction tolerances for PARs are established by the minimum and maximum cross slope requirements described above and as shown on the COS Standard Plans. Finished driveways containing PARs with cross slopes outside the minimum and maximum allowable cross slopes will be rejected. The Contractor is advised to target a cross slope between the minimum and maximum cross slope during construction.

Finished PARs at driveway entrances not meeting width, cross slope, and grade requirements shall be removed and replaced at no cost to the Contracting Agency. No allowances will be made for non-compliance.

#### Ramps

The maximum running slope for ramps at driveway entrances is 8.3% when measured with a 4-foot smart level in the direction of pedestrian travel. Exception: On steep roadway grades, the maximum ramp running slope shall not require the ramp length to exceed 15-feet. The ramp shall be 15-feet in length at the slope required to meet the sidewalk elevation.

Maximum and minimum cross slope requirements and minimum width requirements for ramps at driveway entrances are identical to the requirements described in this Section for sidewalks.

Finished ramps at driveway entrances not meeting width, running slope, and cross slope requirements shall be removed and replaced at no cost to the Contracting Agency. No allowances will be made for non-compliance.

#### **8-14.3(4) Curing** **(January 23, 2013 COS GSP)**

**Add** the following:

If methods of construction cannot exclude pedestrian or vehicular traffic, the Contractor shall use a high-early strength concrete with the prior approval of the Engineer. In this case, the sidewalk or driveway shall remain closed until the concrete reaches a minimum of 2500 PSI compressive strength.

The Contractor shall have readily available sufficient protective covering, such as waterproof paper or plastic membrane, to cover the pour of an entire day in event of rain or other inclement weather.

#### **8-14.3(100) Repair of Vertically Displaced Sidewalk Panels** **(April 1, 2008 COS GSP)**

Sidewalk panels shall be identified via a 'walk-through' inspection of the work areas by the Engineer and the Contractor. It is up to the Engineer to decide if sawcutting will be utilized within the neighborhood. If panels are not repaired by sawcutting, then raised panels may be identified by the Engineer for removal and replacement.

Existing vertically displaced sidewalk panels identified in the Plans or by the Engineer shall be repaired by sawcutting/milling according to these Specifications. The maximum allowable vertically displacement shall be no more than 1 1/2-inches in height. Panels that exceed this limit shall be removed and reconstructed as new cement concrete sidewalk panels. In no case, shall the panel have more than 50 percent of the panel's depth removed by sawcutting. If the sidewalk panel is determined by the Engineer to be compromised after the sawcutting repair, then the panel will be removed and replaced as a new sidewalk panel.

The trip hazards marked for sawcutting shall be sawcut in accordance with the current requirements of the Americans with Disability Act. When vertical displacements are greater than 1/4-inch, but less than 1/2-inch; the displacement shall be beveled to a 2:1 maximum slope. When vertical displacements are greater than 1/2-inch; the displacement shall be tapered to a 12:1 maximum slope. Completed work shall have a smooth and uniform appearance and texture.

The sawcutting shall be taken to the zero point of differential settlement and to both edges of the sidewalk, as required, to eliminate trip hazards for the full-width of the sidewalk.

Equipment used shall consist of a dust collection device utilizing a shield/shroud attached to the cutting device. Protective covers such as plastic tarps, etc. may be utilized in order to protect the area but care shall be exercised so as not to damage property of the homeowners. Repair, reimbursement, or replacement of damaged property caused by the sawcutting operations will be the sole responsibility of the Contractor.

Site Restoration: Immediately following the repair, the Contractor shall return the area adjacent to the work to its previous condition. Dust and debris shall be cleaned, removed, and disposed of in a legal manner from the work site and surrounding areas; including but not limited to, hand-rails, sidewalks, driveway approaches and their transitions, landscaping, vehicles, etc. Should the Contractor fail to complete the site restoration to the Engineer's satisfaction within the allotted time specified by the Engineer, the City shall contract with other parties to complete the work. The costs, including administrative costs, shall be deducted from the contract payment amount due the original Contractor.

The Contractor shall be required to close the sidewalk to pedestrian traffic during the repair in order to insure the safety of pedestrians and animals.

## **SECTION 8-20 ILLUMINATION, TRAFFIC SIGNAL SYSTEMS AND ELECTRICAL**

### **8-20.1 Description**

**(January 1, 2020 COS GSP)**

**Replace** this section with the following:

This work consists of furnishing, installing and field testing all materials and equipment necessary to complete in place, fully functional system(s) of any or all of the following types including modifications to an existing system all in accordance with approved methods, the Plans, the Special Provisions, and these Specifications:

1. Traffic Signal System
2. Traffic Signal System Retrofit
3. Traffic Signal Conduit System
2. Illumination Conduit System
3. Illumination System
4. Intelligent Transportation System
5. Communication Conduit System
6. Communication Cables and Interfaces
7. Video & Data Transmission and Distribution System
8. CCTV System
9. Permanent Variable Message Sign
10. Environmental Sensing Station
11. Non-Intrusive Vehicle Detector System
12. Temporary Traffic Signal System
13. Temporary Intersection Lighting System
14. Rectangular Rapid Flashing Beacon System
15. Driver Feedback Sign

### **8-20.3 Construction Requirements**

#### **8-20.3(2) Excavating and Backfilling**

**(August 1, 2010 COS GSP)**

**Add** the following:

Nonmetallic conduit installed by excavation shall be placed on a minimum 2-inch thick bed of sand. A minimum cover of 6-inches of sand shall be installed over the top of nonmetallic conduit installed by trenching.

#### **8-20.3(4) Foundations**

**(January 1, 2020 COS GSP)**

**Replace** the second sentence in the first paragraph with the following:

Concrete for Type II, III, IV, V, and CCTV signal standards and light standard foundations shall be Class 3000 and does not require air entrainment.

**Replace** the third paragraph with the following:

Foundations shall be poured in one pour unless otherwise directed by the Engineer.

When curb and/or sidewalk is to be installed adjacent to the foundation for a signal standard or luminaire standard, the Contractor shall install a CMP of the correct diameter at the foundation location to allow backfilling of the corner and establishment of proper curb grades prior to pouring the signal or lighting foundation. After establishment of the curb grade and prior to pouring the foundation, the CMP shall be cut 1 ft below final grade, and a strippable 1 foot tall form shall be rigidly installed and securely braced.

The foundation shall be poured to the bottom of sidewalk grade or lower.

**Add** the following after the ninth paragraph:

The Contractor shall furnish and install four 5/8" x 8" x 1-1/2" hot-dipped galvanized anchor bolts with nuts for mounting each controller cabinet.

**Add** the following after the last paragraph:

Whenever the edge of a concrete foundation extends within 18-inches of an existing or proposed concrete improvement, a slab with minimum thickness of 4-inches shall be extended to meet the existing improvement. The cost of such work shall be included in other items of construction.

### **8-20.3(5) Conduit**

#### **8-20.3(5)A General** **(January 1, 2020 COS GSP)**

**Revise** the first paragraph to read as follows:

The ends of all conduit, metallic and nonmetallic, shall be reamed to remove burrs and rough edges. Field cuts shall be made square and true. The ends of unused conduits shall be capped. Malleable duct sealant shall be installed in the cabinet end of all cable vault-to-cabinet conduit that contains conductors and or cable. Mechanical plugs shall be installed in the cabinet end of all empty cable vault-to-cabinet conduit. The threaded ends of metal conduit shall be provided with approved conduit bushings and non-metal conduit shall be provided with end bells. Reducing couplings will not be permitted.

**Add** after the last paragraph:

Flat pull tape shall be installed at the same time as conductors in the conduits. Locate wires are not considered conductors.

The minimum allowable radius of sweeps in communication conduit installation is 36-inches.

All PVC conduit installed shall be schedule 80.

One #14 AWG stranded THHN locator wire with orange insulation shall be placed in continuous lengths in empty conduits or where noted on the Plans.

**8-20.3(5)A1 Fiber Optic Conduit**  
**(January 1, 2020 COS GSP)**

**Revise** the paragraph to read as follows:

Location Wire shall be installed with all nonmetallic conduit that contains fiber optic cable and all conduits identified to contain future fiber optic cable. Location Wire shall be installed inside the conduits. Location Wire shall extend 12-feet into boxes or vaults.

**8-20.3(5)A2 ITS and Cabinet Outer and Inner Duct Conduit**  
**(January 1, 2020 COS GSP)**

**Revise** this section to read as follows:

ITS conduit and both ends of conduit runs entering cabinets, with the exception of the 3/4 inch grounding conduit, shall be sealed with waterproof mechanical plugs. At other locations conduits may be sealed with waterproof mechanical plugs or duct seal.

When open trenching is allowed, a maximum of 300 feet of continuous open trench will be allowed unless otherwise approved by the Engineer.

**8-20.3(5)B Conduit Type**  
**(March 1, 2014 COS GSP)**

**Revise** the fifth paragraph to read as follows:

Conduit runs, including outer-duct, which do not enter the traveled way or shoulders shall be Schedule 80 high-density polyethylene (HDPE) or Schedule 80 PVC.

**8-20.3(5)B2 Non-Metallic Conduit**  
**(March 1, 2014 COS GSP)**

**Revise** the second paragraph to read as follows:

PVC conduit ends shall be terminated with end bell bushings. PVC or HDPE conduit entering cable vaults and pull boxes shall be extended one inch inside the structure to allow innerduct to be secured.

**8-20.3(5)C Conduit Size**  
**(November 1, 2019 COS GSP)**

**Replace** the first paragraph with the following:

The size of conduit used shall be as shown in the Plans. Conduits smaller than 2-inch electrical trade size shall not be used unless otherwise specified, except that grounding conductors at service points may be enclosed in 3/4-inch electrical trade size conduit.

**Delete** the third paragraph.

**8-20.3(5)E1 Open Trenching**  
**(March 1, 2014 COS GSP)**

**Add** the following after the last paragraph

When open trenching is allowed, trench construction shall conform to the City of Spokane's Pavement Cut Policy.

**Add** after the last paragraph:

Flat pull tape shall be installed at the same time as conductors in the conduits. Locate wires are not considered conductors.

The minimum allowable radius of sweeps in communication conduit installation is 36-inches.

All PVC conduit installed shall be schedule 80.

One #14 AWG stranded THHN locator wire with orange insulation shall be placed in continuous lengths in empty conduits or where noted on the Plans.

**8-20.3(6) Junction Boxes, Cable Vaults, and Pull Boxes**  
**(January 1, 2020 COS GSP)**

**Revise** the first paragraph with the following:

Junction boxes, cable vaults, and pull box details shall be installed at the locations shown in the Plans. The Contractor may install, at no expense to the Contracting Agency, such additional boxes as may be desired to facilitate the Work. Junction box installation shall conform to the details in the COS Standard Plans "J" series. Cable vaults and pull boxes shall include racking hardware as detailed in the COS Standard Plans. Special care shall be taken during the placement of the junction boxes to avoid interference with other street items and utilities.

**Add** the following after the last paragraph:

Conduit entering into a cable vault or pull box shall be located in the identical knock out location from the previous pull box or cable vault. Crossing of the conduit is not allowed.

Bell ends shall be placed on all conduits (do not glue in place). Openings around conduits shall be sealed and filled with grout to prevent water and debris from entering the vaults or pull boxes. The grout shall meet the specifications of the cable vaults and pull box manufacturers.

The Contractor shall provide and place a crushed base beneath the junction boxes, for an area the size of the junction box. The Contractor shall excavate to a 4-inch depth and install a compacted 4-inch depth of crushed surfacing top course material.

### **8-20.3(8) Wiring** **(January 1, 2020 COS GSP)**

**Add** the following after the first paragraph:

The copper communication (interconnect) cable shall be installed continuously without splices except where shown on the Plans. The required terminating and splicing of the communication (interconnect) cable will be performed by Contracting Agency forces.

The Contractor shall provide a re-enterable splice closure kit for each underground splice.

**Replace** the second paragraph with the following:

With the exception of induction loop circuits, magnetometer circuits and illumination circuits, the wiring shall be run continuously, without splices, from a terminal located in a cabinet, compartment, pedestrian push button assembly, signal head, disconnect or luminaire head, to a similarly located terminal. Terminals located below grade are strictly prohibited. Illumination circuits shall be spliced in only the pole base at the hand hole.

**Replace** the third paragraph with the following:

Splices in underground induction loop circuits shall be made in junction boxes. Splices will be permitted only where shown in the plans or contract provisions. Induction loop circuits shall be spliced, soldered, crimped and isolated with an approved crimp-type connector prior to encapsulation.

Splices shall be enclosed in a rigid body re-enterable splice closure. Splice closures for induction loops shall be factory filled with encapsulant.

**Delete** the fourth paragraph and the conductor sequence color code chart.

**Add** the following at the end of the fifth paragraph:

Street Lighting Disconnect. A fused disconnect, GLR-10A, shall be installed in the luminaire circuits in each standard base according to 9-29.7.

Power over Ethernet (POE) Extender. Power over Ethernet extenders shall be located in the signal standard hand hole.

**8-20.3(9) Bonding, Grounding**  
**(January 1, 2020 COS GSP)**

**Revise** the tenth paragraph to read as follows:

The connection of the grounding electrode conductor(s) to grounding electrode(s) shall be made by the thermal-welding process.

**8-20.3(10) Services, Transformer, Intelligent Transportation System Cabinet**  
**(November 1, 2012 COS GSP)**

**Add** the following after the first paragraph:

The Contractor shall obtain the required electrical permits for installation of electrical service from the Contracting Agency's Building Department. Permit fees shall be included in the unit contract price for the item of work requiring power.

The service shall be manufactured according to the details in the Standard Plans "J" series and meet industry code requirements. The Contractor shall make the necessary arrangements with the servicing utility to complete the service connection prior to the final inspection. A meter base is required unless otherwise specified.

**Delete** the second, and fifth paragraphs.

**8-20.3(14)A Signal Controllers**  
**(February 14, 2018 COS GSP)**

**Add** the following after the last paragraph:

The controller shall be specified by the City of Spokane, please contact the City Signal & Lighting foreman at 509-232-8814 for controller specifications.

**8-20.3(14)C Induction Loop Vehicle Detectors**  
**(April 1, 2018 COS GSP)**

**Revise** the title of Section 8-20.3(14)C to read as follows:

**8-20.3(14)C Vehicle Detectors**  
**(April 1, 2018 COS GSP)**

This Section is **supplemented** with the following:

The conductors that form the loop and terminate in a signal standard or junction box shall be joined to the loop lead-in cable as shown on the COS Standard Plans in the 'J' series. Where two or more loops are spliced to one lead-in cable, they will be spliced in series according to the direction of the City of Spokane Signals and Lighting Division Foreperson at 509-232-8801.

The shield in the loop lead-in cable shall not be connected or grounded.

Hot sealant installation shall be as follows:

1. Fill slot using the sealant manufacture's installation procedure and approved equipment nozzle.
2. Fill slot within 1/8-inch of finished grade.
3. Do not overspill onto surface of pavement. Remove overspill excess immediately.

Cold sealant installation shall be as follows:

1. Fill slot using the sealant manufacturer's installation procedure and approved equipment nozzle.
2. Fill slot within 1/8-inch of finished grade.
3. Do not overspill onto surface of pavement. Remove overspill excess immediately.

Loop sealants shall be according to 9-29.100.

Loops shall be tested in accordance with Section 8-20.3(14)D prior to overlay at the splice location.

Loops shall be tested in accordance with Section 8-20.3(14)D after the overlay and prior to signal turn on at the cabinet.

The lead-in conduit or hose shall be installed in unpaved areas between the pavement and the junction box by trenching to a depth of 18-inches.

The lead-in shall be spliced to the two-conductor shielded cable in accordance with COS Standard Plans in the 'J' series.

The Contractor shall notify the Engineer when the traffic signal detectors are fully operable. The Engineer will then schedule the date and time for inspection and acceptance by the City of Spokane Signals and Lighting Division Foreperson at (509) 232-8801. The Contractor shall have a representative present during inspection and acceptance by the Engineer.

The Contractor shall furnish and install the materials necessary for the complete replacement of traffic signal detectors that are damaged due to the Contractor's operations at the Contractor's own expense.

Sawcut Induction Loops. The induction loops shall consist of a wire loop installed in saw cut slots according to the COS Standard Plans in the 'J' series.

No substitute shall be authorized for the types of conductors and insulations herein required, nor shall the loop location be altered by the Contractor without the permission or at the direction of the Engineer.

The loop wire shall be completely embedded in the sealant. The sawcuts for each loop shall be sealed the same working day that the loop wiring is installed.

The loops shall be tested prior to resurfacing in accordance with Section 8-20.3(14)D. A loop which fails testing after resurfacing shall be removed by grinding and then reinstalled in the pavement prior to resurfacing the pavement area. A loop that fails testing shall be replaced at no cost to the Contracting Agency.

Preformed (Induction) Loops. Where preformed loops are called out:

A preformed 6' x 6' square, preformed 6-foot round induction loop, or preformed 3-foot diamond shall be installed a maximum of 3-inches below the surface of the crushed surfacing and a maximum of 48 hours prior to being overlaid with HMA or PCCP.

The loops shall be tested prior to resurfacing in accordance with Section 8-20.3(14)D. A loop which fails testing after resurfacing shall be removed by grinding and then reinstalled in the pavement prior to resurfacing the pavement area. A loop that fails testing shall be replaced at no cost to the Contracting Agency.

Microloop Probes. The microloop probe shall be a cylindrical unit designed to be buried beneath the road surface. The device shall transform magnetic field intensity changes into inductance changes. The device when connected to an inductive loop detector shall detect vehicles containing significant ferromagnetic material.

The probe shall be approximately 0.88-inches in diameter and 3.63-inches long. The lead-in cable shall be factory installed, with a length sufficient to connect to other probes and to the junction box where the lead-in will be spliced to the home-run cable. The entire assembly shall be sealed against moisture entry.

Each probe shall be installed vertically in PVC sleeves. The interconnecting cable and lead-in cable shall be installed in a sawcut to the junction box. The microloop lead-in cable shall be spliced into the home run lead-in cable in accordance with the COS Standard Plans in the 'J' series.

Non-Intrusive Vehicle Detection System. The Contractor shall supply and install the non-intrusive vehicle detection system according to the plans and manufacturer's recommendations for a complete and operational non-intrusive detection system according to the plans and special provisions.

The Contractor shall label each cable at the signal cabinet end and the camera end.

**8-20.3(14)E      Signal Standards**  
**(June 19, 2019 COS GSP)**

**Replace** Item #1 and #6 with the following:

1. The Contractor shall furnish shop drawings to the City of Spokane Signal and Lighting Supervisor for approval prior to fabrication for preapproved standards.
6. Any damage to the galvanized pole surface shall be repaired with approved zinc rich paint.

**Add** the following:

Signal Standards shall be by Valmont Industries.

**8-20.3(14)W      Temporary Signalization**  
**(February 14, 2018 COS GSP)**

When required, the Contractor shall design a span-wire suspension system for the temporary signals, submit the design to the Engineer for approval and then install the system, in accordance with the approved design.

The span-wire suspension system for a standard intersection shall consist of one wood pole on each corner, messenger cable installed in a box configuration, and down guys on each corner. A luminaire with mast arm provided by the contracting agency shall be mounted 30-feet above the street on each pole. The location of each pole shall be field located by the Engineer. Non-standard intersections or intersections where poles are to be installed on less than each corner shall be designed in such a manner as to conform to each of the requirements, as contained herein, as is reasonably possible.

The Contractor shall adjust the tension in the span-wire suspension system so that there is approximately 5 percent sag and the clearance to the bottom of the signal head(s) is between 16-feet and 19-feet. The Contractor is responsible for maintenance of the span-wire suspension system during construction and must be able to be on-site within 1 hour after notification from the Engineer or representative if an emergency repair is required. Normal repairs or adjustments shall be completed within 1 working day of notification.

The Contractor shall immediately remove the temporary signal when the new traffic signal is turned on. The Contractor shall transport Contracting Agency provided equipment to the City of Spokane Signal and Lighting Division warehouse 901 N. Nelson Street. The Contractor shall schedule material delivery with the Signals and Lighting Foreperson, who may be reached at (509) 232-8801 at least 2 working days in advance of delivery. The Contractor shall take care to prevent damage to the equipment. The Contractor shall retain ownership of the poles, messenger cable system, and down guys.

The Contracting Agency will design and install the traffic signal heads to be suspended on the span-wire suspension system. The Contracting Agency is also responsible for maintenance of the signal heads, signal wiring, signal controller, AC service, and luminaries during construction.

Existing Traffic Signals. An existing traffic signal at an intersection shall remain in service until the temporary signal is put into service for that intersection. The Contracting Agency will maintain the existing traffic signal at each intersection until the temporary signal for that intersection is put into service.

Existing signal heads shall be removed immediately after turn-on of the temporary signal. The above ground signal equipment shall be removed within 1 working day after turn-on of the temporary signals.

**8-20.3(14)X Traffic Signal Cabinets**  
**(January 1, 2020 COS GSP)**

Cabinets shall be completely wired and tested to the 2003 NEMA TS2 Traffic Controller Assemblies Specification with NTCIP Requirements Version 02.06 (as amended here in).

The Contractor shall submit a detailed list of the cabinet and cabinet components to the City of Spokane Signal and Lighting Foreman for approval prior to finalizing the order.

The Contractor shall deliver the Signal Cabinet to the City of Spokane Signal and Lighting Division for inspection and operational testing. Any component that fails the operational test shall be replaced by the Contractor at no cost to the City.

In addition, and at a minimum, the following requirements shall be met:

The traffic signal cabinet for this project shall be the type called out in the plans and be configured as follows:

**NEMA Type P TS2-2**

- 1 16 Position load bay TS2-2
- 1 Half Width Detector Rack wired for 1-BIU/16-channels of detection,
- 1 Half Width Detector Rack wired for 1-BIU/16 channels of detection/4 Channels of pre-emption  
Auxiliary switch panel, detector panel (32 channel), fan thermostat assemblies, power supply interface panel, power panel, video panel, final assembly
- 1 Smart Monitor 16 channel MMU
- 1 Power Supply Shelf Mount
- 2 Bus Interface Units TS2
- 16 Load switches with I/O Indicators
- 1 Flasher
- 6 Flash Transfer Relays
- 8 Loop Amplifier 4 Channel Rack Mount with timing and LCD (1/2 width)

- 1 Opticom Auxiliary Interface Panel GPS
- 1 Opticom Phase Selector 4 Channel GPS

Omit Police Panel

Omit Video Detection Panel

#### NEMA Type P-Plus TS2-2

- 1 16 Position load bay TS2-2
- 1 cable P-Plus generator plug assembly
- 1 Half Width Detector Rack wired for 1-BIU/16-channels of detection,
- 1 Half Width Detector Rack wired for 1-BIU/16 channels of detection/4  
Channels of pre-emption Auxiliary switch, detector panel (32 channel), fan  
thermostat assemblies, power supply interface panel,  
Power panel, unused phase links and final assembly
- 1 Smart Monitor 16 channel MMU
- 1 Power Supply Shelf Mount
- 2 Bus Interface Units TS2
- 16 Load switches with I/O Indicators
- 1 Flasher
- 6 Flash Transfer Relays
- 8 Loop Amplifier 4 Channel Rack Mount with timing and LCD (1/2 width)
- 1 UPS Power Module 2000W 120V
- 1 Automatic Transfer Switch with Surge and RPA
- 1 Battery Equalizer for 1 string of 48V Batteries
- 1 Battery Cable Harness Kit 48V
- 1 Rack Mount Kit
- 4 Deep Cycle Batteries
- 1 Opticom Auxiliary Interface Panel GPS
- 1 Opticom Phase Selector 4 Channel GPS

Omit Police Panel

Omit Video Detection Panel

#### NEMA Type M Stretch TS2-2

- 1 9 Position load bay TS2-2
- 1 Half Width Detector Rack wired for 1-BIU/16-channels of detection,
- 1 Half Width Detector Rack wired for 1-BIU/16 channels of detection/4  
Channels of pre-emption  
Auxiliary switch panel, detector panel fan thermostat assemblies, power  
supply interface panel, power panel, video panel, final assembly
- 1 Smart Monitor 16 channel MMU
- 1 Power Supply Shelf Mount
- 2 Bus Interface Units TS2
- 9 Load switches with I/O Indicators

- 1 Flasher
- 3 Flash Transfer Relays
- 4 Loop Amplifier 4 Channel Rack Mount with timing and LCD (1/2 width)
- 1 Opticom Auxiliary Interface Panel GPS
- 1 Opticom Phase Selector 4 Channel GPS

Omit Police Panel

Omit Video Detection Panel

#### NEMA Type M Stretch TS2-2 Pedestrian Hybrid Beacon configuration

- 1 9 Position load bay TS2-2
- 1 Half Width Detector Rack wired for 1-BIU/16-channels of detection,
- 1 Half Width Detector Rack wired for 1-BIU/16 channels of detection/4 Channels of pre-emption  
Auxiliary switch panel, detector panel fan thermostat assemblies, power supply interface panel, power panel, video panel, final assembly
- 1 Smart Monitor 16 channel MMU
- 1 Power Supply Shelf Mount
- 2 Bus Interface Units TS2
- 9 Load switches with I/O Indicators
- 1 Flasher
- 3 Flash Transfer Relays
- 4 Loop Amplifier 4 Channel Rack Mount with timing and LCD (1/2 width)
- 1 Opticom Auxiliary Interface Panel GPS
- 1 Opticom Phase Selector 4 Channel GPS

Omit Police Panel

Omit Video Detection Panel

Include Pedestrian Hybrid Beacon Modifications

The Contractor shall identify and mark each field wire in controller cabinets with PVC marking sleeves bearing the circuit number indicated in the Contract.

Cables and conductors within the cabinet shall be routed and bundled together in such a manner as to present a neat appearance. Self-clinching nylon cable ties shall be used to securely bundle together cables and conductors. Cable ties shall be spaced not more than 12-inches apart nor closer than 6-inches, unless breakouts or routing dictates.

Cables and conductors for the traffic signal circuits, loop detectors, and telemetry circuits shall be routed to the front of the cabinet, then CLOCKWISE around the left side to beneath the appropriate termination point. The AC service and the luminaire wiring shall be routed to the front of the cabinet, then COUNTER-CLOCKWISE to the right side of the cabinet.

Service loops shall be provided whenever a conductor breaks away from a bundle and is terminated. The radius of the service loop shall be three times the diameter of #10 AWG or smaller conductors and 5 times the diameter of conductors larger than #10 AWG.

Terminating conductors shall terminate on the terminal block provided in the controller cabinet. Terminating conductors shall not be spliced together before termination on the terminal block. Terminating conductors shall end in either a solderless spade lug terminal or a high-pressure screw lug. If three or more conductors terminate on the same terminal screw, a high-pressure screw lug shall be used.

