Washington State Department of Transportation

Design-Build Contract

Technical Requirements

Washington State Department of Transportation

SR 9/SR 92 Intersection Improvements

Request for Proposal

September 6, 2011

Washington State Department of Transportation

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2.1 GENERAL INFORMATION

2.1.1 GENERAL

Design-Build Flexibility – WSDOT intends to allow the Design-Builder flexibility in design and construction by accommodating the processes, procedures, and innovative techniques that are preferred by the Design-Builder, as long as they are consistent with the Basic Configuration, site conditions, good engineering practices, WSDOT standard practices, and the standards, guidelines, and procedures identified in the Contract.

Other Agencies – WSDOT reviewed the Project with public and private agencies, and incorporated some of the feedback from those agencies into these Technical Requirements and Appendices. WSDOT does not guarantee that the agencies will not impose additional requirements after completion of their review of the Design-Builder's design, or that additional feedback from the agencies will not be incorporated. All contact with the City of Marysville , the City of Lake Stevens, and Snohomish County shall be coordinated through the WSDOT Engineer.

The Design-Builder shall promptly notify WSDOT of any additional agency requirements. The Design-Builder and WSDOT shall coordinate all negotiations with the appropriate agencies.

2.1.1.1 SCOPE

The Design-Builder shall conduct all Work necessary to deliver or construct the Project, unless the Work is specified to be performed by WSDOT or by others. Quality Control and Quality Assurance processes shall apply to all aspects of the Work, including but not limited to, design, construction, environmental compliance, maintenance of traffic, public involvement, utilities, and control of materials. These processes shall be outlined in the Quality Management Plan.

2.1.1.2 DEFINITIONS

The following capitalized terms shall have the following meanings:

Appendix (Appendices) - Where referred to in the RFP (without other reference), the term Appendix (Appendices) refers to the documents listed in Appendix A1.

Forward Compatible - Project elements that are constructed so that they can be integrated into a future project constructed by the City of Marysville that includes a fourth leg without significant demolition or significant reconstruction of the elements. A Forward Compatible Channelization Plan is included in Appendix M1. The Design-Builder shall demonstrate with engineering plans and calculations how the Project elements can be integrated into the Forward Compatible Channelization Plan.

Forward Compatibility - The degree in which elements are Forward Compatible.

Project - SR 9/SR 92 Intersection Improvement Project.

Review and Comment - The process for reviewing and commenting on the Design-Builder's submittals in accordance with the Design-Builder's responsibility for Work. See Section 1-07 of the General Provisions.

2.1.1.3 UNITS OF MEASUREMENT

The Project shall be designed, constructed, and documented in English units of measure.

2.1.1.4 PURPOSE

The purpose of the Project is to reduce congestion, improve traffic operations, and reduce the number and severity of accidents at the SR 9/SR 92 intersection while ensuring forward compatibility with the future City of Marysville project. A Forward Compatible Channelization Plan is included in Appendix M1.

2.1.1.5 PROJECT DESCRIPTION

This project will improve the SR 9/SR 92 intersection at SR 9 MP 17.49 by widening the roadway to accommodate the addition of a SB through lane and SB left turn lane on SR 9, and a drop lane and left turn lane on SR 92. In addition, roadway widening will accommodate a bus stop in each direction on SR 9, and the existing right turn lanes on both SR 9 and SR 92 will be extended. See Conceptual Channelization Plan in Appendix M1. The roadway widening will also accommodate the future City of Marysville project that includes the addition of a fourth leg. See Forward Compatible Channelization Plan in Appendix M1.

Work will also include but is not limited to clearing and grubbing, grading, roadway excavation, drainage improvements, paving, permanent signing, illumination, signals with ITS components, pavement markings, wall construction, construction of water quality/quantity facilities, and guardrail installation.

2.1.1.6 PROJECT GOALS

For Project Goals, refer to the Contract and Instructions to Proposers.

2.1.1.7 COORDINATION WITH OTHER PROJECTS

The Design-Builder shall coordinate the Work for the Project with others; with other WSDOT projects; and in accordance with the General Provisions. The following projects could occur within the immediate vicinity of, or at the same time as, the Project:

- Future City of Marysville Final Configuration that includes a planned Fourth leg as shown in the Forward Compatible Channelization Plan.
- Other projects in the vicinity.

2.1.1.8 IMPACT AREA LINE

The Impact Area Line depicted in the Impact Area Plans, was established to quantify environmental impacts and corresponding mitigation ratios. The Impact Area Plans are located in Appendix M1. The portions of the Permanent Impact Area Lines that cut through Environmentally Sensitive Areas (wetlands, wetland buffers, streams, stream buffers, rivers, river buffers, riparian areas, or specified tree areas) are elements of the Basic Configuration. The Design-Builder is further limited by the total disturbed (clear and grub) acreage.

The disturbed acreage is defined as the area between the existing edge of pavement and the Impact Area Line. The total disturbed area acreage for the Project shall not exceed 3.9 acres.

2.1.2 COMMUNICATIONS

2.1.2.1 PUBLIC INFORMATION

The Design-Builder shall establish and implement a Public Information Plan, which shall describe the proposed methodology for maintaining a consistent level of communication with the public, elected officials, emergency services, community leaders, tribal leadership, and the news media. This Plan shall encourage broad public awareness and understanding of the Project. Refer to Section 2.9 for additional requirements.

2.1.2.2 MEETINGS AND COORDINATION

2.1.2.2.1 All Meetings

The Design-Builder shall develop all meeting agendas and provide all meeting facilities. Agendas shall be sent to invitees prior to meetings.

The Design-Builder shall record minutes of each meeting and distribute copies to WSDOT attendees within seven Calendar Days of the meeting for review and comment. WSDOT will return comments to the Design-Builder within seven Calendar Days of receipt of meeting minutes, and the Design-Builder shall finalize minutes within seven Calendar Days of receiving WSDOT comments.

2.1.2.2.2 Task Force Meetings

The Design-Builder is encouraged to maintain close communication with WSDOT throughout the design and construction of the Project. It is anticipated that this close communication will expedite Project reviews; facilitate the incorporation of innovative project solutions; and facilitate Final Acceptance of the Project.

On previous projects, WSDOT has found task force meetings between the Design-Builder and WSDOT to be an effective method of communication. Task force meetings are particularly effective when they are established for each design discipline; when they commence prior to starting design; and when they continue at regular intervals throughout the design. Task force meetings are required for specific disciplines as noted in these Technical Requirements. Should the Design-Builder choose to hold task force meetings for other disciplines, WSDOT will be available on a weekly basis to attend them.

2.1.2.2.3 Environmental Meetings

2.1.2.2.3.1 *Weekly Environmental Coordination Meetings*

The Design-Builder's Environmental Compliance Manager (ECM) shall organize and implement weekly meetings during design and construction to ensure that the Project design meets the Project environmental commitments, and to identify which construction elements such as locations, work activities, weather conditions, and times of day present the greatest risk to the environment. In addition, the ECM shall review Best Management Practices at these meetings, to avoid and minimize risk. WSDOT shall be invited to attend these meetings. The ECM shall use the commitments database (see Section 2.8) and the construction schedules to identify environmental commitments pertaining to upcoming work activities.

2.1.2.2.3.2 ***Environmental Pre-Construction Meeting***

The Design-Builder shall organize and participate in an environmental pre-construction meeting with WSDOT and the regulatory agencies 14 Calendar Days prior to the start of construction. During the environmental pre-construction meeting, the Design-Builder shall discuss its Environmental Compliance Plan, including its environmental training program, to demonstrate how the Design-Builder shall meet permit conditions and fulfill environmental commitments. The Design-Builder shall discuss its construction schedule and identify the early construction elements.

2.1.2.2.4 Orientation Meetings

Prior to commencement of construction, an orientation meeting shall be held between the Design-Builder and WSDOT to address documentation requirements. The Design-Builder shall be responsible for obtaining, maintaining, and reviewing all documents and records required in the Contract for compliance with the Contract requirements.

2.1.2.2.5 Notification

When the Contract requires that a notification be sent to WSDOT, the Design-Builder shall send an email to the WSDOT Engineer.

2.1.2.2.5.1 ***Pre-Contract Meeting***

As soon as practicable, but not more than 30 Calendar Days after Notice to Proceed, the Design-Builder shall schedule a pre-contract meeting with the WSDOT Engineer to discuss the Project, and to exchange information as described in Section 1-2.1C of the WSDOT *Construction Manual* (M41-01) (Appendix D2). Additional topics relevant to the design phase, as identified by the Design-Builder, shall also be discussed at this meeting.

2.1.2.3 SUBCONTRACTS

2.1.2.3.1 General

The Design-Builder shall incorporate the provisions specified in Section 1-08 of the General Provisions into each subcontract.

2.1.2.3.2 Communication

The Design-Builder shall require all subcontractors, suppliers, and other individuals or entities performing or furnishing any of the Work to formally communicate with WSDOT through the Design-Builder only.

2.1.2.3.3 Coordination

The Design-Builder shall accept sole responsibility for scheduling and coordinating the Work of subcontractors, suppliers, and other individuals or entities performing or furnishing any of the Work under direct or indirect contract with the Design-Builder.

The Design-Builder shall accept sole responsibility for the environmental performance of all subcontractors on the Project. The Design-Builder remains the sole responsible party for all environmental compliance and commitments, and should structure their subcontractor agreements such that compliance by their subcontractors is assured.

2.1.2.4 INTENTIONALLY OMITTED

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2.1.3 PROJECT DOCUMENTATION

2.1.3.1 GENERAL

The Design-Builder shall accept sole responsibility for the documentation of all Work activities.

The Design-Builder shall maintain, in good order, in a secure and protected place at the Project Site, one record copy of all drawings, specifications, addenda, written amendments, change orders, change directives, field orders, and written interpretations and clarifications required for the Work. The Design-Builder shall annotate the record documents to show changes made during construction. The Design-Builder shall make these record documents, together with all approved samples and approved shop drawings available to WSDOT for reference.

2.1.3.1.1 Format

The Design-Builder shall maintain all files indicated in this Section in electronic media and hard copies.

2.1.3.1.2 Communications Distribution

At a minimum, the Design-Builder shall prepare and circulate to WSDOT and meeting attendees, hard copies and electronic files of all correspondence, minutes of meetings, and other documents developed as a result of any and all communications with the following:

- WSDOT;
- Utility Owners;
- Communities;
- Agencies; and
- The general public.

The Design-Builder shall accept sole responsibility for ensuring that all communications are distributed to the appropriate parties.

2.1.3.1.3 Electronic Files

2.1.3.1.3.1 *Backups*

The Design-Builder shall backup all electronic files that have been revised every Calendar Day; backup all electronic files every week; and store all backup media in a secure off-site area in accordance with this Section.

2.1.3.1.3.2 *Data Backup and Recovery*

The Design-Builder shall develop and implement data security and a backup and recovery plan for Project information maintained by the Design-Builder.

2.1.3.2 DESIGN DOCUMENTATION

2.1.3.2.1 Communication and Submittal Documentation

Throughout the course of the Project, the Design-Builder shall maintain in the Design-Builder's construction office and make available for WSDOT review, at a minimum, one complete set of the following documents:

- Contract;
- Calculations;
- Reports;
- Studies and investigations;
- Preliminary Design Submittal and Final Design Submittal documents;
- Released for Construction (RFC) Documents and revised RFC Documents;
- Communications;
- Minutes of meetings;
- Review comments and responses;
- Permits and other environmental agreements; and
- Easement agreements.

2.1.3.3 CONSTRUCTION DOCUMENTATION

2.1.3.3.1 Communication and Submittal Documentation

Throughout the course of the Project, the Design-Builder shall maintain in the Design-Builder's construction office and make available for WSDOT review, at a minimum, one complete set of orderly hard copy files that include the following documents:

- Subcontracts;
- Change orders;
- Shop drawings;
- Pay invoices;
- Field directive changes;
- Claims;
- Calculations;
- Reports; and
- Tests.

Throughout the course of the Project, the Design-Builder shall maintain in the Design-Builder's construction office and make available for WSDOT review, at a minimum, two complete sets of orderly hard copy files that include the RFC Documents.

2.1.3.4 DOCUMENT CONTROL REQUIREMENTS

2.1.3.4.1 General

Document control is an integral part of WSDOT's proactive project management process for all WSDOT projects. The Design-Builder shall use an electronic Document Control

System (DCS) to track and manage all Project documentation. The DCS shall ensure that all incoming and outgoing Project documentation is electronically and physically accounted for and filed.

WSDOT uses Primavera Expedition for document control processes and procedures. The Design-Builder shall work with WSDOT to ensure that the WSDOT and Design-Builder systems and processes are compatible. The Design-Builder's DCS shall be subject to WSDOT Review and Comment.

The Design-Builder shall establish and maintain a collaborative Web site DCS, accessible to both the Design-Builder and to WSDOT from the construction office and remote locations, to exchange, organize, list, store, record, and track correspondence, drawings, technical reports, specifications, submittals, calculations, control of materials, Inspector Daily Reports, meeting minutes, administrative, and other Project documents. The Design-Builder shall also establish document routing, filing, control, and retrieval methods that are compatible with WSDOT's DCS. Document control, storage, and retrieval methods shall include the use of both hard copies and electronic records. The Design-Builder's DCS shall manage all of the documents. The Design-Builder's DCS shall be established and operational prior to the first design submittal to WSDOT, and no later than 30 Calendar Days after Notice to Proceed.

The Design-Builder shall provide training and system support to all WSDOT employees and WSDOT representatives who require access to the collaborative Web site DCS, including all reviewers of Project documents. If applicable, the Design-Builder shall provide all licenses for WSDOT use.

2.1.3.4.2 File Format

Graphics shall be submitted in TIF, GIF, JPG, or PDF file formats (compressed image formats only). These formats are intended for photos, conceptual sketches, and other uses.

Data files contained in a database or a spreadsheet shall be in one of the following formats:

- Microsoft Access;
- Microsoft SQL; or
- Microsoft Excel.

All links between non-graphical data and graphic elements; relationships between database tables; and report formats shall be maintained. All database tables shall conform to the structure and file naming guidance provided by WSDOT. The Design-Builder shall provide the database file in the preferred file format as directed by the WSDOT Engineer.

Any documents such as reports, photographs, and manuals that use a variety of software packages and file formats shall be submitted as PDFs (version 9.0 or later), in addition to being submitted in the base file format.

2.1.3.4.3 Submittals

2.1.3.4.3.1 ***Work Plan***

The Design-Builder shall submit a Document Control Work Plan within 30 Calendar Days of Notice to Proceed or prior to the first design submittal, whichever occurs first. This Plan shall include the following:

- File structure and numbering;

- Flow charts depicting the routing and processing of documents;
- Persons involved and their responsibilities;
- The handling and filing of hard copy documents;
- Incorporation of electronic documents into the system;
- DCS backup and recovery; and
- Submittal log in DCS.

2.1.3.4.3.2 ***Format***

All documents sent to WSDOT shall contain the following information at the top or on the first page of the document being sent:

- WSDOT project name and contract number;
- Document type, such as Letter, Letter of Transmittal, Deliverable, and Submittal; and
- Document number, unique for the type of document. If any revisions are made to the original document, the same unique number shall be used with a revision number added.

At a minimum, all submittals shall include one hard copy and one electronic copy. Unless otherwise specified, the Design-Builder shall send the original hard copy as well as a PDF of the document. WSDOT may also require the Design-Builder to send the file in other formats as requested by the WSDOT Engineer.

2.1.3.4.3.3 ***Project Completion***

Prior to Physical Completion of the Project, the Design-Builder shall deliver to WSDOT a full and complete backup of the DCS. This backup shall include all documents in electronic format. The Design-Builder shall also deliver a copy of the DCS software in the version that the electronic documents and databases were created in.

The Design-Builder shall provide a final file structure and index for the electronic archived documents. Written instructions and procedures for use of the Design-Builder's software pertaining to the archived documents shall also be provided.

2.1.4 SOFTWARE

2.1.4.1 GENERAL

The Design-Builder shall acquire, use, and maintain all software for the Project.

Version – The Design-Builder shall use the current version of the specified software in effect as of Notice to Proceed, unless otherwise specified in this Section.

Updates – The Design-Builder shall update software programs throughout the Contract within six months of release of a software update, or earlier, if mutually agreed upon with WSDOT. WSDOT will similarly update its software.

File Server – The Design-Builder shall store all data files for the software programs on, or have them accessible through, the Design-Builder's central file server.

2.1.4.1.1 Required Project Software

The Design-Builder shall submit all design documentation, whether it is in process, final, or as-built, to WSDOT as hard copies and electronic files on CDROMs. CDROMs shall be labeled using permanent marker. The Design-Builder shall not use tape to label CDROMs.

In addition to any other software specified in the Contract, the Design-Builder shall use the following software programs:

2.1.4.1.1.1 ***Roadway***

InRoads (by Bentley) – Same version WSDOT is using at Notice to Proceed.

2.1.4.1.1.2 ***Structures***

Refer to Section 2.13 for load rating software format.

2.1.4.1.1.3 ***Illumination, Traffic Signals, and Intelligent Transportation System***

Refer to Sections 2.16, 2.17, and 2.18.

2.1.4.1.1.4 ***Signing, Traffic Operations, and Maintenance of Traffic***

Refer to Sections 2.19, 2.21, and 2.22.

2.1.4.1.1.5 ***Drainage***

Refer to Section 2.14.

2.1.4.1.1.6 ***CADD Files***

MicroStation (by Bentley) – The same version WSDOT is using at Notice to Proceed.

2.1.4.1.1.7 ***Word Processing and Spreadsheets***

The Design-Builder shall use the following software:

- Microsoft Word for word processing;
- Microsoft Excel for spreadsheets; and
- Microsoft Access for databases.

End of Section

2.2 MANDATORY STANDARDS

Certain sections of this RFP list mandatory manuals and/or publications that the Design-Builder shall use for the design and construction described in those sections. The Design-Builder shall use the current mandatory manuals and/or publications as of the RFP issue date (September 6, 2011).

If there are updates to the mandatory manuals and/or publications between the RFP issue date and 14 Calendar Days prior to the Proposal Due Date, WSDOT may issue Addendums to the RFP to account for those updates.

If there are updates to the mandatory manuals and/or publications after 14 Calendar Days prior to the Proposal Due Date, or at any time during the time of the Contract, that will affect the design criteria or construction requirements, Section 1-04 of the General Provisions will be enforced.

End of Section

2.3 STATE TAXES

Section 1-07.2(1) shall apply to all work on SR 9 that are north of MP 17.49.

Section 1-07.2(2) shall apply to all work on SR 9 that are south of MP 17.49 and to all work on SR 92.

End of Section

2.5 SURVEYS AND MAPPING

2.5.1 GENERAL

The Design-Builder shall conduct /all Work necessary to complete the land surveying and survey mapping for the Project. This Work includes, but is not limited to, survey control data, secondary horizontal and vertical control surveys, topographic surveys, Right of Way surveys, bridge surveys utility surveys, design surveys, construction surveys, as-built surveys, records of surveys, permits to destroy and remove monuments, Land Corner Records, and all other land surveying services necessary to complete the Project.

2.5.2 MANDATORY STANDARDS

The following is a list of publications that shall be used for all design and construction. They are listed in hierarchical order, with the most important appearing at the top of the list. This is not a comprehensive list; other applicable publications may be required to complete the design and construction. If the Design-Builder becomes aware of any ambiguities or conflicts relating in any way to the Mandatory Standards, the Design-Builder shall notify WSDOT immediately, so that WSDOT may resolve them.

The meaning of words and terms used in this Section and not otherwise defined in the Contract shall be as listed in the current edition of *Definitions of Surveying and Associated Terms*, published by the American Congress on Surveying and Mapping, and the American Society of Civil Engineers.

- Special Provisions (Appendix B2).
- Amendments to the Standard Specifications (Appendix B1).
- Standard Specifications (M41-10) (Appendix D18).
- WSDOT *Highway Surveying Manual* (M22-97) (Appendix D24).
- WSDOT *Design Manual* (M22-01) (DM) (Appendix D3).
- WSDOT *Plans Preparation Manual* (M22-31) (PPM) (Appendix D12).
- Standard Plans (M21-01) (Appendix D17).

2.5.2.1 REFERENCE DOCUMENTS

Refer to the Right of Way sheets in Appendix R1 and Record of Survey in Appendix R2 for control points for SR 9 and SR 92 alignments.

Existing primary control monumentation established by WSDOT, and primary and secondary control monuments established for WSDOT by others are for informational purposes only. Existing WSDOT geodetic primary survey monumentation can be found at the following Web site:

www.wsdot.wa.gov/monument.

2.5.3 PERFORMANCE REQUIREMENTS

2.5.3.1 GENERAL

The Design-Builder is solely responsible for the accuracy of content and completeness of all survey information used in the design and construction of the Project.

The Design-Builder shall verify and confirm the location, accuracy, and datum of all survey data and survey information, regardless of the source. The Design-Builder shall document its verification of all of the data in accordance with the QMP requirements in Section 2.28. WSDOT does not warrant the accuracy of the survey information provided in the RFP except as described in this Section. Any discrepancies between the survey data and the survey information provided by WSDOT shall be brought to WSDOT's attention for resolution.

Horizontal control is based on the North American Datum of 1983, adjusted in 1991. Vertical control is based on North American Vertical Datum of 1988 (NAVD 88) and as specified as < 0.005M (± linear uncertainty).

All field survey work, design and construction shall be done in Project ground datum. The conversion to Project datum shall be completed according to the WSDOT *Highway Surveying Manual*. Any conversion from Metric to English shall use the U.S. Survey foot definition: 1 meter = 39.37 inches exactly.

2.5.3.2 SURVEY MANAGER

The Design-Builder shall designate a Survey Manager for the Project. The Survey Manager shall be registered as a Professional Land Surveyor in the State of Washington. All survey work shall be prepared by, or under the direct supervision of, the Survey Manager. The Survey Manager shall be the single point of contact for all survey activities.

2.5.4 DESIGN REQUIREMENTS

2.5.4.1 GENERAL

The Design-Builder shall prepare field survey Work, which is suitable for preparation of design documents and Released for Construction Documents, and which meets the technical requirements of WSDOT and the Washington State Board of Registration for Engineers and Land Surveyors.

The Design-Builder shall obtain any permits that may be required prior to beginning field Work (see the WSDOT *Design Manual*, Chapter 1450 for Permits). Preparation of surveys shall conform to requirements referenced in the WSDOT *Highway Surveying Manual* including, but not limited to, procedures, record-keeping requirements, equipment use, and safety precautions.

2.5.5 CONSTRUCTION REQUIREMENTS

2.5.5.1 GENERAL

The Design-Builder shall maintain detailed survey records, including a description of the Work performed on each shift, and the methods and control points used. The records shall include adequate detail to allow the survey to be reproduced; graphic notes depicting

control points used and relationship to other control points or reference points; description; coordinates; and location description. Bench marks and temporary bench marks shall also have graphic notes depicting description, elevation, coordinates, and location description. A data collector printout of the day's activities shall not be considered an acceptable record. When requested, the Survey Manager shall provide a copy of each day's record to WSDOT within five Calendar Days after the end of the shift.

Survey work by the Design-Builder shall include, but is not limited to, the following:

- Verifying survey data furnished by WSDOT;
- Expanding into secondary control by adding stakes and hubs as well as additional permanent survey control needed for the Project; and
- Providing descriptions of permanent secondary control to WSDOT.

All permanent secondary control points shall be shown on a Report of Survey Mark form, similar to WSDOT's form, and shall be tied to the Right of Way centerline alignment labeled on a Post Construction Record of Survey. Permanent secondary control points shall be established in accordance with the WSDOT *Highway Surveying Manual*.

For all types of construction, including but not limited to, walls, bridges, grading, drainage, channelization, pavement markings, illumination, signals, guardrails, barriers and signing, the Design-Builder shall provide staking and layout as necessary to adequately locate, construct, and check the specific construction activity.

Upon request, the Design-Builder shall provide WSDOT with copies of all calculations and staking data prior to staking.

2.5.5.2 MONUMENTATION

2.5.5.2.1 General

Except for WSDOT Geodetic Primary Control monuments, the Design-Builder shall document all WSDOT and governmental monumentation and property corners that will be modified, disturbed, or destroyed during the Contract. The Design-Builder shall follow the procedures as set forth in Chapter 16 of the WSDOT *Highway Surveying Manual* (Appendix D24) relating to the destruction and replacement of monumentation.

2.5.5.2.2 WSDOT Monumentation

The Design-Builder shall note all WSDOT Geodetic and Highway Alignment Monuments found within the Project limits on a Record of Survey. The Design-Builder shall notify WSDOT as soon as possible, but no later than 14 Calendar Days prior to any Work that may cause WSDOT Geodetic or Highway Alignment Monuments to be disturbed or destroyed. WSDOT will determine the monuments to be replaced.

The Design-Builder shall complete all permits required by the Washington State Department of Natural Resources (DNR). WSDOT will submit and process forms to DNR that the Design-Builder submitted to WSDOT, as required by Washington State, for any WSDOT Geodetic or Highway Alignment Monuments that are disturbed, destroyed, or relocated. Before any survey monument is removed or disturbed, an approved DNR Application to Remove or Destroy a Survey Monument, together with an Exhibit Map of all found survey monuments, shall be provided to the WSDOT Engineer. Monuments removed or disturbed prior to submitting an approved Application and Exhibit Map will be replaced by WSDOT at the Design-Builder's cost.

WSDOT will replace any WSDOT Geodetic Monument within the Project that may be disturbed or destroyed other than highway alignment monuments that are denoted as PC, PT, POC, or POT and Right of Way monuments. All Highway alignment monuments are required to be replaced. The Design-Builder shall label all monuments removed, replaced, or set on the Post Construction Record of Survey described in this Section, and a copy shall be sent to DNR to complete the permit process.

The Design-Builder shall work with WSDOT to determine the best location, as near as possible to the original location, so that WSDOT may reset the Geodetic Monument.

Existing property corners within the Project limits that are verified by a recorded document shall be replaced at the intersection of the property line and the new Right of Way line.

2.5.6 SUBMITTALS

2.5.6.1 SURVEY RECORDS AND SUBMITTALS

The Design-Builder shall deliver a hard copy and an electronic file of the survey records to WSDOT within 30 Calendar Days of Substantial Completion, unless an earlier delivery is requested by WSDOT. The electronic file shall follow the format for the software programs provided in Section 2.1.

The Design-Builder shall prepare and submit calculations to WSDOT within 14-Calendar Days after Notice to Proceed for concurrence of Project datum to be used.

2.5.6.2 TRAFFIC CONTROL PLAN SUBMITTAL

The Design-Builder shall prepare a Maintenance of Traffic Plan whenever a survey crew, or a survey crew's vehicle, will be working within any roadway clear zone. Submittal, review, and approval of the Maintenance of Traffic Plan shall be in accordance with Section 2.22.

2.5.6.3 MONUMENTATION SUBMITTAL

The Design-Builder shall submit the monumentation permits that are required for the removal, disturbance, and resetting of monuments to WSDOT 14 Calendar Days prior to any removal, disturbance, or resetting.

2.5.6.4 AS-BUILTS

The Design-Builder shall produce reports documenting the location of the as-built alignments, profiles, drainage structures, utilities, walls, bridges, and placement of the survey control monument. These reports shall include descriptive statements for the survey methods used to determine the as-built location of the feature being surveyed. Where WSDOT has provided data to the Design-Builder in x, y, z coordinate format, the Design-Builder shall provide WSDOT with data in x, y, z coordinate format. Where WSDOT has provided data to the Design-Builder in x, y coordinate format only, or z coordinate format only, the Design-Builder shall provide WSDOT with data in x, y coordinate format only, or z coordinate format only.

All x, y, and z coordinates shall be in State Plane.

The Design-Builder shall provide WSDOT with an as-built survey base map file in State Plane, and in accordance with the format for the software programs provided in Section 2.1.

The Design-Builder shall deliver all as-built survey files to WSDOT within 30 Calendar Days of Substantial Completion of the Project.

2.5.6.5 POST CONSTRUCTION RECORD OF SURVEY

The Design-Builder shall provide WSDOT with a hard copy and an electronic file of the Post Construction Record of Survey. A draft copy shall be submitted to the WSDOT Engineer for review prior to recording with the county where the survey was performed. A mylar hard copy, that includes the county's recording numbers, and an electronic file shall be delivered at the time of Substantial Completion, unless an earlier delivery is requested by WSDOT. The electronic format shall be compatible with WSDOT's format. The Post Construction Record of Survey shall include, but is not limited to, the following:

- All monuments that have been removed by construction activities, with an indication showing if they have been replaced or not.
- All permanent secondary and tertiary horizontal and vertical control points established by the Design-Builder shall be defined by State Plane Coordinates (x, y and z) and by station, and offset to the Right of Way centerline alignment. All permanent control points shall be accompanied by a Report of Survey Mark.
- All monuments, remaining undisturbed and set during this Contract, defined by station and offset to the Right of Way centerline alignment.

End of Section

2.6 GEOTECHNICAL DESIGN

2.6.1 GENERAL

The Design-Builder shall conduct all Work necessary to complete the geotechnical investigation and design for the Project. Elements of the Work shall include, but are not limited to, the following:

- The Design-Builder shall review the existing geotechnical information which includes the Geotechnical Baseline Report, SR 9 SR 92 Intersection Improvements, Washington, prepared by WSDOT NW Region Materials (Appendix G1) for this Project.
- The Design-Builder shall evaluate the requirements of the Work, and perform geotechnical explorations, geotechnical analyses, and laboratory testing sufficient to supplement the existing data. The Design-Builder shall provide geotechnical designs and construction support in accordance with this Section.

2.6.2 MANDATORY STANDARDS

The following is a list of publications that shall be used for all design and construction. They are listed in hierarchical order, with the most important appearing at the top of the list. This is not a comprehensive list; other applicable publications may be required to complete the design and construction. If the Design-Builder becomes aware of any ambiguities or conflicts relating in any way to the Mandatory Standards, the Design-Builder shall notify WSDOT immediately, so that WSDOT may resolve them.

- Special Provisions (Appendix B2).
- Amendments to the Standard Specifications (Appendix B1).
- Standard Specifications (M41-10) (Appendix D18).
- WSDOT *Geotechnical Design Manual* (M46-03) (GDM) (Appendix D5).
- WSDOT *Bridge Design Manual* (M23-50) (BDM) (Appendix D1).
- WSDOT *Design Manual* (M22-01) (DM) (Appendix D3).
- WSDOT *Highway Runoff Manual* (M31-16) (Appendix D6).
- WSDOT *Qualified Products List* (M46-02) (QPL) (Appendix D13).
- WSDOT *Materials Manual* (M46-01) (Appendix D10).
- WSDOT *Construction Manual* (M41-01) (Appendix D2).
- Standard Plans (M21-01) (Appendix D17).
- AASHTO *Manual on Subsurface Investigations*, 1st Edition, 1988.
- AASHTO *Guide Specifications for LRFD Seismic Bridge Design*,1st Edition, 2009.
- AASHTO *LRFD Bridge Design Specifications*, Customary US Units, 4th Edition, with 2008 Interim Revisions.
- AASHTO *Standard Specifications for Transportation Materials and Methods of Sampling and Testing*, 27th Edition and Provisional Standards, 2007.

- AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaries, and Traffic Signals,* 4th Edition, 2001, with 2002, 2003, and 2006 Interims.

2.6.2.1 DESIGN-BUILD MODIFICATIONS TO THE WSDOT GEOTECHNICAL DESIGN MANUAL (GDM)

The GDM was created as an internal design document to be used by the WSDOT foundation engineers and engineering geologists. It was also created as an external design document to be used by consultants and Design-Builders performing geotechnical design on WSDOT projects. The GDM is a mandatory design document to be used on all WSDOT projects. For purposes of design-build projects, when the manual refers to an activity that "shall" be done or that "is" done, the Design-Builder shall assume those activities are mandatory. All references to the Bridge and Structures Office (BO), Geotechnical Division (GD), Structural Designer (ST), Structural Engineer, Project Designer, Geotechnical Engineer, and Geotechnical Designer (GT) shall mean the Design-Builder.

No changes have been made to provisions in the GDM that do not apply to design-build contracts, (e.g., descriptions of WSDOT divisions and their duties, descriptions of legal authority, or descriptions of internal WSDOT procedures or policies); however, in some cases it may not be clear whether rights or responsibilities in the GDM are applicable to the Design-Builder. If it is unclear whether specific provisions in the GDM are applicable to the Design-Builder, the Design-Builder shall raise the issue with WSDOT and WSDOT shall make that determination at its sole discretion. WSDOT has identified the following provisions of the GDM that are not applicable to design-build contracts:

- Section 1.2.2; Geotechnical Function Delegated to the Regions
- Section 1.2.3; Coordination Between HQ and Region Regarding Emergency Response
- Section 1.3; Geotechnical Support within WSDOT Project Management Process
- Section 1.6; Geotechnical Consultant Administration
- Chapter 20; Unstable Slope Management
- Chapter 21; Material Source Investigation and Report
- Chapter 22; Geotechnical Baseline Reports for Design Build Projects

2.6.2.2 HISTORICAL AND RECENT GEOTECHNICAL DATA

Historical records for previous geotechnical studies and related Work along the Project alignment are provided in Appendix G2. This information includes test boring logs, memos, reports,. The Design-Builder shall use this information at the Design-Builder's discretion. WSDOT makes no warranty, either expressed or implied, as to the accuracy of this information.

The recent geotechnical information indexed as "SR9 SR92 Team Borings" is included in the GBR. The soil conditions and groundwater levels provided in the GBR are known only at each specific boring location at the time of the boring. A time history of groundwater levels at 9 specific piezometer locations is included in Appendix G3. Collection of groundwater information from these borings is the responsibility of the Design-Builder from Notice to Proceed to completion of the geotechnical design. When the Design-

Builder determines that the geotechnical design is complete, and the borings can be closed, the Design-Builder shall give notice to WSDOT in accordance with the GDM, so that WSDOT can decommission the borings before any excavation work occurs. The historical and recent geotechnical data (SR 9 SR 92 Borings) are included in Appendices G1, G2 and G3. Drawings designed in MicroStation, which include locations of the geotechnical borings, are also included in these Appendices.

2.6.3 PERFORMANCE REQUIREMENTS

2.6.3.1 PERSONNEL REQUIREMENTS

The Design-Builder shall provide a Geotechnical Group Manager with a minimum of ten years of supervisory experience in geotechnical design and construction support of roadways, bridges, retaining walls, and other highway-related elements. The Geotechnical Group Manager shall have at least five years of experience working in Washington State, and shall be familiar with the AASHTO *LRFD Bridge Design Specifications*. The Geotechnical Group Manager shall be a Professional Engineer, licensed under Title 18 RCW, and shall be responsible for the geotechnical design elements of the Project.

The Design-Builder's personnel responsible for the installation and monitoring of new and existing instrumentation such as inclinometers, piezometers, settlement indicating devices, Standard Penetration Test testing, and Becker Hammer testing, shall have a minimum of two years experience with the specific type of instrumentation they will be operating.

2.6.3.2 SUBSURFACE INVESTIGATION PLAN (SIP)

The Design-Builder shall create a Subsurface Investigation Plan (SIP) to supplement information provided in the GBR. Additional explorations (as determined necessary by the Design-Builder and to meet mandatory standards) shall occur along the alignment of planned retaining walls; and at significant cuts and fills, noise walls, culverts, signs, signals, and stormwater treatment detention and infiltration facilities.

The investigation shall be conducted in accordance with the GDM. The Design-Builder shall determine the specific locations, frequency, and scope of the SIP. The Design-Builder shall perform geotechnical investigations at locations of stormwater infiltration, treatment detention ponds, wetlands, infiltration ditches, and structures as specified in the WSDOT *Highway Runoff Manual*.

The investigation shall be conducted in accordance with all environmental permits. The Design-Builder shall refer to Section 2.8 for acquiring environmental permits or modifications to existing permits needed to complete the SIP. The permit application process may be time-consuming, and the Design-Builder shall adjust the SIP schedule for any time delays due to the application process.

The SIP shall be submitted to WSDOT for Review and Comment prior to commencement of any earthwork or excavation. This submittal shall include the number and depths of the proposed borings/cone penetration tests and other field investigations, and the proposed sampling and testing necessary to meet the minimum requirements of the Project. Instrumentation such as piezometers and slope inclinometers to be used for design and construction monitoring purposes shall also be included in the Geotechnical Instrumentation Plan (GIP) as described in this Section. The submittal shall also include a Maintenance of Traffic Plan in accordance with Section 2.22 for investigations that are on or adjacent to, active freeway or city streets. The Design-Builder shall secure an access permit from the appropriate agency, if required.

Soil properties shall be determined in accordance with the GDM. Field tests shall be conducted in accordance with appropriate AASHTO and WSDOT standards.

Following completion of exploratory Work, all boring locations shall be surveyed. The survey shall determine station and offset, elevation, and State Plane coordinates, which shall be included on the boring logs. Following drilling and laboratory Work, the Design-Builder shall retain all samples until Final Acceptance, and shall provide such samples to WSDOT, if requested, before Final Acceptance.

2.6.3.3 LABORATORY TESTING REQUIREMENTS

Laboratory testing of soil and groundwater samples shall be conducted in accordance with the GDM and applicable WSDOT and AASHTO testing procedures. Laboratories conducting geotechnical testing shall be either AASHTO accredited for the testing being performed, or fulfill the requirements of AASHTO R18 for qualifying testers and calibrating/verifying of testing equipment for those tests being performed. All test results shall be included in the Design-Builder's Geotechnical Report.

2.6.3.4 GEOTECHNICAL INSTRUMENTATION PLAN (GIP)

The Design-Builder shall develop, implement, and maintain a documented GIP to satisfy design and quality control requirements. The GIP shall be available to WSDOT for review throughout the Project.

The Design-Builder shall install geotechnical instrumentation where necessary to monitor parameters such as the following:

- Settlement and settlement rates of embankments and structures;
- Pore water pressures;
- Groundwater levels;
- Stability of walls and slopes; and
- Ground vibration.

The Design-Builder shall be responsible for all damage caused by construction activities to structures, and existing or proposed public facilities such as utilities, drainage facilities, streets, and highways on or adjacent to the Right of Way.

Damage to structures may be caused by excessive vibrations, embankment-induced settlement, physical impact, and other construction-related activities. Before construction operations which may cause damage to sensitive facilities commences, the Design-Builder shall identify locations of sensitive facilities, zones of influence, instrumentation types, critical readings, and frequency of readings in a Settlement and Vibration Monitoring Plan. For buildings not owned by WSDOT, and other sensitive facilities including private residences, businesses, city streets, and utilities within the Project area, the Design-Builder shall conduct a pre-condition survey. This survey shall include video or photographic documentation of internal and external building walls and foundations. The pre-condition survey and GIP shall be submitted to WSDOT prior to commencement of any construction activity.

Where existing and proposed facilities are to be constructed on settlement-sensitive or soft ground, the Design-Builder shall install instrumentation to monitor settlements of structures, utilities, and other features within the zone of influence of the embankment. For embankments, the zone of influence shall be defined as a zone extending a minimum

horizontal distance from the toe of the embankment, where the horizontal distance is the height of the embankment. For retaining walls, the zone of influence shall be defined as a zone extending from the toe of the footing, to a minimum distance of twice the height of the wall.

Any instruments owned by the Design-Builder that are damaged during construction and require removal and/or recalibration shall be replaced and/or recalibrated by the Design-Builder.

The Design-Builder's Geotechnical Report shall include all instrumentation data collected for design and construction-related purposes.