Solderless spade lug terminals shall be installed with a crimping tool matched to the terminal as recommended by the terminal manufacturer. The splicing tool shall be designated to prevent the dies from releasing the terminal until the proper compression has been completed.

High-pressure screw lugs, if used, shall have a cast copper body and work on screw and saddle principle. The saddle and cable socket shall be serrated. The saddle shall be of an overlapping design.

Luminaire splices within the controller cabinet shall be made by using insulated crimp-type splices and tape.

Spare conductors shall be taped and tied back.

Controller cabinets manufactured to current NEMA TS2 specifications shall provide for electrical isolation of AC neutral, equipment ground, and logic ground. Grounding conductors (signal commons) shall be terminated on the AC neutral bus. Bonding and equipment grounding conductors shall be terminated on the equipment ground bus. Logic commons (pedestrian push-button and detector unit commons) shall be terminated on the logic ground terminal(s) provided.

Controller cabinets and other concrete base mounted cabinets shall be installed on a bed of exterior-grade silicone caulking compound, white or clear in color, or approved equal sealant. The sealant bed shall cover the entire flange area of cabinet. A neat bead of the same sealant material shall be formed around both the exterior and interior perimeter of the cabinet-concrete joint after the cabinets are bolted down to form an effective watertight seal.

**8-20.3(16) Reinstalling Salvaged Material**  
**(August 1, 2008 COS GSP)**

**Add** the following before the first paragraph:

The Contractor shall remove and legally dispose of the affected signal bases, foundations, controller bases, and the other non-salvageable signalization, communication equipment, and appurtenances as determined by the Engineer.

The Contractor shall also remove and preserve for salvage purposes the reusable signalization, communication, or interconnect equipment as determined by the Engineer. The Contractor shall exercise care when removing the reusable signalization,

communication or interconnect equipment so as to maintain the reusable equipment's serviceability. For the purposes of this Specification, "Salvage" means that the Contractor shall provide the salvage items to the Contracting Agency.

The Contractor shall arrange an on-site preconstruction field inspection with the Engineer and a representative of the Signal and Lighting Division to determine salvageability of the reusable signalization, communication, or interconnect equipment scheduled for removal within this contract.

The Contractor shall provide a written, itemized list of equipment, including the type, quantity, location and condition of signal items to be salvaged, to the Engineer. The Engineer will forward the list to the Signal and Lighting Division Foreperson. The Contractor shall provide this list to the Engineer at least 5 working days after the on-site preconstruction field inspection. Each item listed shall be delivered on a normal Contracting Agency workday to the City of Spokane Signal and Lighting Division warehouse located at 901 N. Nelson Street between the hours of 8:00 A.M. and 2:00 P.M. In order for the warehouse to prepare for the delivery of the items, the Contractor shall contact the Signal and Lighting Division Foreperson at (509) 232-8001 at least 2 working days prior to the delivery date.

Upon delivery, the Contracting Agency will inspect and determine if each salvageable item is in an acceptable condition.

The Contractor shall replace in-kind, repair (to the Engineer's satisfaction) or pay the Contracting Agency to replace the salvageable and insitu signalization, communication, and interconnect equipment that is damaged due to the Contractor's operation, at no cost to the Contracting Agency.

Salvageable items not delivered to the City of Spokane Signal and Lighting Division warehouse by the Contractor by the end of the contract, shall be charged to the Contractor for full replacement cost or required to be replaced by the Contractor in-kind irrespective of its condition prior to removal.

If there was no on-site pre-construction field inspection prior to its removal, each salvageable items removed by the Contractor, delivered to the City of Spokane Signal and Lighting Division warehouse, and deemed not acceptable by the Contracting Agency, shall be charged to the Contractor for full replacement costs or be required to be replaced by the Contractor in-kind, irrespective of its condition prior to removal.

Preservation of Existing Materials to Remain. The Engineer may conduct a pre-acceptance and a post-acceptance inspection of each salvageable item within the limits of this contract.

**Add** the Following new Sections

**8-20.3(100) Communication Cables and Interfaces**  
**(January 1, 2020 COS GSP)**

### **Cable Installation - General**

The Contractor shall provide all materials required for the installation and splicing of the specified communications cables and associated interface devices.

The Contractor shall determine a suitable cable installation method to ensure that all cable installation requirements shall be met in all conduit sections. All work shall be carried out in accordance and consistent with the highest standards of quality and craftsmanship in the communication industry with regard to the electrical and mechanical integrity of the connections; the finished appearance of the installation; as well as the accuracy and completeness of the documentation.

The Contractor shall make a physical survey of the project site for the purpose of establishing the exact cable routing and cutting lengths prior to the commencement of any fiber optic work or committing any fiber optic materials. Splicing is only allowed for the programmed connection of reels and as shown in the Plans to connect a lateral fiber optic cable to the mainline distribution fiber optic cable. The Contractor shall submit a cable routing plan that shows the locations of all splices. All splice locations other than those shown in the Plans must be approved by the Engineer.

All work areas shall be clean and orderly at the completion of work and at times required by the Engineer during the progress of the work.

### **Fiber Optic Cable Installation**

Fiber optic cables shall be installed in continuous lengths without intermediate splices throughout the project, except at the location(s) specified in the Plans.

The Contractor shall comply with the cable manufacturer's specifications and recommended procedures including, but not limited to the following:

1. Installation.
2. Proper attachment to the cable strength elements for pulling during installation.
3. Bi-directional pulling.
4. Breakaway swivel rated to protect the cable from excess tension during installation.
5. Cable bending radius limitations.

The Contractor shall protect the loops from tangling or kinking. At no time during the length of the project shall the cable's minimum bending radius specification be violated.

To accommodate long, continuous installation lengths, bi-directional pulling of the fiber optic cable shall be permitted.

In all cable vaults, and at all splice locations, cable slack of 100 feet (50 feet on each side of the splice) shall be left by the Contractor, unless otherwise specified in the Plans. 50 feet of cable slack shall be installed in all Pull Boxes that are not a splice location. The

fiber optic cable slack shall be coiled and secured with tie wraps to racking hardware or as specified in the Plans.

The pulling eye/sheath termination hardware on the fiber optic cables shall not be pulled over any sheave blocks.

When power equipment is used to install fiber optic cabling, the pulling speed shall not exceed 100 feet per minute. The pulling tension limitation for fiber optic cables shall not be exceeded under any circumstances.

Large diameter wheels, pulling sheaves, and cable guides shall be used to maintain the appropriate bending radius. Tension monitoring shall be accomplished using commercial dynamometers or load-cell instruments.

### **VMS Cabinets**

VMS cabinets in this project are mounted on the sign support structure with 8 ft of clearance to the bottom of the cabinet. The Contractor shall provide enough slack to allow the VMS cabinet patch panel to be worked on in a truck in an adjacent lane or other legal parking location near the sign base. In some cases 50 ft of slack will be sufficient but in other cases, more cable will be required. In all cases, slack cable refers to the amount 2-strand single mode cable or 4-strand single mode cable remaining after terminations are complete. All cable shall be firmly supported to the patch panel allowing the patch panels to be removed from the cabinet without damaging the fiber and the splices.

The Contractor shall provide and install fiber optic fusion splice tray, duplex pigtails with factory terminated ceramic SC connector ferrules polished to UPC.

### **Traffic Signal Cabinets**

Traffic Signal Cabinets are all existing infrastructure on this project. The fiber optic cables shall be firmly supported to the patch panel allowing the patch panels to be removed from the cabinet without damaging the fiber and the splices.

Install fiber optic fusion splice tray, duplex pigtails with factory terminated ceramic SC connector ferrules polished to UPC.

### **Lateral Cabling**

Lateral cables between underground splice closures Traffic Signal Cabinets and CCTV Cabinets shall consist of loose buffered cable and contain the minimum amount of single mode fibers called for in the plans.

### **Communication Closet**

The existing communication closet\$(s) for this project is located at the following location\$(s):

Central and Normandie pump control building (inside building addition)

533 South Ray Street

Fire Station 4

Fire Station 1

City Hall 6<sup>th</sup> Floor

Topside Cabinet at North Maple Street and Country Homes Boulevard

Topside Cabinet at North Ash Street and Indiana Avenue

### **Fiber Optic Cable Splicing**

The Contractor shall use the fusion method with local injection and detection or profile alignment system for all fiber optic splicing.

Field splices for mainline to lateral cables and for end-to-end mainline cables shall be located as shown in the plans. Splices shall be made mid-point of fiber racking length within cable vaults. No additional splices shall be allowed without the approval of the Engineer.

All fusion splicing equipment shall be in good working order, properly maintained, and meeting all industry standards and safety regulations. Prior to commencing of fiber optic cable splicing, the Contractor shall submit all maintenance records for the fiber optic cleaver and the fiber optic fusion splicer to show that they have been properly maintained.

Cable preparation, closure installation and splicing shall be accomplished in accordance with accepted and approved industry standards.

Upon completion of the splicing operation, all waste material shall be deposited in suitable containers for fiber optic disposal, removed from the job site, and disposed of in an environmentally acceptable manner.

The Contractor shall seal all cables where the cable jacket is removed. The cable shall be sealed per the cable manufacturer's recommendation with an approved blocking material.

All below ground splices shall be contained in waterproof underground splice closures.

All splices shall be contained in splice trays utilizing splice protection, such as heat shrink protectors.

### **Cable Racking in Cable Vaults and Pull Boxes**

The Contractor shall provide all required brackets and other racking hardware required for the fiber optic cable racking operations.

The Contractor shall rack the cable in horizontal figure eight loops, which shall permit pulling slack from the vaults without introducing twist to the cable.

Cables shall be secured in racked positions with nylon ties. Identification and/or warning tags shall be securely attached to the cables in at least two locations in each pull box or cable vault.

All coiled cable shall be protected to prevent damage to the cable and fibers. Racking shall include securing cables to brackets (racking hardware) that extend from the side walls. All racked cable shall be placed on the opposite side of any entry ladders located in the vault.

### **Fiber Optic Cable Labeling**

Permanent cable labels shall be used to identify cables and patch cords at each termination point. The cable labels shall consist of white colored heat shrink wraps with identification based on the schematic shown on the ITS detail sheets.

Permanent cable labels shall also be used to identify the fiber optic cable in each aggregate point, pull box, and cable vault. The mainline fiber optic cable shall be labeled at each entry point the cable exits a conduit with “COS MAINLINE TO FILL IN” with the fill in being the next the location where the fiber ends of the cable can be accessed (typically this will be an aggregate point or field cabinet).

The lateral fiber optic cable shall be labeled “COS LATERAL TO FILL IN” with the fill in being the location where the lateral ends or terminates (typically this will be an aggregate point, field cabinet, or splice case location for a cable to cable splice).

### **Interfaces**

#### **Fiber Optic Patch Panels**

The Contractor shall access existing patch panels in the following locations:

Location	Type
Central and Normandie pump	Rack
533 South Ray Street	Rack
Fire Station 4	Rack
Fire Station 1	Rack
City Hall 6 <sup>th</sup> Floor	Rack
Maple Street and Country Homes Boulevard	Rack
North Ash Street and Indiana Avenue	Rack

A labeling diagram shall be supplied with each patch panel in printed form and Microsoft Excel spreadsheet form. The wiring diagram shall identify each fiber terminated in the patch panel using the fiber optic patch panel labeling method as shown in Appendix A. The wiring diagram shall be placed in a plastic sheet protector next to the patch panel.

#### **Fiber Optic Cable Testing**

The installed optical fiber cable shall be tested for compliance with the transmission requirements of this specification, the cable and hardware manufacturer's specifications, and prescribed industry standards and practices.

#### **Types of Testing**

The types of acceptance testing for optical fiber cable system certification are:

Attenuation testing

### **Attenuation Testing**

Insertion loss testing shall be used to measure end-to-end attenuation on each new fiber installed between:

Field Cabinets to Aggregate points, such as the Central Pump.

Insertion loss testing shall be performed at the 1310 nanometer and 1550 nanometer wavelengths in both directions. The contractor shall use an optical loss test set with a stabilized light source and power meter.

Prior to commencing testing, the Contractor shall submit the manufacturer and model number of the test equipment along with the calibration certificate of the light source and power meter to show that it has been properly calibrated within 6 months of the proposed test dates.

The following information shall be documented for each fiber test measurement:

Wavelengths

Fiber type and manufacture with part number

Cable, tube and fiber IDs

Near end and far end test locations

End-to-end attenuation

Date, time, and operator

ORL

### **Optical Time Domain Reflectometer (OTDR) Testing**

The Contractor shall OTDR test fibers that have been installed for this Contract. Testing shall occur in both directions from field location to the Aggregate location.

An optical time domain reflectometer (OTDR) with recording capability shall be utilized to test the end-to-end transmission quality of each optical fiber as previously defined. Quality tests shall consider both attenuation and discontinuities. The OTDR shall be equipped with 1310 nanometer and 1550 nanometer laser for testing singlemode optical fibers. The OTDR shall be capable of providing electronic and hard copy records of each test measurement.

The OTDR shall be equipped with a dead zone box meeting or exceeding the minimum pulse width to allow the entire cable section to be tested. The fiber being tested shall have an optical terminator on the distant end.

Prior to commencing testing, the Contractor shall submit the manufacturer and model number of the OTDR test unit along with certification that it has been properly calibrated within 6 months of the proposed test dates.

Each new mainline and lateral fiber shall be tested in both directions at the 1310 and 1550 nanometer wavelengths. Existing mainline and lateral fibers that are spliced to or re-spliced as part of this contract shall also be tested in both directions and at both wavelengths.

The following information shall be documented for each fiber test measurement:

X-Y plot scaled for fiber length

Deadzone box

Wavelength

Refraction index

Fiber type

Averaging time

Pulse width

Cable and fiber IDs

Near end and far end test locations

Date, time, and operator

Event table that includes: event ID, type, location, loss, and reflection.

The average splice loss of each fiber measured at 1310 nanometers shall be 0.15 dB or less per splice. The average splice loss is defined as the summation of the attenuation as measured in both directions through the fusion splice, divided in half.

No individual splice loss measured (in a single direction) at 1310 nanometers or 1550 nanometers shall exceed 0.20 dB.

The Contractor shall take corrective action on portions of the fiber installation determined to be out of compliance with the specifications.

### **Fiber Cable Testing Documentation**

#### **Compliance Testing**

The Contractor shall submit two electronic copies of the fiber test results for approval by the Engineer. The electronic submittal shall be on compact disk and include two licensed copies of the applicable OTDR reader program.

The following information shall be included in each test result submittal:

1. Contract number, contract name, contractor name and address.
2. Dates of cable manufacture, installation, and testing.
3. Cable and fiber manufacturers specifications.
4. Location of all splices.
5. OTDR test results.
6. Fiber Attenuation values.

7. ORL for all connectors.
8. Locations where corrective action was taken

### **Validation Testing**

Within 30 days of submitting compliant test results, the Contractor, in the presence of the Engineer, shall re-test a minimum of 5% of the previously tested locations to validate the test results. The Engineer will select the 5% sample at random from the terminal device locations. Should corrective action be necessary, the compliance test results shall be declared invalid and Compliance Testing shall be repeated.

Upon completion of validation testing the Contractor shall submit two electronic copies of the validation test results for approval by the Engineer. The submittal shall include the same information as that required for the compliance testing.

### **Patch Cords**

#### **Copper Patch Cords**

The Contractor shall provide and install the necessary copper patch cords between the Ethernet switch and field devices necessary to make the system operational.

#### **Fiber Optic patch Cords**

Fiber optic patch cords shall be factory terminated duplex or simplex single mode connectors. Ethernet devices connected at \$\$Aggregate points like Central Avenue and in field cabinets require a duplex SC- LC configuration.

For bidding purposes, the fiber optic patch cords located at \$\$Central Avenue shall be 20 feet long. The Contractor shall verify lengths prior to ordering. For bidding purposes, fiber optic patch cords for field cabinets shall be 9 feet long.

The Contractor shall clean all fiber optic connector ends every time dust covers are removed. Alignment sleeves and patch cords shall be cleaned with standard methods and materials for fiber optic cleaning. Patch cords shall be immediately connected to alignment sleeves after cleaning or capped with protective dust covers.

Patch cords installed in conduits shall be protected by plastic spiral wrapping. Spiral wrap shall cover the entire length of the patch cord(s) to within 12 inches of end. The spiral wrap shall be installed before the patch cords are pulled into the conduit(s) and be rated for use in electrical installations.

### **Cleaning Fiber Optic Connections**

The Contractor shall submit the procedure and cleaning equipment they propose to use for cleaning male and female fiber optic connectors to the Engineer for approval. The Contractor shall clean all male and female fiber optic connections per the approved procedure. All cleaned connections shall be immediately plugged in. Connectors that are not plugged in within 5 minutes of cleaning shall be re-cleaned before being plugged in. The Contractor shall supply one fiber optic cleaning kit for cleaning connectors on patch cords and patch panels to the City Signals and Lighting representative.

### **8-20.3(101) Video, Voice, and Data Transmission and Distribution Systems (January 1, 2020 COS GSP)**

#### **General**

When shown in the plans, the Contractor shall provide the Cisco switches to the City in the original shipping medium with unopened tamper seals in order for the City to register the switches in our extended warranty program. The Contractor shall confirm the order with the City prior releasing the order.

The City will verify the operation of the equipment. Equipment failing bench testing will be returned to the Contractor for replacement and not installed in the project.

#### **Installation**

The Contractor shall install the Video, Voice, Data Transmission and Distribution System components in the New VMS control cabinets, existing Signal cabinets, and the existing aggregate points, as shown on the plans.

Cisco IE3200-8T2S-E and all necessary components(Contractor Provided).

The Contractor shall install the following Video, Voice, Data Transmission and Distribution System components in the Aggregate location when shown on the plans:

Cisco IE-4010-16S12P and all necessary components(Contractor Provided).

Cisco C9500-16X and all necessary components(Contractor Provided).

#### **Documentation**

Documentation for each system element shall consist of the manufacturer's name and model number, serial number when available, materials and operating specifications, wiring schematic and parts list, owners manuals, factory service manuals, and procedures for factory testing and system acceptance testing specified elsewhere herein. The Contractor shall submit 3 copies of the documentation specified above prior to the installation of the cable or components described in the submittal. In addition, the Contractor shall submit 3 copies of an overall system wiring schematic and termination chart for the installed TMS elements (operation and maintenance manuals). All documentation for each individual element shall be neatly bound in a way for the information is secured together and is totally legible without removing the information from the binding. This documentation shall be in addition to any other data, shop drawings, etc. required to be submitted as specified in these Special Provisions.

### **8-20.3(102) Closed Circuit Television System (July 1, 2015 COS GSP)**

#### **CCTV Pole Mounted Junction Box**

The Contractor shall provide and install a NEMA 3R enclosure to house the CCTV power supply, Ethernet surge suppressor, Hardened Ethernet Switch, and 120 volt surge suppressor. The equipment shall be securely mounted to the back panel of the NEMA 3R enclosure. The enclosure shall be mounted to the existing/new signal standard with stainless steel banding as shown in the plans. The galvanizing on signal poles shall be repaired with a coat of cold applied galvanizing repair paint

### **CCTV System Cabling**

The Contractor shall install and terminate the cabling between the traffic signal cabinet and the pole mounted junction box. The Contractor shall install RJ-45 ends on the Cat 6 cable according to the manufacturer's recommendations. The 120 volt wires shall be terminated to a terminal strip with spade connectors. Ground wires shall be terminated to the grounding bus.

### **CCTV Camera Mounting**

The CCTV camera shall be mounted to the luminaire mast arm as shown in the plans. The Contractor shall supply all necessary mounting brackets. The galvanizing shall be repaired with a coat of cold applied galvanizing repair paint.

### **CCTV System Testing**

During each field acceptance testing phase, the Contractor shall repair or replace the CCTV camera installation as necessary at no additional cost to the Contracting Agency.

### **Bench CCTV Test**

The Contracting Agency will perform a bench test on each camera and pan-tilt-zoom unit, and set the camera address prior to installation. The test will be conducted at the Signal and Lighting Section Shop. The Contractor shall arrange to deliver and retrieve each camera assembly, and is welcome to be present during the test.

The bench test will verify the following capabilities of the camera and pan-tilt-zoom unit:

1. Display camera video on Contracting Agency-provided laptop.
2. Pan and tilt camera through the full range of motion.
3. Zoom and focus camera in both fast and slow modes.
4. Change iris between auto and manual.
5. Change color balance between auto and manual.
6. Change video stream rate.

### **Local CCTV Test**

At each cabinet the Contractor shall connect the Contractor shall demonstrate to the Engineer the following features of the camera installation:

1. Display camera video on Contracting Agency-provided laptop.
2. Pan and tilt camera through the full range of motion.
3. Zoom and focus camera in both fast and slow modes.
4. Change iris between auto and manual.

5. Change color balance between auto and manual.
6. Change video stream rate.

### **8-20.3(103) Permanent Variable Message Sign** **(October 1, 2017 COS GSP)**

The Contractor shall furnish and install necessary conduits, inner ducts, conductors, VMS control cables, junction boxes, service meter cabinets, service disconnects, VMS controller cabinet, VMS mounting system, VMS display as shown in the plans, and providing and installing all software and any needed hardware to ensure the VMS is fully compatible with and completely capable of being operated by the Contracting Agency's existing PC and central control system for a complete and operable system.

#### **Sign Mounting**

The Contractor shall mount the VMS sign to the cantilevered sign structure with a mounting system designed by the VMS manufacturer.

#### **VMS Control Cabinets**

The Contractor shall mount the VMS control cabinets to the cantilevered sign structure. The base of the cabinets shall be 8 feet above sidewalk or top of curb grade. The Contractor shall field drill a hole in the cabinet to allow the control cables and sign power to pass through the coupling on the cantilevered sign structure. The cabinets shall be mounted plumb which requires a tapered mounting flange to be manufactured, shims are not allowed.

#### **VMS Sign Controller**

The VMS shall include an associated sign controller, which shall be installed in the local control cabinet housing. The sign controller hardware and software shall support all VMS communications, control, and diagnostic features.

#### **Software Duplication Rights**

The City of Spokane shall have the right to duplicate the Variable message Sign Control Software as needed for use in controlling signs under its jurisdiction.

#### **Documentation**

The Contractor shall furnish two paper copies of the Control software user manuals, the sign controller cabinet schematic, and the VMS display cabinet wiring schematic, to the Engineer. In addition the Contractor shall provide two USB thumb drives with the same documents in electronic format to the Engineer

#### **VMS Commissioning**

Commissioning shall be performed by a representative of the sign manufacturer in the presence of a representative from the City's Signal and Lighting Section. The Contractor shall schedule the commissioning date and time with the Signal and Lighting Section Foreperson at (509) 232-8801, a minimum of 5 business days ahead of the commissioning date.

Commissioning shall include verification of all items contained in the field testing procedures for VMS signs located in Appendix A.

Any failure identified by either the sign representative or the Signal and Lighting representative shall be repaired and the testing sequence restarted. The sign representative shall provide a copy of the commissioning report prior to leaving the site to the Signals and Lighting representative.

#### Maintenance Kit

The Contractor shall supply a maintenance kit at the time of commissioning. The kit shall include 1 VCF-3000 controller, 2 LED modules, 1 Vanguard Controller Board, 1 photo/temperature sensor, 1-24 volt power supply, and 1 sign surge suppressor.

#### **VMS Central Control Software**

The Contractor shall supply the latest version of the Daktronics central control software, Vanguard v4 Professional, one server license, and two paper copies of the software user manual in a 3 ring binder, to the City of Spokane.

#### **8-20.3(104) Pedestrian Crossing Beacon System** **(April 1, 2018 COS GSP)**

The Contractor shall furnish and install a Pedestrian Crossing Beacon System according to the plans consisting of the pole, frangible base, concrete foundation, underground conduit, cabling, pedestrian push button, signs, sign mounting, LED amber displays and mounting brackets, flasher control module, power connections, and other items required for a complete and functioning system.

The system shall be installed as a wired commercial power system with wired communication between signs and or pedestrian push buttons at a crossing.

**Add** the following new Section:

#### **8-20.3(105) Temporary Intersection Lighting System** **(April 1, 2018 COS GSP)**

The Contractor shall provide, operate, and maintain temporary lighting at the following intersections on the project for all hours of darkness until the new lighting installed by this project is activated:

\*\*\* As required by the City Engineer \*\*\*

Temporary intersection lighting shall conform to 9-29.112.

## **SECTION 8-21 PERMANENT SIGNING**

### **8-21.1 Description** **(August 1, 2008 COS GSP)**

**Replace** this Section in its entirety with the following:

This work shall consist of furnishing and installing permanent signing, sign lighting, sign removal, sign relocation, and refacing existing signs in accordance with the Plans, these Specifications, and the COS Standard Plans at the locations shown in the Plans or where designated by the Engineer.

The term “post” shall apply to the signal pole/standards, stress poles, posts and poles, regardless of shape, length or material used in construction.

The term “overhead” shall apply to the signal pole/standard mast arms, luminaire/street light mast arms, wire and sign bridges, regardless of shape, length or material used in construction.

### **8-21.2 Materials** **(November 1, 2012 COS GSP)**

**Add** the following after the last paragraph:

Traffic sign post, splices, break away bases, and fastening hardware shall conform to Section 9-06.16.

Sign mounts shall conform to the COS Standard Plans in the ‘G’ series and Section 9-06.16.

### **8-21.3 Construction Requirements**

#### **8-21.3(4) Sign Removal** **(February 14, 2018 COS GSP)**

**Replace** this Section in its entirety with the following:

Where shown in the Plans or ordered by the Engineer, the existing signs and, if so indicated, the sign structures shall be removed by the Contractor. Removal shall include the post, signs, concrete base, and the other appurtenances. Where indicated, the Contractor shall remove concrete bases completely and backfill the hole according to Section 2-09.3(1)E. Where an existing sign post is located within a sidewalk area, the Contractor shall remove the post and finish the area to make the sidewalk continuous.

Signs and posts removed by the Contractor shall remain the property of the Contractor and be legally disposed. Removed signs shall be defaced by removing a minimum of one square inch of sign sheeting and plating.

Signs damaged by the Contractor shall be charged to the Contractor for full replacement cost, regardless of its condition prior to removal.

Sign/sign post damaged by the Contractor during removal or other construction operations shall be replaced by the Contractor and at no cost to the City of Spokane.

**8-21.3(9)F Foundations**  
**(September 1, 2015 COS GSP)**

**Add** the following after the last paragraph:

When signs are identified for installation with Type A or Type B posts according to Standard Plan G-10A and/or G-10B, the concrete base portion shall be precast. The Contractor shall not pour bases in the ground.

**8-21.3(12) Steel Sign Post**  
**(August 1, 2012 COS GSP)**

**Replace** this section in its entirety with the following:

Sign Posts. Sign posts shall be constructed in accordance with COS Standard Plans in the 'G' series.

The sign post type designation and installation methods shall be in accordance with the COS Standard Plans in the 'G' series. Sign posts shall be installed plumb and true to the proper height.

Sign Mounting. Signs, sign mounting hardware, shall be in accordance with the COS Standard Plans in the 'G' series.

**8-21.3(100) Sign Manufacturing**  
**(February 14, 2018 COS GSP)**

The Contractor shall design and manufacture the signs. The Contractor **shall submit a spec drawing of each sign's design** (prior to manufacture) for fabrication approval to the City of Spokane's Signs and Marking Supervisor. The City Signs and Marking Supervisor can be reached at (509) 232-8803.

The Contractor shall arrange an appointment with the City of Spokane's Signs and Marking Supervisor prior to presenting signs at 901 N Nelson Street for fabrication inspection approval a minimum of 5 (five) City business days prior to installation.

**8-21.3(101) Splices**  
**(November 1, 2012 COS GSP)**

Splices shall consist of a smaller sized square perforated tube inserted between sections of full size tubing and bolted in place according to the manufacturers recommendations. Post shorter than 12-feet in length shall not contain splices. One splice is permitted in post over to 12-feet in length. Splices shall be installed no lower than 9 ft above finished grade. See the “G” series Standard Plan.

**SECTION 8-22 PAVEMENT MARKING**

**8-22.2 Materials**  
**(January 8, 2010 COS GSP)**

**Replace** this section in its entirety with the following:

Material for pavement marking shall be paint, or durable tape as noted in the bid item meeting the requirements of Section 9-34. Glass beads for paint shall meet the requirements of Section 9-34.4.

Type A – Liquid Hot Applied Thermoplastic pavement markings will not be accepted.

“Pavement Markings – Durable Heat Applied” shall be Type B – pre-formed fused thermoplastic pavement markings according to Section 9-34.

“Pavement Markings – Durable Inlay” shall be Type C – pre-formed cold applied pavement markings according to Section 9-34.

“Pavement Markings – Durable” shall be Type D – liquid cold applied methyl methacrylate pavement markings according to Section 9-34.

**8-22.3 Construction Requirements**  
**(February 14, 2018 COS GSP)**

**Add** the following:

Type B markings are used to supplement longline paint striping, as shown in COS Standard Plans in the ‘G’ series.

For areas that are to have tape and paint, the Contractor shall install the tape prior to paint. In the event that the Contractor applies the tape after painting the striping, then the Contractor shall reapply the paint markings over the tape at no cost to the contracting agency.

The Contractor shall have a manufacturer’s representative on site when installing Type C and Type D markings.

In the event that the Contractor's operations damage the pavement markings outside of the project limits, the Contractor shall remove the existing damaged markings and reinstall the pavement markings in-kind, at no cost to the Contracting Agency.

Type D pavement markings shall be installed in grooves according to 8-22.3(3).

Prior to the first installation of Type B – pre-formed fused thermoplastic pavement markings the Contractor shall coordinate an on-site marking installation training with a marking material manufacturer's representative.

Pavement markings shall be installed 4 inches from existing manhole covers, valve covers, and drainage inlets.

Crosswalk and stop bar pavement markings shall be installed 12 inches from the face of curb.

The Contractor shall install permanent dot lane markers according to City Standard Plan G-50B when painted lane markings are installed.

Dot markers shall be installed after temporary pavement marking has been removed and within 3 days prior to the roadway surface being striped with paint, unless directed otherwise by the Engineer. Painting will be completed within 2 weeks after resurfacing, weather permitting.

**8-22.3(1) Preliminary Spotting**  
**(April 1, 2018 COS GSP)**

**Replace** this Section in its entirety with the following:

The layout required for pavement markings shall be the Contractor's responsibility. The color of the material used for spotting shall match the color of the permanent marking.

**8-22.3(3)F Application Thickness**  
**(July 27, 2016 COS GSP)**

**Add** the following:

Pavement grooving depth shall be a maximum of 100 mils. Groove depth is measured vertically from the bottom of a 2 foot straightedge placed on the roadway surface to the ground surface. Equipment used to form the groove shall produce a smooth bottom square groove with no variations greater than 25 mils when checked with a 10 foot straightedge.

Pavement grooving width shall be the width of the mark as a minimum and the width of the mark plus 1/4" as a maximum.

The intent of the grooving depth is to allow the marking material to be flush with the existing surface.

Grooves shall be cleaned and prepared for marking installation according to the manufacturers recommendations.

**8-22.3(5) Plastic Installation Instructions**  
**(March 1, 2016 COS GSP)**

**Add** the following:

**Type C Inlay Application**

The Contractor shall coordinate an on-site marking installation training with a marking material manufacturer's representative prior to the first installation of Type C pavement markings.

The Contractor shall supplement the manufacturer's installation instructions with the following.

The Contractor shall provide a dedicated steel-drum finish roller and operator for the pavement marking installation of Type C pavement markings.

The Contractor shall install Type C markings for inlay applications when the surface temperature of the HMA is between 160°F and 130°F. The maximum surface application temperature for Type C markings is 180°F.

The Contractor shall walk the tape with one pass of the Roller Tamper Cart loaded with a minimum of 50 lb weight to tack the tape to the asphalt prior to rolling with a steel-drum finishing roller. Tape installed by hand and tape installed with a tape applicator shall be tamped prior to rolling.

The Tape shall be rolled by the steel drum finish roller between 2 mph and 3 mph (typical adult walking speed).

Type C marking installed above 180°F or below 130°F shall be removed and the Contractor shall install the Type C markings with adhesive at no additional cost to the Contracting Agency.

Type C marking installed outside roller speed range shall be removed and the Contractor shall install the Type C markings with adhesive at no additional cost to the Contracting Agency.

Type C markings omitted during paving shall be installed in a 100 Mil groove with adhesive at no additional cost to the Contracting Agency.

**8-22.3(6) Removal of Pavement Markings**  
**(March 14, 2016 COS GSP)**

**Replace** this section in its entirety with the following:

Pavement markings to be removed shall be obliterated until blemishes caused by the pavement marking removal conform to the coloration of the adjacent pavement.

Grinding to remove painted markings is not allowed. Painted markings shall be removed by water blasting only. Grinding to remove plastic marking is allowed to a depth just above the pavement surface, then water blasting or shot blasting shall be required to remove the remaining markings. If, in the opinion of the Engineer, the pavement is materially damaged by pavement marking removal, such damage shall be repaired by the Contractor in accordance with Section 1-07.13(1)

Sand or other material deposited on the pavement as a result of removing lines and markings shall be removed as the Work progresses to avoid hazardous conditions. Accumulation of sand or other material which might interfere with drainage will not be permitted.

**8-22.3(100) Damaged Line Repair**  
**(February 14, 2018 COS GSP)**

The Contractor shall repair lines that are damaged, as defined by the Engineer at no cost to the City. Type B lines shall be repaired with Type B material. Type C lines shall be repaired with Type B material or Type C material with supplemental adhesive. Type D lines shall be repaired with Type D material. Surfaces shall be prepared according to the manufacturers recommendations.

**SECTION 8-24 ROCK AND GRAVITY BLOCK WALL AND GABION CRIBBING**

**8-24.2 Materials**  
**(August 1, 2008 COS GSP)**

**Revise** the “Backfill for Rock Wall” requirements to identify section 9-03.12(2).

**Add** the following after the last item:

Mortar shall meet the requirements of ASTM C-270, for Type “M” mortar. The mortar may be colored to approximate the stone color, using pre-approved methods and materials.

**8-24.3 Construction Requirements**  
**(August 1, 2008 COS GSP)**

**Add** the following:

The Engineer may reject defective material and suspend improperly executed work. Rejected material shall be removed from the construction site and rejected work will be repaired or replaced by the Contractor at no additional cost to the Contracting Agency.

**8-24.3(1)B           Excavation**  
**(August 1, 2008 COS GSP)**

**Add** the following after the first sentence:

The Contractor shall begin rock wall construction by excavating a trench, not less than 6-inches or more than 1-foot in depth below subgrade. The Contractor shall not begin laying the rock wall until the foundation excavation has been inspected and approved by the Engineer. Due care shall be exercised by the Contractor in all operations so that there is no disturbance to private property. Areas on which the rock wall is to be placed shall be shaped to conform to the elevation or slope indicated on the Plans. The rock wall construction will start as soon as possible after the shaping of the cut or fill section and excessive delay in starting construction will be the Contractor's responsibility. The Contractor shall correct problems or repair damage caused by this delay at no expense to the Contracting Agency.

**8-24.3(1)C           Foundation Preparation**  
**(August 1, 2008 COS GSP)**

**Add** the following to the end of the first paragraph:

The laying of rock wall shall not start until the foundation excavation has been inspected by the Engineer.

**Add** the following after the third paragraph:

The larger rocks shall be placed at the base of the wall so the wall will be stable and have a stable appearance. The rocks shall be carefully placed by mechanical equipment and in a manner such that the longitudinal axis of the rock shall be at right angles or perpendicular to the wall face. The rocks shall have the inclining faces sloping to the back of the wall.

The Contractor shall protect the rock wall from the sun and shall keep the rock wall wet for a period of 3 days. The Contractor shall protect freshly placed rock wall elements from heavy or prolonged rain.

**8-24.3(1)D           Construction Geotextile**  
**(August 1, 2008 COS GSP)**

**Replace** the first sentence with the following:

A geotextile filter shall be of the type and placed as shown on the Plans or where directed by the Engineer. The geotextile shall be laid in direct contact with the embankment face with a minimum of wrinkles. Pins may be used to hold the geotextile in place during construction. Overlaps between strips of geotextile shall be a minimum of 24-inches.

**8-24.3(1)E      Rock Placement and Backfill**  
**(August 1, 2008 COS GSP)**

**Add** the following to the end of the second paragraph:

Each row of rocks will be seated as tightly and evenly as possible on the rocks below in such a manner that there will be no movement between the two.

**Add** the following to the end of the fourth paragraph:

The final course shall have a continuous appearance and be placed to minimize erosion of the backfill material.

**Add** the following after the sixth paragraph:

The backfill will be placed after each course of rocks. Backfill material on the bearing surface of the rock course will be removed before setting the next course.

On exposed wall faces, excess mortar shall be removed by utilizing muriatic acid and thorough water flushing, or such other method as approved by the Engineer.

The rock wall shall be protected from the sun and shall be kept wet for a period of 3 days. Freshly placed rock wall elements shall be protected against heavy or prolonged rain.

Backfill and drainage of Rock and Gravity Block Wall shall conform to section 6-02.3(22).

**Add** the following new Section:

**SECTION 8-90      CEMENT CONCRETE STAIRWAYS, LANDINGS AND STEPS**

**8-90.1      Description**  
**(February 14, 2018 COS GSP)**

This work shall consist of constructing cement concrete stairways, landings, and steps where shown on the Plans or as directed by the Engineer. Installation shall meet the requirements of this Special Provision and the COS Standard Plans in the 'D' series.

Stairways shall be defined as structures which utilize or require an intermediate landing or landings. Steps shall be defined as the structures not requiring or utilizing intermediate landing.

**8-90.2        Materials**  
**(April 1, 2018 COS GSP)**

Materials shall meet the requirements of the following Sections:

Portland Cement	9-01
Aggregates	9-03
Pipe Railing	9-06
Reinforcing Bars	9-07
Paint	9-08
Concrete Curing Materials	9-23

The concrete mix shall be air-entrained Class 3000 as specified in Section 6-02.3 unless otherwise specified in the Special Provisions or directed by the Engineer.

Galvanized iron pipe railing shall be fabricated from standard weight galvanized steel pipe conforming to ASTM A-120.

**8-90.3        Construction Requirements**

**8-90.3(1)        Excavation**  
**(April 1, 2018 COS GSP)**

Excavation shall be made to the required depth and to a width that will permit the installation and bracing of the forms. The foundation shall be shaped and compacted to a firm, even surface conforming to the section shown on the Plans. Soft and yielding material shall be removed and replaced with acceptable material.

**8-90.3(2)        Forms**  
**(April 1, 2018 COS GSP)**

Forms may be of any suitable material provided the material used will form a finished cement concrete steps, stairway, or stairway landing of dense concrete conforming to the alignment, grade, and cross section dimensions required by the Plans.

**8-90.3(3)        Reinforcing**  
**(April 1, 2018 COS GSP)**

Cement concrete steps shall be reinforced as shown on the COS Standard Plans in the 'D' series.

**8-90.3(4) Railings**  
**(February 14, 2018 COS GSP)**

Hand railing for cement concrete stairways/steps shall be of welded steel pipe construction, galvanized, or painted in an approved manner as shown on the Plans. Welds shall be made by experienced welders and each weld shall be ground and buffed to a smooth surface. Unless otherwise specified, field welds shall not be allowed and construction joints if required shall be mechanical.

The railing may be placed either completely assembled at the time when stairway/steps concrete is placed or recesses may be provided in the concrete for grouting in the railing posts after the concrete has been placed, finished, and cured. The installed railing shall be in true alignment, of proper grade, and the posts plumb.

Unless provided for otherwise, steel handrails shall be fabricated from 1 1/4-inch Schedule 40 galvanized steel pipe. Field welding may be allowed with prior permission from the Engineer.

The handrails shall be shop primed and painted with a complete Rustoleum coating system. Color shall be gloss black. Prior to painting the railings, the surface shall be prepared in accordance with the recommendations of the paint manufacturer. The welds shall be ground smooth and weld spatter removed. After installation, the welded/ground areas shall be touched up with the complete Rustoleum system. Nicked or bruised areas shall be touched up with the Rustoleum top coat as directed by the Engineer.

When performing field touch-up, the Contractor shall ensure that no overspray or drips occur on the permanent surface. If necessary, the Engineer will direct the Contractor to remove overspray or drips in a manner which does not harm the permanent surface and such work shall be performed at no cost to the Contracting Agency.

**8-90.3(5) Placing and Finishing Concrete**  
**(April 1, 2018 COS GSP)**

Placing and finishing concrete shall conform to the appropriate requirements of Sections 6-02 and 8-14.

Front and side edging of stair treads shall be to a radius of 1/2-inch.

Landings for stairways/steps shall be scored and edged as specified for concrete sidewalks in Section 8-14.3(3) except that transverse and longitudinal jointing shall be modified as necessary to result in uniform size of squares in each landing. Where gutters are along the side of stairways/steps, the gutter portion of stairway/steps landings shall be smooth finished without markings to conform with the stairway/steps gutter.

**8-90.3(6) Curing**  
**(April 1, 2018 COS GSP)**

Cement concrete stairways, landings, and steps shall be cured by an approved method as described in Section 8-14.3(4) and shall be cured for at least 72 hours. During the curing period, traffic shall be excluded.

**Add** the following new Section:

**SECTION 8-91 TRAFFIC ISLANDS**

**8-91.1 Description**  
**(April 1, 2018 COS GSP)**

This work shall consist of constructing traffic islands to line and detail as shown on the Plans or as directed by the Engineer. Unless otherwise indicated on the Plans, the traffic island curb shall be reinforced doweled curb conforming to the COS Standard Plans in the 'F' series.

**8-91.2 Materials**  
**(April 1, 2018 COS GSP)**

Reinforced doweled curb shall be constructed with air-entrained concrete Class 4000 conforming to the requirements of Sections 6-02 and 8-04 and in accordance with COS Standard Plans in the 'F' series.

Island nosings shall be constructed of Class 4000 air-entrained cement concrete and in accordance with Section 6-02 and with the COS Standard Plans in the 'F' series.

Traffic Island concrete shall be 6 sack commercial concrete or an alternate Engineer-approved mix provided that the coarse aggregate gradation shall be 100 percent minus 3/4-inch.

If specified, precast traffic curb shall conform to the requirements of Section 8-07.

Traffic island fill shall be a crushed surfacing top course meeting the requirements of Section 9-03.9(3).

**8-91.3 Construction Requirements**

**8-91.3(1) General**  
**(April 1, 2018 COS GSP)**

The area between the curbs of the islands shall be backfilled with crushed surfacing top course and covered with 4-inches of traffic island concrete. Crushed surfacing shall be thoroughly compacted. Two inch diameter holes shall be drilled through the existing pavement into the subgrade at the low points in the island or as directed by the Engineer

to allow the moisture that may accumulate to drain away. The backfill inside the island shall be graded to effect a slope of 1-inch per foot for the concrete surface, to facilitate drainage, and shall be at a level such that the surface of the traffic island concrete is even with the top of the curb.

**8-91.3(2)                      Special Considerations**  
**(February 14, 2018 COS GSP)**

Restrictions for Clearance. Occasionally situations arise wherein the island curbs become so close together as to make it extremely difficult to form them separately. In order to accommodate this situation in a consistent manner, areas of the traffic island where the curbs are closer than 24-inches measured from outside face to outside face shall be formed monolithically of cement concrete, with NO traffic island concrete used in the space between.

Special Requirements for Crosswalks (if applicable). For this project, one or more traffic islands must accommodate pedestrian traffic. Consequently, special consideration must be made for the pedestrians' safe passage.

Pedestrian ways may take the form of either a pass-through or a normal wheelchair ramp and sidewalk, as provided for below.

1. Pass-throughs shall be created by dividing a single traffic island as necessary to create two or more smaller traffic islands. The pass-throughs shall be a minimum of 6-foot in width. The surface of the HMA or PCCP shall be finished in a manner that will allow water to drain out of and away from the pass-through.
2. For islands of sufficient size, curb ramps shall be used. A minimum 5-foot length landing is required between ramps. The ramps shall be connected with 5-foot wide City standard sidewalk with a broom finish. The sidewalk area shall be separated from the traffic island surfacing with expansion joints. All other sidewalk standards apply including lateral expansion and contraction joints.

The Contractor may choose to construct the island surface in one phase, provided there is an expansion joint between the sidewalk portion of the surface and the traffic island concrete portion of the surface. The Contractor may elect to construct the island surface in two phases, in order to make it easier to achieve the required surface treatments. In this case, there will be no extra compensation made for constructing the surface in multiple phases.

It shall be noted that utilization of the standard doweled island curb does not allow for ramp thickness where the plane of the ramp intersects the plane of the pavement. In order to address this, the Contractor shall chip or saw the pavement to a 4-inch depth and remove the required amount of pavement as to allow for full thickness of the ramp concrete. The edge of the chipped area which coincides with the normal face of curb shall be vertical and neat in appearance, so that when the ramp concrete is poured against it, the resulting work will present a uniform line. In this case, the work to chip

or saw and then remove the required portion of pavement shall be considered incidental to the work and there shall be no extra payment made.

**Add** the following new Section:

## **SECTION 8-92 CEMENT CONCRETE INTEGRAL CURB AND SIDEWALK**

### **8-92.1 Description**

**(April 1, 2018 COS GSP)**

Cement concrete integral curb and sidewalk of the width specified shall be used where shown in the Plans or where directed by the Engineer.

### **8-92.2 Materials**

**(April 1, 2018 COS GSP)**

Concrete shall meet the requirements of Section 8-14.

### **8-92.3 Construction Requirements**

**(April 1, 2018 COS GSP)**

The curb and sidewalk shall be placed monolithically. Basic construction shall conform to Section 8-14 "Cement Concrete Sidewalk" and Section 8-04 "Curbs, Gutters, Spillways and Inlets". The work shall be performed in accordance with these Specifications and the COS Standard Plans in the 'F' series.

Division 9

**SECTION 9-03 AGGREGATES**

**9-03.8 Aggregates for Hot Mix Asphalt**

**9-03.8(2) HMA Test Requirements**  
**(January 1, 2020 COS GSP)**

**Replace** the table under heading (3.) with the following:

Traffic ESAL's (millions)	HMA Evaluation	
	Nonstatistical	Commercial
< 3	40	40
≥ 3	44	40

**Add** the following to the end of this Section:

**ESAL's**

HMA mix designs using 64S-28 performance grade binder shall be designed for traffic loading of 0.3 to < 3.0 million ESAL's.

HMA mix designs using 64H-28 performance grade binder shall be designed for traffic loading of ≥ 3.0 million ESAL's.

**9-03.8(3) Grading**

**9-03.8(3)B Gradation – Recycled Asphalt Pavement and Mineral Aggregate**  
**(January 1, 2020 COS GSP)**

**Replace** the second and third paragraph with the following:

The RAP utilized in the production of HMA shall be sized prior to entering the mixer with 100 percent passing a 1 inch sieve so that a uniform and thoroughly mixed HMA is produced in the mixer.

**9-03.8(7) HMA Tolerances and Adjustments**  
**(January 1, 2020 COS GSP)**

**Revise** the table under heading (1.) Job Mix Formula Tolerances with the following:

Aggregate, percent Passing	Nonstatistical Evaluation	Visual Evaluation
1", 3/4", 1/2" and 3/8" sieves	± 6%	± 8%
No. 4 sieve	± 6%	± 8%
No. 8 sieve	± 6%	± 8%
No. 200 sieve	± 2.0%	± 3.0%
Asphalt binder	± 0.5%	± 0.7%
Voids in Mineral Aggregate, VMA		
Air Voids, Va	2.5% minimum and 5.5% maximum	

### **9-03.9 Aggregates for Ballast and Crushed Surfacing**

#### **9-03.9(3) Crushed Surfacing** **(August 1, 2010 COS GSP)**

**Add** the following after the last paragraph:

The use of crushed surfacing blended with recycled materials is not allowed on streets where the final surface treatment consists of crushed surfacing.

Blending of the materials during lay down is not allowed.

### **9-03.12 Gravel Backfill**

#### **9-03.12(3) Gravel Backfill for Pipe Zone Bedding** **(March 31, 2016 COS GSP)**

**Replace** the table with the following:

Sieve Size	Rigid Pipes	Flexible Pipes
	Percent Passing	
1 1/2"	99-100	
1"	75-100	
3/4"		99-100
5/8"	50-100	
1/2"		80-100
No. 4	20-80	45-100
No. 40	3-24	3-55
No. 200	10.0 Max	10.0 Max
Sand Equivalent	35 min.	35 min.

All percentages are by weight.

**Replace** the last paragraph with the following:

If, in the opinion of the Engineer, the native granular material is free from wood waste, organic material, and other extraneous or objectionable materials. The Engineer may allow the Contractor to use native granular material that does not conform to the grading Specifications above provided the native granular material has a maximum dimension of 1 1/2-inch for bedding rigid pipes and 3/4-inch for bedding flexible pipes.

**9-03.12(5) Gravel Backfill for Drywells**  
**(September 29, 2010 COS GSP)**

**Replace** this Section with the following:

Gravel backfill for drywells shall conform to the following grading:

<u>Sieve Size</u>	<u>Percent Passing</u>
3" square	100
1" square	0 - 15
U.S. No. 200	0 - 5.0

A maximum of 10% of the aggregate, measured by weight, may be crushed or fractured rock.

**9-03.15 Native Material for Trench Backfill**  
**(August 1, 2008 COS GSP)**

Delete this Section in its entirety.

**9-03.21 Recycled Material**

**9-03.21(1) General Requirements**

**9-03.21(1)A Recycled Hot Mix Asphalt**  
**(January 1, 2020 COS GSP)**

**Add** the following to the end of this Section:

Recycled Asphalt Pavement (RAP) used in production of HMA shall be processed and placed in dedicated stockpiles for use in approved mix designs. Additional materials shall not be added to the dedicated stockpiles. RAP shall be free of contaminants such as organic material, earth, brick, concrete, fabric, and bituminous surface treatment (chip seal).

During RAP production samples shall be taken and tested at a minimum frequency of one sample per 1000 tons. The Contractor shall have a City approved or AASHTO accredited laboratory perform the following tests on each sample:

1. Aggregate gradation – AASHTO T 30

2. Moisture content – AASHTO T 255
3. Asphalt binder content – AASHTO T 308

The Contractor shall submit the test results to the Engineer for analysis. The Engineer reserves the right to sample and test RAP stockpiles to verify the Contractors results.

**9-03.21(1)E Table on Maximum Allowable Percent (By Weight) of Recycled Material**  
**(January 1, 2020 COS GSP)**

**Replace** the table in its entirety with the following:

<b>Maximum Allowable Percent (by weight) of Recycled Material</b>					
Material	Material Spec.	Hot Mix Asphalt	Recycled Concrete Aggregate	Recycled Glass (glass cullet)	Steel Slag
Fine Aggregate for Concrete	9-03.1(2)	0	0	0	0
Coarse Aggregates for Concrete	9-03.1(4)	0	0	0	0
Coarse Aggregate for Concrete Pavement	9-03.1(4)	0	100	0	0
Coarse Aggregate for Commercial Concrete and Class 3000 Concrete	9-03.1(4)	0	100	0	0
Aggregates for Hot Mix Asphalt	9-03.8	See 5-04.2	0	0	0
Ballast	9-03.9(1)	20	100	15	20
Permeable Ballast	9-03.9(2)	20	100	15	20
Crushed Surfacing	9-03.9(3)	20	100	15	20
Aggregate for Gravel Base	9-03.10	20	100	15	20
Gravel Backfill for Foundations – Class A	9-03.12(1)A	20	100	15	20
Gravel Backfill for Foundations – Class B	9-03.12(1)B	20	100	15	20
Gravel Backfill for Walls	9-13.12(2)	0	100	15	20
Gravel Backfill for Pipe Zone Bedding	9-03.12(3)	0	20	15	20
Gravel Backfill for Drains	9-03.12(4)	0	0	0	0
Gravel Backfill for Drywells	9-03.12(5)	0	0	0	0
Backfill for Sand Drains	9-03.13	0	0	100	0
Sand Drainage Blanket	9-03.13(1)	0	0	100	0

Gravel Borrow	9-03.14(1)	20	100	30	20
Select Borrow	9-03.14(2)	20	100	30	20
Common Borrow	9-03.14(3)	20	100	30	20
Foundation Material Class A and Class B	9-03.17	0	100	30	20
Foundation Material Class C	9-03.18	0	100	30	20
Bank Run Gravel for Trench Backfill	9-03.19	0	100	30	20

## **SECTION 9-04 JOINT SEALING MATERIALS**

### **9-04.5 Flexible Plastic Gaskets**

**(August 1, 2008 COS GSP)**

**Replace** the third sentence of the first paragraph with the following:

It shall be supplied as a preformed flexible plastic gasket of the size and shape as specified by the Engineer.

## **SECTION 9-05 DRAINAGE STRUCTURES AND CULVERTS**

### **9-05.0 Acceptance and Approval of Drainage Structures, and Culverts**

**(January 1, 2020 COS GSP)**

**Replace** the first paragraph with the following:

All of the following Drainage Structures or Culverts shall be selected from the Qualified Products List (QPL):

- Precast Concrete Manholes and Adjustment Sections
- Precast Concrete Catch Basins and Adjustment Sections
- Precast Concrete Inlets
- Precast Concrete Drywells
- Plain Concrete Storm Sewer Pipe
- Reinforced Concrete Storm Sewer Pipe
- Plain Concrete Culvert Pipe
- Reinforced Concrete Culvert Pipe

Other items may be selected from the Qualified Products List, or submitted using a Request for Approval of Materials (RAM) in accordance with Section 1-06.