2.6.3.5 BOREHOLE SITE CLEANUP

Backfilling of borings, test pits, CPT holes, and abandonment of piezometers and inclinometers shall be performed in accordance with the provisions of applicable local, State, or Federal laws and regulations. Borings shall be abandoned in accordance with Washington State Department of Ecology regulations.

The Design-Builder shall backfill all test holes drilled by the Design-Builder in a manner that ensures against subsequent settlement of the backfill and holes that could be hazardous to persons, animals, or equipment. Upon completion of the field investigation Work, the Design-Builder shall remove all surplus material, temporary structures, and debris resulting from the Work performed on land and in water.

2.6.3.6 FIELD LOGS

The field logs shall be prepared in accordance with the requirements of the GDM. Logs of all field explorations shall be included in the Design-Builder’s Geotechnical Report.

2.6.3.7 GEOTECHNICAL ANALYSIS

The Design-Builder shall perform geotechnical engineering and geologic analyses in accordance with the Mandatory Standards. The geotechnical engineering and analyses shall be based on the findings from subsurface investigations and laboratory testing programs; the results of engineering analyses, including information provided in the GBR; and additional geotechnical studies included in Appendix G.

2.6.3.8 GEOTECHNICAL REPORT

The Design-Builder shall prepare a Geotechnical Report in accordance with the GDM that summarizes the results of the field testing; all instrumentation data; laboratory investigation programs; engineering studies; and geotechnical design recommendations, including those provided in the technical memoranda.

2.6.4 DESIGN CRITERIA

The Design-Builder shall perform appropriate design and construction of the Project elements as specified in the GDM and the BDM.

2.6.4.1 INTENTIONALLY OMITTED

2.6.4.2 WALL DESIGN

All retaining walls and wall foundations shall be designed using the LRFD specifications described in the GDM, the BDM, the AASHTO *LRFD Bridge Design Specifications*, and

the AASHTO *Guide Specifications for LRFD Seismic Bridge Design*, except for soil nail walls, Structural Earth (SE) walls, and noise walls. Soil nail walls shall be designed using the Service Load Design (SLD) method as required in the GDM. Noise walls shall be designed using the Load Factor Design method as required in the GDM. SE walls shall be designed using either the SLD method or the LRFD method as required in the GDM.

The Design-Builder shall meet the landscape and aesthetic requirements described in Section 2.15, and the bridges and structures requirements described in Section 2.13.

2.6.4.3 FOUNDATION DESIGN FOR SIGNALS, SIGNS AND LUMINAIRES

All standard foundations for new cantilevered signals, strain poles, cantilevered signs, sign bridges, and luminaries shall be evaluated in accordance with the GDM. The standard foundation designs provided in the Standard Plans shall be used if the minimum applicable soil and slope conditions are present at the site. If soil/rock or ground conditions are marginal, or if nonstandard loadings are present at the site, detailed analyses shall be conducted. Design of these foundation elements shall be performed in accordance with the AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals*.

2.6.5 CONSTRUCTION CRITERIA

2.6.5.1 PERFORMANCE CRITERIA

Criteria for allowable settlement and horizontal deformation of retaining structures, hydraulic structures, and bridge foundations/piers are provided in the GDM and the BDM.

2.6.5.2 SLOPE STABILITY AND PROTECTION

The Design-Builder is responsible for slope stability throughout the Project, both within and adjacent to the Right of Way. If any landslides develop during construction, the Design-Builder shall cease all activities in the immediate area within and around the unstable ground until the situation is fully assessed by the Design-Builder. The Design-Builder shall immediately contact WSDOT informing them of the situation. Before the Design-Builder returns to work in the immediate area of unstable ground, the Design-Builder shall implement temporary slope stabilization measures to ensure the safety of the public and the Design-Builder's personnel. Permanent slope stabilization measures shall be designed and constructed by the Design-Builder. WSDOT will review and comment on the temporary and permanent slope stabilization measures. Where necessary during construction, the Design-Builder shall be required to drain areas of observed or suspected groundwater seepage to avoid the risk of landslide and surface sloughing through the use of gravel drainage blankets, French drains, horizontal drains, and/or placement of a surface rock facing.

2.6.6 SUBMITTALS

2.6.6.1 GENERAL

All submittals shall be submitted in draft form to WSDOT for Review and Comment. Comments submitted by WSDOT shall be addressed by the Design-Builder to the satisfaction of WSDOT.

All geotechnical calculations using commercial spreadsheets or math software shall be checked with hand calculations to verify logic, look-ups, formulae, and calculations.

Certified geotechnical software shall not require this validation. The spreadsheets and/or math software for performing bearing calculations, pile or shaft capacity calculations, settlement, permeability, Standard Penetration Test corrections, liquefaction calculations, or other calculations developed by the Design-Builder shall be submitted in a Calculations Verification Submittal (CVS). Example problems shall be developed by the Design-Builder and the solutions from the spreadsheets and/or math software used to solve the problems shall be validated with hand calculations. All formulae used shall be documented with references (data sources).

The CVS shall be developed during design, and shall be submitted to WSDOT for Review and Comment prior to use on the Project. Multiple CVS submittals shall be permitted, but each one shall be submitted to WSDOT for Review and Comment prior to use on the Project. The Design-Builder shall provide documentation to WSDOT showing that the formulae in the approved spreadsheets and math software cannot be modified or changed without prior Review and Comment from WSDOT. Any modification to the logic, look-ups, formulae, and calculations of an approved program shall be re-submitted to WSDOT for Review and Comment. Final versions of the technical memoranda and the Design-Builder's Geotechnical Report (final report after addressing comments) shall include the stamp of a Professional Engineer, licensed under Title 18 RCW.

2.6.6.2 DESIGN

Project submittals include, but are not limited to, the following:

- Subsurface Investigation Plan;
- Technical Memoranda;
- Geotechnical Instrumentation Plan;
- Settlement and Vibration Monitoring Plan, if applicable;
- Geotechnical Report;
- Calculations Verification Submittal; and
- Pre-Condition Survey.

End of Section

2.7 PAVEMENT

2.7.1 GENERAL

The Design-Builder shall perform all Work necessary to construct the pavement sections for all roadways and driveways, in accordance with the requirements of this Section. The term pavement, or pavement section, shall be defined as the entire pavement structural section, including but not limited to, Hot Mix Asphalt (HMA), Portland Cement Concrete Pavement (PCCP), base, and sub-base material.

Elements of Work shall include, but are not limited to, the following:

- Widening of existing pavement;
- Rehabilitation of HMA pavement including pavement repair, pre-level or plane and overlay

Pavement shall be maintained during construction in accordance with the requirements of Section 2.29. The exact paving limits shall be determined by the Design-Builder. The conceptual paving limits are shown on the Conceptual Channelization Plan and Roadway Sections in the Conceptual Plans (Appendix M1).

2.7.2 MANDATORY STANDARDS

The following is a list of publications that shall be used for pavement construction. They are listed in a hierarchical order, with the most important appearing at the top of the list. This is not a comprehensive list; other applicable publications may be required to complete construction. If the Design-Builder becomes aware of any ambiguities or conflicts relating in any way to the Mandatory Standards, the Design-Builder shall notify WSDOT immediately, so that WSDOT may resolve them.

- Special Provisions (Appendix B2).
- Amendments to the Standard Specifications (Appendix B1).
- Standard Specifications (M41-10) (Appendix D18).
- WSDOT *Materials Manual* (M46-01) (Appendix D10).
- Draft WSDOT *Pavement Policy* – January 2011 (Appendix D26).
- WSDOT *Pavement Surface Condition Rating Manual* (Appendix D11).
- WSDOT *Construction Manual* (M41-01) (Appendix D2).
- FHWA *Guidelines for the Design of Subsurface Drainage Systems for Highway Structural Sections*, 1972 (RD-72-30).
- WSDOT *Design Manual* (M22-01) (DM) (Appendix D3).
- Standard Plans (M21-01) (Appendix D17).
- AASHTO *A Policy on Geometric Design of Highways and Streets*, 5th Edition, 2004.
- AASHTO *LRFD Bridge Design Specifications*, Customary U.S. Units, 4th Edition, with 2008 Interim Revisions.
- AASHTO *Standard Specifications for Highway Bridges*, 17th Edition, 2002.

- WSDOT *Qualified Product List* (M46-02) (QPL) (Appendix D13).
- WSDOT *Plans Preparation Manual* (M22-31) (PPM) (Appendix D12).

2.7.3 PERFORMANCE REQUIREMENTS

2.7.3.1 GENERAL

WSDOT has prepared a report titled SR 9/SR 92 Intersection Improvements - *Pavement Design*, and is located in Appendix G4. This report presents the results of WSDOT's review of the existing roadway section. It also presents the required pavement section depths which shall be used on the Project. These pavement sections are described further in this Section.

The Design-Builder shall construct pavement sections that meet the following performance requirements:

- Provide a pavement that meets or exceeds the pavement smoothness specified in Section 5-04 of the Standard Specifications.
- Provide pavements with no identifiable distress. The Design-Builder shall evaluate the distress parameters on an as-needed basis as determined by WSDOT. If corrective action needs to be taken, the Design-Builder shall coordinate all such activities so as to minimize disruption to traffic.

2.7.3.2 WIDENING OF EXISTING PAVEMENT

The Project requires widening of the pavement to accommodate standard lane and shoulder widths (per WSDOT Design Manual), and the additional auxillary lanes on SR 9 and SR 92 (see the Conceptual Plans for approximate limits to this Work).

Widenings in areas of full depth shoulder (where the HMA depth and the Base depth are equal to or greater than the mainline HMA and Base depths) shall be constructed by sawcutting at least 0.5 feet into the existing full-depth section that the new pavement will abut. The final pavement lift shall be staged with the widening of the existing pavement, which shall be placed as 0.15 foot minimum compacted depths of HMA over the new and existing surfaces.

In areas where the HMA shoulder depth is less than the HMA mainline depth, the widenings shall be constructed by sawcutting at least 0.5 feet into the existing full-depth section that the new pavement will abut.

The Design-Builder may at his option choose to construct any or all widenings at areas of full depth shoulder by sawcutting 0.5 feet into the existing travel lane and constructing the widening to the required depths.

2.7.3.3 RESURFACING PAVEMENT

2.7.3.3.1 Overlay

After completion of the widening all new and existing pavement within the project limits shall be overlaid with a 0.15 foot minimum compacted depth of HMA.

2.7.3.4 ROADWAY SHOULDERS

New shoulders shall be constructed with the same pavement section as the adjacent travel lanes.

2.7.3.5 MISCELLANEOUS PAVEMENT

Any pavement outside of the shoulder shall be considered miscellaneous pavement. All miscellaneous pavement sections on SR 9 and SR 92 shall match the adjacent shoulder, unless otherwise noted in these Technical Requirements.

The Design-Builder shall restore any local streets and sidewalks damaged during construction of the Project to pre-construction condition or better.

2.7.4 DESIGN REQUIREMENTS

2.7.4.1 **SR 9 WIDENING:**

1. The longitudinal joints created between the new and existing pavements should be away from the wheel path, and should be near the middle of, or at the edge of the lane. If the joint falls in the wheel path, the width of lane or shoulder excavation should be increased accordingly to avoid this condition. Joints in the final overlay shall be located at the lane line or edge line.
2. Construct the widening area including the shoulders and bus pullouts with the following pavement section.

    - 0.15’ HMA Class ½ inch, PG 64-22 (final overlay of the entire roadway)
    - 0.30’ HMA Class ½ inch, PG 58-22 over
    - 0.30’ HMA Class ½ inch, PG 58-22 over
    - 0.70’ CSBC
    - 1.45’ Total

3. Transverse butt joints should be provided at the paving limits to accommodate the overlay. These butt joints should taper from a depth of 0.15’ to 0.00 in a length of 75 feet.
4. Prior to placing new HMA on existing pavement crack seal cracks greater than ¼” in accordance with Section 5-04.3(5)C of the *WSDOT 2010 Standard Specifications for Road, Bridge and Municipal Construction.*
5. If new Traffic signal loops are required, they shall be installed prior to the final overlay.
6. Overlay the entire roadway, including the widening and shoulders and bus pullouts, with 0.15’ HMA Class ½”, PG 64-22.

2.7.4.2 **SR 92 WIDENING:**

1. The longitudinal joints created between the new and existing pavements should be away from the wheel path, and should be near the middle of, or at the edge of the lane. If the joint falls in the wheel path, the width of lane or shoulder excavation should be increased accordingly to avoid this

condition. Joints in the final overlay shall be located at the lane line or edge line.

2. Construct the widening area including the shoulders with the following pavement section.
   - 0.15’ HMA Class ½”, PG 64-22 (final overlay of the entire roadway)
   - 0.30’ HMA Class ½”, PG 58-22
   - 0.30’ HMA Class ½”, PG 58-22
   - 0.70’ CSBC
   - 1.45’ Total

3. Transverse butt joints should be provided at the paving limits to accommodate the overlay. These butt joints should taper from a depth of 0.15’ to 0.00 in a length of 75 feet.
4. Prior to placing new HMA on existing pavement crack seal cracks greater than ¼” in accordance with Section 5-04.3(5)C of the *WSDOT 2010 Standard Specifications for Road, Bridge and Municipal Construction.*
5. If new Traffic signal loops are required, they shall be installed prior to the overlay.
6. Overlay the entire roadway, including the widening and shoulders, with 0.15’ HMA Class ½”, PG 64-22.

2.7.4.3 **DRIVEWAYS:**

If any driveways require construction as a result of this project, construct them with the following pavement sections.

Commercial and other non-residential uses

- 0.30’ HMA Class ½ inch, PG 64-22
- 0.35’ CSBC
- 0.65’ Total

Residential

- 0.20’ HMA Class ½ inch, PG 64-22
- 0.35’ CSBC
- 0.55’ Total

2.7.4.4 RESURFACING PAVEMENT

2.7.4.4.1 Overlay

The compacted pavement depth for overlays shall be as follows:

0.15 feet HMA Class 1/2-inch, PG 64-22;

2.7.4.5 CITY AND COUNTY STREETS

The Design-Builder shall repair city and county streets damaged by the Project in accordance with the city and county pavement design standards.

2.7.5 CONSTRUCTION REQUIREMENTS

2.7.5.1 PAVEMENT MATERIALS

The Design-Builder shall develop the HMA mix design in accordance with Section 2.25; 4,300,000 ESALs shall be used in determining the mix design.

2.7.5.2 REHABILITATING HMA PAVEMENT

2.7.5.2.1 Pavement Repair

Where rutting of 3/8-inch or more is present at the time of construction, then either pre-leveling or plane and overlay to remove the rutting shall be required before construction of the overlay.

All alligator-cracked areas and potholes shall be repaired in accordance with Section 5-04.3(5)E of the Standard Specifications. Pavement removal shall be to a depth of sound material.

2.7.5.2.2 Overlay

Installation of the overlays shall be staged with the widening and new pavement areas so that the final overlay is placed over all travel lanes and shoulders as the final stage of the paving operation.

To accommodate the overlay, vertical transverse butt joints, at a depth equal to that of the overlay, shall be provided at the beginning and ending of the existing HMA limits. A smooth transition shall be provided between the pavement overlay and the pavement beyond the Project limits. A smooth transition shall be 75 feet of transition per inch of overlay thickness. Where existing curb and gutter is to remain, the existing pavement edge shall be planed so the pavement overlay is flush with the existing gutter.

All drainage inlets, manholes, and electrical pull boxes shall be adjusted to the final grade.

2.7.5.3 REMOVING EXISTING PAVEMENT

The Design-Builder shall remove all existing pavement that will not be required for the completed Project traffic lanes or shoulders.

2.7.5.4 ACCEPTANCE SAMPLING AND TESTING

2.7.5.4.1 HMA Mixture

All acceptance testing for HMA aggregate, mixture, in-place density, cyclic density, longitudinal joint density, and coring as required will be performed by WSDOT or its representatives.

Section 5-04.3(8)A5 of the Standard Specifications is revised to read as follows:

The results of all acceptance testing performed in the field and the Composite Pay Factor (CPF) of the lot after three sublots have been tested will be available to the Design-Builder or mix supplier through WSDOT's website. The Design-Builder may request a sublot be retested. To request a retest, the Design-Builder shall submit a written request within seven Calendar Days after the specific test results have been posted to the website. A split of the original acceptance sample will be sent for testing to either the Region Materials Laboratory or the State Materials Laboratory as determined by the WSDOT's Project Engineer. The split of the sample will not be tested with the same equipment or by the same tester that ran the original acceptance test. The sample will be tested for a complete gradation analysis, asphalt binder content and Va and the results of the retest will be used for the acceptance of the HMA in place of the original sublot sample test results. The cost of testing will be deducted from any monies due or that may come due the Design-Builder under the Contract at the rate of $250 per sample.

Low cyclic density areas will be evaluated by WSDOT in accordance with Section 5-04.3(10)B2 of the Standard Specifications. The credit for the price adjustment shall be made under the item "Cyclic Density Price Adjustment".

Longitudinal Joint Density will be evaluated by WSDOT in accordance with Section 5-04.3(10)B3 of the Standard Specifications. The credit for the price adjustment shall be made under the item "Longitudinal Joint Density Adjustment".

The Section 5-04.3(10)B4 of the Standard Specification is revised to read as follows:

The nuclear moisture-density gauge results of all compaction acceptance testing and the CPF of the lot after three sublots have been tested will be available to the Design-Builder or the mix supplier through WSDOT's website. Determination of the relative density of the HMA with a nuclear moisture-density gauge requires a correlation factor and may require resolution after the correlation factor is known. Acceptance of HMA compaction will be based on the statistical evaluation and CPF so determined.

For a sublot that did not meet the minimum of 91.0 percent of the reference maximum density in a compaction lot with a CPF below 1.00 and thus subject to a price reduction or rejection, the Design-Builder may request that a core be used for determination of the relative density of the sublot. The relative density of the core will replace the relative density determined by the nuclear moisture-density gauge for the sublot and will be used for calculation of the CPF and acceptance of HMA compaction lot. When cores are taken by WSDOT at the request of the Design-Builder, they shall be requested by noon of the next workday after the test results for the sublot have been provided or made available to the Design-Builder or the mix supplier. The core will be taken at approximately the same location as the nuclear moisture density gauge test in the compaction sublot being challenged.

Traffic control shall be provided by the Design-Builder as requested by the Project Engineer. Failure by the Design-Builder to provide the requested traffic control will result in forfeiture of the request for cores. When the CPF for the lot based on the results of the HMA cores is less than 1.00, the cost for the coring will be deducted from any monies due or that may become due the Design-Builder under the Contract a the rate of $200 per core.

2.7.5.5 SHOULDER COMPACTION

The first sentence of Section **5-04.3(10)B1 Control of the Standard Specification 5-04.3(10)B1 Control is** replaced with the following:

HMA mixture accepted by statistical or non-statistical evaluation that is used in traffic lanes, including lanes for ramps, truck climbing, weaving speed change, **and all shoulders,** and having a compacted course thickness greater than 0.10 foot, shall be compacted to a specific level of relative density.

2.7.6 SUBMITTALS

2.7.6.1 HMA MIX DESIGN

The Design-Builder shall submit a copy of the completed HMA mix design to WSDOT in accordance with Section 2.25.

2.7.6.2 INTENTIONALLY OMITTED

2.7.6.3 CONTAINMENT, COLLECTION, AND DISPOSAL PLAN

A Containment, Collection, and Disposal Plan shall be prepared in accordance with this Section and Section 2.8.

End of Section

2.8 ENVIRONMENTAL

2.8.1 GENERAL

2.8.1.1 SCOPE

The Design-Builder shall conduct all Work necessary to deliver the Project while protecting and enhancing the environment. Elements of the Work shall include, but are not limited to, the following:

- Avoiding impacts to the community and to the environmental, historic, archaeological, and cultural resources beyond those already approved by the regulatory agencies. If new impacts are unavoidable, the Design-Builder shall make every effort to minimize the unavoidable impacts. New, unavoidable impacts shall be mitigated. The Design-Builder shall contact WSDOT when design changes and/or alternative construction techniques require permit modifications or additional approvals.
- Fostering good relationships with Federal, State, and local agencies; tribes; and local stakeholders by ensuring that the commitments WSDOT has made are reflected in the Project's final design and are fulfilled during construction. The Design-Builder shall accomplish this by meeting or exceeding all environmental requirements and commitments listed in the Contract, permits, environmental documents, and regulatory agency Concurrence Letters.
- Complying with all Federal, State, and local laws, regulations, and ordinances (collectively referred to in this Section as "regulations") and not receiving any permit violations.

2.8.2 MANDATORY STANDARDS

The following is a list of publications that shall be used for all design and construction. They are listed in hierarchical order, with the most important appearing at the top of the list. This is not a comprehensive list; other applicable publications may be required to complete all design and construction. If the Design-Builder becomes aware of any ambiguities or conflicts relating in any way to the Mandatory Standards, the requirements of an environmental document, programmatic agreement, or permit issued for the Project, the Design-Builder shall notify WSDOT immediately, so that WSDOT may resolve them. If a requirement or permit condition is unclear or ambiguous, the Design-Builder shall obtain clarification from the WSDOT Engineer prior to proceeding with design or construction.

- Special Provisions (Appendix B2).
- Amendments to the Standard Specifications (Appendix B1).
- Standard Specifications (M41-10) (Appendix D18).
- Standard Plans (M21-01) (Appendix D17).
- WSDOT *Environmental Procedures Manual* (M31-11) (Appendix D4).
- WSDOT *Environmental Compliance Assurance Procedure* (Appendix E11).
- WSDOT *Highway Runoff Manual* (M31-16) (Appendix D6).

- WSDOT *Design Manual* (M22-01) (DM) (Appendix D3).
- WSDOT *Construction Manual* (M41-01) (Appendix D2).

2.8.2.1 ENVIRONMENTAL DOCUMENTS AND PERMITS

The permits for the SR 9, Lundeen Parkway to SR 92, widening project are being modified to include this project. Completion of the permit modifications is scheduled for January 2012. A list of the permits obtained, permits pending, and additional permits required for the Project is provided in this Section.

Although the modified permits are not available at this time, the conditions from the existing permits apply to this project. Copies of the existing permits have been included in Appendix P. The Proposers are hereby alerted that there may be additional conditions as a result of modifying the permits to include this project. Additional conditions will be made available, through addendum, as soon as they are available.

The Design-Builder shall implement the commitments included in the Commitments List (Appendix C1). The principal environmental documents for the Project, all of which are incorporated into this RFP as Appendices E, H, and P, are listed in Appendix A1.

2.8.2.2 INTERAGENCY AGREEMENTS AND MEMORANDA

WSDOT has entered into several interagency agreements with Federal and State agencies and local jurisdictions which provide guidance and clarification for meeting regulatory requirements. The Design-Builder shall comply with the Implementing Agreements, Memoranda of Understanding or Agreement, and Instructional Letters included in Appendix E and identified in Appendix A1.

2.8.3 PERFORMANCE REQUIREMENTS

2.8.3.1 DESIGN INNOVATION AND TECHNOLOGY

WSDOT recognizes that innovation during the early design stages of a project may alter the number of permits, permit modifications, approvals, effects, and mitigation measures required to construct the Project.

WSDOT has made a number of commitments for the Project. These commitments avoid and minimize Project-related impacts. The Design-Builder shall ensure these commitments are reflected in the design submittals and the Released for Construction (RFC) Documents.

2.8.3.2 ENVIRONMENTAL COMPLIANCE PLAN (ECP)

2.8.3.2.1 Documentation and Approval

The Design-Builder shall prepare and implement an Environmental Compliance Plan (ECP) that identifies roles and responsibilities of key personnel, procedures for environmental compliance, procedures to identify and correct non-compliance events, and procedures for emergency response. WSDOT's goal is to ensure environmental compliance with no permit violations.

In order to facilitate preliminary field investigation in support of design and early construction, WSDOT will accept an Interim Environmental Compliance Plan (IECP) specific to the proposed early construction Work. The information provided in the IECP

shall be incorporated into the Draft and Final ECP when submitted to WSDOT in accordance with this Section. To fulfill the ECP requirements for proposed early Work, the Design-Builder shall submit an IECP that includes a Temporary Erosion and Sediment Control (TESC) Plan, a Spill Prevention, Control, and Countermeasures (SPCC) Plan, a Fugitive Dust Control Plan, an Unanticipated Archaeological Discovery Plan, and any reference documents to WSDOT for review and approval prior to early construction.

The Design-Builder shall provide WSDOT with a complete Draft ECP prior to or with the Preliminary Design Submittal. The Environmental Compliance Manager (ECM) shall be responsible for submitting the Draft ECP. WSDOT will review the Draft ECP in accordance with Section 2.28. The Design-Builder shall provide WSDOT with the Final ECP 30 Calendar Days prior to the commencement of any construction activities not otherwise identified within the IECP, so that WSDOT can ensure its comments were addressed and incorporated. The Design-Builder shall stamp the ECP "Released for Construction". The ECP shall be consistent with all other requirements of the Quality Management Plan (QMP).

The ECP shall consist of two parts:

- Part I: Environmental Personnel, Communications, and Training
- Part II: Environmental Plans and Strategies

The Final ECP shall be stored in a format easily accessible by WSDOT. A hard copy of the ECP shall be maintained by the ECM at the Design-Builder's construction office or on-site at the Project.

2.8.3.2.2 Environmental Personnel, Communications, and Training (Part I)

2.8.3.2.2.1 *Key Personnel: Environmental Compliance Manager (ECM)*

2.8.3.2.2.1.1 *Roles and Responsibilities*

The ECM shall be responsible for the overall environmental compliance for the Project, and shall function as principal technical advisor and coordinator for environmental issues. The ECP shall identify all critical roles, responsibilities, and authorities of the ECM. The ECP shall identify the roles and responsibilities of other staff, and their roles in assuring environmental compliance. The ECP shall identify how the ECM will interact with WSDOT's Environmental Compliance Assurance Inspector (ECAI). WSDOT's ECAI will coordinate environmental and compliance issues with the WSDOT Northwest Region Environmental Technical Advisor (ETA) who will be performing compliance audits and will be working closely with the ECAI.

The ECM shall be on site for the duration of the Project. If the Design-Builder replaces the ECM, the Design-Builder shall provide an equally or more qualified replacement, contingent upon WSDOT's approval. If during the course of the Contract, WSDOT finds that the ECM is not ensuring full environmental compliance with all permits, provisions, policies, and commitments, WSDOT may require replacement of the ECM in accordance with Section 1-05 of the General Provisions.

The ECM must have at least five years of experience managing environmental design and construction compliance issues on projects. At least three of those five years must be specific to linear transportation projects. An ECM with at least two years of experience managing permitting and environmental compliance issues in the Pacific Northwest region is preferred. The ECM must have knowledge of the environmental regulations and permits

relevant to the Project. The ECM is required to be certified through the WSDOT Construction Site and Erosion and Sediment Control Certification Course, or equivalent. The Design-Builder shall provide a copy of the course certificate or other material verifying completion of the certification course at the time of proposal submission.

- The ECM shall also be responsible for the following:
  - Integrating with the design team during plan preparation and advising how to avoid and minimize adverse effects to the natural environment and communities through design and construction means and methods.
  - Reviewing engineering plans to ensure the Project's design accurately reflects environmental commitments and requirements.
  - Ensuring and providing documentation that the Work complies with all environmental commitments agreed to in the environmental documents, permits, agreements, and approvals of the Project.
  - Acting as a liaison to WSDOT, the design team, and the construction personnel (e.g., submitting reports, discussing changes to the Project, communicating compliance issues).
  - Maintaining the authority and means to bring the Project into compliance and/or stop Work if the Project is in violation of an environmental regulation or commitment.
  - Identifying potential wetland and sensitive environmental areas and gaining confirmation from WSDOT NW Region Biology.
  - Identifying when a non-compliant event is occurring or has occurred and notifying the appropriate parties.
  - Preparing and implementing a monitoring plan to ensure erosion/sedimentation and spill prevention, control, and countermeasure supplies and devices and Best Management Practices (BMPs) are effective and maintained.
  - Conducting field inspections to ensure that environmental compliance measures and Best Management Practices are meeting environmental requirements.

2.8.3.2.2.2 *Environmental Communications Protocol*

As part of the ECP, the ECM shall develop, document, and implement an Environmental Communications Protocol. The Environmental Communications Protocol shall describe the process to be used for non-compliance reporting; procedures for internal and external communications; and communications with WSDOT. When developing the Environmental Communications Protocol, the Design-Builder shall ensure it is consistent with the WSDOT *Environmental Compliance Assurance Procedure*.

The Environmental Communications Protocol shall include organizational charts that identify the Design-Builder's ECM and other personnel who will be assisting the ECM to ensure compliance with all permit conditions, performance standards, and environmental commitments. It shall discuss the personnel's roles and communication procedures that will be used for the internal and external communications, and communications with WSDOT.

2.8.3.2.2.2.1 *Internal Communications*

For internal communications procedures, the Design-Builder shall:

- Describe the Design-Builder's organizational hierarchy and identify compliance roles and internal reporting responsibilities;
- Include contact information for all key individuals and their alternates;
- Include a clear discussion regarding which key personnel, in addition to the ECM, have the authority to stop Work on the Project to prevent a violation from occurring; and
- Describe the process for identifying and reacting to non-compliance events.

2.8.3.2.2.2.2 *External Communications*

For external communications procedures, the Design-Builder shall:

- Describe procedures that define how all external communications received and initiated by the Design-Builder will be documented and handled, including how WSDOT will be involved. External communications may originate from the Design-Builder, tribes, local jurisdictions, regulatory agencies, and the public. Issues may range from reporting spills to receiving public noise complaints and violation notices from regulatory agencies. Where appropriate, this communication procedure shall be consistent with the WSDOT *Environmental Compliance Assurance Procedure*, and all permit conditions, performance standards, environmental commitments, and regulations described in Appendices C, E, and P. Unless directed otherwise by WSDOT, the Design-Builder will be the main point of contact for reporting and receiving external notifications regarding spills caused by the Design-Builder. WSDOT will remain the main point of contact (unless the Design-Builder is otherwise directed by WSDOT) for coordination with tribes, local jurisdictions, the public, and regulatory agencies; and will be responsible for external notifications and reporting non-compliance events, spills caused by parties other than the Design Builder, or discoveries of historic, archeological, or cultural resources, or sensitive species or habitat to the relevant agencies.

2.8.3.2.2.2.3 *WSDOT Communications*

For communications with WSDOT, the Design-Builder shall:

- Describe interactions between the Design-Builder and WSDOT in regard to reporting non-compliance issues.
- Identify all applicable WSDOT personnel that would be contacted in the event of a spill, inadvertent discovery, or non-compliance event. The Design-Builder shall ensure the procedure is consistent with the WSDOT *Environmental Compliance Assurance Procedure*,(Appendix E11) all permit conditions (Appendix P), and other environmental commitments related to agency communications (Appendix E).
- Describe the Design-Builder's communication process and key personnel who would be responsible for recognizing when a design change and/or alternative construction technique may require a permit modification or new approval. This section shall describe the Design-Builder's strategy for managing design changes that may require permit modifications or additional approvals.

2.8.3.2.2.3 *Environmental Protection Training*

The Design-Builder shall develop and implement an environmental protection training program for the Design-Builder's design and construction staff, quality assurance personnel, subcontractors, and vendors. The Design-Builder shall be responsible for all Work, including subcontracted Work, and associated personnel should their Work practices lead to a negative effect on the environment or result in a non-compliance event or permit violation. Therefore, the Design-Builder's training program shall orient employees, subcontractors, and all other parties brought onto the job to complete Work in support of the Project to the following activities prior to the start of construction or prior to the start of the subcontractor's Work:

- Permit conditions, performance standards, environmental commitments, and environmental regulations related to the Project;
- The overall importance of environmental issues;
- The specific environmental sensitivities of the Project;
- Erosion and sediment control procedures and certification;
- Environmental compliance monitoring and reporting procedures;
- ECAP triggers for noncompliance reporting to WSDOT
- Spill prevention, containment, and response; the location of spill response kits; and management of known or suspected contamination;
- Unanticipated historic or archaeological discoveries; and
- Emergency response procedures.

The Design-Builder's ECM shall notify the WSDOT Engineer of environmental training sessions and invite WSDOT to participate.

The Design-Builder shall provide training to ensure water quality is monitored in accordance with the WSDOT *Highway Runoff Manual* protocols, Project-specific permit conditions, performance standards, and environmental commitments. This training will include a field visit with WSDOT environmental staff prior to construction to establish monitoring sites and to review monitoring and reporting procedures.

2.8.3.2.3 Environmental Plans and Strategies (Part II)

2.8.3.2.3.1 *Temporary Erosion and Sediment Control (TESC) Plan*

The Design-Builder shall prepare and implement a TESC Plan that will describe measures to minimize erosion during construction activities. The Design-Builder shall identify a Certified Erosion and Sediment Control Lead (CESCL) who shall develop, implement, and update the TESC Plan. The TESC plan shall be modified on a regular basis to reflect field implemented changes and shall be kept up to date with BMPs implemented on the construction site.

The ESC Lead shall have, for the life of the Project, a current Certificate of Training in Construction Site Erosion and Sediment Control from a course approved by Ecology. The Design-Builder shall provide a copy of the course certificate or other documentation verifying completion of the certification course within 30 Calendar Days of Notice to Proceed.

The TESC Plan (narrative and plan sheets) shall be prepared and implemented in accordance with Section 2.14, Chapter 6 of the WSDOT *Highway Runoff Manual,* and Division 8 of the Standard Specifications. The TESC Plan shall address off-site stormwater in accordance with the WSDOT *Highway Runoff Manual* and Division 8 of the Standard Specifications. The Design-Builder's TESC Plan shall accommodate all Project-specific permit conditions, performance standards, environmental commitments, and the requirements of Section 2.29. The Design-Builder shall develop and implement a Project-specific Water Quality Monitoring Plan as part of the TESC Plan. The Water Quality Monitoring Plan shall address the minimum requirements identified in Chapter 6 of the WSDOT *Highway Runoff Manual* and the permit conditions described in Appendix P1. The Plan shall be submitted to WSDOT for review and approval.

The Design-Builder shall submit a TESC Plan that addresses early construction elements as a part of the Preliminary Design Submittal. Updated TESC Plans, including the TESC Stormwater Report narrative and plan sheets, shall be submitted as part of the Final Design Submittal described in Section 2.28. Construction shall not proceed on any element of Work until the relevant TESC Plans, including narratives, are stamped "Released for Construction" as described in Section 2.28.

2.8.3.2.3.1.1 *High Visibility Construction Fencing (HVF) Requirements*

Within the Project limits (including mitigation sites, staging areas, borrow sources, and other sites developed or used to support the construction of the Project), all environmentally sensitive areas, mitigation areas, and the buffers of environmentally sensitive and mitigation areas shall be fenced with High Visibility Construction Fencing (HVF) prior to commencing construction activities, including equipment staging, materials storage, and parking of workers' vehicles.

- If the Project will be constructed in stages, the HVF and other markings described below must be completely installed before construction on that stage can begin. A permit modification may be required to install HVF in stages.
- All staff shall be trained to recognize HVF and understand its purpose.
- HVF shall be maintained until all Work is completed for each stage of the Project.
- All clearing limits, stockpile sites, staging areas, and trees to be preserved shall be clearly marked prior to commencing construction activities for a particular stage of the Project.
- All clearing limits, stockpile sites, staging areas, and tree preservation markings shall be maintained until all Work is completed for each stage of the Project.
- No equipment will enter, operate, be stored, or be parked within any sensitive area except as specifically provided for in the 401 Water Quality Certification (Appendix P1) and other permits issued for the Project.
- Where HVF is not appropriate (such as over water), the environmentally sensitive areas will be clearly marked by other means in order to ensure that these areas are protected.

HVF shall be comprised of UV stabilized orange or yellow high-density polyethylene material with open mesh. The HVF shall be installed in accordance with the manufacturer's recommendations and the Standard Specifications. The HVF shall be at least 4 feet in height, and shall not be fastened to trees.

Installation of HVF is identified as a Hold Point in accordance with Section 2.28. Throughout the life of the Project, the Design-Builder shall preserve and protect the sensitive area, acting immediately to repair or restore any HVF that has been damaged, removed or overgrown by vegetation. Vegetation blocking the view of the HVF shall be removed as ordered by the WSDOT Engineer.

2.8.3.2.3.1.2 *Best Management Practices (BMPs)*

The Design-Builder shall select, install, monitor, and maintain all erosion and sediment control Best Management Practices (BMPs) in accordance with the requirements described in the WSDOT *Highway Runoff Manual* and the Commitments List. The Design-Builder shall not use experimental BMPs unless they have been approved by WSDOT prior to their use (e.g., chemically enhanced sand filtration systems). Monitoring activities and inspection protocols shall be described in the Design Builder's Environmental Compliance Monitoring and Reporting Plan. Failure to install and repair TESC Plan measures may result in liquidated damages (see Section 1-08 of the General Provisions).

The Design-Builder shall remove all temporary BMPs from the Right of Way, in accordance with Section 8-01 of the Standard Specifications and the Project-specific permit requirements. Any temporary BMPs that are not removed from the Right of Way within the time frames designated in the permits will be removed by WSDOT. All costs associated with WSDOT's removal will be deducted from any payments due or coming due to the Design-Builder.

2.8.3.2.3.2 ***Spill Prevention, Control, and Countermeasures (SPCC) Plan***

2.8.3.2.3.2.1 *General Requirements*

The Design-Builder shall prepare and implement a project-specific SPCC Plan for the duration of the Project. The Design-Builder shall submit the Plan to the WSDOT Engineer as part of the ECP in accordance with the requirements described in this Section. No on-site construction activities, including placing materials or equipment in staging or storage areas, may commence until WSDOT accepts an SPCC Plan for the Project. SPCC Plan template and guidance information is available at: http:/www.wsdot.wa.gov/Environment/HazMat/SpillPrevention.htm.

The SPCC Plan shall address hazardous materials, where the term "hazardous materials", as used in these Technical Requirements, includes all fuels, petroleum products and hazardous materials, as defined in Chapter 447 of the WSDOT *Environmental Procedures Manual* (M 31-11). Occupational safety and health requirements that may pertain to SPCC Plan implementation are contained in but not limited to WAC 296-824 and WAC 296-843. The SPCC Plan shall address conditions that may be required by Section 3406 of the current International Fire Code, or as approved by the local Fire Marshal.

2.8.3.2.3.2.2. *Implementation Requirements*

The Design-Builder shall update the SPCC Plan throughout Project construction so that the written Plan reflects actual site conditions and practices. The Design-Builder shall update the SPCC Plan at least annually and in accordance with NPDES permit requirements and shall maintain a copy of the updated SPCC Plan on the Project site. The Design-Builder shall fully implement the SPCC Plan, as accepted and updated, at all times.

2.8.3.2.3.2.3. *SPCC Plan Element Requirements*

The SPCC Plan shall be consistent with the requirements of the Standard Specifications (Appendix D18) and the Amendments to the Standard Specifications (Appendix B1).

2.8.3.2.3.3 *Fugitive Dust Control Plan*

Fugitive dust shall be controlled by the Design-Builder in accordance with the *Memorandum of Agreement between WSDOT and Puget Sound Clean Air Agency Regarding Control of Fugitive Dust from Construction Projects* (Appendix E10) and project-specific commitments. The Design-Builder shall prepare and implement a Fugitive Dust Control Plan to reduce short-term construction impacts to air quality, and submit it to WSDOT for review and approval as part of the ECP. The Design-Builder shall ensure that all air quality and fugitive dust requirements in the permits or other environmental documentation are incorporated into the Fugitive Dust Control Plan to control particulate matter.

2.8.3.2.3.4 *Concrete Containment, Collection and Disposal Plan (CCDP)*

The Design-Builder shall prepare a CCDP to minimize potential for adverse environmental effects associated with project-related concrete work, and submit it to WSDOT for review and approval as part of the ECP. The plan shall include, at a minimum, a description of all concrete-related activities and associated BMPs anticipated for use on this project. The Design-Builder shall ensure that all concrete-related requirements in the permits or other environmental documentation are incorporated into the CCDP.

2.8.3.2.4 Environmental Compliance, Monitoring, and Reporting

The Design-Builder, through rigorous monitoring and inspections, shall ensure that all regulations, approvals, and environmental performance specifications are being fulfilled. At a minimum, the Design-Builder's process for monitoring environmental compliance and reporting shall address the following areas.

2.8.3.2.4.1 *Temporary Erosion and Sediment Control (TESC)*

The Design-Builder shall inspect all on-site erosion and sediment control BMPs, at a minimum, in accordance with the NPDES permit requirements. An Erosion and Sediment Control Inspection Checklist is located in Appendix F5.

2.8.3.2.4.2 *Water Quality Monitoring*

Water quality monitoring shall be performed in accordance with the applicable permits and the WSDOT *Highway Runoff Manual*.

2.8.3.2.4.3 *Post-Construction Monitoring*

Within seven Calendar Days of Substantial Completion, the ECM shall conduct final monitoring inspections to assess and document compliance with permitting requirements and all remaining environmental commitments provided to the Design-Builder in the Commitments List. Inspections should address the successes, failures, and remedial actions for site restoration and compensatory mitigation sites.

2.8.3.2.4.3.1 *Environmental Commitment Close-Out Report*

The Design-Builder shall prepare an Environmental Commitment Close-Out Report to summarize overall compliance with permit conditions, performance standards, and environmental commitments. At a minimum, the Design-Builder's Environmental Commitment Close-Out Report shall include the following:

- Fulfillment descriptions completed for all permit conditions, performance standards, and environmental commitments;
- Commitments the Design-Builder was unable to fulfill, and why;
- Significant compliance deficiencies or incidents that may have occurred during the life of the Project and the corrective actions taken; and
- Future requirements for maintaining permanent BMPs, such as cleaning detention ponds.

The Environmental Commitment Close-Out Report shall be completed within 21 Calendar Days of Substantial Completion. The Design-Builder may submit the Environmental Commitment Close-Out Report in stages as discrete elements of Work are completed.

2.8.4 DESIGN REQUIREMENTS (ENVIRONMENTAL COMMITMENTS)

WSDOT made commitments in the State Environmental Policy Act (SEPA) environmental document, permits, Endangered Species Act (ESA) concurrence documents, and local agreements which contain a number of specific design and construction criteria.

Environmental Permits for this project are being acquired as stated in Section 2.8.2.1. A list of the permits obtained, permits pending, and additional permits required for the Project is provided in Section 2.8.4.2. Copies of permits obtained are included in Appendix P1. Conditions and performance standards from the permits, SEPA documentation, local agreements, and ESA consultation have been consolidated into the Commitments List (Appendix C1). These commitments have been tailored to better define compliance roles and responsibilities for the Project. WSDOT tracks commitments to ensure fulfillment throughout the various stages of Project delivery. The Design-Builder shall fulfill and report on the implementation of these commitments. The commitments included in the Commitments List shall be incorporated into this Project.

2.8.4.1 SEPA DOCUMENTATION

A SEPA Determination of Non-Significance (DNS) has been issued by WSDOT (Appendix E6). If the design of the Project is altered by the Design-Builder in such a way that causes additional impacts to the environment and/or surrounding communities, an addendum to the SEPA DNS may be required. If required, the Design-Builder shall be responsible for preparing any additional environmental documentation. In addition, the Design-Builder shall pay all costs and accept all responsibility for any schedule delays associated with securing the additional environmental approvals.

If required, the environmental re-evaluation shall follow the WSDOT *Environmental Procedures Manual*. It is anticipated that the environmental re-evaluation and related approvals will not be required, provided changes in roadway alignments and grades do not result in additional social, economic, or environmental impacts. WSDOT will coordinate with all previously-involved agencies as part of any re-evaluation process. Final determination regarding the necessity of environmental re-evaluations shall be made by WSDOT.

All environmental re-evaluations shall be subject to written approval by WSDOT.

2.8.4.2 PERMITS AND APPROVALS

2.8.4.2.1 Permit Acquisition

Based on the WSDOT Conceptual Plans in Appendix M1, WSDOT will obtain the following permits and approvals:

- Section 404 Individual Permit – U.S Army Corps of Engineers;
- Section 401 Water Quality Certification – Ecology;
- Hydraulic Project Approval – Washington State Department of Fish and Wildlife (WDFW);
- Coastal Zone Management Act Consistency Determination – Ecology;
- City of Lake Stevens Land Use Permit
- City of Marysville – Critical Areas Permit

The Design-Builder shall acquire the following permits and approvals (if necessary) and comply with all associated environmental requirements:

- Section 402 NPDES General Permit for Construction Activities – Washington State Department of Ecology (Ecology);
- Noise Variance – City of Lake Stevens, Snohomish County, and City of Marysville;
- Environmental documentation and permits for geotechnical borings – all applicable agencies;
- Environmental documentation and permits for installing, modifying, or removing piezometers – all applicable agencies;
- Administrative Order for Chemical Treatment (if necessary) – Ecology.*

*Note: The use of chemical treatment BMPs, including enhanced sand filtration, requires an Administrative Order for Chemical Treatment from Ecology. The Design-Builder shall coordinate with WSDOT for review prior to submitting the plan to Ecology for approval. It is recommended that the Design-Builder allow a minimum of 30 Calendar Days for the approval process.

2.8.4.2.2 Permit Compliance, Modifications, and Additional Approvals

The Design-Builder shall follow the requirements of all permits and commitments referenced in this Section, and any other permits that are obtained for the Project. The Design-Builder shall provide WSDOT with timely notice of its intent to propose an alternative construction method or a design change that is inconsistent with a particular permit, environmental requirement, commitment or contract plan sheet change that affects or changes a sensitive area impact by construction activities. WSDOT will work with the Design-Builder and will bring final detailed proposals provided by the Design-Builder to the regulatory agencies for permit modifications, to obtain new permits, and to re-initiate ESA consultation as required. WSDOT will conduct all communication with regulators associated with potential modifications of permits and /or approvals obtained by WSDOT, and may request the assistance of the Design-Builder. The Design-Builder shall be

responsible for preparing any additional supplemental environmental documentation needed to secure the additional environmental approvals required for implementation of the Design-Builder's alternative proposals.

The Design-Builder shall pay all costs and accept responsibility for any schedule delays resulting from a proposed alternative construction method or design change, including, but not limited to, implementation of an approved ATC. Such costs and schedule delays may result from changes in impacts to the environmental resources addressed in Section 2.8.4.3. In addition to the direct costs associated with preparing documentation for and securing additional environmental approvals, the Design-Builder shall be responsible for costs including, but not limited to, WSDOT labor and materials expenses incurred in gaining environmental approvals. The Design-Builder shall also be responsible for additional mitigation costs such as site acquisition, design, construction, maintenance, and monitoring should this be required as a result of increased impacts.

If requested, the Design-Builder's ECM shall attend environmental coordination meetings between WSDOT and the regulatory agencies. Meetings may occur more frequently during final design stages and prior to initial construction activities.

2.8.4.3 OTHER AGREEMENTS AND COMMITMENTS

The environmental documents listed in Appendices C1, E, and P contain commitments for the completion of the Work. The Design-Builder shall ensure that these commitments are adhered to and implemented.

2.8.4.3.1 Wetlands

A delineation of wetlands within the Project's impact area was completed by biologists. WSDOT prepared a SR 9 Lundeen to SR 92 Intersection Improvements and Widening Report and a SR 9, SR 92 Intersection Improvements Wetlands and Stream Assessment Report Addendum to support environmental documentation for the Project. The Wetland Stream Assessment Report Addendum includes wetland delineations, characterizations, ratings, and functional assessments, and is included in Appendix E2.

The Design-Builder shall install HVF around wetlands identified through the permitting process. The Design-Builder may conduct an independent wetland verification prior to the installation of HVF to confirm that all wetlands have been identified. If the Design-Builder disagrees with WSDOT's findings, the Design-Builder shall identify the location of the new wetlands and/or the existing wetland boundary in question in writing to the WSDOT Engineer for coordination and confirmation by WSDOT biologists.

2.8.4.3.2 Additional Wetlands Impacts

If the Design-Builder proposes changes that will result in impacts outside of the permitted Impact Area Line, the Design-Builder shall notify WSDOT Biologists through the WSDOT Engineer. The WSDOT Biologists will conduct field investigations to assess additional impacts to known wetlands and to determine if previously unidentified wetlands are present. If known or previously unidentified wetlands are present and would be impacted by the proposed change, the Design-Builder shall provide WSDOT with all information necessary to request a permit modification. The Design-Builder shall not impact these wetlands without written authorization from WSDOT. The Design-Builder shall strive to include all additional impacts to wetlands and their associated buffers in a single submittal.

2.8.4.3.3 Mitigation for Wetlands Impacts

WSDOT has determined that construction of the Project will result in unavoidable impacts to wetland and their buffers. Impact to these areas will be mitigated for at a wetland mitigation bank. WSDOT has prepared a Wetland and Stream Mitigation Report, which provides detailed information about the required wetland mitigation (Appendix E5).

Temporary wetland impacts will be restored on-site. WSDOT has prepared draft Temporary Impact Restoration plan sheets which are available in the Wetland and Stream Mitigation Report.

As part of the Project, the Design-Builder shall prepare and submit to WSDOT final Temporary Impact Restoration plan sheets. The Design-Builder shall reference the exhibits in the Wetland and Stream Mitigation Report and electronic files to prepare design submittals for the Temporary Impact Restoration in accordance with Section 2.28, Sections 440 through 460 and Divisions 5 and 6 of the WSDOT *Plans Preparation Manual*, the WSDOT *Highway Runoff Manual*, and the QMP. The Design-Builder shall ensure all permit conditions and environmental commitments are met (see Commitments List in Appendix C1 and Permits [Appendix P]).The Design-Builder shall not restore temporary impacts without written authorization from WSDOT.

2.8.4.3.4 Streams

A survey of streams within the Project's impact area was completed by biologists and verified by WDFW. WSDOT prepared a Wetland and Stream Assessment Report Addendum to support environmental documentation for the Project (Appendix E2).

The Design-Builder shall install HVF to protect all streams and stream buffers identified through the permitting process. The Design-Builder is not required to conduct new surveys of streams identified in the Basic Configuration. However, if the Design-Builder disagrees with the streams as shown on the Basic Configuration or WDFW's findings in the permit, the Design-Builder shall notify WSDOT and shall identify the location of the new streams and/or the existing stream boundary or buffer in question in writing to the WSDOT Engineer for coordination and confirmation by WSDOT biologists.

2.8.4.3.5 Additional Stream Impacts

If the Design-Builder proposes changes that will result in stream or stream buffer impacts outside of the permitted Impact Area Line, the Design-Builder shall notify WSDOT Biologists through the WSDOT Engineer . WSDOT Biologists will conduct field investigations to assess additional impacts to streams or their associated buffers, and to determine if additional streams or their associated buffers are present. If any streams or stream buffers are present and would be impacted by the proposed change, the Design-Builder shall provide WSDOT with all information necessary to request a permit modification. The Design-Builder shall not impact these streams without written authorization from WSDOT. The Design-Builder shall strive to include all additional impacts to streams and their associated buffers in a single submittal.

2.8.4.3.6 Mitigation for Stream Impacts

WSDOT has determined that construction of the Project will result in unavoidable impacts to stream buffers. Impacts to these areas will be mitigated for at a wetland mitigation bank. WSDOT has prepared a Wetland and Stream Mitigation Report which provides detailed information about the required stream mitigation (see Appendix E5).

2.8.4.3.7 Jurisdictional Ditches

WSDOT Biologists performed a reconnaissance of jurisdictional ditches within the Project area. No jurisdictional ditches were identified within the permitted Impact Area Line. The Design-Builder is not required to conduct a new jurisdictional ditch survey. However, if the Design-Builder disagrees with the jurisdictional ditch findings, the Design-Builder shall notify WSDOT and shall identify the location of the new jurisdictional ditch in writing to the WSDOT Engineer for coordination and confirmation by WSDOT Biologists.

2.8.4.3.8 Additional Jurisdictional Ditch Impacts

If the Design-Builder proposes changes that will result in impacts outside of the permitted Impact Area Line, the Design-Builder shall notify WSDOT Biologists through the WSDOT Engineer. WSDOT Biologists will conduct field investigations to assess impacts to jurisdictional ditches and to determine if additional jurisdictional ditches are present. If any jurisdictional ditches are present and would be impacted by the proposed change, the Design-Builder shall provide WSDOT with all information necessary to request a permit modification. The Design-Builder shall not impact these jurisdictional ditches without written authorization from WSDOT. The Design-Builder shall strive to include all impacts to jurisdictional ditches in a single submittal.

2.8.4.3.9 Noise

Construction Noise

The Design-Builder shall implement mitigation measures for temporary noise impacts associated with construction activities in accordance with the SEPA DNS. The Design-Builder shall obtain a noise variance from the local jurisdiction, as required, and shall comply with all conditions within the variance. Mitigation measures for construction noise have been included in the Commitments List.

The Design-Builder should be aware that the process to obtain noise variances can be 3 months or more, and should plan to submit the noise variance applications to each affected jurisdiction a minimum of 90 days prior to start of night work. WSDOT will be available as a resource if the Design-Builder requests assistance during the variance approval process.

Noise Walls

If the Design-Builder adjusts the highway horizontal alignment by more than 10 feet, and/or the highway vertical profile by more than 2 feet, the Design-Builder shall prepare, and submit for review, a Supplemental Noise Analysis Report. The Supplemental Noise Analysis Report shall confirm that the decibel reduction targets identified in the original noise report are still achieved, and/or propose new methods for achieving these targets. The Design-Builder will submit the Supplemental Noise Analysis Report to WSDOT for review allowing for a two week WSDOT review period. The Design-Builder's Supplemental Noise Analysis Report shall comply with the current WSDOT Traffic Noise Analysis Abatement Policy and Procedures. If the Design-Builder makes a change in the Conceptual Plan that may potentially impact modeled noise results, the Design-Builder shall analyze the proposed change for impacts to noise in the Supplemental Noise Analysis Report.

Any additional noise analysis required by this Section shall not model the noise walls with absorptive properties. However, absorptive materials may be considered in application to provide additional noise benefits.

The Design-Builder shall submit the Supplemental Noise Analysis Report for WSDOT's Review and Comment. In addition, the Design-Builder shall work with WSDOT to communicate methods for achieving decibel reduction targets to the public. This shall be done in accordance with the Public Involvement Plan described in Section 2.9.

If noise walls are recommended in the Supplemental Noise Analysis Report, the Design-Builder shall submit the final noise wall plan sheets or shop drawings to the WSDOT Air Quality, Noise and Energy Technical Manager for final review and approval. Allow two weeks for WSDOT review.

The Design-Builder shall provide methods for achieving the decibel reduction targets, as outlined in the Supplemental Noise Analysis Report. This may include noise walls. WSDOT prefers that noise walls be completed within one year of Notice to Proceed.

2.8.4.3.10 Threatened and Endangered Species

A Letter of No Effect has been completed and is included as Appendix E1.

If the Design-Builder modifies design or construction activities beyond those agreed to in the PBA or Letter of No Effect , the ESA consultation may have to be reevaluated. If this occurs, the Design-Builder shall work through WSDOT to provide the necessary information required for ESA consultation. WSDOT will take the lead in coordinating with NOAA Fisheries and USFWS. If ESA consultation needs to be reinitiated due to changes made by the Design-Builder to the Basic Configuration (Appendix M1), all cost and schedule impacts shall be the Design-Builder's responsibility.

The letter of No Effect (Appendix E1) contains a number of performance standards. Performance standards have been included in the Commitments List (Appendix C1). The Design-Builder shall fulfill and report on the implementation of performance standards and environmental commitments in the Environmental Commitments Close-Out Report described in this Section.

2.8.4.3.11 Hazardous Materials

2.8.4.3.11.1 *Potential Soil and Groundwater Contamination*

WSDOT has conducted an initial survey of potential soil and groundwater contamination and identified two contaminated sites that could affect project work. The sites are located just north of the northern SR 9 project limits. Contaminants that might have migrated from these sites to the north end of the Project are petroleum products (including gasoline and benzene) and possibly metals and are described I more detail in the Hazardous Materials Memorandum prepared for this project (Appendix E4). If any contaminated material is encountered during construction, it will be considered a Differing Site Condition (DSC) in accordance with Section 1-04 of the General Provisions. The Design-Builder shall notify WSDOT immediately and shall follow the SPCC Plan as well as all appropriate regulations if contamination is discovered or suspected through observation such as an oily sheen or discolored soils that may or may not emit strong chemical odors.

WSDOT will determine the limits of any excavation that is required in addition to the excavation needed for project construction. All excavated material that is suspected of or confirmed as being contaminated shall be handled and stored in a manner that prevents the spread of contamination to adjacent soil or water and that protects the health and safety of

all on-site personnel during work at the site. Separate stockpiles shall be maintained for confirmed hazardous or contaminated material, suspected hazardous or contaminated material, and all other material.

All water that is removed from areas of suspected or confirmed contamination, including water that leaches from suspected or contaminated stockpiles and water that is suspected of being contaminated, shall be collected, handled, and stored in a manner that prevents the spread of contamination to adjacent soil or water and that protects the health and safety of all on-site personnel during work at the site.

Under direction from WSDOT, the Design-Builder shall transport hazardous or contaminated material to and dispose of it at a facility permitted to receive such material. The Design Builder shall provide WSDOT with a copy of the shipping manifest or bill of landing, indicating the amount of material hauled to the disposal facility and bearing the disposal facility operator's confirmation of receiving the material.

2.8.4.3.11.2 *Asbestos and Lead Based paint (LBP)*

Prior to construction, the Design-Builder shall have performed a thorough hazardous materials survey on all structures that will be demolished. The survey shall include, but not limited to, a good-faith survey of asbestos-containing materials (ACM) and the collection of a waste stream sample for TCLP lead analysis. The surveyor shall be certified under the Asbestos Hazard Emergency Response Act for the ACM survey and under the Washington State Department of Commerce for the lead based paint (LBP) related waste stream sample collection The Design-Builder shall be responsible for filing a Notice of Intent with the Puget Sound Clean Air Agency prior to asbestos abatement or demolition of any structures. The Design-Builder shall ensure notification is received by the Washington State Department of Labor and Industries no later than 14 Calendar Days prior to the asbestos removal start date. The Design-Builder shall inspect, remove, and dispose of all hazardous materials including, but not limited to, ACM/LBP identified in the survey. This effort will not be considered a differing site conditions in accordance with Section 1-04 of the General Provisions.

Prior to commencing asbestos-related Work, the Design-Builder shall provide the WSDOT Engineer with copies of approvals and notifications that have been given or obtained from the required jurisdictional agencies. The Design-Builder shall designate a Washington State Certified Asbestos Supervisor to personally supervise the asbestos removal, and to ensure that the handling and removal of asbestos is accomplished by certified workers, pursuant to Washington State Department of Labor and Industries Standards.

2.8.4.3.11.3 Underground Storage Tanks

If the Design Builder encounters a UST, the Design-Builder shall immediately notify WSDOT. Under direction from WSDOT, the Design-Builder shall decommission and remove the UST. If an UST is encountered, WSDOT and the Design-Builder shall follow all applicable rules and regulations associated with UST removal activities. All UST removal work will be considered a DSC in accordance with Section 1-04 of the General Provisions.

2.8.4.3.11.4 *Disposal of Harmful Materials*

The Design-Builder shall dispose of construction waste material such as concrete or other harmful materials at approved sites in accordance with Sections 2-01, 2-02, and 2-03 of the

Standard Specifications, and as supplemented by the Special Provisions and section 2.8.5.1 Disposal of Surplus Material, below.

2.8.4.3.11.5 Worker and Public Health and Safety

The Design-Builder shall comply with the following regulations and agreements:

- State Dangerous Waste Regulations (Chapter 173-303 WAC);
- State Underground Storage Tank Regulations (Chapter 173-360 WAC);
- State Health and Safety Asbestos Regulations (Chapter 49.26 RCW);
- Safety Standards for Construction Work (Chapter 296-155 WAC);
- Washington Industrial Safety and Health Act (Chapter 49.17 RCW);
- National Emission Standards for Hazardous Air Pollutants (NESHAP) (Code of Federal Regulations, Title 40, Volume 5, Parts 61 to 71); and
- General Occupational Health Standards (Chapter 296-62 WAC).

2.8.4.3.12 Historic, Archaeological, and Cultural Preservation

No known historic, archaeological, or cultural sites have been identified within the Right of Way as described in the Cultural Resources Survey conducted for this project. WSDOT has prepared an Unanticipated Discovery Plan (Appendix E8) to direct post-review discovery protocols pursuant to Section 106 of the National Historic Preservation Act of 1966 (as amended).. The Unanticipated Archaeological Discovery Plan shall be adopted and revised by the Design-Builder, as necessary. The Unanticipated Discovery Plan shall be submitted to WSDOT for Review and Comment as part of the Design-Builder's ECP, prior to the start of construction.

Any historic, archaeological, or cultural objects encountered by the Design-Builder shall not be further disturbed in accordance with Section 1-07 of the General Provisions and the Unanticipated Discovery Plan.

If the Design-Builder elects to propose a design change that would impact areas not previously analyzed in the Cultural Resources Survey (Appendix E3), including geotechnical borings greater than 4 inches, additional subsurface investigation and consultation with the Department of Archaeology and Historic Preservation and affected and interested tribes may be necessary. WSDOT reserves the right to take up to 30 Calendar Days to provide concurrence for the proposed design change. WSDOT will use this time to coordinate with outside agencies, tribes, and other entities, and/or to complete field investigations.

2.8.4.3.13 Tree Preservation

The Design-Builder shall make all reasonable efforts to preserve trees within the Project Impact area. Impact Area Plans are located in Appendix M1. No trees greater than 6dbh may be removed for illumination, signage, or Utility cabinets, without prior approval from WSDOT. Any tree, shrub, ground cover or herbaceous vegetation damaged by construction activities, and scheduled to remain on site, shall be correctively pruned as specified in Section 1-07.16(2) of the Standard Specifications.

2.8.5 CONSTRUCTION REQUIREMENTS

2.8.5.1 DISPOSAL OF SURPLUS MATERIAL

Section 2-03.3(7) C of the Standard Specifications is supplemented with the following:

- All surplus excavation or other materials shall be disposed of outside the Project limits or reused in a manner that does not impact sensitive resources such as wellhead protection zones, surface water bodies, parks, and child-use areas.

2.8.6 SUBMITTALS

The Design-Builder shall submit the following documents to WSDOT as required by this RFP and the permits obtained for the Project. The submittals shall include, but are not limited to, the following:

- Interim Environmental Compliance Plan (IECP);
- Environmental Compliance Plan (ECP);
- Asbestos Containing Materials/Lead Based Paint (ACM/LBP) Surveys;
- Noise Variance Application;
- Environmental Commitments Close-Out Reports;
- Various Construction Monitoring Reports as required in the permits;
- Plan outlining the procedures to be used to prevent high pH stormwater or dewatering water from entering surface waters; and
- Wetland Verification Confirmation letter (if applicable)

End of Section

2.9 PUBLIC INFORMATION

2.9.1 GENERAL

WSDOT and the Design-Builder shall develop and maintain a consistent level of public communication, while encouraging broad public awareness and understanding of the Project.

Providing clear, consistent, and timely messaging is an essential element to successful Project delivery. The public information role consists of many tasks including preparing for and attending public meetings and open houses; responding to public inquiries and complaints; coordination with the media; preparing regular traffic updates, press releases, web updates, and photo and video documentation; and coordination with local jurisdictions, transit providers, emergency services, and local neighborhood, community, and business groups. To support this effort, WSDOT will share clear, concise, and timely information with the public, elected officials, community leaders, businesses, tribes, and the news media.

The Design-Builder shall work with WSDOT to achieve the following public information and community relations goals:

- Support the successful delivery of the Project.
- Provide timely, relevant and thorough information to individuals and entities directly affected by construction to prepare them for construction impacts and to help them make travel decisions and to adjust or avoid travel delays due to construction.
- Assure that any potential disproportionately high and/or adverse impacts on minority and/or low income populations are identified and addressed; and continue to communicate with social service agencies.
- Educate the public about the environmental benefits and improvements associated with the Project, such as treating previously untreated stormwater, and providing environmental mitigation.
- Reinforce positive WSDOT relationships with partner agencies, individuals, and community groups.
- Educate the public about the need, vision, and context for the Project.

2.9.2 MANDATORY STANDARDS

The following is a list of publications that shall be used for all design and construction. They are listed in hierarchical order, with the most important appearing at the top of the list. This is not a comprehensive list; other applicable publications may be required to complete the design and construction. If the Design-Builder becomes aware of any ambiguities or conflicts relating in any way to the Mandatory Standards, the Design-Builder shall notify WSDOT immediately, so that WSDOT may resolve them.

- Special Provisions (Appendix B2).
- Amendments to the Standard Specifications (Appendix B1).
- Standard Specifications (M41-10) (Appendix D18).
- WSDOT *Communications Manual* (Appendix D22).

- WSDOT *Communications Manual Appendix* (Appendix D23).
- WSDOT *Communications Standards and Guide;* http://wwwi.wsdot.wa.gov/NR/rdonlyres/6CD80A8D-4D1F-426E-BEB5-F85A152697F9/0/CommunicationsManual.pdf.

2.9.3 PERFORMANCE REQUIREMENTS

2.9.3.1 JOINT COMMUNICATIONS EFFORT

Development and dissemination of public information for the Project requires the integration of resources and labor between WSDOT and the Design-Builder. Joint communications will educate and inform the public, establish expectations, and play a significant role in delivering a successful Project.

The Design-Builder shall coordinate construction closures and communications with other projects being constructed along and near the SR 9 and SR 92 corridors, and within the region. The Design-Builder shall also maintain ongoing communication with the local agencies within the Project area regarding upcoming construction activities and planned closures.

2.9.3.2 COMMUNICATIONS PLANNING WORKSHOP AND CONSTRUCTION COMMUNICATIONS PUBLIC INFORMATION PLAN (PIP)

The Design-Builder shall participate in a communications planning workshop to discuss the Communication Plan for the Project. At this workshop, WSDOT will review and discuss the Design-Builder's role in the public information activities for the Project. The communications planning workshop shall clarify these roles.

Conceptual SR 9/SR 92 Intersection Improvements Communications Plan is provided in Appendix Y1

2.9.4 WSDOT'S COMMUNICATIONS RESPONSIBILITIES

WSDOT's Public Information Team will retain primary responsibility for the following communications tasks:

- Responses to public comments regarding the SR 9/SR 92 Intersection Improvement Project.
- Communications regarding the environmental assessment concerning issues such as noise analysis and mitigation.
- Managing the SR 9/SR 92 Intersection Improvement public contact database including citizen requests for information. The Design-Builder shall udate this database with Project specific information, requests, and responses.
- Coordination with WSDOT executive and steering committees.
- Media relations activities.
- Managing the SR 9 SR 92 Intersection Improvement Web site, including links to the Project Web site.

- Conducting major Project-related events such as ground-breaking and ribbon-cutting. The Design-Builder shall assist in these activities.
- Contacting elected officials.
- Coordination with the Design-Builder's public information staff and monitoring Project communications to meet WSDOT standards for form, graphic design, content, and messaging.

2.9.5 DESIGN-BUILDER'S ROLE IN PUBLIC INFORMATION EFFORTS

The Design-Builder shall assist WSDOT with identifying and implementing ways of informing the public, individual property owners, and broader communities about design and construction activities that directly affect them. Such information shall be clear, consistent, and comprehensive; shall meet WSDOT graphic and writing standards; and shall be subject to ongoing review by WSDOT before distribution.

The Design-Builder shall participate in Project communications meetings between WSDOT and the Design-Builder weekly, and more often if determined necessary by WSDOT to maintain regular coordination on all public information goals and activities.

The Design-Builder shall update the SR 9 SR 92 Intersection Improvement public contact database with Project-specific information requests and responses. WSDOT will manage the database.

The Design-Builder shall conduct Project-related events such as public open houses and public meetings. WSDOT will assist in these activities.

2.9.5.1 DESIGN BUILDER PUBLIC INFORMATION STAFF

The Design-Builder shall provide staff as needed to support the public information needs of the Project. This staff is responsible for identifying public information issues related to the Design-Builder's Work, and for formulating and implementing strategies to address those issues. Prior to implementing these strategies, the Design-Builder shall consult with WSDOT. The Design-Builder shall work with WSDOT to maintain public satisfaction throughout the Project.

The Design-Builder shall be readily available by telephone during regular business hours with immediate computer and email access. During critical construction activities and emergencies, the Design-Builder shall be available as necessary.

The Design-Builder shall have at least three years of recent experience coordinating information on public projects. The Design-Builder professional experience shall include the following:

- Writing for the public, news media, and internet. Knowledge of WSDOT's Reader-Friendly Toolkit, "plain talk" communications, and media relations protocols is preferred.
- Providing information intended for the public, news reporters, community groups, and others.
- Developing and producing maps, charts, graphs, diagrams, and other visual images, preferably using InDesign, Adobe Freehand, Adobe Photoshop, and WSDOT design templates to meet WSDOT graphics standards.
- Taking photographs and video.

The Design-Builder shall have full access to all of the Design-Builder's Project details that may be relevant to the public, public agencies, emergency service providers, businesses, media, and other interested parties. The Design-Builder shall share information with WSDOT continually throughout the Project.

The Design-Builder shall provide WSDOT with a prioritized after-hours call list within 30 Calendar Days after Notice to Proceed. The call list shall include the contact information for the Design-Builder's public information staff, including home and mobile phone numbers, and e-mail addresses.

2.9.6 DESIGN-BUILDER PUBLIC INFORMATION SPECIFICATIONS

2.9.6.1 MEETINGS

The Design-Builder shall meet weekly with WSDOT to maintain regular coordination and communication with WSDOT on all public information goals and activities. Meetings may include staff from the Cities of Marysville and Lake Stevens, Snohomish County, as well as representatives from other construction projects in the SR 9 or SR 92 corridor.

The Design-Builder shall meet with the SR 9/SR 92 project staff more frequently in the initial months of the Project to learn about Project specifics and expectations.

The Design-Builder shall be available to participate in community meetings.

2.9.6.2 WEEKLY PROGRESS REPORTS

The Design-Builder shall provide a brief Weekly Progress Report to WSDOT. The Report shall summarize progress made the previous week and include photos of the previous week's construction activities. The Design-Builder shall submit the Report by email every Monday to the designated WSDOT Public Information Lead for the Project and the Project Engineer.

An example of a Weekly Progress Report from the Bellevue Braids Project is provided in the SR 9 SR 92 Intersection Improvements Communications Plan.

2.9.6.3 CONSTRUCTION INFORMATION DISSEMINATION

The Design-Builder shall coordinate with WSDOT to collect, write, edit, and disseminate design and construction information to the Project Web site, WSDOT's 511 Condition Acquisition and Reporting System, Highway Advisory Radio (HAR), and Variable Message Signs (VMS). The Design-Builder shall shall communicate with the designated WSDOT traffic engineer and WSDOT's Public Information Team weekly, and more frequently when requested by WSDOT, regarding planned and current construction activities such as location, estimated duration of activity, type of Work being performed, physical impacts (e.g., lane closures, narrowed lanes, commercial vehicle restrictions), and planned construction detours.

2.9.6.3.1 Construction Schedule

One month prior to commencement of construction in any area of the Project, the Design-Builder shall notify WSDOT and the public of construction schedules. The Design-Builder shall provide construction updates to WSDOT on a weekly basis. The Design-Builder shall deliver additional updates if construction and traffic impacts change, or if WSDOT requests additional updates. These updates shall include the upcoming week's planned closures, detours, Project status, and other information relevant to the public.

Every Wednesday by 11 a.m., the Design-Builder shall submit a completed WSDOT Construction Updates form showing all planned closures for the coming week to WSDOT for review and approval. The Design-Builder's shall write a summary of the upcoming approved closures for posting on the Construction Updates Web site, and submit it to WSDOT by noon on Thursdays.

2.9.6.4 CRISIS COMMUNICATIONS PLAN

The Design-Builder shall include a Crisis Communications Plan (emergency response protocol) for responding to emergencies and incidents during the Project in its Draft PIP. The Design-Builder shall coordinate this approach with the Design-Builder's overall Traffic Management Plan and Traffic Incident Management Plan (see Section 2.22). The Design-Builder's Crisis Communications Plan shall address the following:

- Communications approaches to emergencies such as fire, gas line strikes, injured employees, auto accidents in a Work zone, and environmental spills;
- Staff designated to respond to the emergency;
- The cause of specific disruptions such as construction-related disruptions and weather;
- Actions that could be taken to mitigate the crisis;
- Procedures for notifying WSDOT, the public, and the Design-Builder;
- Any corrective procedures that will be put in place as a result of the crisis; and
- Procedures for referring victims of auto damage due to construction to WSDOT's risk management department.

In the event of a crisis, the Design-Builder shall notify WSDOT immediately. Following the emergency, the Design-Builder will summarize the emergency protocol used in an Emergency Incident Report, and submit that Report to WSDOT within three Calendar Days of the crisis.

Within 30 Calendar Days of Contract execution, the Design-Builder shall schedule a crisis communications "No Surprises" workshop with WSDOT to discuss protocols and potential emergency situations. Staff from the Cities of Marysville and Lake Stevens, and Snonomish County may participate in the workshop. Follow-up workshops will be held following any crisis situations.

2.9.6.4.1 Dissemination of Emergency Information

As part of the Crisis Communications Plan, the Design-Builder shall establish and manage an emergency response call list. All appropriate personnel shall be included on the call list for immediate response in the event of an emergency. The call list shall be divided into areas of expertise, so the proper people are contacted for specific emergency situations.

The following WSDOT personnel shall be included on the call list for notification of all emergencies:

- Project Engineer;
- On-Call Public information staff; and
- Traffic Safety Management Center.

The following Design-Builder personnel shall be included on the call list for notification of all emergencies:

- Construction Manager;
- Project Manager;
- Traffic Control Manager
- Public information staff.

The personnel on the call list shall be agreed upon at the communications planning workshop between WSDOT and the Design-Builder. In addition, the Design-Builder shall provide prompt information and assistance as requested by WSDOT during an emergency.

2.9.6.5 COORDINATION WITH TRAFFIC MANAGEMENT PLAN

The Design-Builder shall be responsible for coordinating traffic communications with neighboring construction projects, as part of an established coordinated communications plan. Refer to Section 2.22 for additional traffic coordination requirements.

2.9.6.5.1 Maintenance of Traffic and Access

The Design-Builder shall provide maintenance of traffic and access information for the entire Project to commuters, residents, and businesses, which are affected by the work at least two weeks prior to any revision to access in the area affected. Notifications shall include the following:

- Purpose of the change;
- Area affected and dates of impact;
- Alternate routes and detours; and
- A contact person for further information.

2.9.6.5.2 Traffic Conditions

The Design-Builder shall inform the Traffic Systems Management Center and WSDOT Project personnel of any unusual traffic conditions, such as road obstructions, within 15 minutes of detection.

2.9.6.5.3 Commercial Vehicle Access and Restriction Information

Fourteen Calendar Days prior to any activity taking place that may restrict or impede the movement of commercial vehicles due to reduced lane widths, reduced height clearances, or lower weight limits, the Design-Builder shall coordinate and provide the following agencies with a description, start date, and end date of the event:

- Washington State Patrol;
- WSDOT's Northwest Region Communications Manager;
- WSDOT's Commercial Vehicle Office;
- Washington Trucking Association;
- Community Transit

2.9.6.5.4 Emergency Vehicle Access

The Design-Builder shall develop a protocol for communicating information to the emergency service providers regarding access to the Project area for emergency vehicles. This protocol shall be included in the PIP.

2.9.6.5.5 Bicycle, Pedestrian, and Handicapped Mobility Access

The Design-Builder shall clearly define and communicate to WSDOT access routes for bicycles, pedestrians, and handicapped persons, including alternate routes and detours. Pedestrian and handicapped access must be in accordance with Section 2.22.

2.9.7 METHODS AND TOOLS FOR DISSEMINATION OF INFORMATION

2.9.7.1 HIGHWAY ADVISORY RADIO (HAR)

The Design-Builder shall provide timely and accurate information daily or as requested by WSDOT for HAR messages. The Design-Builder shall prepare draft messages for advance notice of traffic restrictions due to planned construction activities, for WSDOT to record.

2.9.7.2 VARIABLE MESSAGE SIGNS (VMS)

The Design-Builder shall prepare draft messages for advance notice of traffic restrictions due to planned construction activities.

2.9.7.3 INTENTIONALLY OMITTED

2.9.7.4 TELEPHONE HOTLINE

WSDOT will establish, manage, and maintain a telephone hotline for the Project. The Design-Builder shall provide material for recorded updates of current construction impacts, traffic impacts, and Project progress, as needed.

2.9.7.5 PROJECT WEB SITE

The Design-Builder shall provide information on lane closures, detour routes, re-channelization plans, road condition information, and other construction-related issues relevant to the public. The information, including graphics and photos, shall be updated on a regular basis, as determined by WSDOT and the Design-Builder.

2.9.7.6 COLLATERAL MATERIALS

In addition to the dissemination of construction information discussed in this Section, the Design-Builder shall produce and disseminate written materials regarding construction issues specific to the Project, which may include, but are not limited to, schedule, noise, lights, and fugitive dust. Materials shall be made available to the public as requested through U.S. mail, e-mail, WSDOT's Web site, and at individual and group meetings. WSDOT and the Design-Builder shall determine jointly when materials shall be distributed to businesses and neighborhoods; the size of the distribution area; and the content of the materials.

2.9.7.7 CORRESPONDENCE AND E-MAIL

Although correspondence with the public is the primary responsibility of WSDOT, the Design-Builder will assist in providing information for WSDOT staff to use in responding

to public concerns and questions. The Design-Builder shall designate a staff person to assist WSDOT with public correspondence. If necessary, WSDOT staff will ask the Design-Builder to respond to public inquiries by phone. The Design-Builder will forward any emails from the public to the WSDOT Public Information Lead for the Project.

The Design-Builder shall furnish written documentation of other Project-related correspondence to WSDOT within one week of the communication. Project-related correspondence shall include communications with the public, businesses, community groups, and government entities affected by the Project, and other communications required in this RFP. This includes tracking responses to callers and providing weekly status report file to WSDOT.

2.9.7.8 OPEN HOUSES, SPECIAL EVENTS, PUBLIC MEETINGS, AND SPEAKING ENGAGEMENTS

The Design-Builder shall assist in one public open house or media event to inform the public of the Project's status, and to answer questions related to the Project. Alternate approaches to open houses such as the distribution of mailers that actively engage and inform as many people as possible are encouraged.

The Design-Builder shall provide Project information to assist WSDOT with outreach to community groups, including but not limited to, local jurisdictions, neighborhoods, businesses, truckers, shippers, transit agencies, employee transportation coordinators, tribes, and environmental groups. The Design-Builder shall be available to attend public and community meetings or to make presentations, at WSDOT's request. The Design-Builder shall support WSDOT by helping staff with an opening event, such as a groundbreaking and a ribbon cutting or dedication ceremony, including permission for WSDOT and the media to access the work zone, when the Project is complete.