**9-05.1 Drain Pipe**

**9-05.1(6) Corrugated Polyethylene Drain Pipe, Couplings and Fittings (Up to 10 inch)**

**(August 1, 2008 COS GSP)**

Delete this Section in its entirety.

**9-05.1(7) Corrugated Polyethylene Drain Pipe, Couplings and Fittings (12 inch Through 60 inch)**

**(August 1, 2008 COS GSP)**

Delete this Section in its entirety.

**9-05.2 Underdrain Pipe**

**9-05.2(7) Perforated Corrugated Polyethylene Underdrain Pipe (Up to 10 inch)**

**(August 1, 2008 COS GSP)**

Delete this Section in its entirety.

**9-05.2(8) Perforated Corrugated Polyethylene Underdrain Pipe (12-Inch Through 60-Inch Diameter Maximum), Couplings, and Fittings**

**(August 1, 2008 COS GSP)**

Delete this Section in its entirety.

**9-05.9 Steel Spiral Rib Storm Sewer Pipe**

**(August 1, 2008 COS GSP)**

Delete this Section in its entirety.

**9-05.10 Steel Storm Sewer Pipe**

**(August 1, 2008 COS GSP)**

Delete this Section in its entirety.

**9-05.11 Aluminum Storm Sewer Pipe**

**(August 1, 2008 COS GSP)**

Delete this Section in its entirety.

**9-05.12 Polyvinyl Chloride (PVC) Pipe**

**9-05.12(1) Solid Wall PVC Culvert Pipe, Solid Wall PVC Storm Sewer**

**Pipe, and Solid Wall PVC Sanitary Sewer Pipe**  
**(August 1, 2008 COS GSP)**

**Add** the following to the last paragraph:

Fittings shall be ASTM D 3034 SDR 26.

**9-05.12(2) Profile Wall PVC Culvert Pipe, Profile Wall PVC Storm Sewer Pipe, and Profile Wall PVC Sanitary Sewer Pipe**  
**(August 1, 2008 COS GSP)**

**Delete** this Section in its entirety.

**9-05.15 Metal Castings**

**9-05.15(1) Manhole Ring and Cover**  
**(January 1, 2020 COS GSP)**

**Replace** this Section in its entirety with the following:

- Manhole frames and covers shall conform to COS Standard Plan A-12 or A-13, to the requirements of ASTM A-48, Class 30B for cast iron or ASTM A-536, Grade 80-55-06 for ductile iron, and shall be free of porosity, shrink cavities, cold shuts, or cracks or surface defects which would impair serviceability.
- Manufacturer shall certify that the product conforms to the requirements of these Specifications per Section 1-06.3.
- Repair of defects by welding or by the use of “smooth-on” or similar material shall not be permitted.
- Frames and covers shall be identified by the name of the manufacturer, date of manufacture, and heat number in raised letters on the interior face of the casting. In addition, the material shall be identified by the letters “NOD” or “DUC”, for nodular or ductile iron respectively, to be located adjacent to the other required identifying information.
- At the request of the Contracting Agency, there shall be made available at the foundry standard rings and standard covers for use by Inspectors in testing fit and seating.
- When specified, a groove shall be machined in the edge of the cover to retain a rubber gasket.
- The horizontal seating surface and inside vertical recessed face of the frame, and the horizontal seating surface and vertical outside edge of the cover shall be machined to the following tolerances:
  - It shall not be possible to rock the cover when it is seated in any position in its frame.

- It is desired that the edge of the upper surface of the cover be 1/8-inch below the upper surface of the frame when the cover is seated in any position in its frame.
- In those cases where such alignment is not obtained, the difference in level between the cover and the frame shall not exceed 1/8-inch at any point and shall not exceed 1/16-inch over a total of more than one-fourth of the circumference.
- There shall be not more than 1/8-inch side play in any direction between the cover and the frame when the cover is placed in any position in its frame.

**9-05.15(2) Metal Frame, Grate and Solid Metal Cover for Catch Basins or Inlets**  
**(July 20, 2017 COS GSP)**

**Replace** this Section in its entirety with the following:

Castings for metal frames and grates for catch basins and inlets shall conform to the COS Standard Plans in the 'B' series and the requirements of Section 9-05.15(1).

**9-05.17 Aluminum Spiral Rib Storm Sewer Pipe**  
**(August 1, 2008 COS GSP)**

**Delete** this Section in its entirety.

**9-05.19 Corrugated Polyethylene Culvert Pipe, Couplings and Fittings**  
**(August 1, 2008 COS GSP)**

**Delete** this Section in its entirety.

**9-05.20 Corrugated Polyethylene Storm Sewer Pipe, Couplings and Fittings**  
**(November 1, 2012 COS GSP)**

**Delete** this Section in its entirety.

**9-05.21 Steel Rib Reinforced Polyethylene Culvert Pipe**  
**(November 1, 2012 COS GSP)**

**Delete** this Section in its entirety.

**9-05.22 Steel Rib Reinforced Polyethylene Storm Sewer Pipe**  
**(November 1, 2012 COS GSP)**

**Delete** this Section in its entirety.

**9-05.24 Polypropylene Culvert Pipe, Polypropylene Storm Sewer Pipe, and Polypropylene Sanitary Sewer Pipe**  
**(November 1, 2012 COS GSP)**

**Delete** this Section in its entirety.

**9-05.50 Precast Concrete Drainage Structures**

**9-05.50(2) Manholes**  
**(January 1, 2020 COS GSP)**

**Replace** this Section in its entirety with the following:

The precast concrete manhole dimensions shall be as shown on the COS Standard Plans in the 'Z' series or as shown on the plans. The manufacturer shall certify that the product conforms to the requirements of these Specifications per Section 1-06.3.

Precast concrete manhole components shall conform to ASTM C-478 except as modified herein, provided that the wall thickness shall not be less than 4-inches.

Base Section Openings. Base section openings to receive pipe shall be circular and sized to equal outside diameter of pipe plus manhole wall thickness to accommodate the pipe to be inserted and to effectively seal the joint. Resilient connectors conforming to ASTM C-923 may be used at the Contractor's option.

Steps and Ladders. Precast manhole elements shall be provided with manhole steps as shown on the COS Standard Plans in the 'Z' series. Manhole ladders shall not be used and the required number of manhole steps shall be provided in lieu thereof. Manhole steps as provided by the Engineer shall conform to the ASTM C-478 for installation in precast manhole elements. Manhole steps shall be aligned as indicated on the COS Standard Plans.

For COS Standard Plan Z-101 (Manhole-48") sewer manholes only: Manhole steps shall be oriented perpendicular to the main flow line through the manhole. When three pipes are present in a manhole, the manhole steps shall be oriented opposite the intersecting pipe. When more than three pipes are present in a manhole the manhole steps shall be oriented to lead to the largest available bench space.

Joints. Joints between precast manhole elements shall be sealed with a rubber or flexible plastic joint gasket as approved by the Engineer and shall be similar to pipe joints conforming to ASTM C-443. Completed joints shall show no visible leakage and shall conform to the dimensional requirements of ASTM C-478.

Flat Slab Covers. Standard flat slab covers shall be a minimum of 8-inches thick and shall conform to the outer dimension of the standard sections upon which they are to be placed. The 24-inch diameter opening shall be eccentrically located so as to provide at least 6-inches minimum radial distance from the edge of the 24-inch opening to outer

edge of slab, but not more than 2 1/4-inches offset distance from edge of the 24-inch opening to the inside face of the standard section below.

Flat Slab Reducing Sections. Reduction to 36-inches or 48-inches shall be made by means of flat slab reducing sections. The section shall be a minimum of 8-inches thick and shall conform to the outer dimension of the section upon which it is to be placed. The opening shall be located as described for the 24-inch opening.

**9-05.50(3) Precast Concrete Catch Basins**  
**(March 1, 2014 COS GSP)**

**Replace** this Section in its entirety with the following:

Precast concrete catch basins shall conform to the requirements of Section 9-05.50(2), except no steps or ladders shall be provided and the dimensions shall be as shown on the COS Standard Plans in the 'B' series.

**9-05.50(4) Precast Concrete Inlets**  
**(January 1, 2020 COS GSP)**

**Replace** this Section in its entirety with the following:

Precast concrete inlets shall conform to the requirements of Section 9-05.50(2), except no steps or ladders shall be provided and the dimensions shall be as shown on the COS Standard Plans in the 'B' series.

**9-05.50(5) Precast Concrete Drywells**  
**(August 1, 2010 COS GSP)**

**Replace** this Section in its entirety with the following:

Precast concrete drywells shall conform to the requirements of Section 9-05.50(2), except no steps or ladders shall be provided and the dimensions shall be as shown on the COS Standard Plans in the 'B' series. Integral tongue and groove, shiplap-type joints, or approved alignment clips shall be used to preclude relative displacement or shifting of sections under reasonable installation and service loads. Joints need not be leak proof. Joints of square ended sections shall be seated in mortar with a minimum of six equally spaced alignment clips per joint.

Weep Holes. Weep holes shall be uniformly sized and spaced, and shall provide 8 percent to 12 percent effective opening area as compared to the inside surface area of the drywell sections. There shall be approximately one opening per 8-inches of height and 15-inches of circumference. Hole geometry shall be such as to preclude entrance of the consolidated drainage rock surrounding the drywell. Deviation from the above criteria and use of "non-standard" barrel sections shall be subject to prior approval of the Engineer.

**Add** the following new Subsection:

**9-05.100                      Cast Iron Pipe**

**(August 1, 2008 COS GSP)**

Cast iron pipe shall conform to ASTM A-74 extra heavy.

Joints for cast iron pipe shall be sealed with preformed rubber gaskets conforming to ASTM C-564.

Fittings for cast iron pipe shall be iron castings suitable for installation and service in drainage, waste, vent, and sewer lines and shall conform to ASTM A-74. Normally the fittings shall be of the same material as the pipe being connected, except that fittings using other materials or constructed with more than one material may be used subject to the approval of the Engineer.

**SECTION 9-06      STRUCTURAL STEEL AND RELATED MATERIALS**

**9-06.5                      Bolts and Rods**

**9-06.5(3)                      High-Strength Bolts**

**(August 1, 2008 COS GSP)**

**Add** the following after the last paragraph:

Before installing a bolt, nut, washer, or direct tension indicator, the Contractor shall submit to, and obtain the Engineer's approval of, the appropriate samples and mill test certificates for each lot used. Bolts of different diameter and/or length shall be considered separate lots.

**9-06.16                      Roadside Sign Structures**

**(November 1, 2012 COS GSP)**

**Add** the following after the last paragraph:

2 Inch Square Perforated Post

2 inch square traffic sign post shall be 12 gauge perforated tubing, hot-dipped galvanized.

All fastening hardware shall be hot-dipped galvanized.

1 3/4 inch square perforated post material for splices shall be hot-dipped galvanized

**SECTION 9-09      TIMBER AND LUMBER**

**9-09.2                      Grade Requirements**

**9-09.2(3)                      Signposts, Mileposts, Sawed Fence Posts, and Mailbox**

## **Posts**

**(August 1, 2010 COS GSP)**

**Replace** this Section in its entirety with the following:

Sign posts, mileposts, sawed fence posts, and mailbox posts shall conform to the grades listed below. Grades shall be determined by the current standards of the Western Wood Products Association (WWPA) or the West Coast Lumber Inspection Bureau (WCLIB) for the allowable species: Western Red Cedar, Douglas Fir, and Hem-Fir.

<b>Size</b>	<b>Applicable Grade</b>
4 x 4	Structural light framing and studs, Std. & better
4 x 6	Structural light framing, #2 & better
6 x 6, 6 x 8, and 8 x 10	Posts and timbers, #2 & better
6 x 10 and 6 x 12	Beams and stringers, #2 and better

## **SECTION 9-12 MASONRY UNITS**

### **9-12.2 Concrete Brick**

**(August 1, 2008 COS GSP)**

**Replace** this Section in its entirety with the following:

Brick for subsurface structures and adjustment sections for manholes and other related structures shall conform to ASTM C-55, Grade N-II.

## **SECTION 9-13 RIPRAP, QUARRY SPALLS, SLOPE PROTECTION, AND ROCK FOR EROSION AND SCOUR PROTECTION AND ROCK WALLS**

### **9-13.7 Rock for Rock Wall**

#### **9-13.7(1) Rock for Rock Walls and Chinking Material**

**(August 1, 2008 COS GSP)**

**Add** the following prior to first paragraph:

Rock for the wall shall be basalt of approved quality, and shall be sound, free from structural defects and free from earth, clay or other foreign, and deleterious substances.

The rocks shall range uniformly in size for each classification specified and the rocks shall be as nearly rectangular to afford the minimum void between adjacent rocks. Voids shall be completely filled with mortar or suitable rocks. Face joints shall not be more than 2-inches wide. The rocks must fully extend through the rock wall.

## **SECTION 9-14     EROSION CONTROL AND ROADSIDE PLANTING**

### **9-14.2                    Topsoil**

#### **9-14.2(1)                Topsoil Type A** **(January 1, 2020 COS GSP)**

**Replace** this Section in its entirety with the following:

Imported topsoil shall be loose, friable, and shall contain ordinary amounts of humus. Topsoil shall meet the standards in ASTM D5268. Topsoil shall contain no lumps of soil, rocks larger than 1-inch, sticks, roots, or other debris. The Contractor shall provide a soil test which shall demonstrate that it is sufficiently fertile to sustain normal healthy plant growth and shall not have a pH value higher than 7.5 nor lower than 6.5. The test shall be performed within 6 months prior to project delivery. The topsoil shall be delivered in an unfrozen and non-muddy condition and shall be approved by the Engineer prior to spreading.

Existing topsoil shall be tested in a minimum of three locations, with testing being done at a certified testing facility.

Topsoil shall be amended per recommendations to promote vigorous plant growth.

#### **9-14.2(2)                Topsoil Type B** **(August 1, 2008 COS GSP)**

**Delete** this Section in its entirety.

#### **9-14.2(3)                Topsoil Type C** **(August 1, 2008 COS GSP)**

**Delete** this Section in its entirety.

**Add** the following new Section:

#### **9-14.2(100)            Topsoil for Bio-Infiltration Swales** **(January 1, 2020 COS GSP)**

In addition to meeting the specifications of Section 9-14.2(1) (Topsoil Type A), Topsoil for Bio-Infiltration Swales shall contain a minimum of two percent (2.0%) organic material by weight, have a minimum Cation Exchange Capacity (CEC) of 15 milliequivalents/100g, and have an infiltration rate between 1.0 and 4.8 inches/hour. An infiltration test per ASTM D2434 shall be performed within 6 months prior to project delivery. The Contractor shall provide a Manufacturers Certificate of Compliance per Section 1-06.3 demonstrating the material conforms to the specifications above prior to construction. Topsoil shall be placed and graded in such a

manner so as not to alter its infiltration capacity. Topsoil shall be graded smooth, level, and conform to the lines and grades necessary to meet the intent of the plans.

**Add** the following new Section:

**9-14.2(101) Structural Planting Soil**  
**(January 1, 2020 COS GSP)**

The structural soil shall consist of soil, crushed aggregate, and hydrogel used as a tackifier. Soil shall be brown friable soil free of subsoil, refuse, roots, stones larger than 1 inch, noxious weeds, sticks, brush, litter, and other deleterious material. PH shall be between 5.5 and 7.0 and soluble salt levels less than 300 ppm.

**Mix.**

- a) Clayey Loam Soil: 27-35% clay, 25-35% silt, 10-15% coarse sand, 15-20% medium sand, and 0-5% sand.
- b) Stone: 1-1/2" narrowly graded crushed rock of angular, sharp texture. AASHTO #4.
- c) Hydrogel: Cross linked potassium copolymer hydrogel; as GELSCAPE as manufactured by Amerq Corp., Congers, NY 10920 or Broadleaf P4, 1041 W. 16<sup>th</sup> Street, #A103, Costa Mesa, CA. 92627.

**Filter Cloth.**

Geotextile for Underground Drainage, Nonwoven Low Survivability, per Section 9-33.

**Mixing portions.**

Soil; 15-18 units dry weight.

Stone; 100 units of dry weight.

Hydrogel; 0.03 units of dry weight.

Water; as needed to obtain 20% soil moisture (actual amount to be determined during mixing).

Note: At the correct moisture content there will be a minute amount of free topsoil remaining and all of the crushed rock will be uniformly coated with soil. If too much water is added to the mixture water will drain out of the material and the topsoil will wash off the crushed rock. If this occurs this batch of material shall be discarded and not incorporated into the completed work. Mixed material shall be covered for protection from rainfall events.

**9-14.4 Fertilizer**  
**(January 1, 2020 COS GSP)**

**Add** the following after the last paragraph:

When installing sod, the root zone fertilizer shall be commercially prepared and shall contain the following percentages by weight:

Nitrogen	16 percent
Phosphoric Acid	16 percent
Potash	16 percent

Root zone fertilizer for sod shall be applied at a rate of 6 pounds per 1,000 square feet.

**9-14.5                      Mulch and Amendments**  
**(August 1, 2008 COS GSP)**

**Add** the following after the last sentence:

Walk-on-Bark' Fir bark, medium size redwood bark, shredded pine bark, or shredded cedar bark shall be used as topdressing or mulch.

**9-14.7                      Plant Materials**

**9-14.7(3)                  Handling and Shipping**  
**(January 1, 2020 COS GSP)**

**Supplement** this Section with the following:

Plants delivered as a single unit of 25 or less of the same size, species, and variety, shall be clearly marked and tagged. Plants delivered in large quantities of more than 25 must be segregated as to variety, grade, and size; and at least 33 percent of each variety, grade, and size shall be tagged.

**9-14.8                      Stakes, Guys and Wrapping**  
**(August 1, 2008 COS GSP)**

**Replace** this Section in its entirety with the following:

Trees shall not be staked or guyed unless shown on the Plans. Two inch diameter Lodgepole Pine stakes or approved equal shall be used when staking is called for. Rigid guying wire and 2-inch wide webbing shall be used when staking is required.

**SECTION 9-15      IRRIGATION SYSTEM**

**9-15.1                  Pipe, Tubing, and Fittings**  
**(January 1, 2020 COS GSP)**

**Supplement** this section with the following:

Polyethylene pipe less than 1-1/2" nominal diameter shall only be permitted for use as irrigation lateral lines and have a minimum thickness class of SDR 15, be medium density polyethylene pipe, meet the requirements of ASTM D2239, conform to U.S.

Commercial Standard CS-255, be National Sanitation Foundation (NSF) approved, and shall be rated for 100 psi (min).

Polyethylene pipe 1-1/2" to 3" nominal diameter may be used for irrigation mainlines or laterals and shall be IPS diameter with a minimum thickness class of SDR 9. Pipe shall be manufactured in accordance with AWWA C901 and conform to ASTM D3035.

Polyethylene material shall be composed of virgin, high performance PE4710 resins and meet ASTM D3350 code C, with 2% to 3% carbon black. Pipe shall also meet the minimum requirements of CC3 for chlorine resistance, per ASTM-F2263.

#### **9-15.1(2) Polyvinyl Chloride Pipe and Fittings**

**(August 1, 2008 COS GSP)**

**Add** the following to this Section:

PVC Irrigation Sleeve. PVC sleeves shall be Class 200 in accordance with the requirements of ASTM D-1784.

#### **9-15.7 Control Valves**

##### **9-15.7(2) Automatic Control Valves**

**(August 1, 2008 COS GSP)**

**Replace** this Section in its entirety with the following:

Automatic control valve shall be of size, capacity, rating, and material as described on the Plans.

##### **9-15.7(3) Automatic Control Valves With Pressure Regulator**

**(August 1, 2008 COS GSP)**

**Replace** this Section in its entirety with the following:

Automatic control valve with pressure regulators shall be of size, capacity, rating, and material as described on the Plans.

#### **9-15.8 Quick Coupling Equipment**

**(August 1, 2008 COS GSP)**

**Replace** this Section in its entirety with the following:

Quick coupling valve shall be brass one-piece valve with locking top, sized per Plans, with one coupler key provided.

### **SECTION 9-17 FLEXIBLE GUIDE POSTS**

**Add** the following new Section:

**9-17.100                      Channelizing Devices**  
**(January 1, 2020 COS GSP)**

Plastic tubular post shall be consistent in color throughout, be round in cross section, 2-inches to 3-inches nominal outside diameter and maintain a standard diameter for its entire length.

Reflectorized banding shall be in accordance with COS Standard Plans in the 'G' series for channelization. Each reflectorized band shall be attached to the plastic tubular post by means of a manufacturer applied all-weather, pre-coated, self-adhesive glue approved for the type of plastic tubular post material.

**Type 1 - Surface Mount Base**

Surface Mounted Bases shall be a partial sphere in shape; be made of high impact rubber or plastic material, that is of a color that does not conflict with Manual on Uniform Traffic Control Devices (MUTCD) pavement marking requirements and is consistent throughout; be 8-inches nominal diameter where the bottom of the base mount comes into contact with the surface being applied to; attach to the plastic tubular post by a reusable mechanical means, which is capable of maintaining this attachment as a result of vehicle strikes to the plastic tubular post, and have a bottom (i.e. that portion of the base mount that is in contact with the surface it is being applied to) that is relatively flat and be "egg crated" so as to be able to readily accept and hold a mounting material within the "egg crate" voids.

Base Adhesive shall consist of a solid thermoplastic adhesive system requiring no mixing or blending. It shall be composed wholly of a mixture of synthetic thermoplastic resinous binder materials with appropriate extenders, plasticizers, and other adhesives. None of the primary ingredients in the adhesive system shall be crude oil distillates.

**Type 2 - Island Embedded Base**

Bases embedded in Islands shall consist of a round metal anchor 8" long securely embedded in the island concrete according to the COS Standard Plans 'G' Series and the manufacturer's recommendations.

**Type 3 - Reactive Base**

Reactive bases shall contain a reactive spring assembly that allows the post to rebound to the upright position after being struck.

**Type 4 - Threaded Base**

Threaded bases shall consist of a 1.9" diameter by 2" tall embedded threaded sleeve and removable anchor cup plug and channelizers with a threaded metal base that directly screws into the threaded anchor sleeve.

Threaded base channelizers shall consist of a round thermo-plastic polyurethane tube and polyurethane cap with 0.125" walls and a 3.15" (minimum) outside diameter. The tube shall have a permanently bonded threaded base with a minimum of 6 complete threads showing for insertion to the anchor cup.

## **SECTION 9-23 CONCRETE CURING MATERIALS AND ADMIXTURES**

### **9-23.2 Liquid Membrane-Forming Concrete Curing Compounds** **(January 1, 2020 COS GSP)**

**Replace** this Section in its entirety with the following:

Liquid membrane-forming compounds for curing concrete shall conform to the requirements of ASTM C309 Type 1 or 2, Class A or B, except that the water retention when tested in accordance with WSDOT T 814 shall be:

- 1.5 grams maximum for bridge decks
- 2.5 grams maximum for all other applications

Each lot of liquid membrane-forming curing compound requires a WSDOT satisfactory test report and shall be listed on the WSDOT QPL. Liquid membrane-forming curing compounds shall not be used in the absence of satisfactory test results.

### **9-23.6 Chemical Admixtures for Concrete**

#### **9-23.6(4) Type C Accelerating Admixtures** **(January 1, 2020 COS GSP)**

**Supplement** this Section with the following:

Type C Accelerating Admixtures are only allowed when the forecasted 24 hour high temperature is below 50 degrees Fahrenheit.

Type C Accelerating admixtures shall only be added to the mix in solution form and shall not exceed 1.0% by weight of cement used.

## **SECTION 9-29 ILLUMINATION, SIGNAL, ELECTRICAL**

### **9-29.1 Conduit, Innerduct, and Outerduct**

#### **9-29.1(4) Non-Metallic Conduit**

##### **9-29.1(4)A Rigid PVC Conduit** **(March 1, 2014 COS GSP)**

**Replace** this section with the following:

Rigid PVC Conduit shall be Schedule 80 for all locations, unless detailed otherwise in the plans.

##### **9-29.1(5) Innerduct and Outerduct** **(November 1, 2012 COS GSP)**

Delete this section in its entirety.

**9-29.1(5)A Rigid Galvanized Steel Outerduct With PVC or PE Innerduct**

**(April 6, 2009 COS GSP)**

Delete this section in its entirety.

**9-29.1(5)B Rigid PVC Outerduct With PVC or PE Innerduct**

**(April 6, 2009 COS GSP)**

Delete this section in its entirety.

**9-29.1(5)C Innerduct for Straight Sections of Galvanized Steel Outerduct or PVC Outerduct**

**(April 6, 2009 COS GSP)**

Delete this section in its entirety.

**9-29.1(5)D Conduit with Innerducts Fittings and Appurtenances**

**(April 6, 2009 COS GSP)**

Delete this section in its entirety.

**9-29.1(5)D1 Bends for 4-Inch PVC Conduit With Innerducts or Galvanized Steel Conduit With Innerducts**

**(April 6, 2009 COS GSP)**

Delete this section in its entirety.

**9-29.1(5)D2 Prefabricated Fixed and Flexible Bends (for Innerducts)**

**(April 6, 2009 COS GSP)**

Delete this section in its entirety.

Add the following new Section:

**9-29.1(100) MaxCell Innerduct**

**(May 24, 2012 COS GSP)**

MaxCell innerduct shall be of the size called out in the plans, contain the number of sleeves as called out in the plans, and be detectable by containing an 18 gauge solid copper core, green TFN insulated wire the entire length.

**9-29.2 Junction Boxes, Cable Vaults, and Pull Boxes**

**9-29.2(1) Junction Boxes**  
**(January 1, 2020 COS GSP)**

**Delete** the second, third, and fourth paragraph.

**9-29.2(1)A Standard Duty Junction Boxes**  
**(November 1, 2012 COS GSP)**

**Add** the following to the first paragraph:

Type 7 junction boxes shall meet all the requirements of a type 8 junction box but shall be supplied without the locking bolt.

**9-29.2(1)A2 Non-Concrete Junction Boxes**  
**(January 1, 2020 COS GSP)**

**Replace** this section with the following:

Non-concrete junction boxes shall not be used.

**9-29.2(2)B Standard Duty Cable Vaults and Pull Boxes**  
**(November 1, 2012 COS GSP)**

**Revise** this section to read:

Standard Duty Cable Vaults and Pull Boxes shall be concrete and meet AASHTO M-199 or H-20 loading requirements.

**9-29.2(2)B Heavy-Duty Cable Vaults and Pull Boxes**  
**(November 1, 2012 COS GSP)**

**Revise** this section to read:

Standard Duty Cable Vaults and Pull Boxes shall be concrete and meet AASHTO HS-20 loading requirements.