2.9.7.9 PHOTOGRAPHS AND VIDEO

The Design-Builder shall document construction, public outreach, and other Project-related events using photographs and video. The documentation shall be used for public communications, media relations, and WSDOT archival purposes. WSDOT will review the final version before release. The Design-Builder shall comply with the following standards:

- Produce and distribute photos and videos as requested by WSDOT; and
- Track and file photos and videos using the Project's documentation system.

2.9.7.10 EVENTS

The Design-Builder shall coordinate, communicate, and provide a plan to minimize construction impacts for public events held by public and private entities. The Design-Builder shall develop and maintain a list of public events. Examples of public events include, but are not limited to, the Lake Stevens Aqua Fest, Marysville Strawberry Festival; Seafair events; Memorial Day events; July 4th festivities; and picnics and parades in communities along the Project corridor. The Design-Builder shall notify WSDOT of planned events that may be affected by construction 14 Calendar Days before the event takes place, and submit weekly updates to the special events listing.

2.9.7.11 MEDIA RELATIONS

Although media relations are the responsibility of WSDOT, the Design-Builder shall participate in media interviews or other media information support activities at WSDOT's request. When participating in media inquiries and interviews, the Design-Builder shall provide information that complies with WSDOT messaging and other standards, including requirements for advance Project information, Project progress and accountability, and timely response to media inquiries.

The Design-Builder shall coordinate all media requests with WSDOT prior to interviews. WSDOT will be the media spokesperson. The Design-Builder shall provide WSDOT with information and access to key Project staff for press interviews, as requested.

At WSDOT's request, the Design-Builder shall conduct tours of the Project site for media, local or State government officials, or WSDOT management. The Design-Builder shall provide information and materials that meet local broadcast and print media requirements and deadlines. All information released to the news media must be reviewed and approved by WSDOT prior to release.

2.9.8 UTILITY SHUT-OFFS

The Design-Builder shall conduct regular communication with residents and businesses affected by Utility shut-offs, to mitigate the impacts of Utility disruptions. The Design-Builder shall contact and provide written notification to all residents and businesses affected 48 hours in advance of a Utility shut-off, and shall maintain a record of each notification. Notices shall indicate the purpose and expected duration of the outage, and provide information indicating how those affected by the outage can contact the Design-Builder. Notices shall meet WSDOT's communications style and be pre-approved by WSDOT Public Information staff before dissemination. Such notices may also be provided by WSDOT.

In the event of an emergency involving a Utility shutoff, the Design-Builder shall notify the Utility Owner in accordance with Utility company standards and local emergency services.

A contact list of representatives for Utility companies with facilities within the Project site is shown in Appendix U3.

2.9.9 CONSTRUCTION TRAFFIC MITIGATION

The Design-Builder shall collaborate with WSDOT's Public Involvement Team on opportunities to work with transportation coordinators, transit agencies, local chambers of commerce, school districts teams, retail centers, businesses, communities, and others, to encourage more efficient use of highways and roadways. The Design-Builder shall work with the Public Involvement Team on marketing plans to contact these entities, and to keep them informed of construction activities. The Design-Builder shall participate in meetings with the Public Involvement Team and with WSDOT construction mitigation staff, as required.

2.9.10 QUALITY ASSURANCE AND QUALITY CONTROL

The Design-Builder shall maintain a high level of quality control for all public information tools and materials. The Design-Builder shall be bound by the provisions of the Quality Management Plan for all public information. The PIP shall outline a process for managing review and resolution of comments for all communications materials, both within the

Design-Builder's team and with WSDOT. WSDOT will provide the Design-Builder with periodic feedback and suggestions for improvement. The Design-Builder shall be responsible for implementing any changes required by WSDOT.

2.9.11 SUBMITTALS

Project submittals include, but are not limited to, the following:

- Project Contact Call List – Submitted within 30 Calendar Days of Contract execution;
- Communications planning workshop date and draft agenda within 30 Calendar Days of Contract execution;
- Weekly Progress Reports – Format to be established within 30 Calendar Days of Contract execution, with reporting beginning immediately thereafter;
- Construction Information;
- Emergency Response Protocol;
- Project Identification Signs;
- Telephone Hotline Information; and
- Photos and videos.

End of Section

2.10 UTILITIES AND RELOCATION AGREEMENTS

2.10.1 GENERAL

2.10.1.1 SCOPE

WSDOT has identified Utilities that may require Utility Relocation to accommodate the Project. The Utilities are briefly described below. Unless expressly stated otherwise, the specific descriptions of Relocations Work in this Section 2.10.1.1 do not limit or replace the general requirements of this section.

Additional Relocation Work may be necessary to construct the Project. The Design-Builder shall be responsible for determining what, if any additional Utility Relocations will be required; and shall work with Utility Owners to design and construct such relocations in compliance with the Contract.

Incidental Utility Work and any additional Relocation Work that becomes necessary due to the Design-Builder's correction of any inaccuracies in the Utility Information, changes made by the Design-Builder to the Conceptual Plans, or otherwise, are addressed in this Section and in Section 1-07.17 of the General Provisions.

The following list is not a complete description of all Utilities in the area. Unless noted otherwise, depending on the design, these Utilities may or may not require Relocation. See Appendix U2 and Appendix U4 for Utilities approximate location and contact list.

Potential conflict with proposed drainage.
Snohomish County PUD
Water - (425) 783-8605
Power – (425) 783-1000

Potential conflict with proposed drainage.
Puget Sound Energy
Gas – (888) 225-5773

Potential conflict with proposed drainage, sidewalk and ramp SR92
Frontier Communications
Telephone – (407-539-0644

Potential conflict with proposed drainage.
Comcast Cable
Fiber Optic – (800) 266-2278

Potential conflict with proposed sidewalk ramp.
Lake Stevens Sewer District
Sewer – (425) 334-8588

2.10.2 MANDATORY STANDARDS

2.10.2.1 GENERAL

All Utility Work (whether performed by the Design-Builder or by the Utility Owner) shall comply with the Mandatory Standards, all applicable Governmental Rules, any applicable

permits or franchises, the Standards required by the applicable Utility, and any applicable Utility Standards provided in the RFP Appendices. The Design-Builder is responsible for obtaining Utility Standards from the Utility Owners, and for obtaining all other Mandatory Standards relating to the Utility Work.

The following is a list of publications that shall be used for all design and construction. They are listed in hierarchical order, with the most important appearing at the top of the list. If there is a conflict between or among any of the Mandatory Standards applicable to Relocation, the most stringent standard shall prevail. If the Design-Builder's Proposal requirements exceed the requirements of other Mandatory Standards, the Proposal requirements shall prevail. This is not a comprehensive list; other applicable publications may be required to complete the design and construction. If the Design-Builder becomes aware of any ambiguities or conflicts relating in any way to the Mandatory Standards, the Design-Builder shall notify WSDOT immediately before proceeding with design and construction, so that WSDOT may resolve them.

- Utility Standards (applicable to the particular Utility Owner).
- Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards - 49 CFR 192.
- Special Provisions (Appendix B2).
- Amendments to the Standard Specifications (Appendix B1).
- Standard Specifications (M41-10) (Appendix D18).
- WSDOT *Utilities Manual* (M22-87) (Appendix D21).
- WSDOT *Utilities Accommodation Policy* (M22-86) (Appendix D20).
- WSDOT *Local Agency Guidelines* (M36-63) (LAG) (Appendix D8).
- Standard Plans (M21-01) (Appendix D17).
- Design-Builder's Proposal.

2.10.3 PERFORMANCE REQUIREMENTS

2.10.3.1 REIMBURSEMENT OF AND COLLECTION FROM UTILITY OWNERS

2.10.3.1.1 Reimbursement of Utility Owners - General

The Design-Builder shall promptly deliver to WSDOT copies of all invoices received from Utility Owners. If the Design-Builder fails to make any payment to a Utility Owner as specified in Section 1-07.17 of the General Provisions or elsewhere in the Contract on or before the deadline stated in the applicable Relocation Agreement (or if no deadline is stated, within 30 Calendar Days after receipt of the Utility Owner's invoice), then WSDOT will have the right to pay the Utility Owner the amount due (including any interest and/or penalties). If WSDOT pays a Utility Owner, the Design-Builder shall reimburse WSDOT for such payment within 14 Calendar Days after receipt of WSDOT's invoice; or WSDOT, at its discretion, may deduct the amount of reimbursement due from the payment (or payments, if necessary) next due to the Design-Builder under the Contract.

2.10.3.1.2 Collection from Utility Owners - General

The Design-Builder shall promptly deliver to WSDOT copies of all invoices sent to Utility Owners. If the Utility Owner fails to make any payment to the Design-Builder for Relocation Costs consistent with the applicable franchise, permit, and Governmental Rules, the Design-Builder shall notify WSDOT.

The Relocation Agreements shall be consistent with the applicable franchise permit and Governmental Rules. These agreements shall address any Utility Relocation costs.

2.10.3.2 MAINTENANCE AND CARE DURING CONSTRUCTION

The Design-Builder shall carry out all Work affecting Utilities carefully and skillfully, and shall support, secure, and exercise care with respect to Utilities to avoid damaging them.

The Design-Builder shall ensure continuity of all existing Utility services to all users, except when a Utility Owner determines that temporary interruption is necessary and acceptable.

The Design-Builder shall not move or remove any Utility without the written consent of the Utility Owner, unless otherwise directed by WSDOT.

The Design-Builder shall comply with all Applicable Laws relating to grading or excavation in the area of underground Utilities. Before starting construction that may affect any Utility in a particular area (whether underground or overhead), the Design-Builder shall notify the affected Utility Owners in writing at least 30 Calendar Days prior to commencement of the Work. The Design-Builder shall contact the One-Call Locate Center (1-800-424-5555) prior to performing any excavation. The Design-Builder shall maintain all appropriate clearances from active power lines in accordance with WAC 296-155-428.

If any Utilities are damaged by the Design-Builder's activities, the Design-Builder shall immediately notify the affected Utility Owner, the One-Call Locate Center, and WSDOT. The Design-Builder shall pay for all costs associated with damage caused by the Design-Builder, including Utility down-time; all reconstruction; all remediation of hazards; litigation; loss of product; and Utility start-up and delay costs. At the Utility Owner's request, the Design-Builder shall repair the damage, or the Utility Owner may choose to repair the damage at the Design-Builder's expense. All repairs by the Design-Builder shall be performed to the reasonable satisfaction of the Utility Owner. The Design-Builder shall pay any reimbursement due to the Utility Owner because of any damage caused by the Design-Builder within 30 Calendar Days after receipt of the Utility Owner's invoice, unless otherwise provided in an applicable Relocation Agreement.

2.10.3.3 GOVERNMENT APPROVALS AND OTHER PERMITS

The Design-Builder shall obtain or ensure that the Utility Owner obtains all Governmental Approvals and any other clearances, permits, approvals, and agreements necessary for a Relocation; and shall verify that the same have been obtained prior to commencing or permitting the commencement of any construction. The Design-Builder shall verify that the Work performed (whether by the Design-Builder or by or on behalf of the Utility Owner) complies with the requirements of such Governmental Approvals and other clearances, permits, approvals, and agreements.

2.10.3.4 ACCESS TO EXISTING UTILITIES

Any authorized agent of WSDOT, a Utility Owner, or a Utility Owner's representative may enter the Right of Way to inspect, repair, maintain, rearrange, alter, or connect Utility facilities and equipment. The Design-Builder shall cooperate with such efforts and shall avoid creating delays or hindrances to the performance of such Work. If the Design-Builder determines, or a Utility Owner requests, that a Utility Owner must be on site to protect its facility, the Design-Builder shall provide at least seven Calendar Days advance notice to the Utility Owner.

2.10.3.5 BMPS AND TEMPORARY EROSION AND SEDIMENTATION CONTROL

Regardless of who performs or pays for any Relocation Work, the Design-Builder shall ensure that appropriate Best Management Practices and Temporary Erosion and Sedimentation Control measures are followed in the performance of Utility Work. Refer to Section 2.8 for Best Management Practices and Temporary Erosion and Sedimentation Control requirements.

2.10.4 RELOCATION AGREEMENTS, FRANCHISES, AND PERMITS

2.10.4.1 RELOCATION AGREEMENTS

2.10.4.1.1 Requirements

Each Relocation (other than Relocations subject to a Prior Relocation Agreement or an Intergovernmental Agreement, and any Protections in Place) shall be addressed in a Relocation Agreement entered into between the Design-Builder and the Utility Owner as required by Section 1-07.17 of the General Provisions. The Design-Builder shall prepare and negotiate each Relocation Agreement including such exhibits as may be appropriate, and shall prepare and provide all Project information (e.g., reports, plans and surveys) necessary to negotiate the Relocation Agreement. For each Relocation, the Design-Builder shall initiate contact with the Utility Owner at the earliest possible time in order to begin working with the Utility Owner to develop a Relocation Agreement and a Relocation Plan that meet the Project design and schedule.

The Design-Builder shall refer to Chapter 2 of the WSDOT *Utilities Manual* for guidance in preparing Relocation Agreements. At a minimum, each Relocation Agreement shall set forth the specific details of the Work, which typically include the following:

- The nature and location of relocated facilities;
- Allocation of responsibility for design, construction, and other relocation tasks;
- Applicable standards;
- Cost responsibility, cost estimates, and eligibility of costs for reimbursement, if applicable;
- Reimbursement procedures, where appropriate;
- Schedules;
- Joint use issue resolution; and
- Procedures for design review and approval including inspection of construction, acceptance of the Relocation Work, and such other provisions as may be appropriate or reasonably required by WSDOT.

Cost Responsibility for each Relocation shall be determined in accordance with Section 1-07.17 of the General Provisions, unless otherwise directed by WSDOT. Each Relocation Agreement shall designate WSDOT as a third-party beneficiary. Schedules for completion of the tasks specified in each Relocation Agreement shall conform to the Contract Schedule, which shall provide reasonable and adequate time for each task.

The Design-Builder shall provide WSDOT with the opportunity to participate in negotiations of Relocation Agreements in accordance with Section 1-07.17 of the General Provisions. Accordingly, the Design-Builder shall give WSDOT at least seven Calendar Days advance notice of negotiation sessions. The Design-Builder shall submit draft minutes of each negotiation session to WSDOT within seven Calendar Days after the session, and final minutes incorporating any WSDOT comments within seven Calendar Days after WSDOT provides its concurrence.

No material modifications to the Relocation Work or terms of a fully-executed Relocation Agreement shall be made without processing a revision to the Relocation Agreement using the procedures described above.

2.10.4.1.2 Process for WSDOT Review

2.10.4.1.2.1 Draft Relocation Agreement

The Design-Builder shall submit a draft of each Relocation Agreement and exhibits to WSDOT for Review and Comment. The submittal shall also include the most current copy of the sections of the Design Documents that identify the Utility facilities being affected by the Project. WSDOT will review and deliver its comments within 14 Calendar Days from receipt of the draft document. WSDOT's failure to respond within this time frame does not constitute an approval of the terms or form of the submittal. The Design-Builder shall incorporate all WSDOT comments into the Draft Relocation Agreement, and obtain WSDOT approval prior to submitting it to the Utility Owner. The Design-Builder shall deliver each Draft Relocation Agreement concurrently to WSDOT and the Utility.

2.10.4.1.2.2 Final Relocation Agreement

The Final Relocation Agreement shall be submitted to WSDOT for review at least 20 Calendar Days prior to the date scheduled for its full execution. A Relocation Agreement shall be considered final and ready for execution when all of its provisions have been reviewed and approved by WSDOT through the review process described above.

2.10.4.2 New Franchises and Permits

A permit or franchise is required for any Utility Work within Right of Way in which the Utility Owner has not established a property right. The Utility Owner shall prepare an application for a new franchise or permit simultaneously with preparation of the Relocation Agreement or design of modifications necessary for Protection in Place. The Design-Builder shall ensure that the Utility Owner submits an application for a new franchise or permit to WSDOT as far in advance of construction as possible, but in any event not later than 30 Calendar Days prior to construction. The application and Relocation Agreement shall be revised as necessary to obtain a franchise or permit from WSDOT.

The Design-Builder shall ensure that a new franchise or permit has been issued by WSDOT prior to beginning construction of any Relocation or Protection in Place. A new franchise or permit is not required for the abandonment, deactivation, disconnecting, or removal of an existing Utility from within the Right of Way. The Design-Builder shall

notify WSDOT of any abandoned Utility, noting the permit number and how it was abandoned, deactivated or disconnected. A list of existing Franchise/Permit Utilities is provided in the Utility Information (Appendix U2).

2.10.4.3 ASSIGNMENT/DELEGATION OF UTILITY PERMIT/FRANCHISE RIGHTS AND OBLIGATIONS

For each Franchise/Permit Utility determined by the Design-Builder as requiring Relocation, the Design-Builder shall prepare an "Assignment/Delegation of Utility Permit/Franchise Rights and Obligations" document in a form substantially similar to Appendix U1. The Design-Builder shall submit the completed document to WSDOT for approval and execution. The Design-Builder may begin working with a Utility Owner prior to execution of the document by WSDOT, provided that the document shall be submitted to WSDOT no later than the Design-Builder's submittal of the first draft of a Relocation Agreement.

If the Design-Builder determines that it will be unable to successfully negotiate a reasonable Relocation Agreement with the Utility Owner for a particular Franchise/Permit Utility, the Design-Builder shall notify the Utility Owner and WSDOT of such determination. The Design-Builder may, in addition to requesting assistance from WSDOT in accordance with Section 1-07.17 of the General Provisions, exercise the rights that have been assigned to it pursuant to the applicable Assignment/Delegation document, provided, however, that WSDOT makes no representation or warranty as to the Design-Builder's ability under the Assignment/Delegation document to enforce those rights in a manner that satisfies the Design-Builder's Project requirements, or at all.

2.10.5 IDENTIFICATION OF UTILITIES

2.10.5.1 INFORMATION SUPPLIED BY WSDOT

As specified in Section 1-07.17 of the General Provisions, WSDOT has performed certain investigations of existing Utilities located within the Right of Way. These investigations were preliminary, and their results may be inaccurate and/or incomplete. The Utility Information is provided in Appendices U2 through U4. The Design-Builder is advised of the following:

- WSDOT's investigations may have included making requests for "as-builts" from Utility Owners listed in the WSDOT database as having Franchise/Permit Utilities located within the Right of Way; visually locating above-ground Utility objects, including, but not limited to, poles, cabinets, vents, visible manholes, valve boxes, and vault covers; and surveying above ground objects.
- WSDOT has not identified Service Lines for this Project.
- The information shall not be utilized for determining Utility locations.

Refer to Section 1-07.17 of the General Provisions for the limited circumstances in which the Design-Builder may be entitled to an extension of the Contract Time or an increase in the Contract Price because of delays and/or increased costs of the Work that are directly attributable to the correction of inaccurate Utility Information. Unless specified otherwise, the Design-Builder's reliance on any Utility Information is at the Design-Builder's sole risk.

2.10.5.2 UTILITY EASEMENTS

All Utility Easements (existing and proposed) within the Project limits shall be identified or described by the Design-Builder in the Final Design Documents. All new Utility Easements within the Right of Way are subject to prior review and comment by WSDOT.

2.10.5.2.1 Project Utility Easements

WSDOT investigations have identified two utilities that has easement rights within the Project limits:

Bonniville Power Transmission Line

City of Seattle Power & Light Transmission Line

2.10.5.2.2 New Utility Easements

The Design-Builder is advised that WSDOT does not obtain easements for Utilities outside of the Right of Way. Utility Owners are entitled to reimbursement of their costs for acquiring such easements only if WSDOT determines that they held a pre-existing property right entitling them to such reimbursement.

2.10.5.3 DESIGN-BUILDER'S INVESTIGATIONS

The Design-Builder shall be solely responsible for verifying, at its expense, the exact horizontal and vertical location, size, type, and all other relevant characteristics of all Utilities located within the Right of Way or otherwise potentially impacted by the Project (including any Utilities located on private property), whether or not such Utilities are shown in the Utility Information. All information verifying the utilities shall be provided to WSDOT. Any unknown utilities that are discovered during the progress of the project shall be identified, located noting horizontal and vertical location and size of the utility facility found. All information about the found utility shall be given to WSDOT. Such actions shall include making diligent inquiry at the offices of the Utility Owners, consulting public records, and conducting field studies, as appropriate. The Design-Builder shall consider the possibility that the Utility Information and the information provided by Utility Owners may be inaccurate and incomplete.

Refer to Section 1-07.17 of the General Provisions for the Design-Builder's obligations upon determining that any Major Underground Utility was not identified in the Utility Information with Reasonable Accuracy, or identifying any other Utilities not described in the Utility Information.

2.10.5.4 UTILITY MANAGEMENT PLAN

The Design-Builder shall maintain a Utility Management Plan in tabular form, in both electronic and hard copy formats, which shall list each existing and proposed Utility located within the Right of Way or otherwise potentially impacted by the Project. The Design-Builder shall provide an original copy of the Utility Management Plan and monthly updates to the WSDOT NW Region Utility Office. At a minimum, the Utility Management Plan shall include the following information for each listed Utility:

- The name of the Utility Owner;
- A brief description of the Utility by size and type;
- The location of the Utility;

- The proposed disposition (e.g., relocation, Protection in Place) for the Utility;
- The determination as to whether the Utility is a Category 1 Utility or a Category 2 Utility, based on information provided by WSDOT;
- The nature of the Utility Owner's right of occupancy of the Right of Way for such Utility (e.g., franchise, permit, easement), based upon information provided by WSDOT and the Utility;
- The status of the applicable Relocation Agreement;
- The status of Utility design and construction activities; and
- Such additional information as WSDOT shall reasonably request.

The Design-Builder shall update the Utility Management Plan to reflect revisions to Utility Information and status as new information is received.

2.10.6 SCHEDULING, COORDINATION, AND CORRESPONDENCE

2.10.6.1 SCHEDULING

The Contract Schedule shall identify all Utility Work and allow sufficient time for completion of all such Work.

2.10.6.2 COORDINATION RESPONSIBILITIES

The Design-Builder shall be responsible for coordination with all Utility Owners with Utilities located within the Project limits. Such responsibilities shall include obtaining information from and providing information to the Utility Owners; notifying Utility Owners that Utilities affected will require relocation; coordination and scheduling of design review, inspections, approvals, and acceptances; and coordination and scheduling of construction Work. The Design-Builder is responsible for monitoring the progress of Work by Utility Owners, and for resolving any scheduling difficulties with them.

The Design-Builder shall keep Utility Owners informed of the Design-Builder's construction schedules, and of changes which affect their Utilities. The Design-Builder shall also provide Utility Owners with sufficient time to notify their customers of any potential impacts to service.

The Design-Builder shall cooperate with the Utility Owners to the extent that such cooperation is consistent with the Design-Builder's obligations pursuant to the Contract and the scope of Work. The Design-Builder shall act diligently in maintaining a positive relationship with the Utility Owners.

2.10.6.3 NOTICES AND CORRESPONDENCE BETWEEN THE DESIGN-BUILDER AND UTILITY OWNERS

All notices to Utility Owners from the Design-Builder shall be in writing unless otherwise specified. The Design-Builder shall deliver to WSDOT copies of all correspondence between the Design-Builder and the Utility Owner within seven Calendar Days of receipt or sending, as applicable.

2.10.6.4 MEETINGS WITH UTILITY OWNERS

The Design-Builder shall implement a schedule of periodic coordination meetings with each Utility Owner affected by the Work. Such meetings shall commence as early as

possible in the Project design process and shall continue until Completion of the Project (or Completion of the Utility Owner's Relocations, if earlier). Such meetings shall include a preliminary design meeting for the Design-Builder and Utility Owners affected to meet and familiarize themselves with design elements, Utility facilities, and general features of the Project. Thereafter, the frequency of meetings between the Design-Builder and each Utility Owner affected shall be appropriate to the matters under discussion. The Design-Builder shall notify WSDOT at least seven Calendar Days in advance of each meeting, and shall allow WSDOT the opportunity to participate in each meeting.

2.10.6.5 MEETINGS BETWEEN WSDOT AND THE DESIGN-BUILDER

Both WSDOT and Design-Builder representatives shall be available to meet as necessary at the request of either party to discuss and resolve matters relating to Utility Work. The Design-Builder shall schedule such meetings at the reasonable convenience of WSDOT's representatives.

2.10.6.6 MEETING MINUTES

The Design-Builder shall record and maintain minutes of all meetings with Utility Owners and/or WSDOT with respect to Relocation and Utility Work. The Design-Builder shall deliver copies of these meeting minutes to the meeting attendees and make available to WSDOT within seven Calendar Days after each meeting.

2.10.6.7 CONTACT INFORMATION

Utility Owners with Utilities potentially affected by the Project are listed in Appendix U2. The information provided for those Utility Owners includes contact names and mailing addresses. The contact information is current as of the date of issuance of this RFP. The Design-Builder shall be responsible for verifying the accuracy of the contact information and maintaining current contacts for all Utilities affected by the Project, whether or not such Utility Owners are listed in Appendix U4.

2.10.7 DESIGN REQUIREMENTS

2.10.7.1 GENERAL DESIGN CRITERIA

The Design-Builder shall be responsible for verifying that all design plans for Relocation Work, whether furnished by the Design-Builder or by the Utility Owner, are consistent and compatible with the following:

- WSDOT Accommodation Policy Manual requirements.
- The requirements specified in this Section;
- The requirements of the applicable Relocation Agreements and Intergovernmental Agreements;
- The Design-Builder's design and construction of the Project;
- Any other Utilities being installed in the same vicinity; and
- The terms and conditions of all applicable new and/or amended permits and franchises.

The Design-Builder shall confirm that all Relocations to be installed within a limited access Right of Way meet WSDOT's requirements as set forth in the Policy on Accommodation of Utilities on Highway Rights of Way (Chapter 468-34 WAC).

2.10.7.2 RELOCATION DESIGN FURNISHED BY THE DESIGN-BUILDER

Where the Design-Builder and the Utility Owner have agreed that the Design-Builder will furnish the Relocation design, the Design-Builder shall submit its design to WSDOT and the Utility Owner for Review and Comment. The Design-Builder shall coordinate any necessary modifications and re-submittals with WSDOT and the Utility Owner, and obtain written approval from the Utility Owner prior to commencing construction of the Relocation. All subsequent changes to Relocation designs shall be subject to the same review, comment, and written approval process.

The Design-Builder is advised that Category 2 Utility Owners are generally entitled to reimbursement of their design review costs as Relocation Costs.

2.10.7.3 RELOCATION DESIGN FURNISHED BY THE UTILITY OWNER

The Design-Builder shall coordinate the delivery of each Relocation design to be furnished by the Utility Owner pursuant to the applicable Relocation Agreement. The Design-Builder shall review each design for compliance with the specifications, and shall provide comments to the Utility Owner as appropriate. The Design-Builder shall submit the Relocation design to WSDOT for Review and Comment; transmit WSDOT comments to the Utility Owner; and coordinate modification and re-submittal as necessary.

2.10.8 CONSTRUCTION REQUIREMENTS

2.10.8.1 GENERAL CONSTRUCTION CRITERIA

The Design-Builder shall be responsible for verifying that all construction of Relocation Work, whether performed by the Design-Builder or by the Utility Owner, complies with the following:

- WSDOT Accommodation Manual
- The requirements specified in this Section;
- The requirements of the applicable Relocation Agreements;
- The approved plans for construction;
- The Design-Builder's design and construction of the Project;
- Any other Utilities being installed in the same vicinity; and
- The terms and conditions of all applicable new and/or amended permits and franchises.

The Design-Builder shall cooperate with the Utility Owner to obtain all necessary permits, and assure that Utility Owners meet all Project safety and environmental requirements.

2.10.8.2 SPECIAL QUALIFICATIONS

For any Relocations for which the Design-Builder is assigned responsibility for construction as specified in this Section and in Section 1-07.17 of the General Provisions, and for which special qualifications are required by the Utility Owner to perform such

construction, the Design-Builder shall utilize (or cause its subcontractors to utilize) qualified personnel acceptable to the Utility Owner to perform such Relocation Work.

2.10.8.3 INSPECTION

The Design-Builder shall perform all inspection, sampling, and testing of the Utility Owner's and the Design-Builder's Relocation Work necessary to comply with its obligations under the Contract, Relocation Agreements, and the Quality Management Plan. The Design-Builder shall immediately notify WSDOT and the Utility Owners regarding any noncompliance.

Each Utility Owner shall have the right to inspect construction performed on its Utilities by the Design-Builder. The Design-Builder shall not refuse the inspection requests, and shall coordinate a mutually agreeable schedule and scope with the Utility Owner for the inspections. The Design-Builder shall inform the Utility Owner in writing, prior to commencing any Work, so that the Utility Owner may report such deficiencies to the Design-Builder's Construction Quality Assurance Manager for resolution.

The Design-Builder shall obtain the Utility Owner's written acceptance of each Utility for which the Design-Builder performs construction Relocation Work, promptly upon completion of the Work. The Design-Builder shall submit the original document of each written acceptance to WSDOT.

2.10.8.4 INTENTIONALLY OMITTED

2.10.8.5 ABANDONMENT AND REMOVAL

The Design-Builder shall remove any permanently out of service Utility facility from the Right of Way unless WSDOT approves abandonment, deactivation or disconnection, of the facility in place. Abandonment, Deactivation or Disconnection, in place shall mean allowing elements of the Utility facility to remain in the Right of Way following flushing, capping, grouting, and other Work required to meet Utility Standards and/or Applicable Law (whichever is more stringent).

The Design-Builder shall be responsible for all Work associated with the removal and disposal of permanently out of service Utility facilities. If WSDOT approves abandonment, deactivation or disconnection, in place of a Utility, the Design-Builder shall make all arrangements and perform all Work necessary for any proposed abandonment, deactivation or disconnection, including design, construction, and consent from Utility Owners and landowners. The Design-Builder shall also obtain any necessary Governmental Approvals and WSDOT approvals and/or permits, or the Design-Builder shall confirm that the Utility Owner has performed the same.

Any Utility abandoned, deactivated or disconnected, outside of the Right of Way shall be abandoned in accordance with the Utility Owner's Utility Standards.

The Design-Builder shall notify WSDOT in writing of any Utilities that will be abandoned, deactivated, disconnected, or removed.

2.10.8.6 PROTECTION IN PLACE

The Design-Builder shall be responsible for Protecting in Place (or causing to be Protected in Place by the Utility Owners) all Utilities impacted by the Project (including any Utilities remaining in place, any Utilities installed during the course of the Work, and any Prior Relocations), as necessary to ensure their continued safe operation and structural integrity,

in accordance with the requirements of this Section. WSDOT's prior written approval shall be required for any Utilities proposed to remain in their existing locations other than Prior Relocations.

Protection in Place may be permanent or temporary, depending upon the types of measures that are necessary to satisfy the specific requirements of a particular Utility. Any permanent Protection in Place must be recorded as a change to the WSDOT issued permit or franchise for that utility. The Design-Builder shall provide documentation describing the Protection in Place including type of protection installed, location (horizontal and vertical) and milepost.

If the Design-Builder incurs a cost to implement a design to avoid or to provide permanent protection of a Category # 1 Utility, the cost associated with such modification shall be recovered directly from the Utility Owner. The cost for such modifications shall not be included in the lump sum bid cost for the Contract or as a basis for any change order.

2.10.8.7 FIRE PROTECTION

The Design-Builder shall replace in kind any fire hydrants that are impacted by construction of the Project. Costs associated with design and installation shall be included in the original lump sum Contract price.

2.10.8.8 MAINTENANCE OF SERVICE

All Utilities shall remain operational during all phases of construction, except as specifically allowed and approved in writing by the Utility Owner. The Design-Builder shall obtain the Utility Owner's approval in writing prior to any temporary diversion or interruption of service of affected Utility facilities.

2.10.8.9 MAINTENANCE OF TRAFFIC

The Design-Builder shall be responsible for ensuring that all traffic control is safe and has efficient traffic flow during the Utility Work. Refer to Section 2.22 for Maintenance of Traffic requirements. The Utility Company shall prepare Traffic Control Plans for approval by WSDOT. Traffic Control Plans for Utility Work shall be approved by WSDOT prior to the start of any Utility work.

2.10.8.10 STREET RESTORATION

The Design-Builder shall ensure that resurfacing, restoration, and re-striping of all streets, roadside features, or other affected areas are constructed in compliance with the standards of the local agency with jurisdiction over the affected facilities.

2.10.8.11 ENVIRONMENTAL COMPLIANCE PERTAINING TO UTILITY WORK

The Design-Builder shall comply with all applicable Environmental Laws in performance of Utility Work. Refer to Section 2.8 for environmental requirements.

2.10.8.12 MAINTENANCE OF RECORDS

2.10.8.12.1 Construction and Inspection Records

The Design-Builder shall maintain construction and inspection records in order to ascertain that the Work proposed in a Relocation Agreement is accomplished in accordance with the approved plans and the requirements of the Contract.

2.10.8.12.2 Utility As-Built Plans

Upon Physical Completion of the Project (or upon completion of the Utility Relocations, if earlier), the Design-Builder shall deliver to WSDOT a complete set of Utility As-Built Plans and design files that incorporate all changes and details of the Relocation Work. All As-Built Plans shall be of a quality and format acceptable to WSDOT, showing the location of all Utilities within the Right of Way and any Utilities located outside of the Right of Way that were part of the Relocation Work.

Refer to Section 2.12 for final project documentation requirements.

End of Section

2.11 ROADWAY DESIGN

2.11.1 GENERAL

The Design-Builder shall conduct all Work necessary to complete the roadway design and grading elements for the Project.

2.11.2 MANDATORY STANDARDS

The following is a list of publications that shall be used for all design and construction. They are listed in hierarchical order, with the most important appearing at the top of the list. This is not a comprehensive list; other applicable publications may be required to complete the design and construction. If the Design-Builder becomes aware of any ambiguities or conflicts relating in any way to the Mandatory Standards, the Design-Builder shall notify WSDOT immediately, so that WSDOT may resolve them.

- Special Provisions (Appendix B2).
- Amendments to the Standard Specifications (Appendix B1).
- Standard Specifications (M41-10) (Appendix D18).
- WSDOT *Design Manual (Chapter 1510 Pedestrian Facilities)* (M22-01) (DM) (Appendix D3).
- Standard Plans (M21-01) (Appendix D17).
- WSDOT *Plans Preparation Manual* (M22-31) (Appendix D12).
- WSDOT *Local Agency Guidelines* (M36-63) (LAG) (Appendix D8).
- AASHTO *A Policy on Geometric Design of Highway and Streets*, 5th Edition, 2004.
- AASHTO *Roadside Design Guide*, 3rd Edition, 2002, and 2006 Chapter 6 Update.
- ADA Accessibility Guideline (ADAAG), US Access Board.
- AASHTO *Guide for the Planning, Design, and Operation of Pedestrian Facilities*, 1st Edition, 2004.
- *Washington State Modifications to the Manual on Uniform Traffic Control Devices* (M24-01) (MUTCD).
- FHWA *Manual on Uniform Traffic Control Devices for Streets and Highways* (MUTCD), 2003.
- FHWA *Flexibility in Highway Design*, 1997.

2.11.3 PERFORMANCE REQUIREMENTS

The Design-Builder may propose revisions to the roadway design and grading shown in the Conceptual Plans (Appendix M1). The Design-Builder shall consult Section 1-04 of the General Provisions and Section 2.8 for the cost and schedule responsibilities when such changes require modifications to the Basic Configuration and/or to the Project permits.

2.11.4 DESIGN REQUIREMENTS

2.11.4.1 MANDATORY DESIGN CRITERIA

- The SR 9 and SR 92 mainlines are categorized as Rural , Design Class I-1, with Parital Access Control Limited Access on SR 9, and Managed Access Class 2 on SR 92.
- The Project shall be designed to meet the Full Design Level with Rolling Terrain.
- The mainline design vehicle on SR 9 and SR 92 shall be a WB-67.
- A WB-50 shall be used for all of the turning movements at local roadways.
- In widening areas, superelevation transitions shall match the existing superelevation rates and lengths.
- The mainline design speed on SR 9 and SR 92 shall be 60 mph.
- All pedestrian facilities constructed shall be ADA compliant.
- The increase in total pollutant-generating impervious surface shall not exceed the acreage documented in the Commitments List (Appendix C1).
- Where practicable, retaining walls, roadside barrier, drainage inlets, and drainage trunk lines shall be constructed to be Forward Compatible with planned future widening. See Appendix M1 for Forward Compatible Channelization Plans.

2.11.4.2 INTENTIONALLY OMITTED

2.11.4.3 DESIGN DECISION MEMORANDA

Copies of design decision memoranda are included in the Design Decisions (Appendix O1). They identify the decisions made during development of the Conceptual Design and are provided to facilitate review and understanding of the Conceptual Plans.

2.11.4.4 ROADSIDE BARRIER SELECTION

All traffic barriers incorporated into the Project shall be in accordance with the Standard Plans

Within the Project limits, existing guardrail shall be evaluated for need, and shall be removed where not required. Existing guardrail shall also be evaluated to determine if it meets the current WSDOT design standards. Where it meets current WSDOT design standards, it may be left in place. Where it does not meet current WSDOT design standards, it shall be replaced by the Design-Builder. Existing guardrail that is removed shall be offered to WSDOT. If WSDOT decides to retain the guardrail, the Design-Builder shall deliver them to WSDOT Maintenance.

New guardrail type barrier shall not be incorporated into the Project unless otherwise specified in the RFP. All new or replaced guardrails, if required, shall be Beam Guardrail Type 31 or Beam Guardrail Type 31 NB.

2.11.4.5 IMPACT ATTENUATORS

All impact attenuators shall be Quadguard (standard or Elite), TAU II, or REACT350, and shall be designed according to the WSDOT *Design Manual*.

If the Design-Builder determines that none of the systems referenced above meet the design requirements for a proposed application, the Design-Builder shall submit an Impact Attenuator Technical Memorandum for WSDOT review and acceptance.

2.11.4.6 FENCING

Where newly installed fencing and/or walls will create a land-locked area, the Design-Builder shall install a gate that is accessible from the public right of way. Existing fencing along the limited access line which is not disturbed or displaced by construction of the Project may remain, and will not need to be replaced. Breaks in the Right of Way fencing shall conform to the WSDOT *Design Manual*, the Standard Plans, and the Standard Specifications. The Design-Builder shall show all fencing and gates on the construction drawings.

Fall protection fencing shall be provided in accordance with the WSDOT *Design Manual*.

2.11.4.7 SIDE-SLOPES

Side slopes shall be in accordance with Chapter 1230 of the WSDOT Design Manual. As discussed in Section 1230.06 of the WSDOT Design Manual, with justification, slopes steeper than shown in the tables in Exhibits 1230-1, 2, 3 and 4b may be used. For locations where steeper slopes are necessary due to Right of Way constraints, environmental constraints, or other constraints, the Design-Builder shall submit a technical memorandum in accordance with Section 2.12. The technical memorandum shall be submitted to WSDOT for review prior to Construction.

Side slopes shall be summarized in a side slope table on the construction drawings, and shall identify the baseline, station range, and side slope applied.

2.11.4.8 MAINTENANCE ACCESS

Maintenance access roads and road approaches to the access roads shall be designed according to the WSDOT *Design Manual*.

Access requirements for facilities constructed on the Project are addressed in the applicable sections of these Technical Requirements.

The Design-Builder shall design and construct drainage structures (manholes, catch basins, inlets, vaults, tanks, etc.) and landscaped areas inside the Right of Way to be accessible directly from roadway shoulders. The drainage structures and landscape areas shall not require a ladder or lift bucket to gain maintenance access to the access area or the cover/lid for drainage structures. If direct maintenance from the roadway shoulder cannot be provided, the Design-Builder shall design and construct an alternate access route that meets the requirements of the WSDOT *Design Manual*.

2.11.4.9 INTERSECTION DESIGN

With respect to number of lanes and storage lengths at intersections, the intersection configurations provided in the Conceptual Plans shall be the minimum. The Design-Builder may propose reductions in these characteristics of the design. Such proposals shall be supported by traffic operations analysis in accordance with Section 2.21 and accommodate the Forward Compatible Channelization Plan in Appendix M1. WSDOT's determination to accept or reject such proposals will be in its sole discretion and such determinations are not subject to the disputes process otherwise provided under the Contract.

2.11.5 INTENTIONALLY OMITTED

2.11.6 SUBMITTALS

2.11.6.1 DESIGN PARAMETER TABLE

The Design-Builder shall develop design parameter tables that include all of the design criteria shown on the design parameter tables in the Design Parameter Forms (Appendix O4). The Design-Builder shall revise the design parameter tables to reflect the current design at the time of each submittal. The design parameter tables shall be checked according to the QMP, and shall be submitted as part of the Project Development Approval Package. See Section 2.12.

2.11.6.2 ROADSIDE BARRIER TECHNICAL MEMORANDUM

For all existing and proposed roadside barrier, the Design-Builder shall prepare and submit a technical memorandum to WSDOT providing justification for need or removal of the roadside barrier. The technical memorandum shall include the following:

- Description of the roadside hazard including dimensions, station, off-set, narrative description, and photo documentation;
- Barrier length of need calculation;
- Plan layout of barrier including beginning and ending stations, off-set, terminal type, and barrier type; and
- Narrative documenting justification for the need or removal of roadside barrier, and the terminal type selection.

2.11.6.3 IMPACT ATTENUATOR TECHNICAL MEMORANDUM

The Design-Builder shall prepare and submit a technical memorandum when using a system other than the Quadguard (standard or Elite), TAU II, or REACT350. At a minimum, the technical memorandum shall include the following:

- Attenuator location;
- Proposed substitution, including justification describing the attributes of the proposed attenuator, making it the best product for the intended application; and
- Specific design rationale describing why one of the systems referenced above is not applicable.

The design and written justification shall be revised based on comments received during WSDOT reviews.

2.11.6.4 CLEAR ZONE INVENTORY

The Clear Zone Inventory shall be completed prior to the start of construction and updated to reflect all changes from the Project. Refer to Section 700 of the WSDOT *Design Manual*. The Clear Zone Inventory shall be included within the Design Documentation Package.

End of Section

2.12 PROJECT DOCUMENTATION

2.12.1 GENERAL

The Design-Builder shall conduct all Work necessary to complete the required documentation for the design and construction of the Project, and to obtain WSDOT acceptance of the final Project documentation.

2.12.2 MANDATORY STANDARDS

The following is a list of publications that shall be used for all design and construction. They are listed in hierarchical order, with the most important appearing at the top of the list. This is not a comprehensive list; other applicable publications may be required to complete the design and construction. If the Design-Builder becomes aware of any ambiguities or conflicts relating in any way to the Mandatory Standards, the Design-Builder shall notify WSDOT immediately, so that WSDOT may resolve them.

- Special Provisions (Appendix B2).
- Amendments to the Standard Specifications (Appendix B1).
- Standard Specifications (M41-10) (Appendix D18).
- WSDOT *Design Manual* (M22-01) (DM) (Appendix D3).
- WSDOT *Highway Runoff Manual* (M31-16) (Appendix D6).
- WSDOT *Hydraulics Manual* (M23-03)(Appendix D4)
- WSDOT *Environmental Procedures Manual* (M31-11) (Appendix D4).
- WSDOT *Plans Preparation Manual* (M22-31) (PPM) (Appendix D12).
- WSDOT *Construction Manual* (M41-01) (Appendix D2).
- Standard Plans (M21-01) (Appendix D17).
- WSDOT *Qualified Products List* (M46-02) (QPL) (Appendix D13).

2.12.3 PERFORMANCE REQUIREMENTS

All documentation for the Project shall be submitted for review in accordance with the Quality Management Plan (QMP) (see Section 2.28).

2.12.4 DESIGN REQUIREMENTS

2.12.4.1

2.12.4.1.1 Design Documentation Package (DDP) and Project File (PF)

The DDP and the PF shall include all of the elements identified in the DDP Checklist (Appendix O3).

The DDP Checklist shows that some of the DDP and PF items have components of Work that were started by WSDOT, and that the Design-Builder shall complete or update the item. The Design-Builder shall obtain copies of the information from WSDOT that the Design-Builder needs in order to complete the DDP and PF items.

The Design-Builder shall provide WSDOT with updates to the DDP and PF items as changes are made. The DDP and PF must be approved by WSDOT before Final Acceptance.

2.12.4.1.2 Channelization Plan for Approval Package

A Conceptual Channelization Plan has been developed by WSDOT and is included in Appendix M1. The Design-Builder shall develop a Channelization Plan for Approval Package for the Project, and obtain WSDOT approval. The development of the Design Documentation Package (DDP) shall be completed prior to the Channelization Plan approval as discussed in Section 1320.12(2) of the WSDOT Design Manual. The Channelization Plan for Approval Package shall be updated for design changes during construction, and re-submitted for review and signature prior to Final Acceptance. The approved package will be used by WSDOT for Project documentation.

The Channelization Plan for Approval Package shall be prepared by, or under the direct supervision of, a Professional Engineer, licensed under Title 18 RCW. Each sheet of the Channelization Plan for Approval Package shall carry the Professional Engineer's stamp. The Channelization for Approval Package shall be submitted using the WSDOT standard format and shall follow the WSDOT Northwest Region Channelization Plan for Approval Checklist included in Appendix O5

The preliminary Channelization Plan for Approval Package submittals shall include two half-size white paper copies of the plan sheets.

The final submittal of the Channelization Plan for Approval Package shall include one full size (22 inches by 34 inches) Mylar set and two half-size white paper copies. Full size plan sheets shall be prepared using a horizontal scale of one inch = 50 feet.

2.12.4.1.3 Technical Memoranda

The Design-Builder shall provide technical memoranda that document decisions made during completion of the design regarding components not included in the Mandatory Standards. Technical memoranda shall be dated, indicate the Project title, and include the name of the person who wrote the memoranda. The technical memoranda shall follow the following format:

- Section 1 - Subject or purpose;
- Section 2 - Background or existing conditions;
- Section 3 - Discussion of alternatives;
- Section 4 – Recommendations; and
- Section 5 – Conclusions.

2.12.4.1.4 Calculations

All calculations shall be prepared and checked in accordance with the QMP. The calculations shall be available for WSDOT Review and Comment.

2.12.4.1.5 Design Variances

The Design-Builder shall conduct all Work necessary to complete any additional design deviations for the Project. All deviations prepared by the Design-Builder shall be prepared

by, or under the direct supervision of, a Professional Engineer licensed under Title 18 RCW. The cover of each design deviation shall carry the Professional Engineer's stamp.

2.12.4.1.5.1 ***Pre-approved Design Variances***

Signed copies of the design deviations that have been prepared and approved based on the Conceptual Plans are listed below and are included in the Pre-approved Design Deviations (Appendix O2):

- Maximum Extent Feasible No. 1 – Crosswalk and Curb Ramp Cross Slope
- Evaluate Upgrade No. 1 – Right Turn Corner Design

2.12.4.1.5.2 ***Additional Design Variances***

The Design-Builder shall prepare and obtain WSDOT approval, and FHWA approval as required, for all design deviations incorporated into the Project within the Project limits, and not included in the Pre-approved Design Deviations described in this Section. Although additional design deviations may be requested, the Design-Builder is advised that there is no assurance they will be approved.

If the Design-Builder identifies any design deviations that have not been approved for this Project at the time of Contract award, the Design-Builder shall prepare documentation for the design deviations which conforms to the WSDOT *Design Manual* and is in the same format as the Pre-approved Design Deviations. The Design-Builder shall submit this documentation to WSDOT for review and approval. WSDOT will coordinate review of the design deviations with FHWA as required. The Design-Builder shall not incorporate any design deviations into the Project without receiving WSDOT approval, and FHWA approval as required.

Design deviations approved after Contract award shall be addressed in accordance with Section 1-04 of the General Provisions.

2.12.4.1.6 Project Development Approval

The Design-Builder shall update the Design Approval Package (Appendix O1 and Appendix O4) for revisions and additional information throughout development of the Project design to create the Project Development Approval Package. The Project Development Approval Package shall be updated for revisions during construction, and shall be submitted to WSDOT for Review and Comment prior to Physical Completion. WSDOT approval is required prior to Final Acceptance.

2.12.4.1.7 Final Design Documents

Prior to Physical Completion or termination of the Contract, the Design-Builder shall collect and submit all design documents prepared in the performance of the Contract. The Final Design Documents shall include, but are not limited to, the following:

- Design Documentation Package and Project File;
  - Channelization Plan for Approval Package;
  - Design calculations and documentation;
  - Reports and technical memoranda;
  - Design Variances

- Project Development Approval Package; and

- Updated electronic MicroStation and Inroads files, including all Released for Construction (RFC) sheets, reference files and base mapping (topography, including survey updates).

The Design-Builder shall ensure that the Final Design Documents reflect the actual condition of the constructed Work, to the same degree of detail as the RFC Documents.

The Final Design Documents shall include all changes and corrections to the documents that depict the final completed component, with relevant data shown (including copies of calculations not previously submitted with shop drawings or with the Final Design Submittal).

WSDOT will review the submittal and advise the Design-Builder of its acceptance of the Final Design Documents or will provide comments detailing issues to be resolved. The Design-Builder shall address all comments in a manner consistent with the agreed-to comment resolution process, and then resubmit the Final Design Documents to WSDOT for acceptance.

2.12.5 CONSTRUCTION REQUIREMENTS

2.12.5.1

The Design-Builder shall conduct all Work necessary to provide temporary and permanent final records for the Project in accordance with the WSDOT *Construction Manual* and these Technical Requirements.

2.12.5.1.1 As - Built Plans, Amendments to the Standard Specifications, Special Provisions, and Technical Specifications

Prior to Physical Completion of the Project, the Design-Builder shall update and re-release all RFC and design documents affected by changes made during construction in accordance with Section 2.28. The electronic MicroStation and Inroads files shall be updated to show the as-constructed conditions, incorporating all revisions made during construction. The Design-Builder shall make all electronic MicroStation and Inroads files consistent with the software and drawing conformance requirements of the Technical Requirements, and shall submit two hard copies of the As-Built Plans and one complete electronic copy of the updated MicroStation and Inroads files on CDROM.

All revisions to the RFC Documents shall be performed by, or under the direct supervision of, the Engineer of Record (EOR) for the documents. Each re-issued sheet of the revised RFC plans, and the cover of each of the re-issued revised RFC Technical Specifications, shall include the Professional Engineer's stamp.

Calculations for design revisions made during construction shall be available for WSDOT Review and Comment prior to implementation of the revisions during construction. Calculations for design revisions made during construction shall be incorporated into the design calculation file when construction is completed in accordance with Section 2.28.

As-Built Plans shall reflect the same degree of detail as the RFC Documents. Underground features, including but not limited to buried or abandoned structures, shall be documented on the As-Built Plans showing the location and elevation. The Design-Builder shall also provide reproducible originals of the shop drawings for pre-stressed structural elements and all structural steel components.

The Design-Builder shall submit the As-Built Plans as a complete package in sequence, in accordance with standard WSDOT numbering and naming conventions as defined in the WSDOT *Plans Preparation Manual*. The As-Built Plans shall include the following:

- A WSDOT as-built cover sheet form;
- A written certification by the EOR that the As-Built Plans accurately and completely reflect all changes and corrections made during construction;
- The EOR's stamp; and
- An accompanying index and instructions.

Each sheet of the As-Built Plans shall be stamped or clearly marked "AS-BUILT".

Maintenance of Traffic (MOT) and Temporary Erosion and Sediment Control (TESC) Plans are exempt from the as-built requirements.

2.12.5.1.2 Final Records

The Design-Builder shall submit the following final records prior to Completion or termination of the Contract:

- Final Record Book No. 1:
  - This book of documents shall be bound in a semi-rigid, water resistant cover. Each page shall be numbered consecutively. The following documents shall be included, and the order in which they are to be arranged is described below. No other material shall be included in this book.
    1) Index Sheet - Containing the detailed index for Final Record Book No.1 and also the listing of the other final records contained in each book.
    2) The Design-Builder Personnel List - Containing the name and classification of managers, supervisors, foremen, testers, engineers, and any other Design-Builder personnel who were responsible for signing documents or forms or were responsible for decision-making on the Project. Each person shall sign his or her identifying initials after his or her name on this list in the same manner as it appears in other Project documents.
    3) Final Contract Voucher Certification, Form 134-146 - Including the Design-Builder's authorized signature and the WSDOT Regional authorized signature.
    4) Contract Estimate Payment Totals Report - To be provided by WSDOT.
    5) Affidavit of Wages Paid, State L & I Form F700-007-000 - The original or copy of the approved affidavits.
    6) List of Category A and Category B Change Orders - Showing the change order numbers, a brief description of each, and the change order cost.
    7) Record of Construction Materials - Tabulating the source of the construction materials. See Section 2.25 for additional information.

8) A list of all Field Design Changes.

- Project Diaries, Daily Reports, and the Design-Builder's Daily Reports of Traffic Control:
  - The Construction Project Diaries and the Daily Reports shall be organized in chronological order and bound in books similar to Final Record Book No. 1. The pages of these books do not require numbering; however, the books themselves shall be numbered consecutively starting with Final Record Book No. 2. The Design-Builder's Daily Reports of Traffic Control shall be bound in the same manner and the books numbered consecutively after the diaries/daily reports books.
- Materials Certification:
  - See Section 2.25 for additional information on Materials Certification.
- As-Built Plans:
  - As Built Plans shall be full size, 22-inch by 34-inch, blackline prints. Each plan sheet shall have lettering or a stamp identifying it as As-Built Plans.
- Structures (if applicable):
  - The Design-Builder shall complete the Pile Driving Record Book, WSDOT Form 450-004, and Test Pile record, WSDOT Form 410-027, as outlined in Section 6-5.7C of the WSDOT *Construction Manual*.
  - Post-tensioning Records (if applicable).
  - The Design-Builder shall complete the Post-tensioning Records, WSDOT Form 450-005, as outlined in Section 6-2.8 of the WSDOT *Construction Manual*.
- Test Reports for Storm Sewers, Sanitary Sewers, and Water Mains:
  - The Design-Builder shall develop and complete a report for the testing of storm sewers, sanitary sewers, and water mains. This report shall include the type of pipe; the location of the pipe; all of the calculated factors for the testing; the test results; and whether it passes or fails.
- The Design-Builder Construction Survey:
  - Copies of all survey calculations and survey notes including grade books and cross section notes shall be kept and turned over to WSDOT with the final records.
- Temporary Final Records:
  - Temporary final records are comprised of all relevant records not included in the final records. The Design-Builder shall submit these to the WSDOT Engineer with the final records. Examples of these records include but are not limited to the following:

    1) Material acceptance test reports;

    2) Concrete pour records;

    3) Source of materials documentation;

    4) Prints of shop drawings;

5) Copies of certified payrolls (for Federally-funded projects only);

6) Horizontal and vertical alignment data; and

7) Falsework and formwork plans.

Refer to Section 10-3.1B of the WSDOT *Construction Manual* for additional requirements.

2.12.6 SUBMITTALS

2.12.6.1 DESIGN DOCUMENT SUBMITTALS

The design document submittals shall include the following:

- Design Documentation Package and Project File;
  - Channelization Plan for Approval Package;
  - Design calculations and documentation;
  - Reports and technical memoranda;
  - Design Variances
  - Project Development Approval Package; and
- Updated electronic MicroStation and Inroads files, including all RFC sheets, reference files, and base mapping (topography, including survey updates).

2.12.6.2 CONSTRUCTION SUBMITTALS

The construction submittals shall include, but are not limited to, the following:

- As-Built Plans and specifications; and
- Final records.

End of Section

2.13 BRIDGES AND STRUCTURES

2.13.1 GENERAL

The Design-Builder shall conduct all Work necessary to complete the structures for the Project. Elements of Work shall include, but are not limited to, the following:

- Permanent retaining walls, barriers, , pipes, signal and lighting structures,
- Permanent and temporary modifications of, lighting structures, and structure renovations.

2.13.1.1 INTENTIONALLY OMITTED

2.13.2 MANDATORY STANDARDS

The following is a list of publications that shall be used for all design and construction. They are listed in hierarchical order, with the most important appearing at the top of the list. This is not a comprehensive list; other applicable publications may be required to complete the design and construction. If the Design-Builder becomes aware of any ambiguities or conflicts relating in any way to the Mandatory Standards, the Design-Builder shall notify WSDOT immediately, so that WSDOT may resolve them.

- Special Provisions (Appendix B2).
- Amendments to the Standard Specifications (Appendix B1).
- Standard Specifications (M41-10) (Appendix D18).
- WSDOT *Design Manual* (M22-01) (DM) (Appendix D3).
- WSDOT *Bridge Design Manual* (M23-50) (BDM) (Appendix D1).
- WSDOT *Geotechnical Design Manual* (M46-03) (GDM) (Appendix D5).
- WSDOT *Maintenance Manual* (M51-01) (Appendix D9).
- WSDOT *Plans Preparation Manual* (M22-31) (PPM) (Appendix D12).
- WSDOT *Construction Manual* (M41-01) (Appendix D2).
- WSDOT *Materials Manual* (M46-01) (Appendix D10).
- Standard Plans (M21-01) (Appendix D17).
- WSDOT *Qualified Products List* (M46-02) (QPL) (Appendix D13).
- AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaries, and Traffic Signals*, 4th Edition, 2001, with 2002, 2003, and 2006 Interims.
- AASHTO *Guide Specifications for Structural Design of Sound Barriers*, 1989 includes 1992 and 2002 Interims.
- FHWA *Publication No. FHWA-HRT-06-032; Seismic Retrofitting Manual for Highway Structures: Part 1-Bridges*, January 2006.

2.13.2.1 MODIFICATIONS TO THE WSDOT BRIDGE DESIGN MANUAL (BDM)

The WSDOT Design Memoranda shall apply to the Project. Except that the references to the Project advertisement dates shall not apply.

The BDM, as modified by the WSDOT Design Memoranda, shall be further modified for Design-Build as follows:

- Rights and Responsibilities – The following clarifies which rights and responsibilities discussed in the BDM are applicable to the Desing-Builder:
    - The Design-Builder shall complete all analyses, evaluations, load ratings, plans, and specifications discussed in the BDM.
    - All such analyses, evaluations, load ratings, plans, and specifications are subject to Review and Comment by WSDOT.
    - All references to WSDOT sections, offices, and engineer shall mean WSDOT.
- The Design-Builder shall obtain WSDOT's approval for all proposed deviations from the provisions of the BDM.
- The Design-Builder shall follow the guidelines established by Section 1-03.5 of the General Provisions for resolution of perceived ambiguities in or disputes regarding the interpretation of specific provisions of the BDM.

2.13.3 PERFORMANCE REQUIREMENTS

2.13.3.1 GENERAL

A minimum vertical clearance of 16.5 feet shall be maintained over all roadways at all times during and after construction,.

2.13.4 DESIGN CRITERIA

2.13.4.1 PERSONNEL REQUIREMENTS

The Design-Builder shall provide a Structural Lead Engineer with a minimum of fifteen years of experience in the design and construction of, retaining walls, and other highway-related structures. The Structural Lead Engineer shall be a Structural Engineer licensed under Title 18 RCW, and shall be in responsible charge of the structural design elements of the Project.

2.13.4.2 DESIGN CRITERIA

All new permanent structures, and all existing structural elements whose load-carrying capacity are altered by the Work, shall be analyzed and designed using the BDM.

The seismic analyses and design for all new permanent walls shall be in accordance with the requirements of the AASHTO *Guide Specifications for LRFD Seismic Bridge Design.*

2.13.4.2.1 Intentionally Omitted

2.13.4.2.2 Intentionally Omitted

2.13.4.2.3 Intentionally Omitted

2.13.4.2.4 Retaining Wall Design Criteria

The Design-Builder may modify the retaining wall plans shown in the Standard Plans, as necessary, to meet visual quality requirements for the Project. Visual quality requirements shall not adversely affect the strength and safety requirements of the retaining walls.

Reinforced elements in Structural Earth (SE) walls supporting other structures shall be designed for a 100-year service life.

Fall protection, such as safety cable railing, shall be provided at the top of all retaining walls and retaining wall terraces greater than ten feet in height. Fall protection shall have a minimum height of 42 inches above the top of the retaining walls and retaining wall terraces.

The Design-Builder shall evaluate potential impacts to Utilities crossing under proposed walls, and incorporate appropriate mitigation measures to avoid conflicts and detrimental effects including, but not limited to, settlement and surcharge loading.

Refer to Sections 2.6, 2.10, and 2.15 for additional design criteria.

2.13.4.2.5 Intentionally Omitted

2.13.4.2.6 Intentionally Omitted

2.13.4.2.7 Culverts and Precast Concrete Arches

The Design-Builder shall not use corrugated steel structures with a span greater than 26 feet. Timber piles shall not be used as foundations for culverts or precast concrete arches.

2.13.4.2.8 Intentionally Omitted

2.13.4.2.9 Intentionally Omitted

2.13.4.2.10 Intentionally Omitted

2.13.4.2.11 Intentionally Omitted

2.13.4.2.12 Intentionally Omitted

2.13.4.2.13 Intentionally Omitted

2.13.4.2.14 Intentionally Omitted

2.13.4.2.15 Intentionally Omitted

2.13.4.2.16 Intentionally Omitted

2.13.4.2.17 Intentionally Omitted

2.13.4.2.18 Sign Structures, CCTV Camera Structures, and Overhead Lighting Structures

The Design-Builder shall design retaining walls and foundations to account for the placement of any major sign supports (such as cantilevered signs or sign bridges), overhead lighting supports, Intelligent Transportation System facility supports, or VMS facility supports on or behind the retaining walls. All sign, CCTV camera, and luminaire loads shall be isolated from all wall systems except for cast-in-place retaining walls.

Handholes in closed members shall have reinforcement around the holes. Structural bolted splices or connections shall use AASHTO M 164 high strength bolts. All fabricated structural components and hardware shall be galvanized after fabrication in accordance with AASHTO M 111. Hardware shall be galvanized after fabrication in accordance with AASHTO M 232.

Refer to Sections 2.16, 2.18, and 2.19 for additional requirements.

2.13.4.2.18.1 ***Closed Circuit Television (CCTV)***

The analysis and design of Closed Circuit Television (CCTV) camera support structures shall conform to the following criteria:

- Basic wind speed of 90 mph shall be used in computing design wind pressure using Equation 3-1 of the AASHTO *LRFD Bridge Design Specifications*.
- Pole deflection shall not exceed 0.7 inches in 30 mph wind or 1.4 inches in 70 mph wind.
- The Design Life and Recurrence Interval shall be as follows:
    - Fifty years for CCTV camera support structures exceeding 50 feet in height.
    - Twenty-five years for CCTV camera support structures less than 50 feet in height.

- Fatigue Design shall conform to Section 11 of the AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaries, and Traffic Signals* using Fatigue Category III.

2.13.5 CONSTRUCTION CRITERIA

Cranes, drill rigs, and other construction equipment exceeding the legal load shall not be operated on structures without WSDOT's written approval, as specified in Section 1-07 of the General Provisions.

2.13.5.1 INTENTIONALLY OMITTED

2.13.6 SUBMITTALS

2.13.6.1 DESIGN SUBMITTALS

2.13.6.1.1 Plans

The Design-Builder shall submit Released for Construction Documents on WSDOT standard sheets for the retaining walls, including temporary retaining walls; sign structures; lighting structures; and other minor structures.

All final design documents shall include the stamp of a Professional Engineer licensed under Title 18 RCW.

Refer to Section 2.28 for additional requirements.

2.13.6.1.2 Calculations

The Design-Builder shall provide complete sets of calculations to support all structural designs described in this Section. Complete sets of calculations shall be included with each design review submittal (including temporary structures, falsework, and other temporary works).

All final design calculations shall include the stamp of a Professional Engineer licensed under Title 18 RCW.

The sets of calculations shall include the following:

- Index Sheets - These shall include numbered calculation sheets and an index by subject with the corresponding sheet numbers. The name of the Project, Structure Number, designer/checker initials, date (month, day, and year), and supervisor's initials shall be listed.
- Design Calculations - These shall include design criteria; loadings; structural analysis; one set of moment and shear diagrams; and pertinent computer input and output data (reduced to a 8.5-inch by 11-inch sheet size).
- Design Completed Checklist (Form 230 035). Refer to Appendix 1.3-A3 in the BDM.

Refer to Sections 2.12 and 2.28 for additional requirements.

2.13.6.2 WORKING DRAWINGS SUBMITTAL

In accordance with Section 2.28, the Design-Builder shall submit Working Drawings to WSDOT for Review and Comment.

End of Section

2.14 STORMWATER MANAGEMENT

2.14.1 GENERAL

The Design-Builder shall conduct all Work necessary to design, document, and construct the stormwater management facilities for the Project. Elements of Work shall include, but are not limited to, the following:

- Pavement drainage systems for both the permanent Project facilities and the temporary construction conditions;
- Temporary sedimentation and erosion control measures;
- Runoff treatment facilities, including Best Management Practices (BMPs), as required to meet the Mandatory Standards and the permit commitments;
- Stormwater flow control facilities as required to meet the Mandatory Standards and the permit commitments;
- Modify existing inlet spacing as required to meet the allowable gutter flow width criteria within the flow control and water quality catchment area for the Project;
- Maintenance of existing off-site flows that pass through the Project area;
- Protection of existing collection, conveyance, detention, and stormwater runoff treatment,
- Subsurface drainage systems, including maintaining existing systems;
- Design documentation;
- Cleaning of existing drainage facilities and assessing the current conditions of components parts; and
- Consideration of Forward Compatibility for future stormwater conveyance, runoff treatment, and flow control facilities. See Forward Compatibility Channelization Plan in Appendix M1 and Conceptual Hydraulics Report/Plans in Appendix H1

2.14.2 MANDATORY STANDARDS

The following is a list of publications and computer programs that shall be used for all design and construction. They are listed in hierarchical order, with the most important appearing at the top of the list. This is not a comprehensive list; other applicable publications may be required to complete the design and construction. If the requirements of a mandatory standard, programmatic agreement, or permit issued for the Project conflict, then the provisions within the Project-specific permit shall take precedence. If the Design-Builder becomes aware of any ambiguities or conflicts relating in any way to the Mandatory Standards, the Design-Builder shall notify WSDOT immediately, so that WSDOT may resolve them.

- Special Provisions (Appendix B2).
- Amendments to the Standard Specifications (Appendix B1).
- Standard Specifications (M41-10) (Appendix D18).
- WSDOT *Highway Runoff Manual* (HRM) (M31-16) (Appendix D6).

- WSDOT *Hydraulics Manual* (M23-03) (Appendix D7).
- WSDOT NW Region Hydraulic Report Template Section 1-3 of the WSDOT *Hydraulics Manual and the NW Region Hydraulic Report Template*.

  (www.wsdot.wa.gov/Northwest/Environmental/)
- WSDOT *Design Manual* (M22-01) (DM) (Appendix D3).
- Standard Plans (M21-01) (Appendix D17).
- WSDOT *Maintenance Manual* (M51-01) (Appendix D9).
- WSDOT *Plans Preparation Manual* (M22-31) (PPM) (Appendix D12).
- WSDOT *Construction Manual* (M41-01) (Appendix D2).
- WSDOT *Materials Manual* (M46-01) (Appendix D10).
- WSDOT *Qualified Products List* (M46-02) (QPL) (Appendix D13).
- WSDOT *Environmental Procedures Manual* (M31-11) (Appendix D4).
- Washington State Department of Ecology, *Stormwater Management Manual for Western Washington*, 2005.
- Implementing Agreement between the Washington State Department of Ecology and Washington State Department of Transportation Regarding Compliance with the State of Washington Surface Water Quality Standards, February 13, 1998 (Appendix E18).
- Memorandum of Understanding between the Washington State Department of Fisheries, Wildlife, and Transportation Concerning Compliance with the Hydraulic Code. (RCW 77.55.100 and WAC 220-11) (Draft, January 22, 2001).
- Signatory Agency Committee Agreement to Integrate Aquatic Resource Permit Requirements into the National Environmental Policy Act and State Environmental Policy Act Processes in the State of Washington, September 17, 2002.
- Interagency Implementation Agreement - State of Washington Alternative Mitigation Policy Guidance for Aquatic Permitting Requirements from the Departments of Ecology and Fish and Wildlife, February 10, 2000.
- Memorandum of Agreement between Washington State Department of Fish and Wildlife and Washington State Department of Transportation Concerning Construction of Projects in State Waters, June 2002.
- Washington State Aquatic Habitat Guidelines Program, *Integrated Streambank Protection Guidelines*, 2003 (Appendix H5).
- Washington State Department of Ecology Non-point Source Pollution Assessment Project, 1989, Publication #88-17.
- Washington State Water Quality Assessment:

  http://www.ecy.wa.gov/programs/wq/303d/index.htm
- National Resource Conservation Service, Web Soil Survey, http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm.

2.14.2.1 COMPUTER SOFTWARE

The following computer software is the primary software accepted by WSDOT for use on the Project. Use of other computer software and spreadsheets by the Design-Builder will require submittal of additional details about the software, acceptance from WSDOT Hydraulic Office in accordance with the Hydraulics Manual (Appendix D7).

- Mandatory Software:
  - MGS Flood continuous simulation hydrologic model.
- Approved Software:
  - WSDOT spreadsheet for pavement runoff spread calculations;
  - WSDOT spreadsheet for enclosed drainage systems;
  - StormShed2G by Boss International;
  - HY-8, Culvert Hydraulic Analysis Program by FHWA;
  - HEC-RAS Backwater/Surface Water Computation;
  - WSDOT spreadsheet programs downloaded from http://www.wsdot.wa.gov/Design/Hydraulics/ProgramDownloads.htm

2.14.2.2 APPROVED DESIGN MANUALS

The following design manuals are accepted by WSDOT for use on the Project. The Design-Builder shall obtain WSDOT's approval prior to use of other design manuals.

- HEC-11, Design of Riprap Revetment;
- HEC-12, Drainage of Highway Pavements;
- HEC-13, Hydraulic Design of Improved Inlets for Culverts;
- HEC-14, Hydraulic Design of Energy Dissipaters for Culverts and Channels;
- HEC-15, Design of Roadside Channels with Flexible Linings;

2.14.3 PERFORMANCE REQUIREMENTS

2.14.3.1 GENERAL

The stormwater drainage system (consisting of runoff collection systems, conveyance systems, flow control facilities, runoff treatment facilities, and outfalls for the Project's new impervious and pollution-generating surface areas) shall meet the requirements of this Section, the Mandatory Standards, and the Project permits. The Design-Builder shall maintain and provide facilities for handling other runoff from non-pollution-generating surfaces; flows originating from off-site; and cross-drainage as required in the Mandatory Standards and the Project permits. These storm drain, flow control, runoff quality treatment, and cross-drain facilities shall be sized using the methods described in the Mandatory Standards.

2.14.3.2 PERSONNEL REQUIREMENTS - STORMWATER MANAGEMENT

The stormwater management design shall be prepared by, or under the direct supervision of, the Drainage Design Lead Engineer.

The Drainage Design Lead Engineer shall have a minimum of ten years of experience in the design and construction of highway-related drainage elements, and a minimum of two

years of specific WSDOT highway drainage design experience in Western Washington within the last four years. The Drainage Design Lead Engineer shall be a Professional Engineer licensed under Title 18 RCW; shall have completed WSDOT's training course in the Highway Runoff Manual; have current certification and shall be in responsible charge of the stormwater design including downstream analysis, bridge scour analysis, and floodplain fill and hydraulic impact mitigation evaluations. Current Certification is defined as a Certificate that show completion of the Highway Runoff Manual Class. The Drainage Design Lead Engineer shall also be responsible for any drainage design revisions made throughout the duration of the Contract.

The Drainage Design Lead Engineer shall have direct design experience and current knowledge of designing and implementing low impact development-type stormwater treatment techniques to supplement traditional stormwater treatment BMPs.

2.14.3.3 INTENTIONALLY OMITTED

2.14.3.4 CONCEPTUAL HYDRAULIC REPORT

The Conceptual Hydraulic Report provides one stormwater management solution for this project. See Conceptual Hydraulic Report in Appendix H1

By following the outline in the Mandatory Standards, the Design-Builder shall expand the content of the Conceptual Hydraulic Report to include all elements of the design, and shall refine and detail the documentation as necessary to demonstrate that the design meets all Mandatory Standards and fulfills the Project’s environmental commitments.

The drainage design uses Threshold Discharge Area (TDA) concepts in accordance with the HRM method of defining basins for analysis and design. The Design-Builder shall design the drainage for the Project area utilizing the same basin approach to accommodate highway corridor and off-site runoff that discharges to, or flows through, the Project limits.

The Drainage Design Lead Engineer will modify the Conceptual Hydraulic Report, as necessary, and prepare a Hydraulic Report in accordance with Section 2.14.6.5.

2.14.3.5 MODIFIED FILTER DRAINS

If MFD are incorporated into the design, this system shall be specifically designed and constructed according to the design criteria described in the WSDOT Highway Runoff Manual.

2.14.4 DESIGN REQUIREMENTS

2.14.4.1 DESIGN CRITERIA

The Design-Builder shall use the Mandatory Standards and the design criteria described in this Section and in Sections 2.2 and 2.15 to develop the design of the Project. If any of the design criteria are not achievable, the Design-Builder shall submit clear documentation of what cannot be achieved to WSDOT; an explanation of why it cannot be achieved; and a proposed alternative for review and approval.

The Design-Builder is encouraged to seek cost-effective solutions that provide equal or greater environmental benefits and reduced long-term maintenance, with respect to the solutions shown in the Conceptual Plans. Cost-effective solutions may include the innovative use of runoff treatment and flow control techniques; low impact development type BMPs; reduction or conversion of existing impervious surfaces; and design features that lead to the increased infiltration of stormwater where practical and feasible.

2.14.4.2 COLLECTION AND CONVEYANCE STRUCTURES

The Design-Builder shall locate and verify the type, size, location, and condition of existing-to-remain inlets, storm drains, outfalls, and other conveyance structures within the Project limits and include this information in the drainage existing condition survey described herein. If the existing condition of conveyance structures requires repair or replacement, the cost of this Work will be addressed in accordance with Section 1-04.4 of the General Provisions.

The capacity of all proposed and existing-to-remain inlets, storm drains, ditches, outfalls and other conveyance structures within the Project limits shall be sized and/or checked for capacity and included in the Design-Builder's Hydraulic Report. Capacity calculations shall compare required capacity to actual capacity to verify that the design meets the Mandatory Standards.

Where the capacity of a drainage structure to remain differs from the capacity represented in the as-built documents and survey information provided by WSDOT, responsibility for costs associated with the correction shall be as follows:

- Where the actual capacity of an existing drainage structure meets or exceeds the capacity required for the completed Project, the Design-Builder shall document the actual conditions in the As-Built Plans with no additional compensation.
- Where the actual capacity of an existing drainage structure does not provide the capacity required for the completed Project, and the capacity of the drainage structure as shown in the as-built documents and survey information provided by WSDOT was not adequate for the completed Project, the Design-Builder shall replace the structure at the required capacity with no additional compensation.
- Where the actual capacity of an existing drainage structure does not provide the capacity required for the completed Project, and the capacity of the drainage structure as shown in the as-built documents and survey information provided by WSDOT would have been adequate for the completed Project, the Design-Builder shall replace the structure at the required capacity with compensation in accordance with Section 1-04.4 of the General Provisions.

Conveyance system structures (catch basins, manholes, etc.) shall be located outside of the traveled way and auxiliary lanes of the roadway. Existing structures shall be removed and replaced if they fall within the new traveled way or auxiliary lanes.

Media filter drain BMP underdrains shall be a minimum of 8 inches in diameter; designed to operate in a partial depth flow condition; without backwater influence from downstream pipes or ditches; and flow velocities not less than 1.5 feet per second and no greater than 9 feet per second at the treatment design flow rate. Additional capacity and erosion protection shall be provided for overflows that exceed the treatment design runoff and continue down the embankment.

The Design-Builder shall minimize disturbance of the existing pavement that is to remain.

Conveyance systems shall not be constructed by open cut across existing, proposed, or future traffic lanes.

2.14.4.3 WALL DRAINS

The Design-Builder shall avoid placing surface drainage structures and pipelines, including provisions for future drainage facilities, in the reinforcement zone of reinforced earth and soil nail/tie back type walls, or otherwise align the pipes and structures to minimize conflict with the wall's reinforcement straps and anchors. If required, wall surfaces within drainage facilities shall be designed to be aesthetically compatible or located at low visibility locations, in accordance with Section 2.15. Wall surface drainage systems shall be designed for ease of maintenance, providing low-clogging minimal maintenance type structures and/or removable clean-out covers and ports as necessary. Retaining walls shall be designed to prevent surface water running over the face of the wall.

Wherever possible, the internal wall drainage system (perforated pipe underdrain system) shall be connected directly to the highway collection and conveyance system (pipes connected directly to inlets, manholes) or day-lighted with appropriate erosion protection splash pad into ditches in a way that avoids backwater into the underdrain pipes.

Discharge of groundwater to the surface drainage system may increase flow control and runoff quality treatment facility sizes, so consideration shall be given to discharge underdrains separately back to natural patterns. The discharge outlet shall be provided with erosion protection.

Placement of open "weep holes" through the exposed wall face acting as underdrain outlets will not be allowed, unless specifically allowed in the Mandatory Standards. Underdrain outlet ends shall be fitted with flap-type anti-rodent entry fittings. Maintenance clean-out ports shall be provided where underdrain pipes are combined with surface drainage pipes outside of a drainage structure.

Wall foundations and associated underdrain systems that may intercept surface and subsurface water that feeds wetlands shall be designed to maintain the wetland hydrology and inflows in as natural a manner as possible.

Where media filter drain BMPs are place at the top of walls, the wall drainage system may be integrated to provide the function of the media filter drain BMP underdrain. Placement of open "weep holes" through the exposed wall face acting as underdrain outlets shall be placed at regular intervals, as required, to avoid erosive affects on the adjacent wetland.

2.14.4.4 CULVERT EXTENSIONS

The Design Builder shall include and implement all necessary requirements to minimize impacts to riparian zones. Such measures shall include the requirements described in Section 2.14 , and temporary erosion and sediment control requirements described in Section 2.8.

The culvert extension, shall be performed in the dry(or in isolation from the stream flow), in accordance with permit requirements.

2.14.4.4.1 Backwater Analysis

The Final Design Submittal shall include a backwater analysis . These include, but are not limited to, the following:

- Stream culvert extensions;
- Roadside ditch and associated cross culverts;
- Roadside ditches impacted or modified by the highways;

2.14.4.5 CROSS-DRAINS AND CULVERTS

The Design-Builder shall be responsible for cleaning all culverts and cross-drain pipes. The Design Builder shall retain, modify, protect ends with headwalls, or abandon the existing cross-drains and culverts as required to match revised roadway sections, except where specifically noted on the Conceptual Plans or in the Conceptual Hydraulic Report. Note that the extent of this Work may be limited by the Impact Area Line and permit commitments.