**9-29.2(5) Testing Requirements**  
**(November 1, 2012 COS GSP)**

**Delete** this section in its entirety.

**9-29.2(5)A Standard Duty Boxes and Vaults**  
**(November 1, 2012 COS GSP)**

**Revise** this section to read:

Standard Duty Cable Vaults and Pull Boxes shall be concrete and meet AASHTO M-199 or H-20 loading requirements.

**9-29.2(5)D Heavy-Duty Boxes and Vaults**  
**(November 1, 2012 COS GSP)**

**Revise** this section to read:

Standard Duty Cable Vaults and Pull Boxes shall be concrete and meet AASHTO HS-20 loading requirements.

**Add** the following new Section:

**9-29.2(5)ZZ Slip-Resistant and Skid-Resistant Surfacing for Junction Boxes, Cable Vaults, and Pull Boxes**  
**(January 1, 2020 COS GSP)**

Where slip-resistant or skid-resistant junction boxes, cable vaults, or pull boxes are required, each box or vault shall have a slip-resistant or skid-resistant surfacing material applied to the steel lid and frame of the box or vault. Where the exposed portion of the frame is 1/4 inch wide or less, slip-resistant or skid-resistant surfacing material may be omitted from that portion of the frame.

The following materials are approved for application as slip-resistant or skid resistant material:

1. Harsco Industrial IKG, Mebac #1 - Steel
2. W.S. Molnar Co., SlipNOT Grade 3 – Coarse
3. Thermion, SafTrax TH604 Grade #1 – Coarse

**9-29.3 Fiber Optic Cable, Electrical Conductors, and Cable**

**9-29.3(1) Fiber Optic Cable**  
**(January 1, 2020 COS GSP)**

**Add** the following to this section:

Loose Buffered Cable

The fibers shall be placed in color coded loose buffer tubes in groups of \*\*\*12\*\*\*.

Tight Buffered Cable

Tight buffered cable shall contain single mode fiber optic fibers.

OFNR Rating.

Subcable assemblies containing individual tight buffered fibers shall consist of 3-millimeter diameter outer color coded jackets, aramid strength fibers, 900 micron color coded tight buffering, and acrylate fiber coating.

One acceptable alternate is the B-series breakout riser cable from Optical Cable Corporation with 3 millimeter diameter subcable jackets.

#### **Pigtail Fiber Optic Cables**

Pig tails shall contain single mode fiber optic fibers.

Pig tails shall be a 1 meter in length and be OFNR rated

Pig Tails shall contain factory terminated connectors and consist of subcables with a 2.8 to 3.0 millimeter diameter outer jackets, aramid strength fibers, 900 micron color coded tight buffering, and acrylate fiber coating.

Connectors shall match the type called for in the plans and be UPC polished.

### **9-29.3(2) Electrical Conductors and Cable**

#### **9-29.3(2)A Single Conductor**

##### **9-29.3(2)A1 Single Conductor Current Carrying** **(November 1, 2012 COS GSP)**

**Replace** this Section in its entirety with the following:

All current carrying single conductors shall be Type THWN, 600 V cable. Overhead service shall be Type THWN 600 V wire. Service conductors shall be copper of the size required by the Code.

##### **9-29.3(2)A2 Grounding Electrode Conductor** **(November 1, 2012 COS GSP)**

**Replace** this Section in its entirety with the following:

Grounding electrode conductor shall be bare stranded copper.

##### **9-29.3(2)A3 Equipment Grounding and Bonding Conductors** **(March 1, 2014 COS GSP)**

**Replace** this Section in its entirety with the following:

Equipment grounding and bonding jumpers shall be green insulated stranded copper with THHN 600 volt insulation of the size called out in the plans

##### **9-29.3(2)B Multi-Conductor Cable** **(March 1, 2014 COS GSP)**

**Replace** this Section in its entirety with the following:

Two-conductor through 20-conductor unshielded signal control cable shall have stranded copper conductors and shall conform to the International Municipal Signal Association (IMSA) signal cable 20-1.

**9-29.3(2)D Pole and Bracket**  
**(March 1, 2014 COS GSP)**

**Add** the following:

Luminaires calling for 30 foot mounting heights according to Standard Plan J-105, J-105B, and J-105C shall be Type UF two-conductor with ground, nonmetallic sheathed, 600 V. The wire size shall be #12 AWG unless otherwise specified.

**9-29.3(2)I Twisted Pair Communication Cable**  
**(November 1, 2012 COS GSP)**

**Replace** this Section in its entirety with the following:

Twisted pair communication cable shall meet REA Specifications PE-39 for filled, data telephone cable. The conductors shall be #22 AWG, solid copper, twisted pairs. The twisted pairs shall be fully color coded. The shield shall be 8 mil aluminum, coated both sides with copolymer.

**Add** the following new Section:

**9-29.3(2)ZZ Illumination Branch Cable**  
**(March 1, 2014 COS GSP)**

Illumination branch circuit cable shall be Type UF two-conductor with ground nonmetallic sheathed, 600 V cable. The wire size shall be #12 AWG unless otherwise specified.

**Add** the following new Section:

**9-29.3(2)ZZA CCTV Power Cable**  
**(April 1, 2018 COS GSP)**

The power cable shall be outdoor rated and consist of three tinned copper stranded conductors of 14 AWG. The conductors shall be individually insulated and color coded. The cable insulation shall be rated at 300V.

**Add** the following new Section:

**9-29.3(2)ZZB Category 6 Cable**  
**(January 1, 2020 COS GSP)**

Cat 6 cable shall be indoor/outdoor rated and contain 4 twisted pairs of 23 AWG solid bare copper conductors individually insulated and color coded according to TIA CAT 6 Standards . The cable shall contain 4 color coded 23 AWG solid twisted copper pairs, be tested to a minimum of 250 MHZ., be non-shielded, and include a black UV resistant outer jacket.

**Add** the following new Section:

**9-29.3(2)ZZC      Category 5e Cable**  
**(August 9, 2018 COS GSP)**

Cat 5e cable shall be outdoor rated, gel-filled, and contain 4 twisted pairs of 24 AWG solid bare copper conductors with shield and drain wire. Conductors shall be individually insulated and color coded according to TIA Cat 5e standards. The cable shall be tested to a minimum of 350 MHz, and include a black UV resistant outer jacket.

**Add** the following new Section:

**9-29.3(2)ZZD      Machine Vision Video Cable**  
**(April 1, 2018 COS GSP)**

With conventional Machine vision equipment the video cable shall meet RG-6/U specifications. The machine vision cable shall be BELDEN 1189A or equivalent.

**Add** the following new Section:

**9-29.3(2)ZZE      GPS Preemption Cabling**  
**(August 9, 2018 COS GSP)**

The cable shall be Opticom Model 1070 GPS cable or meet the following:

The cable shall have a black SR-PVC outer jacket that is UV and moisture resistant.

The cable shall have a 90°C temperature rating.

The cable shall be rated for 300 volts.

The cable shall contain five twisted pairs of AWG #20 (7 x 28) stranded, individually tinned copper. The twisted pairs shall be Yellow/Yellow-Black; Blue/Blue-White; Orange/Orange-Green; Brown/Brown-White; Purple/Purple-White.

The cable shall contain an aluminized polyester shield.

The cable shall contain a drain wire of AWG #22 (7 x 28) stranded individually tinned copper.

**9-29.6                      Light and Signal Standards**  
**(January 1, 2020 COS GSP)**

**Replace** this Section in its entirety with the following:

Light and Signal Standard manufacturers shall be pre-approved by WSDOT.

Light standards and signal standards (including Types 1, 2, 3, and 4) shall be in accordance with the details shown in the Plans, the City of Spokane Standard Plans J series, as specified in the Special Provisions, and as outlined herein. Fabrication of light and signal standards shall conform to the applicable requirements of Section 6-03.3(14).

Light and Signal Standard manufacturers shall provide full mill certification package upon delivery.

Traffic signal standards shall be supplied with mast arm(s), luminaire arm(s), anchor bolts and required bolts, nuts, and washers as shown on the Traffic Signal Standard Plans.

Poles shall be designed to meet 1994 AASHTO criteria and an 80 MPH sustainable wind loading

Materials for steel light and signal standards, and associated anchorage and fastening hardware, shall conform to Sections 9-29.6(1), 9-29.6(2), and 9-29.6(5) unless otherwise specified in the steel light and signal standard fabricator's shop drawing submittal, including supporting design calculations, as submitted in accordance with Sections 6-01.9 and 8-20.2(1) and the Special Provisions, and as approved by the Engineer.

Supplier shall furnish shop drawings and design calculations for approval if not pre-approved by the City of Spokane except Type I poles.

Anchor bolts for signal standards shall be delivered within thirty (30) days after receipt of order.

**9-29.6(1) Steel Light and Signal Standards**  
**(August 1, 2015 COS GSP)**

**Replace** this section with the following:

Steel plates and shapes for light and signal standards shall conform to ASTM A 36, except that structural shapes may conform to ASTM A 992. Shafts for light and signal standards shall conform to ASTM A 572 Grade 50. Base plates for light standards shall conform to ASTM A 572, Grade 50. Base plates for signal standards shall conform to ASTM A 36. Connecting bolts shall conform to ASTM A 325. Fasteners for handhole covers, bands on lighting brackets, and connector attachment brackets shall conform to ASTM F 593.

The pole shaft shall be formed into a continuously tapered round shaft with a continuous uniform taper of approximately 0.14 inches per foot, with only one longitudinal welded seam, and no more than three (3) transverse welds for 30 foot poles. Standards with an outside diameter greater than 12 inches shall be round in shape but may be constructed as a multisided standard. Multisided standards shall have a minimum of 12 sides which shall be convex and shall have a minimum bend radius of 4 inches.

The pole shaft shall be straight with a permissive not to exceed one (1) inch measured at the midpoint in place and unloaded. A maximum theoretical angular rotation of 1 degree, 40 minutes without wind load, will be permitted for poles and shall be measured with all signal heads, mast arms and luminaries in place.

The pole shaft shall contain a handhole with a reinforcing frame and cover. A second handhold shall be installed above the mast arm connection. See Standard Plan J-105b. The lower half of the handhole's (at the base) reinforcing frame shall contain a

9/16 inch diameter hole tapped, with a stainless steel bolt and a stainless steel binding washer for connection of the grounding lug, for grounding purposes.

Signal Mast arms 50 feet and less in length shall be one piece. Signal Mast arm shall have an end cup and be formed into a continuously tapered round shaft.

Luminaire arms shall have a 2 inch tip tenon.

At a minimum, the pole shaft, mast arm(s), and luminaire arm(s) shall be designed to support 3-section traffic signal heads weighing 60 pounds and having 9.2 square feet of wind area, 5-section heads weighing 75 pounds and having 13.9 square feet of wind area and to support luminaries weighing 35 pounds and having 2.5 square feet of wind area. The location of the design load(s) are shown on the COS Standard Plans J Series. The Contract plans may contain additional heads or different attachment points above the minimums illustrated in the City Standard Plans to design. In this case, the standards shall be designed to support what is shown on the Plans.

Light and signal standards shall be hot-dip galvanized in accordance with AASHTO M 111 and AASHTO M 232.

Steel used for light and signal standards shall have a controlled silicon content of either 0.00 to 0.04 percent or 0.15 to 0.25 percent. Mill test certificates verifying the silicon content of the steel shall be submitted to both the galvanizer and the Engineer prior to beginning galvanizing operations.

#### **9-29.6(5) Foundation Hardware** **(August 1, 2015 COS GSP)**

**Supplement** this Section with the following:

Anchor bolts shall be furnished with two nuts and two washers. Anchor bolts shall be hot-dipped galvanized for their entire length. Bolts shall be designed in accordance with ASTM designation F1554 for bolts less than 1.75 inches in diameter and ASTM designation A449 for bolts equal to or greater than 1.75 inches.

#### **9-29.9 Ballast, Transformers**

##### **9-29.9(1) Ballasts** **(August 1, 2008 COS GSP)**

**Replace** this Section in its entirety with the following:

The ballast shall be capable of starting and operating one high pressure sodium lamp at the stated luminaire nominal voltage 60 Hz within the limits specified by the lamp manufacturer. The ballast including starting aid, must protect itself against normal lamp failure modes. The ballast shall be capable of operation with the lamp in an open or short circuit condition for 6 months without significant loss of ballast life.

The ballast shall be of the reactor type providing for a  $\pm 5$  percent input voltage range. The ballast design center will not vary more than 5 percent from rated lamp watts for nominal line voltage and nominal lamp voltage.

At any lamp voltage from nominal through life, lamp wattage regulation spread at that lamp voltage shall not exceed 2-1/2 percent or  $\pm 1$  line voltage variation.

The luminaire manufacturer will supply ballast electrical data and lamp operating volt-watt traces for nominal and  $\pm 5$  percent rated line voltage to verify ballast performance and compliance with lamp specifications, for the rated life of the lamp.

The ballast must reliably start and operate the lamp in ambient temperatures down to -30 degrees F for the rated life of the lamp.

The lamp current crest factor shall not exceed 1-1/2 for plus or minus  $\pm 5$  percent line voltage variation at any lamp voltage, from nominal through life. The power factor shall be 90 percent (nominal) or higher.

The ballast shall have a name plate attached permanently to the case, listing all electrical data.

#### **9-29.10                      Luminaires**

#### **9-29.10(1)                      Conventional Roadway Luminaires** **(August 8, 2019 COS GSP)**

**Replace** this Section in its entirety with the following:

- A. All LED roadway luminaires shall be a Type III medium distribution with cutoff optics.
- B. LED light sources shall produce a light color temperature of 4,000 K  $\pm$  300 K. The manufacturer shall submit fixture LM-79 and LM-80 reports in conjunction with the luminaire cut sheet. Light sources will also meet or exceed the following efficiency and longevity benchmarks:

#### **Light Emitting Diode (LED) Light Sources**

<b>Minimum Luminous Efficacy</b>	<b>Minimum Expected Lamp Life (hours)</b>	<b>Minimum Lumen Maintenance Factor (25°C) @ 50,000 hours</b>
90 lumens/Watt	> 100,000	0.95

#### **BUG Rating (Maximum)**

B: 2	U: 0	G: 2
------	------	------

- C. LED Drivers (Drivers) shall be Class 1 or 2 type, adequately sized for the luminaires designed light output. The Driver shall be an integral part of the luminaire unit. It shall be a prewired, built-in type mounted in the luminaire.

Provide a manufacturer's nameplate on the Driver housing. The nameplate shall have the manufacturer's name, model number, serial number, hook-up diagram, power supply data, LED type and operating wattage.

The Driver shall operate the lamp within the limits specified below throughout the rated life of the lamp:

1. The LED light source shall not vary more than 10% in light output.
2. The LED light source wattage shall not vary more than plus or minus 5% of nominal when the LED light source is at its rated nominal.
3. The minimum efficiency of the Driver (nominal LED light source watts/line watts) shall not be less than 80%.
4. The Driver shall not allow the LED light source to extinguish when a line voltage dip between 40-50% occurs for several seconds.
5. The power factor shall not drop below 90% and the total harmonic distortion shall be less than 20% for the line voltage with allowable fluctuations of +/- 10%.
6. Drivers shall be provided with integral 10kV surge suppression.
7. The line starting current shall not exceed normal line operating current.
8. The Driver shall start and operate the LED light source in ambient temperatures down to -20 °F.
9. The Driver shall conform to all ANSI Standards.

Unless otherwise shown or specified, operate Drivers on a multi-voltage type to be connected to 120 V, 208 V, 240 V, or 277 V.

- D. Furnish LED roadway luminaires for horizontal slip fitter end mounting.

Luminaires shall have cast aluminum housings and shall attach to 2 inch pipe tenons on mast arms. The luminaire attachment fitting shall provide for a

minimum of plus or minus 3 degree adjustment of the luminaire in the vertical direction.

The lens and doorframe assembly, when closed, shall exert pressure against a gasket. Gaskets shall be composed of material capable of withstanding the temperatures encountered and shall be securely held in place.

All luminaires shall have their components secured to the luminaire frame with corrosion-resistant mounting hardware. The housing, complete with integral Driver, shall be weather tight, IP 66.

If sand-cast, the aluminum housing shall be left in its natural finish. If die-cast, the housing shall be given a coat of aluminum paint.

All traffic signal luminaires shall be Cobra head style, sized according to the illumination requirements of the roadway and energized by 120-240 V.

All Street Luminaires shall be Cobra head style, sized according to the illumination requirements of the roadway and energized by 120-240V

- E. One of the following preapproved luminaire series shall be used, or approved equal:

<b><u>Manufacturer</u></b>	<b><u>Series (200 W HPS Replacement)</u></b>
American Electric	ATBo, 3oBLEDE10, MVOLT R3, NLPCSS
Philips	RFM-1o8W48LED4K-G2-R3M-UNV- DMG-RCD-GY3
Cree	BXSP2-HO-HT-3ME-165W-4oK-UL-SV- N/Q6 with backlight control shield

The fixture lumen output shall be as specified in the plans.

**Add** the following new Section:

**9-29.10(2) Decorative Luminaires**  
**(January 1, 2020 COS GSP)**

The following preapproved luminaires shall be used, consistent with existing City of Spokane CBD Lighting:

<b><u>Manufacturer</u></b>	<b><u>Model No.</u></b>
Lumca (P1A-Modern Acorn)	CP-2662-36NLED-48-208-BLK
Lumca (P1B P2B-Traditional)	CPR-0662-18LED07-40W-40K-L3-208-BLK
Lumca (P1C P2C-Transitional)	CPL-6104-18LED07-40W-40K-L3-208-BL

**9-29.11 Control Equipment**  
**(August 9, 2018 COS GSP)**

**Replace** this Section in its entirety with the following:

Each luminaire shall be controlled by plug-in photoelectric control mounted on the luminaire housing.

**9-29.11(2) Photoelectric Controls**  
**(August 1, 2008 COS GSP)**

**Supplement** this Section with the following:

The photoelectric control shall be a plug-in device, rated to operate on 120-240 volts, 60 Hz. The unit shall consist of a light sensitive element connected to necessary control relays. The light sensitive element shall have a spectral response such that it is especially sensitive to north sky illumination.

The unit shall be so designed that a failure of any electronic component will energize the lighting circuits.

The control shall be protected by a lightning arrestor to provide surge protection to a minimum of 10,000 amperes and shall be rated to switch on 1,000 watts incandescent.

The photoelectric receptacle shall be in accordance with EEI-NEMA Standards.

**9-29.12 Electrical Splice Materials**

**9-29.12(1) Illumination Circuit Splices**  
**(April 1, 2018 COS GSP)**

**Replace** this Section in its entirety with the following:

Illumination circuit splices shall be either, wirenuts or solderless crimped connections to securely join the wires, both mechanically and electrically, as defined in 8-20.3(8). Splices shall be made in the pole base at the hand hole.

**9-29.12(2) Traffic Signal Splice Material**  
**(August 9, 2018 COS GSP)**

**Replace** this Section in its entirety with the following:

Lead-in cable to loop wire or magnetometer sensing probe splices shall be rigid body, re-entenable type with encapsulating gel sealant.

Copper communication cable splices shall be housed in a 3M Better Buried 2" x 24" with 4441 encapsulate splice case or approved equal.

### **9-29.13 Control Cabinet Assemblies**

#### **9-29.13(3) Traffic Signal Controller** **(April 1, 2018 COS GSP)**

**Add** the following:

#### **Controller Unit (CU)**

##### **Siemens M60 Controller**

The controller unit shall exceed the requirements of Advanced Traffic Controller (ATC) standard v5.2b., published 2006. The controller shall run on a Linux operating system and shall be configurable as a local, master or local/master depending on the local intersection software in use. The controller shall have a removable light-emitting diode backlit LCD Display with 16 lines of 40 characters with adjustable contrast setting front panel. It shall have a 37 pin D connector for backward compatibility with TS-1 facilities. The following port configurations are required:

##### **Central Processor Unit (CPU)**

- Open architecture platform with standard Linux operating system
- MPC 8270 266MHz processor
- 512MB FLASH, 64MB DRAM and 1MB SRAM
- TOD Clock with automatic daylight savings time adjustment
- Power supply will power the SRAM during power failures

##### **Keyboard and Display**

- Siemens Multiview Display with dual view screens
- Removable light-emitting diode backlit LCD Display with 16 lines of 40 characters with adjustable contrast setting
- Emulation of terminal per Joint NEMA/AASHTO/ITE Standard
- Key quantity and function per Joint NEMA/AASHTO/ITE Standard

#### Communications Module

- 10 Base-T Ethernet with built-in switch and 5 front panel
- 4 RJ-45 connectors
- 4 USB 2.0 Ports and a Datakey Port
- Dedicated GPS Port
- Unique MAC address assigned by the Institute of Electrical and Electronic Engineers (IEEE)
- EIA-232 port for uploading/downloading applications software and OS updating
- Single and multi-mode fiber optic options
- 1200 bps Frequency Shift Keying (FSK) modem (optional)

#### Controller Housing

- 7 expansion slots with card guides for standard size Versa Modules and 2 slots with card guides for standard Joint
- NEMA/AASHTO.ITE ATC modems (optional)
- Polycarbonate construction (excluding back panel), rear mounting tabs and aluminum power supply mounting plate for electrical grounding
- Carrying handle

#### **9-29.13(4) Traffic-Signal Controller Software** **(April 1, 2018 COS GSP)**

**Add** the following:

The Siemens M60 controller shall come with the most current SEPAC Version of local intersection software and shall be operable with the TACTICS™ regional software platform.

#### **9-29.13(5) Flashing Operations** **(April 1, 2018 COS GSP)**

**Add** the following:

All P size cabinets shall be wired to flash for all channels. Flashing operation shall alternate between the used vehicle phases 1,3,5,7 and 2,4,6,8. Flash programming shall be either red or yellow simply by changing wires on the front of the load-bay

All M size cabinets shall be wired to flash for all channels. Flashing operation shall alternate between the used vehicle phases 2,6 and 4,8 Flash programming shall be either red or yellow simply by changing wires on the front of the load-bay.

**9-29.13(6) Emergency Preemption**  
**(April 1, 2018 COS GSP)**

**Add** the following:

The Emergency vehicle preemption system shall utilize Global Positioning System technology to provide active vehicle preemption based on an estimated arrival time or distance to the signal.

**9-29.13(8) Generator Transfer Switch**  
**(February 1, 2016 COS GSP)**

**Replace** this Section in its entirety with the following:

The cabinet front door shall have a locking generator bypass compartment that shall be used to connect a generator to operate the cabinet during extended loss of service line power. The generator compartment shall be capable of being closed and locked while a generator is connected. The mechanism for allowing generator cable access while the compartment is closed, shall be an integral part of the generator bypass door, via a sliding panel that will normally be in the closed position. Inside the compartment there shall be a silkscreened panel housing a Hubbell HBL2615 30A / 125V flanged inlet receptacle capable of accepting a standard generator plug, a BACO HC52DQG cam switch with split AC+ feeds, and (2) LED lamps with sockets. One LED shall be illuminated when the cabinet has service line power and the other when the cabinet is under generator control. All LED's shall be field replaceable without putting the intersection in flash and shall carry a 5 year manufacturer warranty.

All wiring to the generator bypass compartment shall be contained in a single cable bundle. The cable shall connect to the backside of the electrical components and shall only be accessible from the inside of the cabinet front door. All electrical components on the inside of the front door that carry AC voltage shall be covered by a see-through plexi-glass cover. The generator bypass cable shall terminate at the same power panel location as service line voltage.

**9-29.13(10) NEMA, Type 170E, 2070 Controllers and Cabinets**

**9-29.13(10)A Auxiliary Equipment for NEMA Controllers**  
**(June 21, 2018 COS GSP)**

**Replace** this Section in its entirety with the following:

Auxiliary Equipment shall meet NEMA TS2 Type 2 standards.

**Auxiliary Panel**

The cabinet shall include an auxiliary switch panel mounted to the interior side of the police panel compartment on the cabinet door. This panel shall be hinged at the bottom

to allow access to the soldered switches with the use of clamps or tools. Both sides of the panel shall be silkscreened. All of the switches shall be protected by a hinged see-through Plexiglas cover.

At a minimum the following switches shall be included;

**Controller ON/OFF Switch:** There shall be a switch that renders the controller and load-switching devices electrically dead while maintaining flashing operations for purpose of changing the controller or load-switching devices. The switch shall be a general-purpose bat style toggle switch with .688-inch long bat.

**Signals ON/OFF Switch:** There shall be a switch that renders the field signal displays electrically dead while maintaining controller operation for purpose of monitoring controller operations. The switch shall be a general-purpose bat style toggle switch with .688-inch long bat.

**Stop Time Switch:** There shall be a 3-position switch labeled “Normal” (up), “Off” (center), and “On” (down). With the switch in the “Normal” position, a stop timing command shall be applied to the controller by the police flash switch or the MMU (Malfunction Management Unit). When the switch is in its “Off” position, stop timing commands shall be removed from the controller. The “On” position shall cause the controller to stop time. The switch shall be a general-purpose bat style toggle switch with .688-inch long bat.

**Technician Flash Switch:** There shall be a switch that places the field signal displays in flashing operation while the controller continues to operate. This flash shall have no effect on the operation of the controller or MMU. The switch shall be a general-purpose bat style toggle switch with .688-inch long bat.

**Pedestrian Test Switches:** There shall be (4) disconnect/test switches for the pedestrian phases. These switches shall have three positions labeled “On” (up) which shall be normal operation, “Off” (center) which shall disconnect the applicable pedestrian phase, and “Test” (down) which shall provide a true input to the controller for the applicable pedestrian phase. These switches shall be labeled 2, 4, 6 and 8.

**Pre-Empt Test Switches:** All (6) preempt inputs shall have disconnect/test switches. These switches shall have two positions labeled “On” (up) which shall connect the controller to the Opticom output, and “Test” (down) which shall provide a momentary true input to the controller. These switches shall be labeled 1, 2, 3, 4, 5 and 6.

## **Police Panel**

When specified to include the police panel:

Behind the police door the following switch shall be included;

**Flash Switch:** There shall be a switch for the police that puts the cabinet into flashing operations. The switch shall have two positions, “Auto” (up) and “Flash” (down). The “Auto” position shall allow normal signal operation. The “Flash” position shall

immediately cause all signal displays to flash as programmed for emergency flash and apply stop time to the controller. When the police flash switch is returned to “Auto”, the controller shall restart except when the MMU has commanded flash operation. The switch shall be a general-purpose bat style toggle switch with .688-inch long bat.

### **Cables**

All wire cable bundles shall be encased in flex or expandable braided sleeving along their entire free length.

SDLC cables shall be professionally routed in the cabinet interior to easily reach the controller, malfunction management unit or detector racks. SDLC connectors shall be secured with screws. Spring clips shall not be used.