Cross-drains operated and maintained by others (e.g., city and county storm drain systems) shall be protected, kept separate from the Project drainage system, and maintained at their existing capacity and function unless noted otherwise in the Conceptual Hydraulic Report.

The Design-Builder shall locate and verify the type, size, location, and condition of existing-to-remain cross-drains and culverts within the Project limits and include this information in the drainage existing condition survey described herein. If the existing condition of a cross-drain or culvert requires repair or replacement, the cost of this Work will be addressed in accordance with Section 1-04.4 of the General Provisions.

All existing and proposed cross-drains and culverts in the Project area shall be checked and/or sized for capacity, and the results shall be included in the Design-Builder's design calculations and Final Hydraulic Report. All culvert designs and capacity checks shall be done in accordance with the WSDOT *Hydraulics Manual and Highway Runoff Manual (HRM)*. Capacity calculations shall include a comparison of required capacity to actual capacity. The capacity calculations shall use future land use conditions when modeling runoff flows from an off-corridor basin.

Where the capacity of a cross-drain or culvert to remain differs from the capacity represented in the as-built documents and survey information provided by WSDOT, responsibility for costs associated with the correction shall be as follows:

- Where the actual capacity of a cross-drain or culvert meets or exceeds the capacity required for the completed Project, the Design-Builder shall document the actual conditions in the As-Built Plans, and Final Hydraulic Report with no additional compensation.
- Where the actual capacity of a cross-drain or culvert does not provide the capacity required for the completed Project, and the capacity of the cross-drain or culvert as shown in the as-built documents and survey information provided by WSDOT was not adequate for the completed Project, the Design-Builder shall replace the structure at the required capacity with no additional compensation.
- Where the actual capacity of a cross-drain or culvert does not provide the capacity required for the completed Project, and the capacity of the cross-drain or culvert as shown in the as-built documents and survey information provided by WSDOT would have been adequate for the completed Project, the Design-Builder shall replace the structure at the required capacity with compensation in accordance with Section 1-04.4 of the General Provisions.

Culvert ends within the clear zone shall be beveled and subject to further reinforcement protection as required in the WSDOT *Hydraulics Manual, WSDOT Design Manual* and the Standard Plans.

2.14.4.6 INFILTRATION

The runoff treatment concepts identified in the Conceptual Hydraulic Report assumed that, except for the dispersion site, no infiltration was feasible within the Project area. Soil investigations were done to help verify the assumptions used in the Preliminary Hydraulic Report. Details of these soil investigations, including locations, borehole and test pit logs, piezometer data, and test results are included in the Appendix G geotechnical documents.

2.14.4.7 RUNOFF TREATMENT AND FLOW CONTROL

Permanent highway runoff flow control and water quality treatment facilities shall be located outside of stream, steep slope, and wetland buffer areas, and designed in accordance with the HRM.

The use of emerging technologies and proprietary (vendor-supplied) flow control and treatment facilities shall meet the requirements of Section 5-4.1 of the HRM. Any proprietary stormwater treatment products proposed to be used by the Design-Builder shall be specifically submitted for review and acceptance by WSDOT, prior to being incorporated into the Project.

The use of any galvanized products on storm drainage pipes and other hydraulic structures will not be allowed.

The Design-Builder shall review the BMP selection process in the HRM and document the procedures and final selections. The use of enclosed vaults, tanks, or galleries for runoff flow control or runoff treatment shall be minimized. Vaults, tanks, or galleries shall only be accepted where it is demonstrated that other treatment BMPs are not feasible due to hydraulic limitations and Right of Way constraints. Where vaults, tanks, or galleries are required, the Design-Builder shall minimize the sizes by incorporating other BMPs, whenever practicable. The Design-Builder shall also obtain approval of the contracting agency prior to incorporating these features into the final design..

If off-site flow cannot be separated from on-site flow to a stormwater management facility, the combined flow must be treated. After the flows are combined, flow splitting to create equivalent on-site and off-site flow will not be permitted. Flow splitting upstream of a volume-based runoff treatment BMP, such as a stormwater treatment wetland, will not be permitted.

Stormwater management facilities shall be equipped with necessary hydraulic controls for ease of dewatering permanent wetpools as required for maintenance and plant establishment. Bypass piping and control valves shall be incorporated to route flows around the structures during cleaning operations.

Vaults, tanks, and galleries shall be arranged, partitioned, or compartmentalized with internal baffles or partial-height water-tight walls so that maintenance workers will be able to handle, remove, or relocate up to a maximum volume of 6,000 gallons of combined fluid and debris/sediment within each compartment. Access covers shall be located directly above the inlet and outfall pipes, and over the low floor end of each compartment. The floor shall slope (both longitudinal and transverse directions) to the clean-out location and outlet. Smaller vault, tank, and gallery compartments, up to 10 feet wide, shall be designed and constructed so as to be suitable for cleaning with high-pressure rodding and vactor

trucks. Vault compartments greater than 10 feet in width shall have ramp access suitable for motorized sediment removal equipment (e.g., small front-end loaders such as bobcats or skid steers), or removable lids suitable for crane lift access of larger cleaning equipment and buckets, as accepted by WSDOT.

WSDOT requires 50-foot spacing for access points for the first third of any vault or tanks as needed for sediment removal. Secondary access shall also be provided suitable for easy entry by personnel during inspections. All hatches shall be provided with access ladders. The facility shall meet OSHA confined space requirements for entry (examples include maximum 50 feet to the nearest exit point when inside, ladder fall restraints, ventilation, and provisions for lighting in large vaults); shall be vented; and shall have locking covers or otherwise be fenced to protect against unauthorized entry. Confined space with access shall be a minimum of 4 feet wide and 7 feet tall. Depth from the access cover to the invert shall not exceed 20 feet. Inspection access covers shall be at least 30 inches in size. Access covers and ladders shall be supplied for the inlet and outfall controls such that visual inspection of the inlet and outfall elements can be achieved conveniently. The access ladders and operating controls shall be designed such that a maintenance person will be able to reach any grab handles, grates, or screens outside of the standing water.

Where access lids or covers are required to be placed within the pavement, curb gutters, parking areas, and vehicle travel areas such as shoulders, the access lids or covers shall be designed in accordance with Section 2.13. Access lids and vaults shall not be located within the traveled way or auxiliary lanes. Preferred cover and frame types for live loadings are bolt-down ductile iron type. Refer to Section 2.13 for additional structural requirements.

The Design-Builder shall submit maintenance access, pipe slope, internal baffle walls, drain systems, and other provisions for maintenance to WSDOT for Review and Comment.

2.14.4.8 DOWNSTREAM ANALYSIS

The Design-Builder shall perform downstream analysis for individual stormwater facilities. This analysis shall include a review of the regional (city or county) stormwater pipes and other conveyance systems receiving runoff. The Design-Builder shall include this information in the highway runoff design. Project improvements shall not increase the potential for flooding downstream of the Project.

Downstream analysis shall include development of a map of flow routes downstream of the Project for at least 1/4 mile to serve as a quick reference. The Design-Builder shall provide adequate detail of stormwater runoff flow patterns to allow for quick identification of on-site erosion or spill locations.

2.14.4.9 MAINTENANCE ACCESS

All new stormwater structures shall be situated and/or provided with separate access such that routine maintenance and inspections can be easily achieved. Catch basins, inlets, and manholes on storm drains shall be located at the outer edges of shoulders, or in medians or merge areas, where access by vactor, high pressure rodding, and suction trucks can be easily achieved without requiring traffic lane closures. Manholes, hydraulic control, and sedimentation structures located outside of the paved shoulder area in grass medians or shoulder areas shall be provided with a maintenance access road. Culverts and cross-drains isolated from convenient maintenance and inspection access shall be provided with achievable maintenance and inspection access at least one end of the pipe.

Stormwater treatment facilities such as ponds, vaults, constructed wetlands, media filter drains, and filtration swales, shall have maintenance in accordance with the HRM and Sections 2.11. Hydraulic control structures such as weirs, orifices, valves, and gates that are used for the operation, monitoring, and maintenance of vaults, ponds, and other treatment or flow control facilities, shall be provided with a maintenance access road. Maintenance access adjacent to the sedimentation pools of ponds and vaults shall include a working area suitable for the loading and maneuvering of sediment disposal equipment and trucks.

Where media filter drains are located outside of the shoulder or median area, or where isolated by barriers, walls, or berms, maintenance access shall be provided for such routine work as monitoring, inspections, mowing, and changing of filter media.

Maintenance access roads shall be designed to be compatible with maintenance equipment, in accordance with the following table:

Location	Design Vehicle	Access Requirement
Open ponds	SU, SU with trailer and WB-40	Vactor (SU) to clean outfall structure, Self propelled crane (WB-40) with clam bucket to clean pond (this is a four-axle with two steering axles on the front and two rear driving axles on the rear). Dump truck with trailer for hauling spoils
Detention vault and tank compartments less than 10 feet wide.	SU	Vactor to clean tank and outfall/inlet structures.
Detention vault and tank compartments 10 feet wide and greater.	SU, SU with trailer, WB-40	Vactor to clean outfall structure. Self propelled crane to remove vault lids, lift cleaning equipment, load trucks. Dump truck with trailer for hauling spoils.
Media Filter Drain	SU, SU with trailer	Dump truck, trailer, and backhoe to change filter media. Truck and trailer with mower.

Maintenance access roads shall be a minimum of 12 feet wide with longitudinal slopes not to exceed 15 percent. Maintenance roads shall be paved with pervious paving materials that meet the frequency of use and equipment requirements respective to each location. A minimal light use access road shall consist of a prepared subgrade in accordance with Section 2-06 of the Standard Specifications; shall be sloped and shaped and/or provided with underdrains for proper drainage; and shall include a layer of construction geotextile and 6-inch minimum thickness of crushed surfacing. Maintenance access roads in landscaped areas shall be designed and constructed to fit with the landscaping theme, using alternative surfacing reinforcement such as soil grids and grow-through paver blocks.

Maintenance access designs shall be submitted to WSDOT for Review and Comment prior to being incorporated into the Project.

2.14.4.12 Existing Drainage Issues

The Design-Builder shall identify and remediate existing surface drainage maintenance issues within project limits. The Design-Builder shall consult with area maintenance staff; document identified issues and prepare responses of how the design will address

each issues, or reason for not addressing the existing drainage issues as part of the current project.

2.14.5 CONSTRUCTION REQUIREMENTS

2.14.5.1 PROTECTION AND RESTORATION OF SENSITIVE RESOURCE AREAS

All Design-Builder's staff shall have environmental training in accordance with Section 2.8, and shall be aware that no access or impacts are permitted beyond the high visibility construction fencing. Where possible, pipe outfalls to natural waterways shall be done using infiltration trenches with over-topping level spreader designs for a more natural dispersion type discharge. Direct pipe discharge shall be armored against erosion using bio-engineering techniques, to the greatest extent possible. All temporary work areas for pipe or ditch work shall be graded, and vegetation restored to previous existing conditions.

Where there are no impacts to riparian areas beyond the end of the existing cross-drain culverts on streams identified in the Conceptual Plans or in the Conceptual Hydraulic Report, the Design-Builder shall design solutions that do not extend the ends of the existing culverts into streams; thus maintaining a no-disturbance area around the existing stream riparian zones. All temporary working areas shall be restored after construction and finished in accordance with the requirements of Sections 2.8 and 2.15.

2.14.5.2 MAINTENANCE OF DRAINAGE FACILITIES

Refer to Section 2.29 for specifications on maintaining drainage conveyance facilities during the course of the Work.

2.14.5.3 UTILITIES

The stormwater design must consider existing Utilities. Refer to Section 2.10.

2.14.5.4 TEMPORARY EROSION AND SEDIMENT/POLLUTION CONTROL

Temporary Erosion and Sediment Control (TESC) and Spill Prevention Control and Countermeasures plans and narratives shall be prepared and implemented in accordance with Section 2.8, Chapter 6 of the HRM, Section 1-07 of the General Provisions, Division 8 of the Standard Specifications, and the Project permits. Runoff from construction areas shall be collected and treated and/or discharged consistent with the HRM and Project permits.

The TESC design shall be prepared by an individual who has successfully completed WSDOT's Construction Site Erosion and Sediment Control Course. Class dates, locations, availability, and training registration is available from the Statewide Erosion Control Coordinator (360-570-6649).

Alternatively, the individual shall complete a Construction Site Erosion and Sediment Control Lead (CESCL) certification course offered by a CESCL certification agency; or the individual shall be current as a Certified Professional in Erosion and Sediment Control (CPESC). A listing of CESCL certification courses can be found at the following Web site:

http://www.ecy.wa.gov/programs/wq/stormwater/cescl.htm

The Design-Builder shall prepare the SPCC plans in accordance with Section 2.8. Instructions for plan preparation are available to contractors at the WSDOT Hazardous Materials Program Web site:

www.wsdot.wa.gov/Environment/HazMat/SpillPrevention.htm

A TESC plan template, which provides information on how to create an effective TESC plan, is available online for non-WSDOT TESC plan designers at the WSDOT Erosion Control Program Web site:

www.wsdot.wa.gov/Environment/WaterQuality/ErosionControl.htm

The TESC design shall also be prepared under the direction of a Professional Engineer, licensed under Title 18 RCW, and shall carry the Professional Engineer's stamp.

The temporary drainage facility design shall consider traffic safety during construction including, but not limited to, consideration of gutter flows along the roadway shoulder. Gutter flow limits shall not extend into a highway traffic lane.

2.14.5.5 ABANDONMENT AND REMOVAL OF EXISTING DRAINAGE STRUCTURES

Abandonment and/or removal of existing drainage structures and pipes shall meet the applicable requirements of Divisions 2 and 7 of the Standard Specifications. Any existing pipe or other structure which will be abandoned and will remain under any traffic pavement shall be filled using methods and materials that assure the pipe or structure is completely filled in a supported, non-void condition. The Design-Builder shall include the abandonment details, including any abandon-in-place filling methods and materials, with the drainage structure and pipe shop drawings.

2.14.6 SUBMITTALS

2.14.6.1 GENERAL

Drawing submittals shall be complete with associated engineering documentation sufficient to verify that the design meets the Mandatory Standards, specifications, permits, and applicable agreements.

2.14.6.2 DRAINAGE EXISTING CONDITION SURVEY

As part of the Preliminary Design Submittal, the Design-Builder shall complete the Drainage Existing Condition Inventory, and survey, as required to include all existing drainage pipe systems and associated structures that are to remain within the Project limits. This Work shall include storm drains and cross-drains. The survey shall identify each system by MP and Project stationing, and show the pipe end and structure coordinates, sizes, and types; invert levels at ends and structures; skews; the general condition of the structure; the upstream and downstream channel profile; and cross sections within the construction limits. If additional facilities are identified, the Design-Builder shall prepare a supplement to the Drainage Existing Condition Survey describing the condition of the pipe systems to remain, including summaries of the inventory survey, pipe types, general condition of the pipe, and structures for each system, with photo and plan exhibits that illustrate the general condition and specific problems of each pipe run. The report shall identify specific failures and blockages.

The Design-Builder shall submit the draft supplement to the Drainage Existing Condition Survey for WSDOT review in accordance with Section 2.12, along with or prior to submittal of the first Preliminary Hydraulic Report. The final supplement to the Drainage

Existing Condition Survey shall include revisions incorporating WSDOT review comments, and the electronic format survey data. The Final Supplemental Hydraulic Report shall be submitted along with or prior to the Preliminary Hydraulic Report.

2.14.6.3 DESIGN PLANS

The Design-Builder shall prepare stormwater management plan sheets in accordance with Section 2.28; Sections 440 through 460 of the WSDOT *Plans Preparation Manual*; and Divisions 5, 6, 7, and 8 of the Standard Specifications.

In addition to the items listed in the WSDOT *Plans Preparation Manual*, all sensitive areas (including wetlands, streams, riparian zones, and their buffer boundaries), stream and wetland ordinary high water elevation contours, and FEMA flood level contours, shall be shown on the grading and drainage plan sheets. The Grading Plans shall also show the placement locations and type requirements for the high visibility sensitive area protective fencing.

2.14.6.4 DESIGN CALCULATIONS

The Design-Builder is responsible for completing all calculations necessary for the design of the Work. The Design-Builder shall prepare calculations in accordance with the WSDOT *Plans Preparation Manual*, the WSDOT *Hydraulics Manual*, and the Highway Runoff Manual (HRM), to support the design shown on the plans and details. Fish passage facility design calculations shall be prepared in accordance with WAC 220-110 and the Washington Department of Fish and Wildlife Aquatic Habitat Guidelines, *Design of Road Culverts for Fish Passage*. The associated set of design calculations shall be submitted with each set of Drainage Plans submitted in accordance with Section 2.28.

The calculations shall include a narrative that describes the approach taken and the order of the calculations, including sections on the methodologies used (appropriateness and accuracy requirements), design decisions made, and resultant summaries. The calculations shall include copies of the input and output printouts from the supporting computer programs, spreadsheets, hand calculations, exhibits, and sketches. The calculations shall also include, but are not limited to, the following items:

- Index Sheets – The Design-Builder shall number all calculation sheets and prepare an index by subject with the corresponding sheet numbers. The Design-Builder shall list the name and number of the Project, SR Number, designer/checker initials, date (month, day, and year), and supervisor's initials.
- Design Calculations – These calculations shall include design criteria, hydrology and hydraulics calculations, and pertinent computer input and output data (reduced to 8.5-inch by 11-inch sheet size). The calculations shall include a narrative of the approach taken, and final conclusions and summaries of the calculation results in both narrative and table format. The calculations shall be in logical order, technically clear, and cross-referenced to correspond directly with drainage structure and basin numbering on the drainage plans, maps, and exhibits for ease of reference.
- Special Design Features – The Design-Builder shall include a brief narrative of major design decisions or revisions, and the reasons for them.
- Design decision summaries.

- Any Amendments to the Standard Specifications, Special Provisions, and Technical Specifications necessary as construction specifications.
- Drainage maps showing the hydrologic features, drainage basins, sub-basins, TDAs, existing and final conveyance and cross-drain structures, flow direction arrows, fish passage facilities, numbering system, and any other features necessary to support and clarify the design calculations. The drainage maps shall also show all geotechnical and environmental sensitive areas, streams and wetlands with buffer boundaries, riparian zones, the ordinary high water and FEMA flood level contours, aquifer and well head protection zones, sanitary drain fields, and major Utilities that will affect the drainage design. The drainage design drawings and maps shall be on 11-inch by 17-inch bond paper.
- Documentation justifying use of vaults and detention tanks in place of ponds.
- Other exhibits to provide details necessary to clarify and support the calculations.

2.14.6.5 HYDRAULIC REPORT

A Hydraulic Report shall be prepared by, or under the direct supervision of, the Drainage Design Lead Engineer. The report shall be in accordance with the WSDOT *Hydraulics Manual* and the HRM. The Hydraulic Report shall follow the guidance, outline, and format as shown in Section 1-3 of the WSDOT *Hydraulics Manual and the NW Region Hydraulic Report Template*.

The Design-Builder shall submit a Draft Hydraulic Report to support WSDOT's review of the drainage design drawings. The Draft Hydraulic Report shall show the Design-Builder's overall Project runoff flow control, runoff treatment, and storm drainage concept for the Project. In particular, the report shall include the overall basin and TDA layouts; locations of cross-drains and outfalls; basic hydrology and hydraulic calculations; downstream analysis; major conveyance system layout; and concepts to be used at specific locations for flow control and treatment of Project runoff.

The Design-Builder shall update the Hydraulic Report to reflect changes in the original design during construction. All drawing submittals for changes made during construction shall include a supplemental hydraulic design attachment to support WSDOT design review. The supplements shall reference the Hydraulic Report and be specific as to the changes; be easily readable as stand-alone documents; show why the revision was made and how it affected the design; and include the revised drawings and exhibits, supporting calculations, and revised summaries and tables. The combined Hydraulic Report and supplemental updates shall reflect the design and as-built condition of the drainage system at the end of construction.

The Design-Builder shall assemble the Final Hydraulic Report and all Supplemental Hydraulic Reports into a single document, in accordance with Section 1-3 of the WSDOT *Hydraulics Manual*. The Final Hydraulic Report shall incorporate the final as-built documentation in accordance with this Section, including the updated report text, records of decision, associated design criteria, drainage maps, drainage plans and profiles, calculations, and details. The Final Hydraulic Report is subject to Review and Comment in accordance with Section 1-4 of the WSDOT Hydraulic Manual.

The Design-Builder shall submit six copies, in three ring binders, on 8.5-inch by 11-inch paper, except that exhibits may be on 11-inch by 17-inch paper. The final submittal shall include the Final Hydraulic Report in electronic form on a CDROM, complete with all associated drawing files (MicroStation format), electronic versions of spreadsheets,

calculations, documents (Microsoft Word format), and hydrologic/hydraulic models; and a searchable PDF copy of the Report.

The Final Hydraulic Report and all supplemental attachments shall include the Drainage Design Lead Engineer's stamp.

2.14.6.6 SHOP DRAWING SUBMITTALS

The Design-Builder shall submit shop drawings in accordance with Section 2.28 for all drainage structure, and pipe elements.

2.14.6.7 DESIGN REVISIONS DURING CONSTRUCTION

Calculations for revisions made during construction shall be incorporated into the Final Hydraulic Report when construction is completed.

When new plan sheets are required as part of a construction revision, the revisions shall be made in accordance with Section 2.28.

2.14.6.8 MAINTENANCE MANUAL

The Design-Builder shall prepare Instructions for Drainage Maintenance that describes the "what" and "when" maintenance procedures for all Project drainage facilities, including the maintenance requirements for the flow control and runoff treatment facilities. The Drainage Maintenance Instructions shall include a description of the BMPs used on the Project and how they function; a tabulation of quantities for new stormwater facilities (e.g., manholes, catchbasins, linear feet of storm drain pipe, vaults, sand filters, linear feet of media filter drain, acres of pond site, and linear feet fencing). The Drainage Maintenance Instructions can be a one or more page discussion on 8.5-inch by 11-inch paper, except that any exhibits may be on 11-inch by 17-inch paper. The Design-Builder shall submit the Drainage Maintenance Instructions for Review and Comment. After incorporating WSDOT's review comments, the Design-Builder shall provide copies of the Final Drainage Maintenance Instructions. The final submittal shall also include an electronic version in pdf format on a CDROM.

2.14.6.9 LIST OF SUBMITTALS

Project submittals include, but are not limited to, the following:

- Draft and Final Supplement to the Drainage Existing Condition Survey;
- Certifications of Construction Site Erosion Control personnel;
- Draft and Final Downstream Analysis for Verification of Flow Control Measures;
- Conceptual Stormwater Management Layout (type, size and location);
- Drainage design calculations submitted with the corresponding drainage design plans;
- Hydraulic Report (various submittals during design development, supplemental updates during construction, and complete Final As-Built Hydraulic Report for the record);
- Shop drawings;
- Amendments to the Standard Specifications, Special Provisions, and Technical Specifications;

- Final submittal including Hydraulic Report in pdf format and all calculations, documents, and drawing files on a CDROM;
- Final submittal including Drainage Maintenance Manual in pdf format and all calculations, documents, and drawing electronic files on a CDROM; and

End of Section

2.15 ROADSIDE RESTORATION DESIGN (LANDSCAPE AND AESTHETICS)

2.15.1 GENERAL

The Design-Builder shall conduct all Work necessary to complete the roadside restoration design (landscape and aesthetics) for the Project. Elements of Work shall include, but are not limited to, the detailed aesthetic enhancements described in Appendix L1 and the SR 9 and SR 92 Conceptual Planting Plans in Appendix M1, including the intended form, function, and appearance of each highway feature and element.

2.15.2 MANDATORY STANDARDS AND REFERENCE DOCUMENTS

The following is a list of design references and publications that shall be used for all design and construction. They are listed in hierarchical order, with the most important appearing at the top of the list. This is not a comprehensive list; other applicable publications may be required to complete the design and construction. If the Design-Builder becomes aware of any ambiguities or conflicts relating in any way to the Mandatory Standards, the Design-Builder shall notify WSDOT immediately, so that WSDOT may resolve them.

- Special Provisions (Appendix B2)
- Amendments to the Standard Specifications (Appendix B1).
- Standard Specifications (M41-10) (Appendix D18).
- *SR 9 and SR 92 Landscape Design Criteria (Appendix L1)*
- WSDOT *Design Manual* (M22-01) (DM) (Appendix D3).
- Standard Plans (M21-01) (Appendix D17).
- WSDOT *Roadside Manual* (M25-30) (Appendix D16).
- WSDOT *Roadside Classification Plan* (Appendix D15).
- WSDOT *Traffic Manual* (M51-02) (Appendix D19).
- WSDOT *Local Agency Guidelines* (M36-63) (LAG) (Appendix D8).
- Conceptual Plans (Appendix M1)
- WSDOT *Northwest Region, Area 3, Integrated Roadside Vegetation Management Plan*. (Appendix D28)
- FHWA *Flexibility in Highway Design*, 1997.
- American Standard for Nursery Stock, ANSI Z60.1, 2004.

2.15.3 PERFORMANCE REQUIREMENTS

The aesthetics, principles, and strategies established by WSDOT for the Project include, but are not limited to, the following:

- Care shall be taken to preserve the existing natural environment.
- The Project shall emphasize and enhance the existing natural context and landscape to achieve context-sensitive roadside treatments.

- Existing trees and desirable understory vegetation shall be preserved to the greatest extent possible.
- Consistency of the visual quality of the landscape along the entire length of the Project shall be maintained.
- Native and/or naturalized plant materials that exhibit good drought tolerance shall be used to the greatest extent possible.

2.15.4 DESIGN CRITERIA

2.15.4.1 DESIGN CRITERIA - GENERAL

The Design-Builder shall refer to Appendix L1 and M1 in developing the final plans for the Project, together with the design criteria described in this Section. The Context Sensitive Solutions (CSS) treatments used on the Project shall not decrease the structural integrity of any Project elements. If any of the Design Criteria are not achievable, the Design-Builder shall submit clear documentation to WSDOT showing what cannot be achieved and a proposed alternative for review and comment.

2.15.4.1.1 Intentionally Omitted

2.15.4.1.2 Retaining Wall Aesthetics

The Design-Builder shall incorporate the aesthetic treatment for the retaining wall design. Refer to Section 2.13 for other requirements.

The Design-Builder shall minimize the visual impact of all retaining walls by performing one of the following tasks:

- Using wall profiles and alignments that blend with the natural terrain by stepping the tops of walls; or
- Grading to reduce the need for walls, except where walls that minimize the impact on sensitive areas is used.

For walls visible from the roadway, or that otherwise have an impact on the visual quality of the roadway, the following wall types will not be allowed, unless otherwisde approved by WSDOT:

- Gabion;
- Gravity block;
- Modular block;
- Crib walls; and
- Ecology block embankment.

Wall types and aesthetic treatments shall be submitted as part of each wall submittal.

Prior to construction of any walls, the Design-Builder shall provide WSDOT with one form liner, and three 4-foot by 4-foot concrete samples of each retaining wall finish, for WSDOT Review and Comment.

Where the Work requires modifications to existing retaining walls, not including lengthening, the modified retaining wall shall match the aesthetic treatments of the existing wall.

2.15.4.1.3 Fencing Aesthetics

The Design-Builder shall develop the all fencing plans according to the following guidelines:

- In locations where maintenance access gates are required, the Design-Builder shall provide lock or entry mechanisms consistent with WSDOT security requirements.
- All new fencing shall be the following color and type: UV-resistant, coated chain link, dark brown in color.
- Refer to the WSDOT *Design Manual* for additional fall protection fencing requirements.

2.15.4.1.4 Landscape Planting Aesthetics

The overall landscape design, including plant material type, size, density, and location, shall meet the requirements of Appendix L1and the WSDOT *Roadside Classification Plan*. Refer to Sections 2.8 and 2.14 for additional landscape requirements.

The existing vegetation shall be preserved and protected to the greatest extent possible. All trees with a 6-inch dbh or greater are identified as significant trees. The Design-Builder shall clearly tag all trees greater than 6 inches dbh that will be removed. Once the trees are tagged, the Design-Builder shall notify the WSDOT Engineer five Calendar Days prior to tree removal, for WSDOT field Review and Comment. Removal of desirable vegetation outside of the impact area is not allowed.

The following are additional Project requirements:

- The Design-Builder shall select plant material based on soil conditions, slopes, growth habits, visibility issues with sight lines, signage, closed circuit television (CCTV) cameras, and watering requirements.
- The Design-Builder shall furnish, install, plant, and care for plants and planting areas in accordance with the Standard Specifications and Appendices B1 and B2.
- The Design-Builder shall use plant species native to or naturalized in the Project region. Plants selected shall meet the needs and requirements, and blend in with the context of each of the various planting areas. The Design-Builder shall consider the long-term sustainability and maintenance requirements of plant material, including watering, fertilizing, and pruning requirements of individual species; frequency of maintenance; and access and safety of maintenance personnel.
- The Design-Builder shall design based on the full-growth habits of plant material, so that it does not cause issues with visibility, sight lines, clear zone requirements, and visibility of signage, including viewing by CCTV cameras.
- The Design-Builder shall incorporate travel speeds, sight distance, drainage needs, signage, maintainability, and other elements that impact the safety and views of the motorists entering and leaving the Project into the planting design.
- The Design-Builder shall incorporate sight distances from intersecting roadways, at grade separations with major roads and existing roadways into the planting design.
- The requirements for each plant material type are as follows:

- The Design-Builder shall install trees in mass plantings, either within a shrub bed or in groupings, using similar types of trees. Refer to Appendix L1.
- The Design-Builder shall select the following emergent plant species to be planted in the Constructed Wetland cells of each Stormwater Pond:
  - Hardstem Bulrush, *Schoenoplectus acutus.*
- The Design-Builder shall not plant trees within the clear zone.
- The Design-Builder shall select grasses for planting adjacent to the paved roadway based upon the desired height for safe viewing from vehicles, soil compatibility, reduced mowing requirements, and erosion control capabilities. Refer to Appendix L1.

- If construction activities impact vegetation outside of the Right of Way, the Design-Builder shall promptly and properly restore the landscape to its previous state.
- The Design-Builder shall ensure that all trees, shrubs, deciduous vines, and perennials comply with the Standard Specifications and the applicable requirements of the American Standard for Nursery Stock, ANSI Z60.1.

The Landscape Plans shall comply with the following guidelines:

- The Design-Builder shall develop the Landscape Plans from a functional analysis of the roadside. The functional analysis shall be performed in accordance with the WSDOT *Roadside Manual*.
- The Design-Builder shall indicate the type, quantity, size, spacing, root condition, and location of all plantings. The Landscape Plan shall also include methods of planting; a maintenance schedule for maintaining a neat, healthy, and orderly green space.
- The Design-Builder shall identify all locations for planting within the Right of Way, and shall identify all existing vegetation to remain.
- The Design-Builder shall consider existing plantings and other features within adjacent Right of Way and properties. The Design-Builder shall consider existing conditions in order to maintain continuity and to avoid negative impacts (e.g., shading plants that require sun).

2.15.4.1.5 Watering

Where necessary, a temporary irrigation or watering system/method or proper soil amendment shall be installed to keep all plantings and grass sufficiently watered to sustain life. Temporary watering shall employ manual or mechanical methods. All associated costs for water and operation and maintenance of a temporary watering system shall be the responsibility of the Design-Builder during plant establishment.

2.15.4.1.6 Topsoil and Soil Preparation

- All planting areas shall receive soil preparation. Soil preparation shall include loosening of compacted soils by ripping to a depth of 12 inches, followed by uniform placement of soil amendment to a 3-inch non-compacted depth and incorporated into existing soils to a 10-inch depth.

- All planting areas shall be planted at a maximum plant spacing of 4' o.c. spacing unless otherwise approved by the NW Region Landscape Architect to support the proposed design concept.
- All planting areas shall be covered with a 3-inch uniform layer of bark or woodchip mulch to aid in water retention and weed and pest control..

2.15.4.1.7 Grading, Drainage and Emergent Planting in Ponds

The Grading Plans shall comply with the following guidelines:

- The Design-Builder shall adjust grading in order to minimize disturbance to the existing native vegetation to remain.
- The Design-Builder shall design side slopes and embankments to minimize the use of barriers, metal guardrails, and fall restraint measures. Slopes in planting areas shall not be steeper than 2:1, in order to conduct maintenance activities safely.
- The Design-Builder is encouraged to build stormwater detention basins that are natural in appearance, and to use natural stone and plantings on side slopes.
- The Design-Builder shall develop a plan to successfully establish the emergent plants in the Constructed Wetland cell in the Stormwater Pond. See Chapter 2.14 for addition requirements.

2.15.5 CONSTRUCTION CRITERIA

2.15.5.1 PLANT ESTABLISHMENT

The plant establishment period shall be three years. The Design-Builder shall care for all plants installed as part of the Work, in accordance with the requirements of the Standard Specifications, for a period of three years after the acceptance of initial planting for the entire Project.

All costs for plant establishment Work shall be included in the Proposal Price.

If plants require replacement, the size of the replacement plants shall match the size of the plants immediately adjacent to them at the time of replacement. If a replaced plant requires another replacement during the maintenance and establishment period, the new replacement shall also be covered for the maintenance and establishment period, and shall meet the 100 percent survivability performance standard.

After acceptance of initial planting, and during the establishment period, WSDOT will review the completed landscape installation with the Design-Builder's representative on a monthly basis. Plant material health, mulching, erosion controls, weed control, and other maintenance concerns will be specifically noted. Replacement needs will be noted and directed to the Design-Builder during the planting and establishment period.

The Design-Builder shall perform, at a minimum, the maintenance practices listed below for a period of three years. In addition, the Design-Builder shall use the WSDOT *Northwest Region, Area 3, Integrated Roadside Vegetation Management Plan* as a guideline.

- Watering – A temporary watering system/method shall be installed that will keep all plantings and grass sufficiently watered to sustain life. Temporary watering systems/methods shall employ manual or mechanical methods, and shall be submitted to WSDOT for review and comment.

- Weed Control – Complete and employ a weed control plan in accordance with Section 8-02 of the Standard Specifications.
- Pruning – Prune damaged branches on trees and shrubs to prevent injury or disease.
- Insect and Pest Control – Monitor plant materials for any insect or pest problems that could damage the materials, and mitigate the problem in accordance with Section 8-02 of the Standard Specifications.
- Erosion Control – Replace mulch around trees and shrubs to the required depth and limits. Repair eroded areas, and replace mulch as required to prevent continued erosion.
- Remove noxious/nuisance species of shrubs, trees, and plants as indicated in Section 2.29.

2.15.5.2 PERFORMANCE STANDARD FOR ROADSIDE RESTORATION

The standards of success for roadside restoration are as follows:

- <u>First, second and third year after planting:</u>
  - One hundred percent of the plants are alive, healthy, and vigorously growing. All dead, dying, or unhealthy plants are replaced.
  - Planting areas are weed-free.
- <u>The standards of success for the Constructed Wetland Cell are as follows</u>:

  First year after planting:
  - 100 percent of the plants are alive, healthy, and vigorously growing. All dead, dying or unhealthy plants are replaced.
  - Plants are weed free

  Second and third year after planting:
  - A minimum of 50 percent of coverage by year 2 and 90 percent by year 3 of emergent plants over the total surface area of the Constructed Wetland Cell
  - Planting areas are free of noxious and invasive weeds. See Section 2.14 for additional requirements.

2.15.5.3 PERFORMANCE STANDARD FOR AESTHETIC TREATMENTS

The standards of success for aesthetic treatments are as follows:

- The Design-Builder shall monitor the appearance of the aesthetic treatments on walls for any defects, flaws, or vandalism during the construction period and up to Final Acceptance. Refer to Section 2.29 relating to maintenance and appearance of aesthetic treatments. The Design-Builder shall note the defects, flaws, or vandalism, and promptly notify WSDOT. The Design-Builder shall remedy vandalism until Physical Completion.

2.15.6 SUBMITTALS

2.15.6.1 PRELIMINARY SUBMITTALS

The Design-Builder shall submit a Roadside Work Plan for all planting on the Project, including emergent plantings for the Constructed Wetland cell for the Stormwater Pond , in accordance with Section 8-02 of the Standard Specifications. The Design-Builder shall submit Plant Establishment Plans for the second-year and third-year plant establishment, including scope and detail consistent with the first-year plan required in Section 8-02 of the Standard Specifications.

The Design-Builder shall also submit preliminary plans and details of all aesthetic treatments.

Preliminary design submittals include, but are not limited to, the following:

- Preliminary Landscape Plans;
- Preliminary Irrigation Plans;
- Plant Establishment Plans;
- Roadside Work Plans, which shall also include the Design-Builder's approach to successfully establishing emergent plants in Constructed Wetland cells; and
- Weed Control Plans.

2.15.6.2 FINAL DESIGN SUBMITTAL

The Design-Builder shall prepare plan sheets in accordance with the WSDOT *Plans Preparation Manual*, Section 440 through 460, and Division 5 and 6. A Landscape Architect licensed in the State of Washington shall affix his/her original signature, date of signature, original seal, license number, and date of expiration to each plan sheet.

Final design submittals include, but are not limited to, the following:

- Final plans and details of aesthetic features;
- Final Landscape Plans; and
- Final Irrigation Plans;

2.15.6.3 PROJECT SUBMITTALS DURING CONSTRUCTION

Project submittals include, but are not limited to, the following:

- One form liner sample for each type of wall finish and pattern;
- Three 4-foot by 4-foot concrete samples of wall finishes for each type of wall finish;
- Pigmented sealer color samples (including paint colors for metal applications);

End of Section

2.16 ILLUMINATION

2.16.1 GENERAL

The Design-Builder shall perform all Work necessary to meet the requirements for temporary and permanent lighting for the Project, including the required illumination specified in Section 1040.05 of the WSDOT *Design Manual* (Appendix D3), and all other requirements of this RFP.

Refer to Sections 2.16.4.2.1 and 2.22 for additional temporary lighting requirements.

2.16.1.1 FORWARD COMPATIBILITY

The illumination system design and placement shall be Forward Compatible as defined in Section 2.1. See Forward Compatible Channelization Plan in Appendix M1.

2.16.2 MANDATORY STANDARDS

The following is a list of publications that shall be used for all design and construction. They are listed in hierarchical order, with the most important appearing at the top of the list. This is not a comprehensive list; other applicable publications may be required to complete the design and construction. If the Design-Builder becomes aware of any ambiguities or conflicts relating in any way to the Mandatory Standards, the Design-Builder shall notify WSDOT immediately, so that WSDOT may resolve them.

- Special Provisions (Appendix B2).
- Amendments to the Standard Specifications (Appendix B1).
- Standard Specifications (M41-10) (Appendix D18).
- WSDOT *Northwest Region Current Practices in Electrical Design* (Appendix T4).
- WSDOT *Design Manual* (M22-01) (DM) (Appendix D3).
- Standard Plans (M21-01) (Appendix D17).
- WSDOT *Materials Manual* (M46-01) (Appendix D10).
- WSDOT *Construction Manual* (M41-01) (Appendix D2).
- WSDOT *Plans Preparation Manual* (M22-31) (PPM) (Appendix D12).
- WSDOT *Maintenance Manual* (M51-01) (Appendix D9).
- WSDOT *Bridge Design Manual* (M23-50) (BDM) (Appendix D1).
- National Fire Protection Association, *National Electric Code* (NFPA, NEC),2008.
- AASHTO *A Policy on Geometric Design of Highways and Streets*, 5th Edition, 2004.
- AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals*, 5th Edition, 2010, with 2010 Interim.
- AASHTO *Roadside Design Guide*, 3rd Edition, 2002, and 2006 Chapter 6 Update.
- EIA *Electronic Industries Alliance Standards and Technical Publications.*

- IESNA *American National Standard Practice for Roadway Lighting*, 2000 (ANSI/IES RP-8-00).
- IESNA *American National Standard Practice for Tunnel Lighting*, 2005 (IES-RP-22-05).