### **Detector Racks**

NEMA P Cabinet and NEMA P Plus Cabinet

The cabinet shall have 32 channels of detection within two (2) 1/2 width detector racks. One (1) 1/2 width rack shall support sixteen (16) channels of loop detection using four (4) slots with four (4) channels per slot, one (1) EDI BIU700H Bus Interface Unit (BIU) and one (1) 764 Opticom™ phase selector(s). One 1/2 width rack shall support sixteen (16) channels of loop detection using four (4) slots with four (4) channels per slot and one (1) EDI BIU700H Bus Interface Unit (BIU). The two (2) racks will be mounted, one on top of the other, on the uppermost shelf within the cabinet. The power and loop cabling shall be connected via a 37 pin DB connector using spring clips. The Opticom cable shall be connected via a 24 pin connector. The power cable shall be a 6 pin connector. All power wires shall be 18AWG. The addressing of detector rack shall be accomplished via dipswitches mounted to the PCB. There shall be the capability to turn off the TS2 status to the BIU for the uses of TS1 detector equipment via dipswitches mounted to the PCB. There shall be a 34 pin connector using locking latches that breaks the output from the detector to the input of the BIU, there shall also be +24VDC and logic ground on this connector. The rack shall have space at the bottom front for labeling.

### **Detector Panel**

The detector panel shall support (32) channels of vehicle detection, (4) channels of emergency vehicle preemption, and (4) channels of pedestrian detection on a single panel. This panel will be mounted on the left side of the cabinet below the bottom shelf. The panel shall also include (19) position neutral and ground buss bars with raised slotted & torque style screw head.

### **Video Detection Panel**

When video detection is specified there shall be video detection interface panel for single point interface for video power and coax cabling. The panel shall provide up to six (6) individual surge arrestor and circuit breaker circuits so that individual cameras can be replaced in the field without disrupting the entire video detection system.

### **Supplemental Loads**

If specified, all pedestrian phase yellows and odd numbered vehicle phase yellows and greens shall be loaded with a 2.5K-ohm, 10-watt resistor. Each load resistor shall be easily accessed from the back of the main panel (load-bay).

### **Service Surge Suppression**

The cabinet shall be equipped with an EDCO model SHP300-10 or approved equivalent surge arrestor mounted on the power panel. Power to all cabinet electronics shall come through this surge suppression circuit.

### **Power Panel**

The power panel shall handle all the power distribution and protection for the cabinet and shall be mounted in the bottom right side of the facility. All equipment shall be mounted on a 12" x 17" silkscreened aluminum panel and include at a minimum the following equipment:

- A 30-amp main breaker shall supply power to the load bay, load switches and auxiliary panel.
- A 20-amp auxiliary breaker shall supply power to the fan, light and GFI.
- A 20-amp equipment breaker shall supply power to the controller, MMU, power supply and convenience outlet and/or power strip.
- A 50-amp, 125 VAC radio interference line filter.
- An EDCO model SHP300-10 surge arrestor.
- A normally open, 50-amp, solid-state relay. The relay shall have a green LED light that is on when energized. (No Mercury Contactors shall be allowed)
- One see-through Plexiglas cover on stand-offs to protect maintenance personnel from AC line voltages. This shall be removable by loosening screws but without removing screws.
- Two (19) position solid aluminum, tin plated neutral buss bar with raised slotted & torque style screw heads.
- One (19) position solid aluminum, tin plated ground buss bar with raised slotted & torque style screw heads.
- Two MOVs shall be terminated on the 120AC in field terminal. One tied between line and ground, the other between neutral and ground.

### **Malfunction Management Unit (MMU)**

The cabinet shall come with an (MMU) that meets all the requirements of NEMA TS2-2003 while remaining downward compatible with NEMA TS1. It shall have (2) high contrast LCD displays and an internal diagnostic wizard. It shall come with a 10/100 Ethernet port. It shall come with software to run flashing yellow arrow operation. The MMU shall be an Eberle Design, Inc. model MMU-16LEip or approved equivalent.

**Load Switch**

The cabinet shall come with (9 (nine) for M Cabinet or 16 for P Cabinet) load switches. All load switches shall be cube type and have LED indications for both the input and output side of the load. The load switches shall be PDC model SSS87I/O or approved equivalent.

**Flasher**

The cabinet shall come with (1) flasher. The flasher shall be cube type and have LED indications. The flasher shall be PDC model SSF87 or approved equivalent.

**Flasher Transfer Relay**

The cabinet shall come with (3 (three) for M Cabinet or 6 for P Cabinet) heavy duty flash transfer relays. The relays shall be Detrol Controls model 295 or approved equivalent.

**Bus Interface Unit (BIU)**

The cabinet shall come with (3 for M Cabinet and 2 for P Cabinet) bus interface units (BIU). These shall meet all the requirements of NEMA TS-2 1998 standards. In addition, all BIUs shall provide separate front panel indicator LED's for DC power status and SDLC Port 1 transmit and receive status. The (BIU)'s shall be Eberle Design, Inc. model BIU700H or approved equivalent.

**Power Supply (PS)**

The cabinet shall come with a shelf mounted cabinet power supply meeting at minimum TS 2-2003 standards. It shall be a heavy duty device that provides +12VDC at 5 Amps / +24VDC at 2 Amps / 12VAC at .25 Amp, and line frequency reference at 50 mA. The power supply shall provide a separate front panel indicator LED for each of the four outputs. Front panel banana jack test points for 24VDC and logic ground shall also be provided. The power supply shall provide 5A of power and be able to cover the load of four (4) complete detector racks. The (PS) shall be Eberle Design, Inc. model PS250 or approved equivalent.

**Loop Amplifiers**

The cabinet shall come with (4 for M Cabinet and 8 for P Cabinet) 4-channel rack mounted loop amplifiers. These devices shall have LCD displays and be capable of monitoring the call strength from all (4) channels (2 at a time) via a pie graph on the front panel. These devices must have the capability to perform directional logic and 3<sup>rd</sup> car queuing for protected/permissive operation. The loop amplifiers shall be Eberle Design, Inc. model ORACLE4H or approved equivalent.

**Opticom™**

The cabinet shall come with (1) 4-channel rack mounted Opticom phase selector. The Opticom phase selectors shall be Global Traffic Technologies model 764 or approved equivalent.

**BBS System**

When specified for inclusion, the uninterruptible power system (BBS) shall include at a minimum a UPS module with SNMP, ATS assembly, batteries, battery heater mats, battery cables and a battery management system. All other ancillary equipment for a complete functioning UPS system shall be included. The BBS shall be located in a separate compartment with a separate external door equipped with one door switch to report door open status. The door shall be mounted with a single continuous stainless steel piano hinge that runs the length of the door.

The key BBS system components include:

### **UPS Module**

The cabinet UPS module shall be (1) FXM 2000W uninterruptible power supply that supplies clean reliable power control and management. It shall have Automatic Voltage Regulation (AVR), an Ethernet SNMP interface and a control and power connection panel that is rotatable for viewing in any vertical or horizontal orientation. It shall have nominal dimensions of 5.22" x 15.5" x 8.75" and come with mounting brackets. The UPS module shall be an Alpha model 017-232-29 or equivalent.

### **UATS/UGTS Assembly**

The UPS cabinet shall contain a universal automatic transfer switch and universal generator transfer switch connected between the UPS module and the batteries. It shall have surge protection, have dimensions of 3.25" x 15.5" x 6.00" and come with mounting brackets. The ATS module shall be an Alpha model 020-168-21 or equivalent.

### **UPS Batteries**

The batteries shall be (4) high performance silver alloy sealed valve regulated lead acid AlphaCell™ GXL GelCell batteries with 109Ah runtime. The BBS batteries shall be Alpha model 220 GXL or equivalent.

### **UPS Battery Harness**

The UPS battery harness shall be a battery cable (5) foot long wired for (4) batteries. The battery harness shall be Alpha model 740-628-27 or equivalent.

### **Battery Management System**

The battery management system shall be AlphaGuard™ battery charge management system which extends battery operational life. It shall be an Alpha model 012-306-21 or equivalent.

## **9-29.13(10)C NEMA Controller Cabinets** **(January 1, 2020 COS GSP)**

**Replace** this Section in its entirety with the following:

Each NEMA traffic controller shall be housed in a weatherproof cabinet conforming to the following requirements:

The cabinet shall be a completely wired and tested to the most current NEMA TS2-2003 v02.06 Type 2 Traffic Controller Assemblies Specification with NTCIP Requirements Version 02.06 (as amended here in). In addition, and at a minimum the following requirements shall be met:

The P cabinet shall be designed for 16 channel operation where load switch sockets 1-8 will be configured for a vehicle phase, load switch sockets 9-12 will be pedestrian phase and load switch sockets 13-16 will be overlaps A-D These load switch sockets shall be configured in this manor without rewiring the back side of the load-bay.

The M cabinet shall be designed for 9 channel operation. Load switches 1-4 shall be vehicle phases 2,4,6,8; load switches 5 -8 shall be pedestrian phases 2,4,6,8; load switch 9 shall be Overlap A. These load switch sockets shall be configured in this manor without rewiring the back side of the load-bay.

The cabinet shall be wired for (16 for M or 32 for P) channels of detection.

The cabinet shall be capable of integrating transit signal priority equipment.

The use of PC boards shall not be allowed except in detector racks or BIU cages.

The use of plug and play modules shall not be allowed.

All cabinet 120VAC wires shall be 18AWG or greater, including controller “A, B, C, and D” and MMU “A & B” cables.

The entire cabinet and components shall undergo a 72 hour test burn in before delivery to the testing agency. If the cabinet comes with a controller, the cabinet shall come with an ATSI TS2 Frame grabber communications test report before delivery will be accepted.

The cabinet shall meet “Buy America” specifications.

The cabinet assembly shall be completely manufactured in the United States of America.

### **Cabinet Enclosure**

At a minimum the **P cabinet** shall meet the following criteria:

1. It shall have nominal dimensions of 56” high x 44” width x 25.5” depth and meet the footprint dimensions as specified in Section 7.3 of NEMA standards for a Type P cabinet. The cabinet base shall have continuously welded interior mounting reinforcement plates with the same anchor bolt hole pattern as the footprint dimensions.
2. Shall be fabricated from 5052-H32 0.125-inch thick aluminum.
3. The cabinet shall be double-flanged where it meets the cabinet door.

4. The top of the cabinet shall be sloped 1" towards the rear to facilitate water runoff. And shall bend at a 90° angle at the front of the cabinet. Lesser slope angles are not allowed.
5. The inside of the cabinet shall utilize C channel rails. (2) Welded on the back wall on 34" center and (4) welded on each side wall on 08" center with 04" between sets. C channel rails shall be 48" in length, start 5" from the bottom of the cabinet interior and run the entire usable height the cabinet side walls. Adjustable rails are not allowed.
6. The Cabinet shall be supplied with a natural mill finish inside and out, unless otherwise specified.
7. All external fasteners shall be stainless steel. Pop rivets shall not be allowed on any external surface.
8. The cabinet shall be supplied without a door handle. The door shall incorporate a 3/8" Allen head socket recessed in the cabinet door. The cabinet shall be supplied with (1) 3/8" removable Allen head wrench.
9. When the police panel is specified for inclusion, the main door shall contain a police door with a conventional police lock. A key shall be provided for both the cabinet lock and the police door lock. The police door shall be recessed into the main door so that the police door is flush with the main door.
10. A closed-cell, neoprene gasket seal shall be bonded to all enclosure doors. A stiffener plate shall be welded across the width of the inside of the main door to prevent flexing. A main door bar stop shall be a two-position, three-point stop that accommodates open-angles at 90, 125, and 150 degrees. A louvered air entrance located at the bottom of the main door shall satisfy NEMA rod entry test requirements for 3R ventilated enclosures. Bearing rollers shall be applied to ends of door latches to discourage metal-on-metal surfaces from rubbing. Lock assembly shall be positioned so handle does not cause interference with key when opening the door.
11. When the police panel is specified for omission, the police panel door and all associated appurtenances shall be omitted.
12. The cabinet shall be equipped with a universal lock bracket capable of accepting a Best™ Construction Core and a Corbin#2 tumbler series lock. The cabinet shall come equipped with a Best blue construction core lock.
13. The cabinet shall be supplied with two door switches which control the door open status and the cabinet interior lighting circuits.
14. All exterior seams shall be manufactured with neatly formed continuously weld construction. The weld for the police box door shall be done on the inside of the cabinet door. All welds shall be free from burrs, cracks, blowholes or other irregularities.

15. The fan baffle panel seams shall be sealed with RTV sealant or equivalent material on the interior of the cabinet.
16. The cabinet shall be UL listed
17. The cabinet shall come with lifting ears affixed to the upper exterior of the cabinet. These ears shall utilize only one bolt for easy reorientation.
18. The cabinet shall be supplied with a three-stage, multi-ply progressive density polyester, disposable air filter. Filter element shall be attached with Velcro type mounting along the full length of all four edges. Filter performance UL 900 Class 2 listed and shall conform to ASHRAE Standard 52.1.
19. The door shall be mounted with a single continuous stainless steel piano hinge that runs the length of the door. Attaching tamper resistant bolts shall also be stainless steel.

At a minimum the **P-Plus cabinet** shall meet the following criteria:

1. The cabinet shall have nominal dimensions of 56" high x 44" width x 25.5" depth and meet the footprint dimensions as specified in Section 7.3 of NEMA standards for a Type P cabinet. The cabinet base shall have continuously welded interior mounting reinforcement plates with the same anchor bolt hole pattern as the footprint dimensions shown in Standard Plan J-106b.
2. The cabinet shall be fabricated from 5052-H32 0.125-inch thick aluminum.
3. The cabinet shall be double-flanged where it meets the cabinet doors.
4. The top of the cabinet shall be sloped 1" towards the rear to facilitate water runoff. And shall bend at a 90° angle at the front of the cabinet. Lesser slope angles are not allowed.
5. The inside of the cabinet shall utilize "C" channel rails. (2) Welded on the back wall on 34" center and (4) welded on each side wall on 8" center with 4" between sets. "C" channel rails shall be 48" in length, start 5" from the bottom of the cabinet interior and run the entire usable height the cabinet side walls. Adjustable rails are not allowed.
6. The cabinet shall be supplied with a natural mill finish inside and outside.
7. All external fasteners shall be stainless steel. Pop rivets are not be allowed on any external surface.
8. The cabinet shall be supplied without door handles. The doors shall incorporate a 3/8" Allen head socket recessed in the cabinet door. The cabinet shall be supplied with (1) 3/8" removable Allen head wrench
9. When the police panel is specified for inclusion, the main door shall contain a police door with a conventional police lock. A key shall be provided for both the

cabinet lock and the police door lock. The police door shall be recessed into the main door so that the police door is flush with the main door.

10. A closed-cell, neoprene gasket seal shall be bonded to all enclosure doors. A stiffener plate shall be welded across the width of the inside of the main door to prevent flexing. The main door and the battery compartment door bar stops shall be a two-position, three-point stop that accommodates open-angles at 90, 125, and 150 degrees. A louvered air entrance located at the bottom of the each door shall satisfy NEMA rod entry test requirements for 3R ventilated enclosures. Bearing rollers shall be applied to ends of door latches to discourage metal-on-metal surfaces from rubbing. Lock assemblies shall be positioned so handle does not cause interference with key when opening the doors.
11. When the police panel is not specified for omission, the police panel door and all associated appurtenances shall be omitted.
12. The cabinet shall be equipped with universal lock brackets capable of accepting a Best™ Construction Core and a Corbin#2 tumbler series locks. The cabinet shall come equipped with a Best blue construction core locks.
13. The cabinet shall be supplied with three door switches which control the door open status of both doors and the cabinet interior lighting circuits.
14. All exterior seams shall be manufactured with neatly formed continuously welded construction. The weld for the police box door shall be done on the inside of the cabinet door. All welds shall be free from burrs, cracks, blowholes or other irregularities.
15. The fan baffle panel seams shall be sealed with RTV sealant or equivalent material on the interior of the cabinet.
16. The cabinet shall be UL listed
17. The cabinet shall be supplied with lifting ears affixed to the upper exterior of the cabinet. These ears shall utilize only one bolt for easy reorientation.
18. The cabinet shall be supplied with a two-stage, multi-ply progressive density polyester, disposable air filter. Filter element shall be attached with Velcro type mounting along all four edges. Filter performance UL 900 Class 2 listed and shall conform to ASHRAE Standard 52.1.
19. The doors shall be mounted with a single continuous stainless steel piano hinge that runs the length of the door. Attaching tamper resistant bolts shall also be stainless steel.

### **Generator Bypass Compartment and Cable**

The cabinet front door shall have a locking generator bypass compartment that shall be used to connect a generator to operate the cabinet during extended loss of service line

power. The generator compartment shall be capable of being closed and locked while a generator is connected. The mechanism for allowing generator cable access while the compartment is closed, shall be an integral part of the generator bypass door, via a sliding panel that will normally be in the closed position. Inside the compartment there shall be a silkscreened panel housing a Hubbell HBL2615 30A / 125V flanged inlet receptacle capable of accepting a standard generator plug, a BACO HC52DQG cam switch with split AC+ feeds, and (2) LED lamps with sockets. One LED shall be illuminated when the cabinet has service line power and the other when the cabinet is under generator control. All LED's shall be field replaceable without putting the intersection in flash and shall carry a 5 year manufacturer warranty.

All wiring to the generator bypass compartment shall be contained in a single cable bundle. The cable shall connect to the backside of the electrical components and shall only be accessible from the inside of the cabinet front door. All electrical components on the inside of the front door that carry AC voltage shall be covered by a see-through plexi-glass cover. The generator bypass cable shall terminate at the same power panel location as service line voltage.

At a minimum the **M cabinet** shall meet the following criteria:

1. It shall have nominal dimensions of 51" high x 30" width x 16" depth and meet the footprint dimensions as specified in Section 7.3, Table 7-1 of NEMA TS2 standards for a Type M cabinet. The cabinet base shall have continuously welded interior mounting reinforcement plates with the same anchor bolt hole pattern as the footprint dimensions.
2. Shall be fabricated from 5052-H32 0.125-inch thick aluminum.
3. The cabinet shall be double-flanged where it meets the cabinet door.
4. The top of the cabinet shall be sloped 1" towards the rear to facilitate water runoff. And shall bend at a 90° angle at the front of the cabinet. Lesser slope angles are not allowed.
5. The inside of the cabinet shall utilize C channel rails. (2) Welded on the back wall on 20" center and (2) welded on each side wall on 08" center. The C channel rails on the back and side walls shall be 41" in length. The C channel rail on the back wall shall start 3" from the bottom of the cabinet interior. The C channel rails on the side walls shall start 2" from the bottom of the cabinet interior. Adjustable rails are not allowed.
6. The Cabinet shall be supplied with a natural mill finish inside and out, unless otherwise specified.
7. All external fasteners shall be stainless steel. Pop rivets shall not be allowed on any external surface.

8. The cabinet shall be supplied without a door handle. The door shall incorporate a 3/8" Allen head socket recessed in the cabinet door. The cabinet shall be supplied with (1) 3/8 removable Allen head wrench.
9. When the police panel is specified for inclusion, the main door shall contain a police door with a conventional police lock. A key shall be provided for both the cabinet lock and the police door lock. The police door shall be recessed into the main door so that the police door is flush with the main door.
10. A closed-cell, neoprene gasket seal shall be bonded to enclosure doors. A stiffener plate shall be welded across the width of the inside of the main door to prevent flexing. A main door bar stop shall be a two-position, three-point stop that accommodates open-angles at 90, 125, and 150 degrees. A louvered air entrance located at the bottom of the main door shall satisfy NEMA rod entry test requirements for 3R ventilated enclosures. Bearing rollers shall be applied to ends of door latches to discourage metal-on-metal surfaces from rubbing. Lock assembly shall be positioned so handle does not cause interference with key when opening the door.
11. When the police panel is specified for omission, the police panel door and all associated appurtenances shall be omitted.
12. The cabinet shall be equipped with a universal lock bracket capable of accepting a Best™ Construction Core and a Corbin#2 tumbler series lock. The cabinet shall come equipped with a Best blue construction core lock.
13. The cabinet shall be supplied with two door switches which control the door open status and the cabinet interior lighting circuits.
14. All exterior seams shall be manufactured with a neatly formed continuously weld construction. The weld for the police box door shall be done on the inside of the cabinet door. All welds shall be free from burrs, cracks, blowholes or other irregularities.
15. The fan baffle panel seams shall be sealed with RTV sealant or equivalent material on the interior of the cabinet.
16. The cabinet shall be UL listed.
17. The cabinet shall come with lifting ears affixed to the upper exterior of the cabinet. These ears shall utilize only one bolt for easy reorientation.
18. The cabinet shall come with a three-stage, multi-ply progressive density polyester, disposable air filter; and the filter performance shall conform to listed UL 900 Class 2 and shall conform to ASHRAE Standard 52.1. The filter element shall be attached with Velcro type mounting along the full length of all four edges.

19. The door shall be mounted with a single continuous stainless steel piano hinge that runs the length of the door. Attaching tamper resistant bolts shall also be stainless steel.

### **Shelves**

The cabinet shall be provided with two (2) double beveled shelves 10" deep that are reinforced welded with V channel, fabricated from 5052-H32 0.125-inch thick aluminum with double flanged edges rolled front to back. Slotted hole shall be inserted every 7" for the purpose of tying off wire bundles.

### **Ventilating Fans**

The cabinet shall be provided with a finger safe din rail mounted thermostatically controlled (adjustable between 4-176° Fahrenheit) ventilation fan. The fan shall be installed in the top right side of the cabinet plenum. A removable aluminum vent cover shall be supplied to allow a second thermostatically controlled fan to be added per customer request.

### **Computer Shelf**

A slide-out computer shelf 16" length by 12" width by 2" depth shall be installed underneath the lower equipment shelf. The shelf shall be mounted so that controller cables will not interfere with the operation of the shelf when equipment is installed. The shelf shall have a hinged cover that opens from the front and shall be powder-coated black. It shall be a General Devices Part # VC4080-99-1168.

### **Main Panel Configuration (Load-Bay)**

#### **NEMA P and P+ Cabinet**

The design of the panel shall conform to NEMA TS2 Section 5, Terminals and Facilities, unless modified herein. This panel shall be the termination point for the controller unit (CU) MSA,B & C and (MMU) MSA & B cables. The terminal and facilities layout shall be arranged in a manner that allows all equipment to be readily accessible.

The load-bay shall be fully wired and meet the following requirements:

- The load-bay shall have the following dimensions; constructed from aluminum with a nominal thickness of 0.125 inches and a maximum width of 37-1/2 inches (31.5" for P+) including attached wiring bundles.
- It shall be a Z type configuration.
- The entire assembly shall roll down and provide access to all of the back of panel wiring. All solder terminals shall be accessible when the load-bay is rolled down. The assembly shall be able to roll down without requiring other components, cables or switches to be removed.
- The load-bay shall be designed so that all other cabinet screw terminals are accessible without removing cabinet electronics.

- All the controller (CU) and malfunction management (MMU) cables shall be routed through the back of the load-bay so that they will not be subject to damage during load-bay roll down.
- The top of the load-bay panel shall attach directly to Unistrut™ spring nuts without the use of standoffs and spacers.
- The load-bay shall be balanced such that it will not roll down when fully loaded with load switches, flashers and flash transfer relays, and the Unistrut™ spring nuts are removed.
- The P cabinet shall be designed for 16 channel operation where load switch sockets 1-8 will be configured for a vehicle phase, load switch sockets 9-12 will be pedestrian phase and load switch sockets 13-16 will be overlaps A-D. These load switch sockets shall be configured in this manor without rewiring the back side of the load-bay. Load-bay channels 1-8 and 13-16 shall be routed through a flash transfer relay.
- Sixteen load switch sockets spaced on 2" center per NEMA TS2 section 5.3.1.2, figure 5-2.
- SIX flash transfer relay sockets.
- One flasher socket.
- All load switches and flasher shall be supported by a bracket extending at least 1/2 the length of the load switch.
- A screw terminal shall be provided to access all functions on all BIUs.
- Wiring for one Type-16 MMU.
- All 24 VDC relays shall have the same base socket but different from the 115VAC relays.
- All 115VAC relays shall have the same base socket but different from the 24VDC relays. (not applicable to flash transfer relays or the mercury contactor)
- The load-bay shall be silkscreened on both sides.
- Field wiring terminations shall be per channel across the bottom of the load-bay. Each channel shall have 3 terminations from left to right beginning with phase 1 corresponding to the appropriate vehicle phase Red, Yellow and Green and following the order of the load switches. Field terminals shall be #10 screw terminal and be rated for 600V.
- All cable wires shall be terminated. No tie-off of unused terminals will be allowed.
- Shall be 100% manufactured in the United States of America

## **NEMA M Cabinet**

The design of the panel shall conform to NEMA TS2 Type 2 Section 5, Terminals and Facilities, unless modified herein. This panel shall be the termination point for the controller unit (CU) MSA & B & C and (MMU) MSA & B cables. The terminal and facilities layout shall be arranged in a manner that allows all equipment in the cabinet and all screw terminals to be readily accessible by maintenance personnel.

The load-bay shall be fully wired and meet the following requirements:

- The load-bay shall have the following dimensions; constructed from aluminum with a nominal thickness of 0.125 inches and a maximum width of 17 1/4 inches including attached wiring bundles.
- The entire assembly shall roll down and provide access to all of the back of panel wiring. All solder terminals shall be accessible when the load-bay is rolled down. The assembly shall be able to roll down without requiring other components, cables or switches to be removed.
- The load-bay shall be designed so that all other cabinet screw terminals are accessible without removing cabinet electronics.
- All the controller (CU) and malfunction management (MMU) cables shall be routed through the back of the load-bay so that they will not be subject to damage during load-bay roll down.
- The top of the load-bay panel shall attach directly to Unistrut™ spring nuts without the use of standoffs and spacers.
- The load-bay shall be balanced such that it will not roll down when fully loaded with load switches, flashers and flash transfer relays, and the Unistrut™ spring nuts are removed.
- The M cabinet shall be designed for 9 channel operation. Load switches 1-4 shall be vehicle phases 2,4,6,8; load switches 5-8 shall be pedestrian phases 2,4,6,8. Load switch 9 shall be Overlap A. These load switch sockets shall be configured in this manor without rewiring the back side of the load-bay.
- Nine Load switch sockets spaced on 2" center per NEMA TS2 section 5.3.1.2, figure 5-2.
- Three Flash transfer relay sockets.
- (1) Flasher socket.
- All load switches and flasher shall be supported by a bracket extending at least 1/2 the length of the load switch.

- Wiring for one Type-16 MMU. All MMU wiring shall be soldered to backside of a screw terminal. The screw terminals provide access to all functions of the MMU.
- All 24 VDC relays shall have the same base socket, but it shall be different from the 115VAC relays.
- All 115VAC relays shall have the same base socket, but it shall be different from the 24VDC relays. (not applicable to flash transfer relays)
- Shall have a relay that drops +24VDC to load switches when the cabinet is in flash.
- The load bay shall have terminals to access the flash circuits 1 and 2.
- There shall be a wire between the pedestrian yellow field terminals and another terminal on the load bay. The MMU channel 9-12 yellows shall terminate next to said pedestrian yellows terminal.
- The load-bay shall be silkscreened on both sides, numbers and functions on the front side, and numbers only on the back side.
- Field wiring terminations shall be per channel across the bottom of the load-bay. Each channel shall have 3 terminations corresponding to the appropriate vehicle phase Red, Yellow and Green. Default wiring shall be left to right vehicle phases 2, 4, 6, 8, pedestrian phases 2, 4, 6, 8 and Overlap A, following the order of the load switches. Field terminals shall be #10 screw terminal and be rated for 600V.
- All cable wires shall be terminated. No tie-off of unused terminals will be allowed.
- Shall be 100% manufactured in the United States of America

## **NEMA P, P+ and M Cabinets**

### **Wiring**

All wiring shall conform to NEMA TS2 Type 2 section 5.2.5 and table 5-1. Conductors shall conform to military specification MIL-W-16878D, Electrical insulated high heat wire, type B. Conductors #14 or larger shall be permitted to be UL type THHN. Main panel wiring shall conform to the following colors and minimum wire sizes:

Vehicle green load switch output	14 gauge brown
Vehicle yellow load switch output	14 gauge yellow
Vehicle red load switch output	14 gauge red
Pedestrian Don't Walk switch	14 gauge orange
Pedestrian Walk switch	14 gauge blue
Pedestrian Clearance load switch	14 gauge yellow
Vehicle green load switch input	22 gauge brown
Vehicle yellow load switch input	22 gauge yellow
Vehicle red load switch input	22 gauge red

Pedestrian Don't Walk input	22 gauge orange
Pedestrian Walk input	22 gauge blue
Pedestrian Clearance input	22 gauge yellow
Logic Ground	18 gauge gray
+24V DC	18 gauge red with white tracer
+12V DC	18 gauge pink
AC+ Line	14 gauge black
AC- Line	14 gauge white
Earth Ground	16 gauge green
AC line (load bay)	12/14 gauge black
AC neutral (load bay)	12/14 gauge white
Controller A, B and C cables	22 gauge blue <i>with the exception of power wires (AC+ Black, AC- White &amp; Earth Ground Green)</i>
MMU A & B cables	22 gauge orange <i>with the exception of power wires (AC+ Black, AC- White &amp; Earth Ground Green)</i>

The field terminal blocks shall have a screw Type No. 10 post capable of accepting no less than 3 No. 12 AWG wires fitted with spade connectors. Four (4) 12-position terminal blocks shall be provided in a single row across the bottom of the main panel. Spade lugs from internal cabinet wiring are not allowed on field terminal screws. The flash program shall be changeable from the front of the load-bay. All load switches, flasher, and flash transfer relay sockets shall be marked and mounted with screws. Rivets and clip-mounting is unacceptable.

Wire size 16 AWG or smaller at solder joints shall be hooked or looped around the eyelet or terminal block post prior to soldering to ensure circuit integrity. All wires shall have lugs or terminal fittings when not soldered. Lap joint/tack on soldering is not acceptable. All soldered connections shall be made with 60/40 solder and non-corrosive, non-conductive flux. All wiring shall be run neatly and shall use mechanical clamps and conductors shall not be spliced between terminations. Cables shall be sleeved in braided nylon mesh and wires shall not be exposed.

### **Load-Bay and Panel Wire Termination**

All wires terminated behind the main panel or on the back side of other panels shall be SOLDERED. No pressure or solder-less connectors shall be used.

### **Cabinet Light Assembly**

The cabinet shall have two LED lighting fixtures with 15 high power LEDs using a cool white color emitting 300lm min @ 12VDC/750mA. The LED shall be a Rodeo Electronics TS-LED-05M02 or equivalent. The LED fixtures shall be powered by a Mean Well class 2 power supply LPV-20-12 that shall be mounted on the inside top of the cabinet near the front edge below and independent of the slide-out computer shelf. An

on/off switch that is turned on when the cabinet door is opened and off when it is closed shall activate the lighting fixture(s) power supply.

### **Convenience Outlet**

The cabinet shall be wired with one convenience outlet with a ground fault interrupter and TWO power strips without ground fault interrupters. The ground fault outlet shall be mounted on the right side of the cabinet on or near the power panel. The power strips shall be ...on each side above... the top shelf. No outlets shall be mounted on the door. The GFI power shall be fed through the auxiliary breaker. The power strip shall be fed through an EDCO SHP300-10 transient voltage suppressor located on the cabinet power panel. There shall be a 2-position terminal block on the power panel, between the power strip and the EDCO SHP300-10 for easy replacement.

### **9-29.16                      Vehicular Signal Heads, Displays, and Housing** **(October 1, 2017 COS GSP)**

**Replace** the second paragraph with the following:

Backplates shall be constructed of 5-inch-wide, .050-inch-thick corrosion-resistant flat black finish, be non-louvered, and be one-piece. Backplates shall be supplied with a 2 inch wide yellow (#3931) Type 4 High Intensity Prismatic retroreflective sheeting installed on the perimeter.

### **9-29.17                      Signal Head Mounting Brackets and Fittings** **(August 1, 2008 COS GSP)**

**Delete** the last paragraph.

### **9-29.24                      Service Cabinets** **(November 1, 2012 COS GSP)**

**Replace** this Section in its entirety with the following:

All electrical conductors, buss bars, and conductor terminals shall be copper

The minimum size of control circuit conductors used in service cabinets shall be 14 AWG stranded copper with THWN insulation.

Service cabinets shall be constructed of steel or aluminum. If aluminum, they shall be fabricated from 0.125 inch (minimum) and anodized. If steel, they shall be fabricated from 12-gauge (minimum) steel, and hot dipped galvanized.

Doors shall be lockable with a padlock.

#### **Aerial Service Cabinet**

The aerial AC service enclosure shall be Square D model QO2-4L70RB or an approved equal meeting the following:

The AC service enclosure shall be lockable, rain-tight, designed for two large 60 amp circuit breakers expandable to four small circuit breakers, rated at 70 amps, and suitable for mast mounting.

The enclosure for the AC service shall be designed so that the access door to the circuit breakers may be opened without de-energizing either the controller branch service or the street lighting branch service.

The AC service shall be designed so that the street lighting branch circuit and the controller branch circuit may be separately de-energized.

#### Ground Mounted Service Cabinet

The ground mounted service cabinet with underground service entrance shall be a Tesco Model 26-100 or an approved equal:

The Cabinet shall be UL listed

The cabinet shall be fabricated from 12 gauge, hot dipped galvanized steel, or 1/8 inch anodized aluminum, or 304D 14 gage stainless steel as required, and be rated as a NEMA 3R enclosure.

The internal parts shall be fabricated from 14 gage cold rolled steel.

The cabinet shall be of all welded construction with welding materials specifically designed for the material used.

All fasteners, hinges, latches, and hardware shall be of stainless steel and hinges shall be continuous piano type.

There shall be no exposed nuts, bolts, screws, rivets or other fasteners on the exterior.

The cabinet shall have a fully framed side hinged outer door with swaged close tolerance sides for flush fit with top drip lip and closed cell neoprene flange compressed gaskets.

The cabinet door shall have a 2,000 pound stress rated hasp, welded to the cabinet door. 4- 5/8 inch x 18 inch anchor bolts and applicable appurtenances (including nuts) shall be provided.

The distribution and control panel shall have a hinged deadfront panel with 1/4 turn latch and knurled knobs.

The deadfront shall be hinged on the same side as the front door and shall open a minimum of 120°.

The unit shall contain a removable back panel.

#### Power Distribution Panel

It shall provide separate main and disconnects- as required.

All circuit breakers shall be installed in a vertical position, handle up for "On", handle down for "Off".

All circuit breakers shall be industrial grade, plug-in breakers shall not be used.

All bushings shall be UL approved THHN cable busing, fully rated for 125 Amps.

At least 6 standard single pole circuit breakers spaces (3/4 inch nominal) shall be provided.

#### Control Compartment

The cabinet shall be completely prewired in the factory.

All terminals shall be permanently labeled.

All control wiring shall be #14 AWG THHN.

**9-29.25                      Amplifier, Transformer, and Terminal Cabinets**  
**(April 1, 2018 COS GSP)**

**Replace** this section in its entirety with the following:

Terminal cabinets shall be NEMA 3R and meet the following specifications:

1. Cabinets shall be constructed of 0.125 inch thick 5052-H32 aluminum using continuously welded construction.
2. Nominal cabinet dimensions shall be 8"d x 16"h x 12"w.
3. Cabinet doors shall have a full length, heavy gauge, stainless steel piano hinge.
4. All cabinets shall have a double flanged door with a closed cell neoprene door gasket.
5. Includes a drip shield.
6. Cabinet shall include 2 – 12 position Insulated terminal blocks (Marathon 1512DJ). The blocks shall be 600 volt, heavy-duty, barrier type. The terminal blocks shall be provided with a field-side and a control-side connector separated by a marker strip.
7. Main door lock is a Best CX series Green core lock with latch type locking bolt.
8. Mounting shall be as noted in the Contract.

**Add** the following new Sections:

**9-29.100                      Pre Formed Loops**  
**(June 22, 2018 COS GSP)**

Preformed Loops shall:

Contain 16 AWG or 14 AWG stranded copper wire with THHN insulation.

Consist of the number of turns according to the Standard plans or as detailed on the plan sheets.

Constructed with an outer protective duct of 5/8" (outside diameter) hydraulic hose and be injected with rubberized asphalt.

Contain no splices.

Lead-ins shall contain a minimum twist of the loop wire of 3 twists per foot.

Be factory tested and provided with factory test report indicating wire continuity and loop inductance.

Loop sealant for use in HMA pavement shall be one of the following:

QCM EAS – 14 Epoxy Adhesive

RAI Pro-Seal 6006 Ex

CRAFCO 34271 (hot pour)

3M 5000 (cold sealant)

Fields T Series – Type T4 (hot pour)

Loop sealant for use on concrete bridge decks and PCC pavement shall be one of the following:

AHT 1614JFR – HP Joint Sealant (hot pour)  
QCM EAS – 14 Epoxy Adhesive  
RAI Pro-Seal 6006 Ex  
3M 5000 (cold sealant)

Hot loop sealants shall be heated according to the manufacturer's recommendations.

Backer rod shall not shrink when exposed to hot pour sealants. The Contractor shall demonstrate this in the field prior to installation.

The Contractor shall submit catalog cuts of the preformed loop, sealant, and backer rod for review and approval by the Street Department.

**Add** the following new Section:

**9-29.101 Magnetometers**  
**(November 1, 2014 COS GSP)**

Microloop Probes. The microloop probe shall be a cylindrical unit designed to be buried beneath the road surface. The device shall transform magnetic field intensity changes into inductance changes. The device when connected to an inductive loop detector shall detect vehicles containing significant ferromagnetic material.

The probe shall be approximately 0.88-inches in diameter and 3.63-inches long. The lead-in cable shall be factory installed, with a length sufficient to connect to other probes and to the junction box where the lead-in will be spliced to the home-run cable. The entire assembly shall be sealed against moisture entry.

The probe shall have a nominal inductance of 25 microhenries per probe plus 21 microhenries per 100-feet of interconnecting and lead-in cable. The sensitivity shall be 3.5 to 8.0 nanohenries per millioerstads at 50 KHz, 400 millioerstads ambient magnetic field intensity.

Microloop probes shall be furnished and installed as shown on the Plans and on the COS Standard Plans in the 'J' series. The Contractor shall measure the vertical component of the magnetic field intensity prior to installation of the microloop probe(s). The location must have a field intensity of between 0.2 Oerstad and 0.8 Oerstad. The Engineer will determine the alternate location if the planned location is not suitable.

Each probe shall be installed vertically in PVC sleeves. The interconnecting cable and lead-in cable shall be installed in a sawcut to the junction box. The microloop lead-in cable shall be spliced into the home run lead-in cable in accordance with the COS Standard Plans in the 'J' series.

**Add** the following new Section:

**9-29.102                      Non-Intrusive Vehicle Detection System**  
**(January 1, 2020   COS GSP)**

The following preapproved non-intrusive vehicle detection system shall be used:

**GRIDSMART®:**

- GRIDSMART® Bell Camera with ultra-wide angle fisheye camera
- GRIDSMART® Bell Camera mounting bracket
- GRIDSMART® GS2 Processor with TS2 SDLC connector kit and Performance module software included.

**Iteris**

- Vantage Vector-Next color camera/radar system (115V)
- Vantage Next CCU unit, shelf mount, TS2 version
- Vantage Radius Surge Protection Panel

**Add** the following new Section:

**9-29.104                      Fiber Optic Patch Cords**  
**(November 1, 2014   COS GSP)**

**Fiber Optic Patch Cords**

Fiber optic patch cords shall utilize singlemode fiber, OFNR rated, ceramic ferrules, factory connectorized utilizing thermal cured epoxy, UPC polish, with an ORL of -50 dB and maximum insertion loss of 0.5 dB, and consist of tight buffered cable with a 3 millimeter outer jacket. Duplex patch cables shall contain a clip that allows polarity correction of the connectors without the need for special tools. Hybrid patch cords shall be constructed with differing connector types for each end, according to the plans, for connecting devices to patch panels.

**Add** the following new Section:

**9-29.105                      Fiber Optic Connectors**  
**(November 1, 2014   COS GSP)**

**Fiber Optic Connectors**

Unless otherwise noted in the Plans, fiber optic connectors used on this project shall meet the following:

All fiber optic connectors shall be factory connectorized and polished to UPC with an ORL of -50dB. The connectors shall be of the type specified in the Plans.

All fiber optic connectors shall have a maximum insertion loss of 0.5 dB per connector.

All fiber optic connectors shall be capped with a protective dust cover.

The Contractor shall submit catalog cuts with the Request for Approval of Material for review and approval by the Project Engineer.

**Add** the following new Section:

**9-29.106 Fiber Optic Splice Closures**  
**(November 1, 2014 COS GSP)**

**Fiber Optic Splice Closures**

Underground Fiber Optic Splice Closure

All underground splice closures shall be COYOTE RUNT or appropriately sized COYOTE DOME.

Traffic Signal Cabinet and VMS Control Cabinet Fiber Optic Splice Closures

All splice closures for Traffic Signal Cabinets and VMS Control Cabinets shall be SPH-01P by Corning Cable Systems.

Communication Closet Splice Closures

Splices closures shall be compatible with Siemon patch panel and be contained in the patch panel. Due to space limitations, splice closures that consume rack space below a patch panel will be rejected.

**Add** the following new Section:

**9-29.107 Fiber Optic Patch Panels**  
**(November 1, 2014 COS GSP)**

**Fiber Optic Patch Panels**

Each patch panel shall be populated with interconnection sleeves according to the Plans. Empty patch panel slots shall have a blank cover. All interconnection sleeves shall have a protective dust cover installed.

The splice trays and the fiber optic interconnection sleeves shall be enclosed on all sides by the patch panel when the patch panel is closed.

Rack Mount Fiber Optic Patch Panels for Aggregate Points

Rack-mount fiber optic patch panels shall be capable of mounting in a standard 19 inch EIA equipment mounting rack. Rack-mount patch panels shall be Siemon.

Rack Mount Fiber Optic Patch Panels for VMS Cabinets

Rack-mount fiber optic patch panels installed in VMS cabinets shall be Siemon, 1 rack unit tall and be capable of mounting in a standard fixed 19 inch EIA equipment rack. Interconnection sleeves shall be mounted to the front of the panel and be Siemon quick pack or equivalent.

Wall Mount Fiber Optic Patch Panels for Traffic Signal Cabinets

Wall mount fiber optic patch panels shall be corning SPH-01P.

Add the following new Section:

**9-29.108 Racks and Cable Management**  
**(November 1, 2014 COS GSP)**

**Racks**

Equipment mounting racks in buildings shall be Siemon RS-07-S.

**Cable Management**

Vertical cable managers shall be Siemon RS-CNL.

Horizontal cable managers shall be Siemon WM-143-5, or WM-144-5, or WM-145-5, as noted in the plans.

Add the following new Section:

**9-29.109 Video & Data Transmission and Distribution Systems**  
**(January 1, 2020 COS GSP)**

**General**

If any equipment specified in this section has been superseded by a newer product that is interchangeable, the newer product shall be supplied. If the product is no longer available and has no replacement, the Contractor shall propose a different product meeting the same performance and material specifications as the discontinued one.

**Equipment**

- Ethernet switching devices shall be by Cisco Industries

Manufacturer:

Cisco Systems Inc.  
170 West Tasman Dr.  
San Jose, CA 95134  
Telephone: 1-800-553-6387

Equipment Model Numbers:

Rugged Switch

- IE-3200-8T2S-E (No POE)
  - PWR-IE50W-AC power supply
- IE-3200-8T2S-E (POE)
  - Power supply based on need
- Accessories
  - SD Card – SD-IE-4GB
  - Optional DIN Rail – STK-RACK-DINRAIL
  - License – IE3200-DNA-E
- 1000BASE-LX/LH SFP transceiver module

### Rugged Fiber Switch

- IE-4010-16S12P (12 Ethernet and 16 SFP ports)
- Accessories
  - PWR-RGD-AC-DC-H Redundant Power Supply
  - License – IE4010-DNA-E-H
- 1000BASE-LX/LH SFP transceiver module

### Fiber Switch

- C9500-40X (40 port 1G/10G SFP)
- C9500-16X (16 port 1G/10G SFP)
- Accessories
  - C9500-NM-8X (adds 8 1G/10G SFP ports) Expansion Module
  - 19” Rack Mounts – C900-ACC-KIT-19I
  - PWR-C4-950WAC-R Redundant Power Supply
  - C9500-DNA-X-X License
- 1000BASE-LX/LH SFP transceiver module

The Contractor shall submit catalog cuts with the Request for Approval of Material for review and approval by the Project Engineer.

**Add** the following new Section:

**9-29.110 Closed Circuit Television Systems**  
**(January 1, 2020 COS GSP)**

### General

If any equipment specified in this section has been superseded by a newer product that is interchangeable, the newer product shall be supplied. If the product is no longer available and has no replacement, the Contractor shall propose a different product meeting the same performance and material specifications as the discontinued one.

### Television Camera Assembly

Television cameras shall be supplied as a unit including pan and tilt mechanism, clear lens, and 28 foot pig tail.

#### 1. Equipment Model Numbers:

Camera: Spectra HD dome drive 30x 1080P	D6230L
Back Box: Spectra IV PENDT MT	BB4-PR-E
Dome: Spectra III PPRES DOME PEND CLR	LD53PR-1
Pressurized back Box Modification	SMR-1-252IP7
Adapter pole mount	PA3512
Modify pole mount with internal channel	SMR 1-2FMFAR
28 ft Pigtail	SMR 1-2NOHJV

2. Manufacturer:

Pelco  
3500 Pelco Way  
Clovis, CA 93612-5699  
www.pelco.com  
Telephone: (800) 289-9100

The Contractor shall submit catalog cuts with the Request for Approval of Material prior to ordering this material for review and approval by the Project Engineer.

**CCTV System Cabling**

The Contractor shall terminate power cables to the terminal strip and make necessary connections to the power surge suppressor and camera power supply.

Category 6 cable shall be terminated to an RJ-45 connector for connection to the Ethernet surge suppressor.

The Contractor shall terminate the 28 foot camera cable pigtail to the RJ-45 surge suppressor and the camera power supply.

**Surge Suppression**

Signal/Camera Cabinet surge suppressors shall be Transtector SL-Vor consist of:  
Six NEMA 5-15 outlets.

Have a nominal operating voltage of 120 VAC.

Equipped with silicone avalanche suppressor diode technology for over current protection.

The surge suppressor shall be equipped a visual status indicator for “Operational” or “Fail” conditions.

Surge suppressors isolating the CCTV camera from the Ethernet Switch and between the Signal Controller and the Ethernet Switch shall be Transtector TSJ 10/100BT or consist of:

Silicone Avalanche Diode Technology

One in and one out RJ 45 connection

Maximum of 12 V peak operating voltage

-30° to +65° C operating environmental temperature

90% relative humidity

Grounding lug

The surge suppressor isolating the CCTV power supply from the Signal Cabinet shall be Transtector ACP100MN.

**NEMA 3R Enclosure**

The enclosure shall be 16” X 12” X 6” painted gray and rated as a NEMA 3R enclosure.

The enclosure shall contain an 8 position terminal strip capable of accepting spade type connectors and an 8 position grounding bus.

The door shall have a continuous vertically oriented piano hinge.

The Ethernet surge suppressor, the line voltage surge suppressor, and the camera power supply shall be mounted in the enclosure.

**Add** the following new Section:

**9-29.111 Permanent Variable Message Sign**  
**(August 1, 2015 COS GSP)**

The VMS display shall be model VF-2420-27 x 110-46A. The VMS display and model 336 pole mounted cabinet shall be supplied by:

Daktronics, Inc.,  
331 32<sup>nd</sup> Ave,  
Brookings, SD 57006-5128  
Phone: (800)  
FAX: (605) 697-4300  
Email: [sales@daktronics.com](mailto:sales@daktronics.com)

The Contractor shall submit catalog cuts with the Request for Approval of Material for review and approval by the Engineer.

**Sign Mounting Hardware**

The sign housing shall be provided with all necessary hardware including sign mounting beams, vertical and horizontal brackets, and all related hardware to install the VMS onto a truss cantilevered sign structure.

The VMS housing, structural framing, face covering, and mounting members shall be designed to withstand a wind velocity of 100 mph with a 30 percent gust factor and shall otherwise comply with the 2001 requirements of AASHTO's Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals.

**Circuit Boards**

The manufacturer's submittal shall include a schematic diagram for each type of circuit board used in the sign display and control system.

**Display LEDs**

LEDs used in the VMS display shall be from one LED manufacturer and of one part number. LEDs shall conform to the following minimum requirements:

1. Operating temperature range shall be -40° C to +100° C, and storage temperature range shall be -40° C to + 100°C.
2. Minimum half power viewing angle shall be 30°. Half power viewing angle is defined such that, at a given distance from the LED, luminous intensity measured at any point at an angle of 15° from the LEDs center axis shall be no less than half the luminous intensity measured directly on the LEDs center axis.

### **LED Intensity Control System**

The VMS shall be equipped with an LED intensity control system. The control shall support both manual and automatic control. LED intensity control shall consist of photo sensors and associated circuitry. VMS controller analysis of these ambient light measurements shall automatically determine which preprogrammed LED intensity levels will provide the best VMS legibility for the given ambient light condition. The LED intensity control system shall not cause flickering of the LED display.

### **Power Supplies**

The LED hybrid display matrix shall be powered by regulated switching DC power supplies that operate from 120 VAC input power and have an output of 24 volts DC or less. Power supplies shall be wired in a redundant parallel configuration that uses multiple supplies per display. The supplies shall have a “current sharing capability that allows them to provide equal amounts of current to their portion of the LED Display. Power supplies shall be rated such that if one supply fails, the remaining supplies will be able to operate their portion of the display under full load conditions (all pixels on at maximum drive current) while in an ambient temperature of +60° C.

Power supplies shall operate within a minimum input voltage range of +90 to +135 VAC. Power supply output at an ambient temperature of +60° C shall be no less than 65% of its room temperature (+21° C) output. Power supply efficiency shall be a minimum of 74%. Power supplies shall have a minimum power factor rating of 0.95. Power supplies shall be short circuit protected. Under short circuit conditions, the DC side of the power supply shall be powered down. The power supplies shall reset automatically after 5 seconds of AS power off. Power supplies shall be protected by a minimum overload allowance of 105%. Inputs to power supplies shall be fused or circuit breaker protected. A failed power supply shall not interfere with the other operating power supplies.

A copy of the power supply manufacturer’s data sheet and its UL or ETL product card shall be provided with the VMS manufacturer’s submittal.

### **VMS Control Cabinet**

The VMS Control Cabinet shall be supplied as a pole mountable 336 style NEMA 3R cabinet as shown in the plans. The mounting bracket shall be tapered to offset the taper of the sign structure allowing the cabinet to be mounted plumb.

The Cabinet shall be constructed of 5052-H34 Aluminum with continuously welded external seams.

The access doors shall contain a three-point latch with stainless steel handle, one per side for two sides. The doors shall be sealed with 0.5" x 2" closed-cell neoprene gaskets. Lock cores shall be City of Spokane specification M-2 "Best" brand, from Allied Fire & Security located in Spokane Washington.

#### VMS Cabinet Uninterruptable Power Supply

The VMS Cabinet shall be supplied with an Uninterruptable Power Supply that is mounted in the standard EIA 19" rack.

The UPS shall be capable of being managed over the existing Ethernet network.

The batteries shall be leak proof, Maintenance-free Lead –Acid with suspended electrolyte.

#### Transient Current Protection

VMS and sign controller signal and power inputs shall be protected from electrical spikes and transients.

AC power for all equipment shall be protected at the load center inside the field cabinet. A parallel-connection surge suppresser, rated for a minimum surge of 10 kJ, shall be connected to the load center in a manner that protects the load center and the equipment it feeds.

AC power for control equipment, such as the field controller and communication equipment, shall be further protected by the use of a series-connected surge suppresser capable of passing 15 Amps of current. This device shall be UL 1149 recognized.

EIA 232/485 communications ports in the sign controller shall be protected by avalanche diodes rated for 11.5 volts at 10 Amps and 14 Volts at 70 Amps. The diodes shall be connected between each signal line and ground.

Digital input and output lines from the VMS to the control equipment shall be protected at the control equipment by optically isolated input and output modules, or optically isolated solid state relays. Inputs shall include, but shall not be limited to the VMS regulated power supply diagnostics and the AC power failure alarm. Outputs shall include, but shall not be limited to the cooling fan and defog/defrost fan control.

#### Sign Controller

The sign controller shall cause the desired message to be displayed on the VMS. The sign shall display alphanumeric character fonts. The sign controller shall be NTCIP compliant and provide a default value for each NTCIP object supported.

#### Message Selection

With the sign controller software, the central computer or laptop computer shall be capable of implementing a message selected from those stored in controller memory, or a new message entered via the communication port.

A message shall remain displayed on the sign until either a command to change the current message or a command to blank the display is received.

#### Data Transmission Requirements

Sign Controllers shall have an integrated RJ45 10/100 Base-T Ethernet communication port, an integrated Hayes compatible RJ11 modem port, 3 integrated RS-232 ports, and an integrated RS422 port.

#### Memory

Sign controllers shall have non-volatile changeable memory capable of retaining data for a minimum of 30 days following a power failure. The memory shall be capable of storing up to 500 changeable messages.