2.16.3 PERFORMANCE REQUIREMENTS

2.16.3.1 SOFTWARE

The Design-Builder shall use AGI32 Lighting Design Software available from Lighting Analysts, Inc., Littleton, Colorado, (303) 972-8852. The software shall use data files in Illuminating Engineering Society (IES) standard format for the luminaires. Lighting analysis shall be submitted to WSDOT on hard copy; and AGI32 files shall be submitted to WSDOT on CDROM.

2.16.3.2 MEETINGS

It is recommended that the Design-Builder work with WSDOT to establish a Traffic Design Team to oversee and provide input on the design and construction of traffic-related design issues including, but not limited to, signing, lighting, pavement marking, traffic signals, and Intelligent Transportation Systems (ITS). It is recommended that the Design-Builder schedule and chair the meetings during the design and construction stages until Substantial Completion. It is recommended that the Design-Builder prepare the agenda, meeting minutes, exhibits, and design plans necessary for each meeting (see Section 2.1). Meetings may include representatives from WSDOT, the City of Marysville the City of Lake Stevens, or Snohomish County, and other representatives as requested by WSDOT.

2.16.4 DESIGN AND CONSTRUCTION REQUIREMENTS

2.16.4.1 PERMANENT LIGHTING DESIGN REQUIREMENTS

The Design-Builder shall provide illumination at all locations identified in Chapter 1040 of the WSDOT *Design Manual*, and as specified in these Technical Requirements.

All existing equipment that is removed including, but not limited to, luminaire poles, luminaire pole bases, cabinets, lamps, and luminaires, shall be replaced with new equipment. No existing equipment may be reused for the permanent illumination system, unless otherwise specified. Removed light standards and luminaires shall be salvaged in accordance with this Section.

The Design-Builder shall design and construct the illumination system to accommodate future maintenance. The illumination system shall be designed to minimize lane closures required for maintenance.

The allowable line loss for illumination circuits shall be a maximum of five percent.

A Conceptual Illumination Plan is located in Appendix M1.

2.16.4.1.1 Photometric Analysis

The Design-Builder shall complete a Photometric Analysis that includes the following:

- Lighting intensities (foot candles) and uniformity (average/minimum); light pole locations and heights; luminaire types; wattage and brightness; and quantities of each.

- Lighting calculations that account for the anticipated loss of light due to Lamp Lumen Depreciation and Lamp Dirt Depreciation shall be 0.62.
- Consideration of roadway safety; ease and cost of maintenance; consistency with adjacent roadway lighting designs; annual energy costs; provision for future lighting needs; and local planning policies.
- Lighting contours for nighttime illumination shall show the distances from the light source at lighting levels 1.0, 0.5, and 0.2 foot-candle. Lighting contours of 0.1 and 0.05 foot-candle shall be provided for permanent surfaces adjacent to sensitive areas such as streams and rivers. Topographic plan features shall be shown at least 150 feet beyond the illumination contours.
- Lighting calculation grid spacing shall be 5 feet by 5 feet.
- Veiling illuminance calculations

2.16.4.1.2 Spillover Light

When adjacent to non-commercial areas, the maximum spillover light allowed shall be 0.2 foot-candles at ground level at the edge of the Right of Way, unless otherwise noted. The Design-Builder shall install flat lens medium cut-off fixtures to limit spillover light outside of the Right of Way. The Design-Builder may use shielding to limit spillover light. New lighting shall minimize spillover light shining on the main and side channels of streams and rivers to no more than 0.05 foot candles.

2.16.4.1.3 Specific Requirements

The Design-Builder shall provide illumination when required in accordance with light levels and uniformity ratios provided in the WSDOT *Design Manual*.

All existing light standards that are removed shall be replaced with light standards meeting the Contract requirements. Existing light standard foundations shall not be reused and shall be removed.

Local road lighting outside of limited access right of way shall be constructed in accordance with local agency standards.

2.16.4.1.3.1 ***Light Standards***

Light standards and foundations shall conform to the Standard Plans with the following exceptions:

- Light standards shall be steel, tapered, round steel sections not exceeding 50 feet in height. The luminaire arm shall be horizontal and attach to the light standard at a 90 degree angle. The luminaire arm shall be round, steel, and shall not exceed 12 feet in length. A 2-foot nominal luminaire arm length is preferred, if required light levels can be achieved. The luminaire arm shall have no bends.
- Light standards shall also meet the following requirements:
    - Handhole - When mounted on the barrier, the handhole shall be located on the down-stream side of traffic.
    - Base Details - Base details shall conform to the Standard Plans. Bases shall be fixed or slip, as required.

- All openings shall be installed during fabrication. All openings in the pole shall have a water-tight, gasketed cover attached with stainless steel box bolts.
- No field welding shall be permitted.
- The design of the light standard shall comply with *AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals*. A 90-mph wind loading, and a 1.14 gust effect factor shall be used, along with appropriate height, exposure factor, shape, and drag coefficients. The Design Life and Recurrence Interval shall be 50 years. Fatigue design shall conform to AASHTO Section 11, Table 11-1, using Fatigue Category III.
- The Design-Builder shall perform a geotechnical soil analysis for light standard foundations to determine the appropriate design criteria for light standard foundations.

Complete calculations for light standard structural design shall be prepared and submitted to WSDOT in accordance with the Northwest Region current practices.

2.16.4.1.3.2 ***Luminaires***

The Design-Builder shall furnish and install flat cobra head-style, high pressure sodium vapor luminaire with, Type III, medium cut-off distribution wall mount, and decorative luminaires are used or where local agency jurisdiction dictates luminaire type.

The Design-Builder shall coordinate the placement of light standards and the associated conduit system with guardrail, noise walls, retaining walls, Utilities, and overhead power lines. All conduits shall have a minimum clearance of 3 feet from guardrail posts.

The Design-Builder shall provide slip-base light standards within the clear zone. Light standards shall have no more than two luminaires per pole, and 310-watt luminaires shall not be used.

2.16.4.1.4 Equipment Provided by WSDOT

The Design-Builder shall supply all equipment.

2.16.4.1.5 Design Documentation

The Design-Builder shall provide all documents and information required for the Design Documentation Package in accordance with Section 2.12.

2.16.4.2 PERMANENT ILLUMINATION CONSTRUCTION REQUIREMENTS

The Design-Builder shall use materials approved in accordance with Section 2.25.

Illumination systems shall remain operational at all times during construction unless a temporary illumination system is provided to cover the affected area. Any damage to illumination systems shall be repaired prior to hours of darkness on the following day.

Existing illumination systems to be replaced on the Project shall remain operational until new or temporary illumination systems are installed, tested, and fully-operational. The Design-Builder shall notify WSDOT 14 Calendar Days prior to removing existing illumination systems or disrupting power to any illumination system.

All lighting conductors shall be installed using conduits containing only lighting electrical conductors. The conduit and pull box system shall be separated from traffic signal

conduits and ITS conduits. A shared trench, shared power service, and shared cabinet foundations may be used.

The minimum allowable wire size is #8 "AWG" American Wire Gauge for the proposed electrical system

The Design-Builder shall provide maintenance for all lighting within the Project limits, until Final Acceptance.

The Design-Builder shall coordinate with the Utility company to determine the minimum separation between overhead Utilities and illumination structures. A minimum of ten feet of circumferential clearance to all power lines including the neutral shall be maintained. A greater clearance may be required for higher voltages.

The Design-Builder shall perform the required testing in accordance with the Special Provisions and Section 8-20 of the Standard Specifications. WSDOT will perform the final electrical inspection and acceptance of illumination systems in accordance with WAC 296-46B-010.

2.16.4.2.1 Temporary Illumination Construction Requirements

Temporary illumination system and temporary signal system shall be designed as required, depending on the final construction traffic control plans, staging plans, order of work and detours.

2.16.4.2.2 Electrical Service

The Design-Builder shall coordinate with WSDOT and submit the necessary design information for new and modified electrical services. Outside limited access, lighting will be serviced in accordance with City of Marysville or City of Lake Stevens standards.

Electrical service cabinets for non-WSDOT electrical systems shall not be located within limited access right-of-way unless otherwise approved by WSDOT, and shall be designed to the local agency standards.

Underground service laterals (conduit and conductors) shall be provided by the Design-Builder between the Utility power source and the service cabinet. Power feed conductors, from the Utility transformer to the service cabinet, shall be isolated from other circuits by using a separate conduit. Junction boxes in this conduit run are not allowed. Service connections shall meet Utility company requirements. The Design-Builder shall coordinate placement of electrical services so that circuits from the service do not overlap or cross paths with circuits from other services.

Sizes of service breakers shall be in accordance with the National Electrical Code. Branch breakers shall be at least 140 percent of the computed illumination circuit load. The breaker size shall not exceed the ampacity of the smallest conductor it protects. The Number 10 cable in the pole and mastarm are protected by fusing, and are not a consideration in this sizing requirement. The size of the main breakers shall not exceed 140 percent of all of the computed illumination loads, and 125 percent of all other loads on the service. The minimum main breaker size shall be 200 amps for WSDOT services. The service lateral conductors shall be sized to serve the full load of the electrical bus work. Lead in conductors for transformers, services, panels, and cabinets shall be sized to the capacity of the main breaker or size of the device.

Rating of lighting contactors shall equal or exceed the branch breaker rating for the circuit they switch.

In addition to the breakers required to satisfy the Contract requirements, the Design-Builder shall provide a minimum of two spare 30 amp branch breakers in each new service cabinet.

Electrical services shall provide sufficient access for WSDOT; shall comply with the requirements of the serving Utility; and shall not be installed in ditches or on slopes steeper than 4:1.

A new electrical service cabinet type D is required if the existing service cabinet is older than 10 years or if it is not a type D. A separate electrical service is required for the City's owned illumination system. A service agreement request is required to disconnect the existing electrical service or to energize the new electrical service.

A new electrical service is required if the Design-Builder requires disconnection and reconnection of power from the serving Utility to an existing service cabinet, except if the existing service meets Electrical Utility Service Equipment Requirements Committee (EUSERC) requirements and WSDOT requirements.

Wire sizes for transformers shall be designed to the load rate of the transformers. Step up transformers shall not be permitted between electrical services and loads.

2.16.4.2.2.1 *Electrical Service Agreements*

WSDOT will obtain all Service Agreements from the electric power company. The Design-Builder shall pay all costs charged by the electric power company for the Service Agreement and for the power company's costs associated with upgrading its facilities to meet the requirements of the Service Agreement. WSDOT will pay the monthly electric bills starting on the day Work begins for the existing lighting, and for the lighting installed under the Contract until Physical Completion.

The Design-Builder shall coordinate with WSDOT and submit a Service Agreement Request for all new and modified services required for the Project. The Service Agreement Request shall include the information listed in the Service Agreement Checklist (Appendix U5) and the following:

- Location of existing or new service submitted in plan sheet format;
- Load calculations showing design and future loads in Kilo-Volt-Amps (KVA) and voltage required;
- Request for modifications to existing services showing existing load, new load, and ultimate load; and
- Name of the Utility and the service agreement number (for existing services).

The Design-Builder shall submit the Service Agreement Request a minimum of 60 Calendar Days in advance of when the power connection is needed. WSDOT will begin procurement of the Service Agreement after the Service Agreement Request is accepted and determined complete by WSDOT. If changes to the Service Agreement are required by the Design-Builder, the Design-Builder shall pay all costs associated with the Service Agreement revisions. Further, the 60 Calendar Day advance notice will begin when the revision to the Service Agreement Request is accepted and determined complete by WSDOT.

If the Design-Builder proposes to remove an existing service, the Design-Builder shall notify WSDOT in writing at least 14 Calendar Day prior to the proposed removal, so that the service account can be cancelled. The written notification shall contain the Service Agreement number, location, and electrical load in KVA.

2.16.4.2.3 Electrical Inspector

The Department of Labor and Industries has authority over all electrical installations within the State of Washington. WSDOT has been granted authority over all electrical installations within the rights of way of State highways, provided WSDOT maintains and enforces an equal, higher, or better standard of construction, materials, devices, appliances, and equipment than is required by State law. It is the role of the WSDOT Electrical Inspector to assure that all electrical installations meet the requirements of the National Electric Code, and all applicable State laws and provisions.

The WSDOT Electrical Inspector will perform the following:

- Act as a resource for the ITS design team;
- Assist with ITS plan reviews;
- Perform periodic inspections during construction;
- Witness required ITS field tests (as desired); and
- Inspect and approve all electrical and ITS installations in accordance with this RFP.

WSDOT will designate a WSDOT Electrical Inspector. The Design-Builder shall contact WSDOT to arrange for electrical inspection.

2.16.4.2.4 Salvage

The Design-Builder shall salvage the existing ITS, signal, and illumination equipment including cabinets, poles, luminaires, and associated equipment, and all other equipment requested by WSDOT to the WSDOT Northwest Region Signal and ITS Maintenance Superintendent at the following address:

3700 - 9th Avenue South
Seattle, Washington 98134
Telephone: (206) 442-2110

Fourteen days prior to delivery of salvaged items, the Design-Builder shall provide a list of salvage items, their quantity, and current condition to the Northwest Region Signal and ITS Maintenance Superintendent. The Design-Builder shall give notice to the WSDOT Northwest Region Signal and ITS Maintenance Superintendent seven Calendar Days prior to delivery. The Design-Builder shall provide all labor and equipment to transport, load, unload, and store the salvaged items.

2.16.4.2.5 Conduit System

The Design-Builder shall not sawcut or open trench across mainline or ramps under any circumstances.

The Design-Builder shall not sawcut or open trench the following on roadways outside of limited access Right of Way:

- Cement concrete pavement;

- Any pavement after the final lift of Hot Mix Asphalt or Portland Cement Concrete Pavement is placed; or
- Existing pavement to remain.

When the conditions described above are encountered, the Design-Builder shall install conduit using jacking, drilling, or boring methods. The Design-Builder shall install new conduit for the illumination system with the following exceptions:

- Conduit under pavement may be used, provided the conduit is free of debris, in good repair, and proofed and cleaned in accordance with Section 8.20 of the Standard Specifications.

All conduits shall have a minimum clearance of 3 feet from guardrail posts.

The minimum size conduit for illumination systems is a 2-inch diameter, except for the following:

- Three-quarter-inch conduit from the first junction box to an underdeck luminaire.
- Smaller diameter conduit may be used from the junction box to any light standard.
- A one-inch size conduit shall be used between light standards with slip bases and the adjacent junction box.

The Design-Builder shall install a spare 2-inch conduit associated with every conduit crossing under pavement or through structures, including walls. The Design-Builder shall install a spare 2-inch conduit between each service cabinet and the first junction box.

In new conduits, conductors shall occupy a maximum of 26 percent of the cross-section of the conduit. In existing conduits, conductor fill shall meet NEC requirements for conduit with three or more conductors, and shall occupy a maximum of 40 percent of the conduit's cross-sectional area.

The Design-Builder shall install two 2-inch conduit/junction box systems (embedded in concrete) in each of the following:

- Bridge rail;
- Median cast in place barrier; and
- Roadside cast in place barrier.

The conduit/junction box installations shall be constructed in accordance with Section 2.13 and the Standard Plans. All conduit installed in concrete structures shall be fitted with appropriate deflection and/or expansion fittings.

2.16.4.2.6 Junction Boxes, Pull Boxes

Where possible, junction boxes shall not be located within paved areas. Any junction boxes located within paved areas shall be Heavy Duty Type 4, 5, or 6. The Design-Builder shall consult with WSDOT when considering installation of heavy duty junction boxes. No junction boxes shall be placed in the traveled way or auxiliary lanes.

Junction boxes installed face up in the sidewalk of bridge structures shall be cast iron type with skid resistant covers. Junction boxes located outside of paved areas shall be Type 1L, 2L, or 8. Refer to the Standard Plans and details in the WSDOT *Standard Plans Details.*

Junction boxes shall be installed between 5 feet and 10 feet from each light standard, at all cabinets, and where a conduit system requires a major change in direction. The maximum

spacing for junction boxes in traffic barrier, retaining wall, or structures shall be 180 feet within each raceway system, and 240 feet in all other areas.

Refer to Section 2.18 for additional requirements

2.16.4.2.7 Utility Locates

Prior to installing any element of the illumination system, the Design-Builder shall contact the One-Call number (1-800-424-5555) for Utility locations. The Design-Builder shall be responsible for coordination with the Utility Owners and reconciliation of any Utility conflicts in accordance with Section 1-07 of the General Provisions and Section 2.10.

In addition, the Design-Builder shall be responsible for responding to the One-Call number requests as the owner (see Section 2.10). When requested, the Design-Builder shall mark all conduit installed as part of the Project. WSDOT will locate and mark existing conduit remaining undisturbed that is owned by WSDOT. Typically the WSDOT locate will be within 4 feet lateral of conduit. The Design-Builder shall verify exact locations of all underground conduit before Work begins.

2.16.5 SUBMITTALS

The Design-Builder shall submit Preliminary Illumination Plans for Review and Comment, and prepare Final Permanent Illumination Plans prior to issuance of the Released For Construction Plans. All submittals shall follow the requirements of Section 2.28 and the Quality Management Plan approved by WSDOT.

2.16.5.1 PRELIMINARY DESIGN SUBMITTAL

2.16.5.1.1 Photometric Analysis

Photometric analysis shall be performed for all illumination areas. The analysis shall identify the mounting height, light standard height, offset, spacing, and lighting fixture data. Photometric data files in IES standard format for the luminaires shall be submitted to WSDOT for Review and Comment. The Design-Builder shall provide the following analysis data for the design areas as required by Chapter 1040 of the WSDOT *Design Manual*:

- Minimum light level;
- Minimum average light level;
- Uniformity ratio (avg./min.); and
- Maximum veiling luminance ratio.

The Design-Builder shall submit a graphical report showing all design areas with calculation points. The report shall be legible and to scale, and shall list all photometric files, luminaire definitions, and their characteristics. The Design-Builder shall also submit a rendering for each lighting area requiring 3D lighting analysis.

The Design-Builder shall submit an electronic copy of the Photometric Analysis (in AGI format) to WSDOT with the Preliminary Design Submittal for Review and Comment.

2.16.5.1.2 Plans

The Permanent Illumination Plans shall be prepared in accordance with the WSDOT *Northwest Region Current Practices in Electrical Design*; the Photometric Analysis; and

the WSDOT *Plans Preparation Manual*. The Plans shall include, but are not limited to, the following items:

- Existing Utilities;
- Proposed channelization;
- Location of light standards, service cabinets, conduit, and junction boxes required for the installation;
- Illumination for overhead signs as required;
- Luminaire schedule specifying mounting height, luminaire type, lamp, voltage, wattage, station and offset, and service number; and
- Identification of existing illumination to remain.

The Design-Builder shall submit the Permanent Illumination Plans to WSDOT for Review and Comment.

The Design-Builder shall also submit back-up data Items 1 through 3 as described in the WSDOT *Northwest Region Current Practices in Electrical Design* (Appendix T4).

2.16.5.2 FINAL DESIGN SUBMITTAL

The Permanent Illumination Final Design Submittal shall be complete, and shall include all of the items from the Preliminary Illumination Design Submittal, in addition to the following:

- Existing Utilities;
- Proposed channelization;
- Light standards as specified, including foundation bases and anchorages;
- Conduit and conductor schedule showing new wire and existing wire to remain;
- Transformer schedules;
- Sub-panel schedules;
- Service cabinet types, as required, including photocells, breaker schedules, and wiring diagrams;
- Wiring diagram for each illumination circuit;
- Complete construction notes;
- Wire notes (including identification of new and existing conductors and conduit);
- All wire, cable, and terminators that are needed for the complete operation of the lighting system;
- Illumination details for non-standard design elements;
- All references to the Standard Plans and electrical details; and

Refer to Sections 2.12 and 2.28 for submittal and review requirements.

The Design-Builder shall also submit Items 4 through 13 as described in the WSDOT *Northwest Region Current Practices in Electrical Design*.

2.16.5.3 RELEASED FOR CONSTRUCTION ILLUMINATION PLANS

Refer to Sections 2.12 and 2.28 for submittal and review requirements.

2.16.5.4 SHOP DRAWINGS

Shop drawings and product data shall include the following:

- Light Standards and mast arms, for each type and size;
- Luminaires and lamps;
- Wiring diagrams;
- Electrical panels;
- Splice enclosures;
- Conduit;
- Concrete for foundations;
- Junction boxes; and
- Wiring.

End of Section

2.18 INTELLIGENT TRANSPORTATION SYSTEMS (ITS)

2.18.1 GENERAL

The Design-Builder shall conduct all Work necessary to meet the requirements for Intelligent Transportation Systems (ITS) in accordance with this RFP, and shall keep the existing ITS functioning throughout construction of the Project. This Section discusses ITS standards and publications, performance requirements, design and construction criteria, maintenance during construction, and submittal requirements.

The Design-Builder shall maintain electrical power to all ITS devices during construction. The Design-Builder shall maintain communications between all ITS devices and the Traffic Systems Management Centers (TSMC) during construction.

The Design-Builder shall design, furnish, and install complete ITS including, but not limited to, the following elements:

- All cabinets, controllers, software, loops, junction boxes, and any ancillary equipment required to create a functioning ITS;
- System and equipment testing as required;
- Foundations, property restoration, and incidental Work.

Forward Compatibility

The Design-Builder shall design the following ITS elements to be Forward Compatible in accordance with Section 2.1:

- Install CCTV cabinet and equipment in (double wide) the new traffic signal cabinet.
- Install CCTV camera on signal pole on Northwest corner of intersection.
- Install ITS conduit (2-2 inch) from existing pull box at Sta. 160 + 90 and extend through the intersection to the project limits on NB SR 9 and EB SR 92.
- Install (approximately 1600 feet) of Mainline fiber optic and make connections to the end of the existing system (about Sta. 152 +00 Right) – including the interconnect fiber.
- Install all required conduits, pull box, cable vault, and communications equipment.

Maintenance Requirements

All ITS devices shall be designed and constructed so that they are accessible and maintainable using current maintenance methods and materials. Refer to Section 2.11 for additional requirements.

2.18.2 MANDATORY STANDARDS

The following is a list of publications that shall be used for all design and construction. They are listed in hierarchical order, with the most important appearing at the top of the list. This is not a comprehensive list; other applicable publications may be required to complete the design and construction. If the Design-Builder becomes aware of any ambiguities and/or conflicts relating in any way to the Mandatory Standards, the Design-Builder shall notify WSDOT immediately, so that WSDOT may resolve them.

- ITS Special Provisions (Appendix B2).
- Standard Specifications (M41-10) (Appendix D18).

- WSDOT *Northwest Region ITS Design Guide* (Appendix I1)
- WSDOT *Northwest Region ITS Current Practices Supplement* (Appendix I4).
- WSDOT *Northwest Region ITS Current Practices* (Appendix I3).
- WSDOT *Design Manual* (M22-01) (DM) (Appendix D3).
- Standard Plans (M21-01) (Appendix D17).
- *Washington State Modifications to the Manual on Uniform Traffic Control Devices* (M24-01) (MUTCD).
- WSDOT *Materials Manual* (M46-01) (Appendix D10).
- WSDOT *Construction Manual* (M41-01) (Appendix D2).
- WSDOT *Northwest Region ITS Details* (Appendix I2).
- WSDOT *ITS Device Naming* (Appendix I2).
- ICC *Supplement to the International Code*,2007.
- ICC *International Building Code* (IBC),2006.
- National Fire Protection Association *National Electrical Code* (NFPA, NEC), 2005.
- AASHTO *A Policy on Geometric Design of Highways and Streets*, 5th Edition, 2004.
- AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaries, and Traffic Signals*, 4th Edition, 2001, with 2002, 2003, and 2006 Interims.
- FHWA *Manual on Uniform Traffic Control Devices for Streets and Highways* (MUTCD), 2003.
- AASHTO *Roadside Design Guide*, 3rd Edition, 2002, and 2006 Chapter 6 Update.
- US DOT National ITS Architecture.
- EIA/TIA *Fiber Optic Test Procedure* (FOTP) *Standards*.
- USDA *United States Department of Agriculture Rural Utilities Service* (RUS) *Specifications and Drawings*.

2.18.3 PERFORMANCE REQUIREMENTS

2.18.3.1 ITS DESIGN PROGRESS MEETINGS

Refer to Section 2.16.

2.18.3.2 TESTING OF EXISTING EQUIPMENT

To ensure that all existing equipment is in proper working order at a Project site where the Design-Builder will perform Work, the Design-Builder may request a meeting at each Project site with WSDOT and the agency with current maintenance responsibility, prior to the performance of any Work at the Project site. At the time of this meeting, all loops, cabling, connectors, and cabinet operations may be tested by the Design-Builder. The

Design-Builder shall be responsible for requesting, coordinating, and conducting the on-site meeting, and for providing all labor, materials, test equipment, and test documentation. All testing shall be non-destructive. If the Design-Builder begins Work at a Project site without arranging this pre-testing, WSDOT will assume that all cabinet components and operations were in proper working order prior to the performance of any Work, and the Design-Builder shall be responsible for ensuring that all cabinet components and operations are in proper working order during and upon the completion of the Work. If no pre-testing is completed, any equipment that is not functioning upon the completion of the Work will be assumed to have been in proper working order as of the date of Notice to Proceed, and shall be replaced at the Design-Builder's expense.

2.18.3.3 ITS TESTING

The Design-Builder shall follow all testing requirements in accordance with the Special Provisions.

The Design-Builder shall coordinate ITS testing with the WSDOT Engineer and with the Signal Branch Office. Prior to any testing, the Design-Builder shall provide 30 Calendar Days notice to the WSDOT Engineer and to the Signal Branch Office. The WSDOT Signal Branch Office may be contacted at the following address:

3700 - 9th Avenue South
Seattle, Washington 98134
Telephone: (206) 442-2110

The Design-Builder shall have current training and certification on all testing equipment used. The Design-Builder shall provide documentary evidence that the instruments used for testing have been calibrated in accordance with the instrument manufacturer's specifications within the last 12 months. The Design-Builder shall have all testing equipment calibrated annually for the duration of the Contract. Measurements recorded during the tests shall be supplied to WSDOT.

The Design-Builder shall have in its possession a certification of test device calibration in accordance with the American National Standards Institute (ANSI) guidelines. The testing device shall measure electrical and insulation characteristics of power and signal control cables, and calibration documentation of optical cable test equipment. ANSI guidelines call for annual calibration of test equipment.

Depending on the construction schedule, highway ITS components may be installed, made operational, and relocated at a later time. Highway ITS components shall undergo all series of tests when relocated.

The Design-Builder shall provide a schedule for all testing so that WSDOT may observe the testing. Times and locations for all tests shall be provided to WSDOT a minimum of seven Calendar Days in advance of any test.

The Design-Builder shall develop all ITS testing procedures and pass/fail requirements. Testing procedures and requirements must be accepted by WSDOT prior to any testing. WSDOT may observe any tests and will audit test results.

2.18.3.3.1 Fiber Optic Splicing and Testing Plan

The Design-Builder shall submit a Fiber Optic Splicing and Testing Plan prior to beginning work on the ITS. The Fiber Optic Splicing and Testing Plan shall be in Work format and shall include the following:

- Location of all proposed fiber optic splices, including what is being spliced;
- Schedule date of splices and testing;
- Tests to be performed;
- Equipment to be used for testing;
- Calibration results of testing equipment; and
- List of Project contact (including phone numbers) for the Design-Builder and WSDOT staff.

The Fiber Optic Splicing and Testing Plan shall be submitted in Work format, with each final plan submittal that includes ITS Work. The Fiber Optic Splicing and Testing Plan shall be updated as necessary with each design change affecting testing type and location. Upon completion of the splicing and testing of ITS equipment, the Design-Builder shall submit Project documentation and fiber optic test documentation, in accordance with the Section and the Special Provisions.

2.18.3.3.2 Power and Control Cable Testing

The Design-Builder shall test power and control cables according to the requirements of Section 8-20 of the Standard Specifications, and the applicable sections of the Special Provisions.

2.18.3.4 COORDINATION WITH ADJOINING PROJECTS

The Design-Builder shall obtain the ITS design plans for any adjacent projects, and determine the coordination requirements for continuous functioning of the ITS equipment for the Project. The Design-Builder shall adjust the design and construction schedule accordingly to coordinate the installation of the required components, while continuously maintaining the ITS. Refer to Section 2.1.

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2.18.3.5 MAINTENANCE AND OPERATION OF ITS COMPONENTS

The Design-Builder shall provide maintenance of all existing and new highway ITS components that the Design-Builder furnished and installed as part of the Project, until Physical Completion or unless otherwise noted.

Upon execution of the Contract, the Design-Builder shall be responsible for all highway ITS and communications components that the Design-Builder performs Work on, including those components already in place. The Design-Builder shall maintain the components through Physical Completion.

Maintenance and operation includes the response to faults. The three categories of faults -- urgent, priority, and minor -- are described as follows:

- Urgent – Any fault that causes a total failure, disruption, safety impact, or system-wide disruption of the following equipment or services:

- Communications links and equipment; and
- CCTV facility.

The response time for urgent faults of ITS components shall be less than two hours. The repair time for urgent faults of ITS components shall be less than four hours.

- Minor – Any other fault. The response time shall be midnight of the next Calendar Day. The repair time shall be less than four hours.

The Design-Builder shall provide a plan for maintenance of existing and new ITS components within the Project limits. The plan shall include, at a minimum, the following:

- Details of the proposed preventive maintenance program including frequency, for each highway ITS component.
- A general description of the proposed emergency maintenance and operation response program, for each highway ITS component. This description shall include the categories of faults and how the faults will be detected.
- Maintenance and operation activities.

The Design-Builder shall replace, not repair, hardware or equipment if any of the following occurs:

- The Design-Builder has attempted to repair the hardware or equipment on at least one previous occasion and there has been a subsequent failure;
- The repair activities interfere with the movement of traffic; or
- WSDOT decides that replacement is necessary in the interest of public safety.

The Design-Builder shall maintain a log documenting maintenance activities and all repairs performed on ITS equipment. The maintenance log shall be made available to WSDOT upon request.

2.18.3.6 ITS TRAINING

The Design-Builder is not required to provide training to WSDOT for the Project.

2.18.3.7 WSDOT PERSONNEL

The Design-Builder shall coordinate the Work with WSDOT personnel and the SR 9/SR 92 Project office, as required. The Design-Builder shall coordinate ITS Work with the following WSDOT staff:

2.18.3.7.1 WSDOT ITS Implementation Engineer

The WSDOT ITS Implementation Engineer will perform the following:

- Recommend acceptance of components and/or methods to WSDOT;
- Review the certification of test device calibration (to ANSI specified guidelines);
- Review and make recommendations for acceptance to WSDOT of the required documentation including specifications, shop drawings, and all measured and recorded values for the system and for each cabinet;

- Review splice vault, CCTV, cabinet, and communication hub locations once surveyed and staked in the field;
- Oversee connections to the existing ITS communication network;
- Review plans and component submittal packages and assist the design team; and
- Make recommendations to WSDOT for the acceptance of ITS components based on the submittal and other documentation packages.

2.18.3.7.2 WSDOT Electrical Inspector

The Department of Labor and Industries has authority over all electrical installations within the State of Washington. WSDOT has been granted authority over all electrical installations within the rights of way of State highways, provided WSDOT maintains and enforces an equal, higher, or better standard of construction, materials, devices, appliances, and equipment than is required by State law. It is the role of the WSDOT Electrical Inspector to assure that all electrical installations meet the requirements of the National Electric Code, and all applicable State laws and provisions.

The WSDOT Electrical Inspector will perform the following:

- Act as a resource for the ITS design team;
- Assist with ITS plan reviews;
- Perform periodic inspections during construction;
- Witness required ITS field tests (as desired); and
- Inspect and approve all electrical and ITS installations in accordance with this RFP.

WSDOT will designate a WSDOT Electrical Inspector. The Design-Builder shall contact WSDOT to arrange for electrical inspection.

2.18.4 DESIGN REQUIREMENTS

2.18.4.1 GENERAL REQUIREMENTS

The Design-Builder shall provide for fiber optic communications, real-time National Television System Committee CCTV surveillance and all associated traffic control devices.

The Design-Builder shall provide a complete, operational, and maintainable ITS and components. The ITS system and its components shall be compatible with the existing system. The Design-Builder shall furnish, install, and maintain all electrical power service and communications necessary for the ITS. The Design-Builder shall label all new and existing ITS devices using naming and numbering conventions in accordance with the WSDOT *ITS Device Naming*. The Design-Builder shall provide an ITS system that meets the following requirements:

- Expandability;
- Cabinet layouts in accordance with the WSDOT *Northwest Region ITS Design Guide Supplement* and the WSDOT *Northwest Region ITS Details (Appendix I5)*;

- Documentation reflecting the National ITS Architecture;
- Support for stand-alone operation of all field devices using backup software components;
- Protection from voltage surges and lightning;
- Weather-resistant components capable of operating in rain, snow, and wind conditions, and in temperature and humidity ranges encountered in the Project area;
- Hazard-free ITS components mounted along the side of the road outside of the clear zone, or in protected areas;
- If ITS components are mounted in the clear zone, they shall be constructed and protected in accordance with the AASHTO *Roadside Design Guide*; and
- Field cabinets with standard WSDOT locking devices.

The Design-Builder shall use stainless steel mounting hardware such as bolts, nuts, washers, and external hinges on vaults, cabinets, shelters, junction boxes, and other outdoor ITS devices. The Design-Builder shall use only components designed for ten or more years of industrial use.

All material, equipment, and components furnished by the Design-Builder shall be new (within 12 months from the date of manufacture), of the latest design and manufacture, in an operable condition at the time of delivery and installation, and compatible with the existing system.

The Design-Builder shall install the cabinets so that they are easily accessible to maintenance personnel from the roadway (see Section 2.11), and so that they maximize safety for the maintenance personnel, where possible. When possible, the Design-Builder shall locate the ITS elements so that the need for future relocation is eliminated.

The finish coat for all ITS poles shall be painted or powder coated in accordance with the Special Provisions.

2.18.4.1.1 Vehicle Detection

2.18.4.1.1.1 ***Loop Detectors***

There are no detection loops within the project limits.

2.18.4.2 COMMUNICATION CONDUIT SYSTEM

The Design-Builder shall provide a complete conduit system, including all associated conduit, cables, junction boxes, pull boxes, cable vaults, and accessories.

Specifications for conduit and conduit systems are described in the Special Provisions.

The Design-Builder shall use two 2-inch conduits for mainline communication. The Design-Builder shall install all communications cables within the conduit system. Direct-buried or exposed cables will not be permitted. A minimum of one spare 2-inch conduit shall be provided to each cabinet or field device, and at each roadway crossing. Communications conduit system shall only be used for fiber optic distribution and transmission cables or copper connections between ITS devices

The Design-Builder shall not install pull boxes, junction boxes, or cable vaults (existing or new) in any portion of the traveled way or auxiliary lanes. If final re-striping will cause the communication conduit system to encroach the traveled way or auxiliary lanes, the Design-Builder shall relocate the communication conduit system, where appropriate, to eliminate encroachment of the traveled way and auxiliary lanes. If temporary striping causes encroachment of the traveled way or auxiliary lanes with pull boxes, junction boxes, or cable vaults, these items shall be relocated outside of the traveled way and auxiliary lanes, or protected in place to the satisfaction of the WSDOT Engineer while providing a safe roadway for the public.

All conduit shall be a minimum of 2 inches in diameter, except where a smaller diameter is required at the entry of some pole foundations such as ramp meter poles, “ramp meter ahead” flashing signs, and poles with slip bases.

The conduit and pull box system shall be separated from lighting conduits and traffic signal conduits, although a shared trench, shared power service, and shared cabinet pads may be used. Where conduit is trenched, it shall be encased in red-tinted Controlled-Density Fill, and shall include a trace wire. When communication cable is installed as part of a new system, the communication cable shall be kept separate from all other wiring.

2.18.4.2.1 Intentionally Omitted

2.18.4.2.2 Junction Boxes

Junction boxes shall not be placed in the traveled way or auxiliary lanes. Existing junction boxes located within the traveled way of mainline, ramps, or auxiliary lanes (existing or new), shall be relocated by the Design-Builder outside of the traveled way including mainline, ramps, or auxiliary lanes.

All junction boxes in pavement shall be heavy duty Type 4, 5, or 6. Junction boxes shall be placed 1 inch above grade in unpaved areas.

The maximum spacing for junction boxes on traffic barriers, retaining walls, or structures shall be 180 feet within each raceway system, and a maximum spacing of 240 feet in all other areas.

2.18.4.2.3 Cable Vault and Pull Boxes

Cable vaults and pull boxes shall not be placed in the traveled way or auxiliary lanes. Existing cable vaults, pull boxes, located within the traveled way of mainline, or auxiliary lanes (existing or new) shall be relocated by the Design-Builder outside of the traveled way including mainline, or auxiliary lanes.

Pull boxes shall not be placed in paved areas unless there are no other alternatives.

Pull boxes placed in paved areas shall have load-bearing lids. However, load bearing lids shall not be installed on pull boxes that are outside of paved areas.

Pull boxes shall be used for intermediate pull points where cable vaults are not needed. No splices will be allowed in pull boxes.

At a minimum, the Design-Builder shall place cable vaults at each end of the Project, and at each hub location. Cable vaults shall be used as pull points, at splice locations, and where there are major changes in mainline conduit direction. Cable vaults shall be located with consideration for accessibility, including access along arterial routes. A cable vault shall be placed at each ITS cabinet.

Cable vaults shall not be placed within paved areas. The maximum spacing for cable vaults is one mile. The Design-Builder shall clean existing vaults prior to installing cable.

The Design-Builder shall coil and rack a minimum of 50 feet of each cable at all cable vaults and pull boxes.

The maximum spacing for pull boxes or cable vaults in a mainline conduit run is 1,000 feet.

2.18.4.3 COMMUNICATION CABLES AND INTERFACES

The Design-Builder shall provide a communication network that meets the requirements of this RFP. Communication hardware typically consists of modems, servers, network connections, cables, connectors, and switches. The backbone of the communication network shall be Single-Mode Fiber Optic (SMFO) cable.

The Design-Builder shall provide a complete communication cable and interface system to all ITS elements along SR 9 within the Project limits using new SMFO cable. Twisted pair cable shall also be provided, as specified. The existing communication cable and interface system includes the following:

- Mainline trunk SMFO cable (36-strand);
- Distribution SMFO cable (12-strand);
- Distribution twisted-wire pair cable.

Specifications for communication cable and testing requirements are described in the Special Provisions.

The Design-Builder shall perform the following:

- Ensure the existing communications functionality during the construction period at all times;
- Design and construct a fully-functioning and operable communications network to serve the highway ITS components along the Project; and
- Propose solutions to achieve design objectives based on WSDOT functional, technical, operational, and maintenance requirements.

The Design-Builder shall furnish and install a RS900 Ethernet switch in the CCTV controller cabinet.