#### Power Interruptions

Contents of the sign controller's memory shall be preserved by battery backup during AC power interruptions and the controller shall automatically resume operation once AC power is restored. Upon recovering from a power interruption, the sign controller shall display the message identified by the Power Recovery Message parameter. The sign controller shall report to the central computer that it has recovered from a power interruption.

#### Control Software

The Contractor shall supply one copy of the Vanguard v4 Standard software.

The control software shall be designed to operate on Microsoft Windows 7 operating systems as a minimum.

The software shall be capable of controlling the new VMS and other existing VMS currently controlled from the Spokane Regional Traffic Management Center.

The sign control software shall be a stand-alone Personal Computer (PC) application that allows access up to 255 signs through a direct line or dial up connection.

The control software shall provide for command and control of the following functions:

#### VMS Control

Software shall retrieve, display, update and download/upload the following functional parameters to the local sign controller in response to user-initiated instructions. The pixel service test shall activate every pixel by reversing the image (positive to negative and vice versa) being displayed on the sign at the time of the test, so that the message remains readable. Software shall perform the following operations in conjunction with its monitoring and logging functions:

Display message

Blank the current message

Change message priority

Pixel, lamp and fan tests

Set time and date in the sign controller  
Retrieve sign ID, type, and manufacturer

#### Communications

Communications between the control software and sign controller shall be NTCIP compliant.

The control software shall verify all communications for errors. If a response from a sign controller contains a communications error, or if there is no response the Control Software shall re-establish communications.

#### Data Collection

The control software shall retrieve errors detected, message number currently being displayed, and current message priority. Using different commands, the software shall retrieve message MULTI strings, a map of defective pixels, the time and date, the event schedule, and configuration parameters.

#### Message Library

The control software shall store messages and transfer messages to a sign for storage and/or display. When a user desires to send a message to a sign, the control software shall offer as choices only those messages compatible with the sign in question. The control software shall allow message names in plain text representation (no MULTI).

The control software shall display all character fonts supported by the Variable Message Sign System. Message shall be displayed on the computer monitor in exactly the same format (font, text centering and justification) as on the Variable Message Sign.

#### Software Duplication Rights

The City of Spokane shall have the right to duplicate the Variable message Sign Control Software as needed for use in controlling signs under its jurisdiction.

The Contractor shall supply one copy of the Vanguard v4 Professional and one server license to the City for installation on an existing server.

#### Documentation

The Contractor shall furnish two paper copies of the Control software user manuals, the sign controller cabinet schematic, and the VMS display cabinet wiring schematic, to the Engineer. In addition the Contractor shall provide two CD ROM disks with the same documents in electronic format to the Engineer.

**Add the following new Section:**

**9-29.112 Fiber Optic Cleaning Kit**  
**(April 1, 2018 COS GSP)**

The fiber optic cleaning kit shall be capable of cleaning FC, SC, ST, and LC single mode connectors.

The kit shall contain disposable cleaning tips or semi mechanical rotating cleaning tips of the appropriate size for the connectors. The kit shall contain a hand held patch cord cleaner with dry retractable tape that has a manually operated trap door that exposes a new clean section of the cleaning tape per manipulation. The trap door shall be normally in the closed position. The tape shall be compatible with the type of connector described above. The tape shall be replaceable.

The kit shall contain optical quality cleaning fluid.

The kit shall be supplied in a field portable carrying case specifically designed for the cleaning material.

**Add** the following new Section:

**9-29.113                      Driver Feedback Sign System**  
**(January 1, 2020 COS GSP)**

Driver Feedback Signs shall be VCalmSM-16 with GPS or be:

30”(w) x 36”(h) x 3.625”(d)

Contain Amber LED full matrix display

Weigh 32 pounds

Enclosure of 0.090 continuous formed aluminum powder coated black

Lens/Door of 3/8” polycarbonate

Solar powered with Li-Ion batteries

White “YOUR SPEED” sign

GPS clock

Frangible base

4” aluminum sign post

Anchor bolts

Sign mounting hardware

**Add** the following new Section:

**9-29.114                      Rectangular Rapid Flashing Beacon**  
**(January 1, 2020 COS GSP)**

Rectangular Rapid Flashing Beacons shall consist of the following:

Two 7” x 3” rectangular vehicle LED amber modules spaced 7” apart with an overall width of approximately 22”.

Auto dimming during night or low light conditions.  
Programmable control module to set flash pattern and total flashing duration.  
Flasher display mounting brackets.  
4" diameter nominal aluminum post.  
Frangible "transformer" base.  
Anchor bolts.  
Solar power or commercial power capable.  
Lockable NEMA 3R cabinet for control equipment mounted on the post.  
Pedestrian push button for system activation.  
Hard wire interconnection for synchronized flasher activation.  
5"x7" R10-25 push button instruction sign and mounting hardware.  
30"x30" W11-15 sign and mounting hardware.  
30"x18" W16-7P sign and mounting hardware.

Operate in the MUTCD specified (MUTCD Section 4L.01 compliant) flash pattern. The flash pattern shall be user-selectable in the field.

**The RRFB indication on the left-hand side shall be illuminated for approximately 50 Milliseconds.**

Both RRFB indications shall be dark for approximately 50 milliseconds.

**The RRFB indication on the right-hand side shall be illuminated for approximately 50 milliseconds.**

Both RRFB indications shall be dark for approximately 50 milliseconds.

**The RRFB indication on the left-hand side shall be illuminated for approximately 50 milliseconds.**

Both RRFB indications shall be dark for approximately 50 milliseconds.

**The RRFB indication on the right-hand side shall be illuminated for approximately 50 milliseconds.**

Both RRFB indications shall be dark for approximately 50 milliseconds.

**Both RRFB indications shall be illuminated for approximately 50 milliseconds.**

Both RRFB indications shall be dark for approximately 50 milliseconds.

**Both RRFB indications shall be illuminated for approximately 50 milliseconds.**

Both RRFB indications shall be dark for approximately 250 milliseconds.

## **SECTION 9-30 WATER DISTRIBUTION MATERIALS (August 1, 2008 COS GSP)**

**Delete** the first sentence which begins with "This specification addresses ...".

## **9-30.1                    Pipe**

### **9-30.1(1)                    Ductile Iron Pipe**

**(August 1, 2008 COS GSP)**

**Add** the following before the first paragraph:

Be advised that the referenced “Standard Thickness Class” designation was used in previous editions of the AWWA Standard which are no longer current and is now listed under “Special Classes” Thickness Class in the current edition of the AWWA C151/A21.51 Standard.

### **9-30.1(5)                    Polyvinyl Chloride (PVC)**

**(August 1, 2008 COS GSP)**

**Delete** this Section in its entirety.

### **9-30.1(5)A                    Polyvinyl Chloride (PVC) Pipe (4 inches and Over)**

**(August 1, 2008 COS GSP)**

**Delete** this Section in its entirety.

### **9-30.1(5)B                    Polyvinyl Chloride (PVC) Pipe (Under 4 inches)**

**(August 1, 2008 COS GSP)**

**Delete** this Section in its entirety.

### **9-30.1(6)                    Polyethylene (PE) Pressure Pipe (4 inches and Over)**

**(August 1, 2008 COS GSP)**

**Delete** this Section in its entirety.

## **9-30.2                    Fittings**

### **9-30.2(1)                    Ductile Iron Pipe**

**(August 1, 2008 COS GSP)**

**Replace** first sentence with the following:

Fittings for ductile iron pipe shall be manufactured of ductile iron and shall meet the requirements of AWWA C110 or AWWA C153.

### **9-30.2(5)                    Polyvinyl Chloride (PVC) Pipe**

**(August 1, 2008 COS GSP)**

**Delete** this Section in its entirety.

**9-30.2(5)A Polyvinyl Chloride (PVC) Pipe (4 inches and Over)**  
**(August 1, 2008 COS GSP)**

**Delete** this Section in its entirety.

**9-30.2(5)B Polyvinyl Chloride (PVC) Pipe (Under 4 inches)**  
**(August 1, 2008 COS GSP)**

**Delete** this Section in its entirety.

**9-30.2(6) Restrained Joints**  
**(January 1, 2020 COS GSP)**

**Replace** the last sentence in the first paragraph with the following:

Any device utilizing set screws shall not be permitted.

**Add** the following after the last paragraph:

For pipe 12-inches and under, acceptable manufactured restraint joint systems are as follows:

- MJ Gripper Gland as manufactured by U.S. Pipe;
- TR Flex restraint joints as manufactured by U.S. Pipe; Lok-tyton restraint joints as manufactured by U.S. Pipe;
- Field-Lok restraint joint as manufactured by U.S. Pipe;
- Tyton-Lok mechanical joints as manufactured by the Pacific States Cast Iron Pipe Company;
- MEGALUG as manufactured by Ebaa Iron, Inc.;
- American Fast Grip Gaskets as manufactured by American Ductile Iron Pipe;
- Gripper Gaskets as manufactured by Gripper Gasket LLC;
- McWayne Sure Stop 350 gaskets as manufactured by McWayne.
- One-Lok as manufactured by SIGMA Corporation;
- Star Grip as manufactured by Star Pipe Products;
- ROMAGrip as manufactured by ROMAC Industries.

The preceding restrained joint systems which are external restraint shall be acceptable only if external restraint systems for pipe 12-inches and under have multiple teeth on the gripping wedge at the gripping surface.

For pipe larger than 12-inches the acceptable manufactured restraint joint systems are as follows:

- TR Flex Gripper Ring as manufactured by U.S. Pipe (Water Department's written approval is required prior to use);

- TR flex restraint joints as manufactured by U.S. Pipe; Lok-Tyton restraint joints as manufactured by U.S. Pipe;
- Tyton-Lok mechanical joints as manufactured by Pacific States Cast Iron Pipe Company;
- American Lok-Ring restraint joints as manufactured by American Ductile Iron Pipe Company;
- Flex-Ring Joint Including Field Flex-Ring for sizes 14-inch through 36-inch restraint joints as manufactured by American Ductile Iron Pipe Company;
- MEGALUG [pipe 48-inches and under] as manufactured by EBAA Inc.;
- Field Lok Gaskets as manufactured by United States Pipe & Foundry Company;
- American Fast Grip Gaskets as manufactured by American Ductile Iron Pipe;
- SuperLug as manufactured by Sigma Corporation;
- Snap-loc restraints for push-on joints as manufactured by Griffin Pipe Products Co.;
- HP Loc Restrained joint pipe as manufactured by U.S. Pipe Co.;
- Star Grip as manufactured by Star Pipe Products.

The preceding restrained joint systems which are external restraint shall be acceptable only if external restraint systems for pipe larger than 12-inches have multiple teeth on the gripping wedge at the gripping surface.

**9-30.2(10) Polyethylene (PE) Pipe (4 inches and Over)**  
**(August 1, 2008 COS GSP)**

**Delete** this Section in its entirety.

**9-30.3 Valves**  
**(August 1, 2008 COS GSP)**

**Replace** the last sentence with the following:

Valves shall open CLOCKWISE (open right).

The size and rating of valves will be approved by the Engineer prior to installation. Valves shall be the same size and have a pressure rating in excess of the test pressure of the lines.

Gate Valves. Gate valves shall be resilient seat. Where indicated on the Plans or directed by the Engineer, ends shall be flange x mechanical joint, flange x flange, or mechanical joint x mechanical joint.

Check Valves. Check valves shall be wafer type resilient seat double disc swing check valves, of class specified on the Plans or Special Provisions with cast or ductile iron plate and body, Buna-N seals and plain or flat face, Marlin Duo-Check II, HMP, or an approved substitute.

The Contractor shall pressure test the check valves and butterfly valves provided by the Contracting Agency at the beginning of the contract, prior to installation, in order to verify the suitability of the valves. The tests shall be conducted in the presence of the Engineer.

Air Valves. Unless specified otherwise in the Contract, air valves shall be provided by the City of Spokane Water Department.

**9-30.3(1) Gate Valves (3 to 16 inches)**  
**(November 1, 2012 COS GSP)**

**Replace** this Section in its entirety with the following:

Pre-Approved Gate Valve Manufacturers:

- American Flow Systems
- Clow
- East Jordan Iron Works
- M&H
- Mueller
- Kennedy
- Stockham
- Waterous

All valves shall comply with ANSI/AWWA C509-01 or ANSI/AWWA C515-01 or their latest revisions, Class 150. Resilient seated Gate Valves shall be non-rising stem type suitable for direct burial, or the rising stem type (OS&Y). Shaft seals shall be standard “O” ring seals.

All cast iron shall conform to ASTM A-126 Class B. All ductile iron shall conform to ASTM A-536 Class B.

Stems shall be manganese bronze having a minimum ultimate tensile strength of 60,000 psi, and a minimum yield strength of 20,000 psi or greater. Stainless steel stems will also be allowed. Bolts shall be electro-plated steel with hex heads and hex nuts in accordance with ASTM A-307.

NRS stem collars shall be cast integral with the stem and machined to size. The housing for the valve stem collar shall be machined. A thrust bearing shall be incorporated as required to optimize operating torques.

NRS valves shall be furnished with “O” ring stem seals using two “O” rings located above the thrust collar to be set in grooves in the stem.

The internal and external iron surfaces of the body and bonnet shall be totally coated with epoxy and shall conform to AWWA 550 standards. Gates for all valves shall be encapsulated in rubber, be field replaceable and provide a dual seal on the mating body seat. Valves shall be capable of installation in any position with rated sealing in both directions. Rubber seats of specially compounded SBR material shall be utilized and be capable of sealing even under conditions of normal wear. The valve body shall have internal guides engaging integral lugs in the gate in a tongue and groove manner, supporting the gate throughout open/close travel.

Gate valve stems shall have a 2" wrench operating nut, painted red and with an arrow showing clockwise opening direction. Gate valves shall open in a clockwise direction of the operating nut (Open Right).

Rising stem gate valves (OS&Y) shall open in a counter-clockwise direction (Open Left) and shall be wheel top operator, painted black.

Gate valves shall be furnished with a type of end connection as follows: Mechanical joint per ANSI/AWWA C111, or Flange-ANSI/AWWA flange drilling Class 125, or as shown on the plans.

Markings shall be in accordance with ANSI/AWWA C509-01, or ANSI/AWWA 515-01 to include the name of the manufacturer, minimum working pressure, and valve size.

Gate valves shall be rated for zero leakage at 150 psi water working pressure and have a 300 psi hydrostatic test for structural soundness for 4" through 12".

Bidders shall submit with their bid a catalog or brochure that describe the valves, including materials used in the valve construction, they propose to furnish.

**9-30.3(3) Butterfly Valves**  
**(August 1, 2008 COS GSP)**

**Add** the following after the first paragraph:

Valve shafts shall be constructed of 18-8 Type 304 stainless steel or protected with 18-8 Type 304 stainless steel journals.

The valve mating seat shall be constructed of 18-8 Type 304 stainless steel.

Valve ends shall be mechanical joint conforming to ANSI/AWWA C111/A21.11 or as specified on the Plans and Specifications.

The vendor and/or Contractor shall furnish the City of Spokane an affidavit of compliance that the valves furnished comply with, or exceed the applicable provisions of these Specifications as well as those of the ANSI/AWWA C504 (latest revision).

**9-30.3(4) Valve Boxes**  
**(August 1, 2008 COS GSP)**

**Add** the following before the first paragraph:

Cast iron valve boxes shall be Spokane Rich Model 930 or approved equal, manufactured as detailed on the COS Standard Plans in the 'Y' series.

**Add** the following new Sections:

**9-30.3(100) Frames and Covers for Valve Chambers**  
**(August 1, 2008 COS GSP)**

**9-30.3(100)A Cast Iron Frames and Covers**  
**(August 1, 2008 COS GSP)**

Cast iron frames and covers shall conform to the Standard Plans and shall be marked "WATER" as specified on the Standard Plans. Castings shall conform to the requirements of ASTM A48, Class 30 and shall be free of porosity, shrink cavities, cold shuts, or cracks, or any surface defects which would impair serviceability. Repair of defects by welding or by the use of "smooth-on", or similar material will not be permitted. The manufacturer shall provide test bars per ASTM A 48 for all orders of 200 or more units when called for in the Special Provisions.

When lock type castings are called for, the locking device shall be such that the cover may be readily released from the ring, and all movable parts shall be made of noncorrosive metals and otherwise arranged to avoid possible binding.

Ductile iron covers, when specified, shall conform to ASTM A 536, Grade 80-55-06.

**9-30.3(100)B Machine Surfaces**  
**(August 1, 2008 COS GSP)**

The horizontal seating surface and inside vertical recessed face of the frame, and the horizontal seating and vertical outside edge of the cover shall be machine finished to the tolerances shown on the Standard Plans. At the request of the Owner, there shall be made available at the foundry standard rings and standard covers for use by Inspectors in testing fit and seating.

When specified, a groove shall be machined in the edge of the cover to retain a rubber gasket as shown on the Standard Plans.

**9-30.3(100)C Identification**  
**(August 1, 2008 COS GSP)**

Valve chamber frames and covers shall be identified by the name or symbol of the manufacturer. This identification shall be in a plainly visible location when the frame and cover is installed. In addition to the manufacturer's identification, when ductile iron is specified, the material shall be identified by the following: "NOD" or "DUC" for nodular or ductile iron respectively. The manufacturer's identification and the material identification shall be adjacent to each other and shall be minimum 1/2-inch letters recessed to be flush with the adjacent surfaces.

**9-30.3(100)D      Mortar**  
**(August 1, 2008 COS GSP)**

Portland cement mortar shall be 1 part Portland cement to not less than 1-1/2 parts nor more than 3 parts of plaster sand, mixed with the least amount of water necessary to provide a workable mix. Dehydrated lime in an amount not exceeding 50 percent of the Portland cement by weight, may be added to the mix at the option of the Contractor.

**9-30.5                      Hydrants**  
**(January 23, 2017 COS GSP)**

**Replace** this Section in its entirety with the following:

Fire hydrants shall conform to AWWA C502-94, or latest revision thereof, and the Standard for Dry-Barrel Fire Hydrants. Fire hydrants shall meet or exceed AWWA C502 standards. Fire hydrant pattern shall be approved by the City of Spokane.

The fire hydrant shall be designed and manufactured such that the valve seat can be replaced without excavation.

The fire hydrant shoe (hydrant bottom section containing the hydrant main valve seat assembly) shall be ductile iron with epoxy coating (**NOTE:** Cast iron is not acceptable).

The bury depth plate shall be stainless steel and specify the following depths:

- 5.0 ft.
- 5.5 ft.
- 6.0 ft.

The bury plate shall be bolted to the bonnet or ground flange.

The fire hydrant bonnet shall include a self-oiling system. The self-oiling system shall include an oil reservoir and an oil fill plug. The oil fill plug shall allow for visual verification of the oil level.

"Grease" lubricated hydrants are not acceptable. Hydrants shall be equipped with hose port and steamer port cap chains.

The following fire hydrants are approved for use by the City of Spokane:

- Waterous WB-67
- Mueller Super Centurion 250
- Kennedy K-81D

Hydrants shall be painted in accordance to AWWA C502, Section 4.2.

One primer coat shall be applied to hydrant surfaces above the finished ground line.

The primer shall meet or exceed the requirements of Federal Specification TT-C-491 b.

The primer coat shall be applied prior to the application of the finish coat of paint.

The finish coat of paint applied above the finished ground line shall have a minimum wet film thickness of 4.0 mils.

All oil, grease and contaminants shall be cleaned from all surfaces prior to applying primer and finish coats.

The finish coat shall be Yellow Enamel.

**9-30.5(1) End Connections**  
**(August 1, 2008 COS GSP)**

**Replace** this Section in its entirety with the following:

The end connection shall be mechanical joint conforming to AWWA C-110 and C-111.

**9-30.5(2) Hydrant Dimensions**  
**(February 25, 2016 COS GSP)**

**Replace** this Section in its entirety with the following:

The dimensions and details of the hydrant and nozzles, unless otherwise noted, shall be as follows:

1. Working pressure shall be 250 PSI.
2. Hydrant connection pipes shall be 6-inch inside diameter, ductile iron mechanical joint pipe.
3. Main valve seat: only fire hydrants with a compression type main valve that closes with water pressure will be accepted. The design shall allow for all of the operating parts, including the valve seat to be removed through the barrel without excavation. The minimum diameter opening shall be 5 1/4-inch. Main valve seats shall be threaded type. Leaded-in valve seats are not acceptable.
4. Hydrants shall have two 2 1/2-inch nozzles and one 4 1/2-inch nozzle. Nozzles shall be threaded-in type or 1/4 turn O-ring with lock.

All threads shall be National Standard type.

5. Hydrants shall be suitable for 5-foot, 5 1/2-foot, and 6-foot bury (as specified) and equipped with ground line safety flange.
6. There shall be a minimum of 18-inches between the center of the pumper nozzle nut and the ground line.
7. There shall be a minimum of 34-inches between the ground line and the top of the operating nut.
8. Hydrants shall have a ductile iron shoe with epoxy coating.
9. Hydrants shall open left (COUNTER CLOCKWISE).
10. Hydrants shall have national standard stems and caps meeting the following:
  - a. Pattern of nut: pentagon.
  - b. Height of nut: 1-inch minimum.
  - c. Size: 1 1/2-inch at the base, 1 7/16-inch at the top, faces to be tapered uniformly.
11. Hydrants shall be equipped with hose port and streamer port cap chains attached to the nozzle section.
12. Hydrants shall have O-ring stuffing boxes.
13. Storz fitting:
  - a. Harrington Model – Storz 125 – 5-inch or equal.
  - b. 1/4 turn hydrant streamer port adapter.
  - c. 5-inch Storz X 4.5-inch female thread.
  - d. National hose thread 4.5-inch to match the existing pattern.
  - e. Storz blind cap with cable.
  - f. Two lock screws to hydrant nozzle for theft protection.

#### **9-30.6 Water Service Connections (2 inches and Smaller)**

##### **9-30.6(1) Saddles** **(August 1, 2008 COS GSP)**

**Replace** this Section in its entirety with the following:

Saddles shall be ductile iron, bronze, or stainless steel.

Saddles used for 3/4-inch, 1-inch, 1 1/2-inch, and 2-inch services shall be double strap and shall be female iron pipe thread outlet.

##### **9-30.6(3) Service Pipes**

##### **9-30.6(3)C PEX-a Tubing** **(April 1, 2008 COS GSP)**

**Delete** this Section in its entirety.

##### **9-30.6(4) Service Fittings** **(April 1, 2008 COS GSP)**

**Delete** the last sentence in this Section.

## **SECTION 9-33 CONSTRUCTION GEOSYNTHETIC**

### **9-33.4 Geosynthetic Material Approval and Acceptance**

#### **9-33.4(1) Geosynthetic Material Approval** **(January 1, 2020 COS GSP)**

**Supplement** this Section with the following:

When geotextile is not identified as nonwoven or woven in the COS Standard Drawings, project drawings, or individual specifications, the geosynthetic shall be woven, moderate survivability per Section 9-33.2(1).

## **SECTION 9-34 PAVEMENT MARKING MATERIAL**

### **9-34.3 Plastic**

#### **9-34.3(2) Type B – Pre-formed Fused Thermoplastic** **(April 1, 2018 COS GSP)**

**Supplement** this Section with the following:

The product shall be on the WSDOT Qualified Products List for both asphalt (ACP) and concrete (PCC) applications.

There shall be no preheating of the road surface to a given temperature for product application.

The top surface of the material shall have regularly spaced indents. These indents shall act as a visual cue during application that the material has reached a molten state, so satisfactory adhesion and proper bead embedment has been achieved and a post-application visual cue that the installation procedures have been followed.

The Contractor shall provide a catalog submittal and the manufacturers installation recommendations for products, even though they are pre-approved.

## **SECTION 9-35 TEMPORARY TRAFFIC CONTROL MATERIALS**

### **9-35.4 Sequential Arrow Signs** **(August 1, 2008 COS GSP)**

**Replace** this Section in its entirety with the following:

The MUTCD requirements are supplemented with the following:

Sequential arrow signs furnished for this project shall be Type B.

The color of the light emitted shall be yellow.

The power source for the sign shall be capable of operating the lamps at their optimum light level for the entire period of operation. The power source will be subject to the approval of the Engineer prior to use.

A control panel, using solid-state circuitry, shall be enclosed in a ventilated, vandal-resistant box. A photoelectric control, with manual override, shall automatically dim the lights during hours of darkness. Arrow panels shall be capable of a minimum of 50 percent dimming from their rated lamp voltage.

**Add** the following new Section:

## **SECTION 9-90 CHANNELIZING DEVICES**

### **9-100.1 Materials**

**(April 2, 2018 COS GSP)**

Plastic tubular post shall be consistent in color throughout, be round in cross section, 2-inches to 3-inches nominal outside diameter and maintain a standard diameter for its entire length.

Reflectorized banding shall be in accordance with COS Standard Plans in the 'G' series for channelization. Each reflectorized band shall be attached to the plastic tubular post by means of a manufacturer applied all-weather, pre-coated, self-adhesive glue approved for the type of plastic tubular post material.

#### **Surface Mount Base**

Surface Mounted Bases shall be a partial sphere in shape; be made of high impact rubber or plastic material, that is of a color that does not conflict with Manual on Uniform Traffic Control Devices (MUTCD) pavement marking requirements and is consistent throughout; be 8-inches nominal diameter where the bottom of the base mount comes into contact with the surface being applied to; attach to the plastic tubular post by a reusable mechanical means, which is capable of maintaining this attachment as a result of vehicle strikes to the plastic tubular post, and have a bottom (i.e. that portion of the base mount that is in contact with the surface it is being applied to) that is relatively flat and be "egg crated" so as to be able to readily accept and hold a mounting material within the "egg crate" voids.

Base Adhesive shall consist of a solid thermoplastic adhesive system requiring no mixing or blending. It shall be composed wholly of a mixture of synthetic thermoplastic resinous binder materials with appropriate extenders, plasticizers, and other adhesives. None of the primary ingredients in the adhesive system shall be crude oil distillates.

#### **Island Embedded Base**

Bases embedded in Islands shall consist of a round metal anchor 8" long securely embedded in the island concrete according to the COS Standard Plans 'G' Series and the manufacturer's recommendations.

#### Reactive Base

Reactive bases shall contain a reactive spring assembly that allows the post to rebound to the upright position after being struck.

#### Threaded Base

Threaded bases shall consist of a 1.9" diameter by 2" tall embedded threaded sleeve and removable anchor cup plug and channelizers with a threaded metal base that directly screws into the threaded anchor sleeve.

Threaded base channelizers shall consist of a round thermo-plastic polyurethane tube and polyurethane cap with 0.125" walls and a 3.15" (minimum) outside diameter. The tube shall have a permanently bonded threaded base with a minimum of 6 complete threads showing for insertion to the anchor cup.