The Design-Builder shall furnish and install a 2070 Eagle signal controller with the following components:

Controller Components:
2070-1B CPU
2070-2A
2070-3B
2070-4A

Software:
NEXTPHASE 1.75C or latest

The Design-Builder shall not substitute, apply any part, or attach any piece of equipment contrary to the manufacturer's recommendations and standard practices.

The Design-Builder shall not use leased telephone lines, microwave, or wireless communications for permanent communications systems.

2.18.4.3.1 Fiber Optic Cable

The Design-Builder shall furnish, install, test, and maintain the following SMFO cable for mainline trunk and distribution:

The Design-Builder shall furnish and install a six-strand SMFO cable between the traffic signal controller cabinet at the traffic signal within the Project limits to the nearest CCTV cabinet. WSDOT will make the fiber optic connections at both ends.

The Design-Builder shall install mainline fiber optic cable conduit systems with consideration to access, maintainability, and Forward Compatibility on the roadway side of walls and Right of Way fences. The Forward Compatible Channelization Plan is located in Appendix M1. The Design-Builder shall minimize the number of transverse crossings of the roadway. The Design-Builder shall place the fiber optic trunk cable in conduit. Cable vaults shall not be placed within paved areas.

When fiber optic mainline cable parallels overhead electrical transmission lines, the Design-Builder shall locate the fiber optic cable as far from the transmission lines as possible. The Design-Builder shall not place the fiber optic cable within a ditch or near culvert clean-out areas.

All fiber optic cable shall be designed and routed through pull boxes and cable vaults. Fiber optic cable shall not be routed through junction boxes. The Design-Builder shall remove all existing cables that are no longer needed to operate the ITS.

Splices in distribution cable shall be performed inside cable vaults placed in the vicinity of ITS cabinets. The splices shall be connected to ITS cabinets with pre-terminated cables.

2.18.4.3.2 Fiber Optic Connection Components

2.18.4.3.2.1 ***Indoor Patch Cords***

The Design-Builder shall supply all patch cords in accordance with this RFP. The patch cords shall have less than 2 feet of slack at all locations.

2.18.4.3.2.1.1 *FC-UPC Fiber Connectors*

The Design-Builder shall use factory-installed LC-UPC connectors with yellow or blue boots for single-mode fibers and shall follow these requirements:

- LC-UPC connector loss shall be < 0.3 dB; maximum reflectance value shall be -55 dB;
- Connector ratings shall be from -22 degrees Fahrenheit to 140 degrees Fahrenheit for operation; and from -40 degrees Fahrenheit to 140 degrees Fahrenheit for storage;
- Connectors shall have protective caps;
- Connectors shall be secured to the aramid fibers surrounding the individual optic fibers;
- Connector bodies shall be of one-piece construction, have metallic coupling nuts and bodies, and zirconia ceramic ferrules; and

- Boots shall be glued in place to prevent spinning.

2.18.4.3.2.2 *Outdoor Fiber Splice Closure*

The Design-Builder shall provide an outdoor fiber splice closure, which includes an outer enclosure and plastic splice trays. The Design-Builder shall provide the outdoor fiber splice closures in accordance with the Special Provisions. The temperature rating for the splice closure shall be -22 degrees Fahrenheit to 140 degrees Fahrenheit.

2.18.4.3.2.2.1 *Outer Enclosure*

The Design-Builder shall provide an outer enclosure, which meets the following requirements:

- Protects splices from damage;
- Is composed of salt corrosion-resistant material and compatible materials not supporting galvanic cell action;
- Is re-enterable;
- Permits splicing without circuit disruption;
- Has a grounding lug (ground all fiber optic cable shields); and
- Has cable (trunk and pigtail) strain relief and is compatible with the inner enclosure, splice trays, and cables.

2.18.4.3.2.2.2 *Splice Closure*

The Design-Builder shall provide a splice closure, which allows re-entry of fiber optic cable. The splice closure shall permit the cable to enter without exceeding the minimum bending radius; shall have non-oxidizing coating on all connections; and shall have a cable clamp bonding it to the cable. The enclosure shall have space to terminate up to two trunk cables.

The splice closure shall permit selective fiber splicing (i.e., a cable can loop in and out with only the selected fibers cut).

2.18.4.3.2.2.3 *Splice Tray*

The Design-Builder shall provide a plastic splice tray (inner enclosure), which meets the following requirements:

- Allows entry to individual fibers;
- Is stackable;
- Holds 12 splices and 24 fibers;
- Does not violate the bare fiber bend radius; and
- Has room for identification of the splice on the cover.

2.18.4.3.2.3 ***Wireless Communications***

The Design-Builder shall not use wireless communications between field devices and communication nodes, with the exception of temporary communications during construction as permitted in this RFP.

2.18.4.4 ELECTRICAL SERVICE

Refer to Section 2.16.

2.18.4.4.1 Furnished and Installed Service Equipment

The Design-Builder shall furnish and install all required electrical service equipment and transformers. Refer to Section 2.16 for electrical services.

2.18.4.4.2 Coordination with Power Utility

Refer to Section 2.16 for electrical services.

2.18.5 CONSTRUCTION REQUIREMENTS

At the preliminary design level, the Design-Builder shall design the ITS as a whole before installation of any individual field component. The Design-Builder shall notify WSDOT a minimum of seven Calendar Days in advance of staking locations for ITS devices. The Design-Builder shall not make final connections of the newly-installed or temporary ITS components to the existing system until receiving concurrence from WSDOT.

2.18.5.1.1 Salvage

The Design-Builder shall salvage the existing ITS, signal, and illumination equipment including cabinets, poles, cameras, VMS, luminaires, and associated equipment, and all other equipment requested by WSDOT to the WSDOT Northwest Region Signal and ITS Maintenance Superintendent at the following address:

3700 - 9th Avenue South
Seattle, Washington 98134
Telephone: (206) 442-2110

Fourteen days prior to delivery of salvaged items, the Design-Builder shall provide a list of salvage items, their quantity, and current condition to the Northwest Region Signal and ITS Maintenance Superintendent. The Design-Builder shall give notice to the WSDOT Northwest Region Signal and ITS Maintenance Superintendent seven Calendar Days prior to delivery. The Design-Builder shall provide all labor and equipment to transport, load, unload, and store the salvaged items.

2.18.5.2 ALLOWABLE WORKING HOURS ON THE ITS

All ITS devices, whether inside or outside of the Project limits, shall not be taken out of operation by the Design-Builder, and shall remain operational during all phases of construction.

The Design-Builder shall work on active ITS elements within the Project from 9 p.m. to 4 a.m., or during hours coordinated with planed traffic closures.

Unless otherwise specified in this RFP, the Design-Builder shall contact WSDOT a minimum of seven Calendar Days prior to performing any Work on existing and active ITS devices and 30 Calendar Days in advance of performing any Work on the hub. The Design-Builder shall perform all Work in a manner ensuring the integrity and proper performance of all ITS components.

Liquidated damages will be assessed for unplanned ITS disruptions (see Section 1-08 of the General Provisions).

2.18.5.3 REPAIR PARTS

During construction, the Design-Builder shall identify local vendors for repair parts for all ITS components, so that the parts can be obtained within four hours. The Design-Builder shall provide a list of vendors to WSDOT within 60 Calendar Days of execution of the Contract.

2.18.5.4 MATERIALS AND FABRICATION

The Design-Builder shall round and smooth sharp corners and edges on all ITS components that the Design-Builder furnishes and installs.

2.18.5.5 UTILITY LOCATES

Refer to Section 2.16.

2.18.5.5.1 Vehicle Detection (Intentionally Omitted)

2.18.5.5.1.1 ***Non-Intrusive Detection***

2.18.5.5.2 Signal Head Assembly

2.18.5.5.3 Control Cable and Connections

2.18.5.6 COMMUNICATION CONDUIT SYSTEM

Unless otherwise specified, the Design-Builder may use existing conduit, if the existing conduit meets all design requirements. Where existing conduit shall be replaced, abandoned, or is otherwise not acceptable, the Design-Builder shall furnish and install new conduit. The Design-Builder shall not relocate or use salvaged conduit.

The Design-Builder shall not direct-bury fiber optic cable. The Design-Builder shall install fiber optic cable in conduit for the entire length of the Project. The Design-Builder shall use High-Density Polyethylene non-metallic conduit for plowed or bored conduit installations, and PVC for trenched conduit installations.

The Design-Builder shall ensure that the conduit and conduit splices sustain a pressure of 150 psi.

The Design-Builder shall immediately cap all open ends of installed conduit until cables are installed. “Abandon conduit” shall mean the Design-Builder removes the unused cables and conduit elbows.

Standard bell ends shall be installed on all conduit ends by the Design-Builder to prevent damage to the installed cable.

With open trench installations of conduit, the Design-Builder shall place the conduit a minimum of 3 feet below the bottom of the pavement. The Design-Builder shall place granular material in the bottom of the trench, and shall compact the granular material to a depth of 6 inches over the top of the conduit. Refer to Sections 2-16 and 8-20 of the Standard Specifications for additional requirements.

The Design-Builder shall install PVC used for fiber optic cable a minimum of 24 inches below the finished grade.

The Design-Builder shall install warning tape in accordance with the Special Provisions and the WSDOT *Northwest Region ITS Details (Appendix I5)*.

Conduit under pavement shall be installed in accordance with Section 2.16.

2.18.5.6.1 Existing Conduit Systems

Existing conduit systems may consist of stick PVC, stick polyethylene, continuous polyethylene, or Rigid Steel Conduit.

When installing fiber optic cable assemblies in existing conduits through existing junction boxes, the Design-Builder shall check the cable route to ensure that there is a smooth transition between exit and entrance elevations, and that the horizontal angle is not so sharp as to cause damage to the cable as it is being pulled through the existing conduit. If the Design-Builder encounters sharp bends, the Design-Builder shall install new conduit to provide a smooth transition.

In accordance with Section 8-20 of the Standard Specifications and the Special Provisions, the Design-Builder shall clean the existing conduit of any debris that could impede pulling fiber optic or copper cable through it, or that could damage the cable if the debris remained.

2.18.5.6.2 Non-Metallic Conduit (NMC)

The Design-Builder shall use Non-Metallic Conduit (NMC) PVC schedule 80 conduit for all installations under traveled lanes for the Project. NMC PVC schedule 40 may be used in all other conduit installations, unless otherwise specified. All NMC trenched or installed under pavement for the Project shall be encased in orange-tinted CDF and shall include a trace wire.

2.18.5.6.3 Junction Boxes

Junction boxes serve as collection points for conduits entering a cabinet or service.

The Design-Builder shall place junction boxes adjacent to all control cabinets, electrical service points, and detector stations. For each detector station, the Design-Builder shall provide two junction boxes for each direction of travel – one on the outside shoulder and one in the median.

On long conduit runs, the Design-Builder shall space junction boxes no farther apart than 240 feet.

When the junction box is abandoned, the Design-Builder shall remove the junction box in accordance with the Standard Specifications.

Prior to use, the Design-Builder shall clean and adjust to grade the existing junction boxes installed by others.

All metallic junction box lids shall be grounded, including any existing junction boxes that are to remain.

Junction boxes shall not be placed in the traveled roadway.

Junction boxes shall not be used for conduit runs containing fiber optic cable. Pull boxes or cable vaults shall be used for this application.

Any junction boxes located within paved areas shall be Heavy Duty Type 4, 5, or 6. The Design-Builder shall consult with WSDOT for locations where Heavy Duty junction boxes are proposed. Refer to the WSDOT *Northwest Region Illumination and Signal Details* for junction box details (Appendix I6). Junction boxes located outside of paved areas shall be Type 1, 2, or 8.

2.18.5.6.4 Cable Vault and Pull Boxes

The Design-Builder shall include a drainage system, grounding provisions, enclosure hanger bracket assembly, and a ground rod marker in the construction of a fiber optic splice vault.

The fiber optic splice vault shall protect the outdoor fiber splice closure, and shall meet the following requirements:

- Vaults not installed in the roadway shall have light duty lids.
- When installed in the roadway, the pullbox, vault and lid material shall meet the UL requirements for Tier 10 heavy-duty splice vault;
- The vault lid shall have a non-slip surface; and
- The Design-Builder shall provide one ferrous device for every three vaults the Design-Builder furnishes and installs, to lift the cover from the body.

2.18.5.6.5 Fiber Optic Cable

The Design-Builder shall replace each fiber optic cable that is nicked, severed, or otherwise rendered unusable due to Work performed as part of the Contract. Spliced fiber optic cable shall be replaced with new, unspliced cable, unless otherwise provided for in this RFP. Liquidated Damages may apply in accordance with Section 1-08 of the General Provisions. The Design-Builder shall notify the WSDOT Electrical Inspector as soon as cable damage is discovered.

The Design-Builder shall exercise caution and excavate manually using hand-held tools when exposing an existing fiber optic cable. The Design-Builder shall report all nicks or abrasions to WSDOT prior to replacement. The Design-Builder shall not exceed the bending radius while handling and re-routing the cable.

The Design-Builder shall furnish and install new fiber optic cable for the Project and shall provide a temporary fiber optic cable system, if required, to provide a continuous and complete operation of the ITS distribution and transmission system.

The Design-Builder shall use lubricants during cable-pulling operations, in accordance with the Special Provisions. The lubricants shall be compatible with cable insulation materials, and shall not deteriorate the cable insulation. In the event a cable is severed or otherwise rendered not usable because of Work preformed as part of the Contract, the Design-Builder shall perform the following activities:

- Use fusion splices to make the initial emergency repair to fiber optic cable.
- Install the splices in existing splice vaults using all of the materials required for splicing fiber optic cable. The fusion splices shall meet the requirements for splices made by the Design-Builder. The Design-Builder shall install approved fiber optic cable with fusion splices.

- Install new cable between existing terminations or splices as appropriate for cable severed because of Work performed as part of the Contract.
- If nicks or abrasions occur, the Design-Builder shall replace the entire fiber optic cable run with new fiber optic cable.

2.18.5.6.5.1 *Fiber Optic Cable Installation*

The Design-Builder shall install cable in accordance with the Special Provisions and the following:

- The Design-Builder shall calculate the expected tension on fiber optic trunk cable and pulling tape prior to installing trunk cable in conduit runs. The Design-Builder shall distribute the pulling force between the inner strength member and the aramid fibers by securing both to the main pulling device.
- The Design-Builder shall use a “break-away” type pulling attachment to protect against over-stressing the cable. The Design-Builder shall not use a cable grip that pulls only on the outer jacket to pull fiber optic cable.
- Damage to the cable from any source which exceeds the manufacturer’s recommended tensile strength limits or cable-bending radius is cause for the cables to be rejected. The Design-Builder shall ensure a minimum-loaded bend radius of 10 inches, and a minimum-installed bend radius of 8 inches.

2.18.5.6.5.2 *Fiber Optic Cable Splicing*

The Design-Builder shall splice fiber optic cable as specified in the Special Provisions.

The Design-Builder shall fusion-splice the fiber optic cable only. Cable splices will be allowed if approved by WSDOT; only at the location specified; and then only when there are no practical alternatives. Splices shall be made in cable vaults using splice closures approved by WSDOT.

The Design-Builder shall follow the fiber optic cable manufacturer’s methods, recommendations, materials, and techniques for splicing.

The Design-Builder’s splicing equipment shall be in good working order, properly calibrated, and meet all industry standards and safety regulations. The cable preparation, closure installation, and splicing shall be accomplished in accordance with industry standards.

To minimize mechanical stress and splicing locations, cables shall be trained into final position observing minimum bending radii of the cable of not less than 20 times the diameter of the cable, or as specified in the manufacturer’s requirements, whichever is greater.

Cleanliness and freedom from contamination shall be strictly observed with respect to splicing materials and joint construction. Upon completion of the splicing operation, the Design-Builder shall deposit all waste material in suitable containers, remove it from the job site, and dispose of it in accordance with State and Federal laws.

2.18.5.6.5.3 *Fiber Optic Connection Components*

Fiber optic connection components may be required to connect cable installed to the ITS communications network for the Project. The Design-Builder shall follow the requirements of the necessary components in the following sections.

2.18.5.6.5.4 *Patch Panel Components*

The Design-Builder shall furnish and install pre-terminated patch panels in accordance with this RFP and the Special Provisions, at the following locations:

- All ITS cabinets;

The Design-Builder shall provide additional matching fiber distribution components as needed (e.g., splice trays, patch panel, patch cords, and six packs).

2.18.5.6.5.5 *Fiber Optic Cable Identification Requirements*

The Design-Builder shall identify all fiber optic cable at all terminals, and whenever the cable is entering or leaving a vault, junction box, housing, or enclosure. The Design-Builder shall use permanent non-conducting white-colored heat shrink wraps, with identification based on the ITS detail sheets fastened securely to the cables.

The Design-Builder shall use cable designations that consistently conform to the accepted overall scheme developed by the Design-Builder to indicate location, circuit, device, cable number, terminal branch, and position. The Design-Builder shall use letters and numbers.

The surface of the outer jackets shall be printed with the manufacturer's identification, date of manufacture, and part number.

2.18.5.6.5.6 *Outdoor Fiber Splice Closure*

The Design-Builder shall install sufficient desiccant (packaged silica) in the enclosure to reduce possible damage from moisture, in accordance with the manufacturer's recommendations.

2.18.5.6.5.7 *Splice Protection*

The Design-Builder shall mount all splices on the splice tray. Polyethylene tubes shall protect the fibers, and ethylene vinyl acetate sleeves with stainless steel rods shall protect the splices. Vinyl markers shall identify each fiber in the enclosure.

2.18.5.7 ELECTRIC, ELECTRONIC,

Electric, electronic, cables may exist within the Project limits and may be impacted by construction activities and/or require replacement. The Design-Builder shall exercise caution when working near existing cables. When exposing existing cables, the Design-Builder shall excavate manually using only hand-held tools.

Industry-accepted lubricants used during cable pulling operations shall be compatible with cable insulation materials and shall not degrade the cable insulation. The Design-Builder shall stock splice kits meeting the technical requirements to repair any cable damaged by construction activities. When making temporary twisted pair control cable splices, the Design-Builder shall use button-style, gel-filled, crimp-on, butt splices enclosed in zippered poly bags. The Design-Builder shall protect the splices above ground until the permanent splices are installed.

For cable damaged by Work performed as part of the Contract, the Design-Builder shall install new cable between existing terminations or splices.

The Design-Builder shall seal all nicks or abrasions caused when exposing a cable by hand-digging, with rubber splicing tape. The Design-Builder shall seal a nick penetrating the cable jacket to the underlying material with a cast epoxy kit using 3M Scotchcast kits

and 3M Scotch #23 rubberized splicing tape that have met the requirements for cable jacket repair, or by using an equivalent approved by WSDOT.

All cables connecting equipment such as cabinets shall conform to the equipment manufacturer's specifications, the Special Provisions, and the Standard Specifications.

2.18.5.7.1 Electric and Electronic Cable

The Design-Builder shall not splice electric or electronic cables without the WSDOT Electrical Inspector's approval. The Design-Builder shall use one-piece cables between termination points for power, communications control, and RF cables.

When using crimp-on connectors, the Design-Builder shall install the insulation of electrical cables deep enough into the lug so that the insulation acts as a strain relief.

The Design-Builder shall maintain the electrical continuity of the cable shields. The Design-Builder shall ground all cable shields entering cabinets and splice closures in accordance with the Special Provisions. The Design-Builder shall comply with Section 3.3 of the USDA RUS Splicing Standard PC-2 for shield bonding. The Design-Builder shall use bonding connectors complying with RUS standard PE-33 (Cable Shield Connectors).

2.18.5.8 GROUNDING

The Design-Builder shall install a grounding system and protection devices that are suitable for the specific installation and equipment being supplied, in accordance with the Special Provisions, Section 8-20 of the Standard Specifications, and Standard Plan J-9a.

2.18.5.9 CONTROL CABINETS

The Design-Builder shall furnish and install the control cabinets, and make them functional.

The Design-Builder shall ensure that the existing control cabinets are operational at all times, outside of the allowable working hours identified in this Section.

The Design-Builder shall use industry-standard fiber management practices and techniques in all control cabinets.

2.18.5.10 COMPONENT, TEST, AND PROJECT DOCUMENTATION

The Design-Builder shall prepare and submit component, test, and Project documentation. The test documentation shall include completed forms and electronic documentation. Two sets of component and test documentation shall be submitted directly to WSDOT for acceptance.

The Design-Builder shall notify WSDOT when all ITS requirements have been met. WSDOT will accept the ITS after verifying the proper operation of all components.

2.18.5.10.1 Fiber Optic Cable Test Documentation

The Design-Builder shall submit fiber optic cable test documentation (including calibration and certification of the fiber optic cable test equipment), as part of the component documentation; and any testing documentation required in accordance with the Special Provisions.

The Design-Builder shall follow the format of the Fiber Optic System Test Plan.

The Design-Builder shall use WSDOT's file naming convention for all test files, and shall provide all test documentation to WSDOT in accordance with the Special Provisions.

The Design-Builder shall provide a test summary describing the final measurements that are out of range; any approved changes in specified methods; and actual dates of tests performed by both power meter and Optical Time Domain Reflectometer.

Upon completion of the Project, the Design-Builder shall provide the TSMC System Inspector with two copies of the manufacturer's reel (spool) test documentation.

2.18.5.10.2 Maintenance/Operation of Furnished and Installed ITS Components Plan

The Design-Builder shall submit to WSDOT a written plan for providing maintenance and operation of ITS components furnished and installed by the Design-Builder, a minimum of 21 Calendar Days prior to performing Work on any portion of the ITS.

2.18.6 SUBMITTALS

The Design-Builder shall comply with Sections 2.12 and 2.28 for plan/test report submittals, reviews, and other administrative processes, unless otherwise specified.

2.18.6.1 ITS PRELIMINARY PLANS SUBMITTAL

The ITS Preliminary Plans, Fiber Optic System Test, and other test plans described in this Section shall be submitted to WSDOT for Review and Comment as part of the Preliminary Design Submittal described in Section 2.28.

The ITS Preliminary Plans Submittal shall include the devices described in this Section, in addition to the following:

- Title block, north arrow, and scale bar;
- Legend of symbols;
- Existing ITS features and Utilities;
- Locations of all proposed ITS devices with labels;
- Proposed channelization;
- Proposed fiber optic cable/conduit location plan; and
- Cabinet locations.

2.18.6.2 ITS FINAL DESIGN SUBMITTAL

The Design-Builder shall provide an ITS Final Design Submittal, as part of the Final Design Submittals described in Section 2.28, that addresses the comments received from the ITS Preliminary Plans Submittal review, and any issues raised during the ITS design meetings.

The ITS Final Design Submittal shall be complete and include all of the items from the ITS Preliminary Plans, in addition to the following:

- All ITS details in accordance with the WSDOT *Northwest Region ITS Details*;
- All ITS labels;
- Temporary ITS plan;

- Pull box, cable vault, and junction box locations and details;
- Communication schematics and fiber distribution diagrams;
- Fiber optic splice details;
- Panel service details;
- Transformer/breaker schedule;
- Power service locations;
- Power distribution schematic;
- Cabinet foundation details;
- Fiber termination cabinet details;
- Details for non-standard elements;
- Wire notes (including identification of new and existing conductors and cable) and construction notes;
- Calculations to support transformer sizing and transformer over current protection devices;
- Conduit fill and junction box capacity calculations; and
- Service load calculations.

The Design-Builder shall submit a Fiber Optic Splicing and Testing Plan with each Final Design Submittal that includes ITS Work.

2.18.6.3 RELEASED FOR CONSTRUCTION ITS PLANS

Refer to Sections 2.12 and 2.28 for submittal and review requirements.

2.18.6.4 OTHER SUBMITTALS

- Component, test, and project documentation;
- Fiber optic cable test documentation;
- Maintenance and Operations Plan; and
- Product manuals.

The Design-Builder shall provide WSDOT with the x, y, and z GPS coordinates of the newly installed ITS components including, but not limited to, the following elements:

- CCTV Systems
- Communication Conduit Systems;
- Communication Cable and Interface Systems;
- Video, Voice, and Data Distribution and Transmission Systems;
- Control cabinets;
- All junction and pull boxes, and cable vaults;
- Mainline fiber-optic cable (every 50 feet);

- Fiber-optic splices vaults; and
- Stand-alone electric service pads.

The Design-Builder shall also provide WSDOT with the x, y, and z GPS coordinates of existing components when they are connected to the new components.

End of Section

2.19 SIGNING

2.19.1 GENERAL

The Design-Builder shall conduct all Work necessary to meet the requirements for permanent signing for the Project. Refer to Section 2.22 for additional temporary signing requirements.

2.19.2 MANDATORY STANDARDS

The following is a list of publications that shall be used for all design and construction. They are listed in hierarchical order, with the most important appearing at the top of the list. This is not a comprehensive list; other applicable publications may be required to complete the design and construction. If the Design-Builder becomes aware of any ambiguities or conflicts relating in any way to the Mandatory Standards, the Design-Builder shall notify WSDOT immediately, so that WSDOT may resolve them.

- Special Provisions (Appendix B2).
- Amendments to the Standard Specifications (Appendix B1).
- Standard Specifications (M41-10) (Appendix D18).
- Standard Plans (M21-01) (Appendix D17).
- WSDOT *Design Manual* (M22-01) (DM) (Appendix D3).
- WSDOT *Northwest Region Sign Design Current Practices* (Appendix S1)
- WSDOT *Traffic Manual* (M51-02) (Appendix D19).
- *Washington State Modifications to the Manual on Uniform Traffic Control Devices* (M24-01) (MUTCD).(WAC 468-95) http://apps.leg.wa.gov/WAC/default.aspx?cite=468-95
- WSDOT *Materials Manual* (M46-01) (Appendix D10).
- WSDOT *Construction Manual* (M41-01) (Appendix D2).
- WSDO*T Sign Fabrication Manual* (M55-05) (Appendix D25).
- WSDOT *Plans Preparation Manual* (M22-31) (PPM) (Appendix D12).
- WSDOT *Maintenance Manual* (M51-01) (Appendix D9).
- FHWA *Manual on Uniform Traffic Control Devices for Streets and Highways* (MUTCD), 2009.
- AASHTO *A Policy on Geometric Design of Highways and Streets*, 5th Edition, 2004.
- AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals*, 5th Edition, 2009, with 2010 Interim Revision.
- AASHTO *Roadside Design Guide*, 3rd Edition, 2002, and 2006 Chapter 6 Update.
- Transportation Research Board *Highway Capacity Manual*, 2000.
- ITE *Traffic Control Devices Handbook*, 2001.

- FHWA *Traffic Control Systems Handbook*, 2005.
- ITE *Traffic Engineering Handbook*, 6th Edition, 2009.

2.19.3 PERFORMANCE REQUIREMENTS

2.19.3.1 SOFTWARE

The Design-Builder shall use software for producing engineering drawings of guide signs that can either create or seamlessly convert files to MicroStation DGN.

The Design Builder may use WSDOT's *Sign Specifications WinXP* Excell spreadsheet program to produce the sign specification sheets. The spreadsheet program can be accessed from the following link:

http://www.wsdot.wa.gov/northwest/trafficdesign

2.19.3.2 MEETINGS

Refer to Section 2.16.

2.19.4 DESIGN AND CONSTRUCTION REQUIREMENTS

2.19.4.1 SIGNING DESIGN REQUIREMENTS

2.19.4.1.1 General

Prior to furnishing and installing signs, the Design-Builder shall prepare a Signing Plan to be reviewed by WSDOT.

2.19.4.1.2 Plan Requirements

The Design-Builder shall prepare and submit a Permanent Signing Concept Plan for the Project. This Plan shall include all necessary guide, warning, regulatory, marker and information signs. The Permanent Signing Concept Plan shall provide for modifications to signs outside of the Project limits that are rendered inaccurate, ineffective, confusing, or unnecessary by WSDOT as a result of modifications by the Project. The modifications shall include the addition, removal, or alteration of signs and appurtenances. The Permanent Signing Concept Plan shall include and provide for all Project signing within and outside of the Project limits.

The Permanent Signing Concept Plan shall include, but is not limited to, the following:

- Sign locations;
- Panel legends;
- Proximity to ITS devices and light standards;
- Types of proposed sign structures;
- Signal system mast arm sign legends; and
- Identification of all existing signs to remain or to be relocated.

The Design-Builder shall replace all signs within the Project limits or affected by the Project that were installed more than seven years prior to Contract execution. This includes all signs affected by the Project due to modified lane configurations, so that

continuous information is provided to the motorists. Signs fabricated and installed seven years or less from Contract execution may remain in place or may be relocated as necessary to accommodate the new geometry. The installation date shall be considered to be the date shown on the sign fabrication decal located on the back of the sign. In the event the sign fabrication decal is missing, the sign shall be deemed to be more than seven years old, and shall be replaced. MIS may be excluded from this requirement. All signs that are relocated shall be installed on new steel sign posts and on new foundations.

Spacing of signs along the roadway shall be per the requirements of the *WSDOT Northwest Region Sign Design Current Practices* (Appendix S1).

The Permanent Signing Plans shall include, but are not limited to, the sign legend, the legend layout, and the sign material requirements, in accordance with the WSDOT *Northwest Region Sign Design Current Practices*. Placement of the signs shall account for the required sight distances.

2.19.4.1.3 Intentionally Omitted

2.19.4.1.4 Material Requirements

Sign Sheeting Material –All permanent traffic signs shall be constructed in accordance with Section 9-28 of the Standard Specifications. Section 2.2(2) of the WSDOT *Traffic Manual* (Appendix D19) describes the requirements for reflective sheeting types.

Sign Supports - Steel sign posts shall be used for all ground mounted signs. Refer to Section 2.13 for additional requirements.

2.19.4.1.5 Intentionally Omitted

2.19.4.1.6 Intentionally Omitted

2.19.4.2 PERMANENT SIGNING CONSTRUCTION REQUIREMENTS

2.19.4.2.1 General

All existing signs; new permanent signs installed as part of this Contract; and construction signs that are inappropriate for the traffic configuration at a given time shall be removed or completely covered with metal, plywood, or an approved product specifically manufactured for sign covering during periods when they are not needed.

Sign structure foundations shall not encroach onto shoulders. The Design-Builder shall prepare and submit a deviation for any clear zone or shoulder encroachment of sign structure supports or foundations in accordance with Section 2.12.

The Design-Builder shall use materials approved in accordance with Section 2.25.

Existing sign panels and sign structures shall remain in place or shall be temporarily mounted until new or replacement signs are installed. New or replacement signs shall not be installed in a location that obscures the visibility of an existing sign. Refer to Section 2.22 for additional requirements.

2.19.4.2.2 Material Requirements

The Design-Builder shall supply new materials for all sign posts, structures, mounting hardware and foundations.

2.19.4.2.3 Salvage

All sign panels, sign structures, sign posts and foundations removed from the Right of Way shall become the property of the Design-Builder.

2.19.5 SUBMITTALS

All submittals shall be in accordance with the Quality Management Plan. Refer to Section 2.28.

2.19.5.1 PRELIMINARY DESIGN SUBMITTAL

The Design-Builder shall submit the Preliminary Signing Plan and an Existing Sign Inventory with the Preliminary Design Submittal.

The Design-Builder shall use the Northwest Region Sign Inventory spreadsheet as provided at the following link:

http://www.wsdot.wa.gov/Northwest/TrafficDesign/default.htm

The Existing Sign Inventory shall include all signs within the Project limits, and signs that may be affected by the Project. The Existing Sign Inventory shall include the following:

- Location of sign by station, or road feature where stationing does not exist;
- Horizontal distance from edge of traveled way;
- Size of sign panel including sizes of internal logos or emblems;
- Sign fabrication date;
- General condition of sign, noting any apparent damage and the fabrication date;
- Post type, size, and length;
- Condition of posts;
- Vertical clearance;
- Strip map and legend showing all existing traffic signs, including cross road and side street signs; and
- Digital photographs of all existing signs along the corridor with identifying labels, including station and direction.

2.19.5.2 PERMANENT SIGNING PLANS (FINAL DESIGN SUBMITTAL)

The Design-Builder shall prepare plan sheets in accordance with Section 2.28, and the PPM.

The Permanent Signing Plans shall include, but are not limited to, the following items:

- Sign Specification Sheets containing all necessary fabrication (size, color, sheeting type), installation (mounting), station offset, relocation, and removal information for each sign.
- Design drawings showing the location of all new signs and existing signs to remain, to be relocated, or to be removed.

- o Include sign number referenced from Sign Specification Sheet.
- o Include small scale layout of all signs including guide, regulatory, warning, and object markers.

- Show final pavement markings on the Permanent Signing Plans.
- Sign Detail plans including panel sizes; background and legend color; border width and corner radius; text height; font; and sign numbers corresponding to the Sign Specification Sheets for all non-standard signs.
- Sign drawings (other than Standard Plans) showing details of sign mounting, foundations, base connections, and frames.
- Analysis of signal system mast arm loading for mast arm-installed signs.

The Permanent Signing Plans shall be submitted to WSDOT for Review and Comment as part of the Final Design Submittal.

End of Section

2.20 PAVEMENT MARKING

2.20.1 GENERAL

The Design-Builder shall conduct all Work necessary to meet the requirements for permanent pavement markings for the Project. Refer to Section 2.22 for additional temporary pavement marking requirements.

2.20.2 MANDATORY STANDARDS

The following is a list of publications that shall be used for all design and construction. They are listed in hierarchical order, with the most important appearing at the top of the list. This is not a comprehensive list; other applicable publications may be required to complete the design and construction. If the Design-Builder becomes aware of any ambiguities or conflicts relating in any way to the Mandatory Standards, the Design-Builder shall notify WSDOT immediately, so that WSDOT may resolve them.

- Special Provisions (Appendix B2).
- Amendments to the Standard Specifications (Appendix B1).
- Standard Specifications (M41-10) (Appendix D18).
- WSDOT *Design Manual* (M22-01) (DM) (Appendix D3).
- Standard Plans (M21-01) (Appendix D17).
- WSDOT *Traffic Manual* (M51-02) (Appendix D19).
- *Washington State Modifications to the Manual on Uniform Traffic Control Devices* (M24-01) (MUTCD).).(WAC 468-95) http://apps.leg.wa.gov/WAC/default.aspx?cite=468-95
- WSDOT *Materials Manual* (M46-01) (Appendix D10).
- WSDOT *Construction Manual* (M41-01) (Appendix D2).
- WSDOT *Plans Preparation Manual* (M22-31) (PPM) (Appendix D12).
- WSDOT *Maintenance Manual* (M51-01) (Appendix D9).
- FHWA *Manual on Uniform Traffic Control Devices for Streets and Highways* (MUTCD), 2003.
- AASHTO *A Policy on Geometric Design of Highways and Streets*, 5th Edition, 2004.
- AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals*, 4th Edition, 2001, with 2002, 2003, and 2006 Interims.
- AASHTO *Roadside Design Guide*, 3rd Edition, 2002, and 2006 Chapter 6 Update.
- Transportation Research Board *Highway Capacity Manual*, 2000.
- ITE *Traffic Control Devices Handbook*, 2001.
- FHWA *Traffic Control Systems Handbook*, 1996.
- FHWA *Traffic Monitoring Guide*, 2001.

- ITE *Traffic Engineering Handbook*, 6th Edition, 2009.
- ITE *Manual of Transportation Engineering Studies*, 2000.
- WSDOT *Northwest Region Traffic Operations RedBook* (Appendices T1 and T2).
- WSDOT *Qualified Products List* (M46-02) (QPL) (Appendix D13).

2.20.3 PERFORMANCE REQUIREMENTS

2.20.3.1 SOFTWARE

Refer to Section 2.21 for traffic operations software requirements.

2.20.3.2 MEETINGS

Refer to Section 2.16.

2.20.3.3 PAVEMENT MARKINGS PERFORMANCE REQUIREMENTS

The Design-Builder shall ensure that all pavement markings on the Project meet the requirements of Section 8-22 of the Standard Specifications.

The Design-Builder shall test the retroreflective performance of newly applied pavement markings after 12 hours, but within 21 Calendar Days, of the marking application. The Design-Builder shall take ten retroreflective readings per color line, evenly spaced, over a 2,000-foot roadway segment within a one-mile section. The Design-Builder shall take ten retroreflective readings per 2,000-foot roadway segment over the length of the Project.

The Design Builder shall ensure that the retroreflective pavement marking test methods and retroreflective performance meet the requirements in accordance with Section 9-34 of the Standard Specifications.

The Design-Builder shall prepare a written report summarizing all of the retroreflective and chromium content test results, and submit the report to WSDOT within seven Calendar Days of completing the field testing.

Any section of pavement marking that fails to satisfy the test criteria shall be replaced, at no cost to WSDOT, and retested to ensure it meets retroreflectivity and chromium content criteria. The results of the retested sections shall be included in the Design Builder's Pavement Marking Test Results Report.

The Design-Builder shall ensure that the minimum retroreflectance values for the pavement markings as specified in the Standard Specifications and listed in these Technical Requirements are maintained until Final Acceptance.

2.20.4 DESIGN AND CONSTRUCTION REQUIREMENTS

2.20.4.1 PERMANENT PAVEMENT MARKING DESIGN REQUIREMENTS

The Design-Builder shall prepare permanent Pavement Marking Plans that show all tapers, horizontal curve data, lane shoulder, buffer widths, and the following marking elements:

- Center line striping;
- Edge line striping;
- Gore striping;

- Lane line striping;
- Wide lines;
- Stop bars;
- Arrows;
- Legends;
- Symbols;
- Object markers and delineators;
- Aerial surveillance markers;
- Crosswalk lines;
- Drainage markings;
- Raised Pavement Markers (RPM);
- Wide shoulder markings comprised of 8-inch wide stripes at 45-degree angles, spaced at 100-foot intervals. Type 1 RPMs spaced at 1-foot intervals shall be placed in front of the striping, facing on-coming traffic;
- Any other markings consistent with the needs of the Project.

The Pavement Marking Plans shall provide a basis for the pavement marking requirements for the Project. The Design-Builder shall be responsible for removing and replacing existing pavement marking in areas where temporary pavement marking will be used during construction.

Type 2 RPMs shall be placed outside of the left edge line as shown in Standard Plan M-20.30.01 spaced at the following intervals:

- Eighty-foot intervals on tangents and horizontal curves with a radius of 5,000 feet or more; and
- Forty-foot intervals on horizontal curves having radii of less than 5,000 feet.

Where new permanent pavement markings are required, all adjacent edge lines, and lanes lines, shall also be replaced.

Gore striping shall be in a chevron format combined with Type 1 RPMs placed in front of the striping facing on-coming traffic, and spaced 1-foot apart.

Type 2 RPMs located on gore areas shall have red reflectors on the back side to alert drivers traveling in the wrong direction.

2.20.4.1.1 Permanent Pavement Marking Material Requirements

The Design-Builder shall provide permanent pavement markings that meet the requirements of Section 9-34 of the Standard Specifications for all locations within facilities maintained by WSDOT, including lane lines and edge lines.

On arterial and local streets maintained by the City of Lake Stevens and Marysville, the Design-Builder shall use pavement marking materials specified by the agency having jurisdiction over that facility. Refer to the Special Provisions.

All permanent striping on mainline shall be Methyl Methacrylate (MMA). In other locations, MMA shall be required where the Standard Plans or other guidelines refer to MMA as "desirable".

All MMA markings, except HOV wide lines, shall be profiled in accordance with the Standard Plans.

2.20.4.1.2 Pavement Marking Material Certification

The Design-Builder shall provide WSDOT with a manufacturer's certification that the pavement marking material meets the requirements of Section 9-34 of the Standard Specifications. The Design-Builder shall ensure that the certification includes the manufacturer's address, telephone number, and contact person. The Design-Builder shall perform all required testing in accordance with Section 9-34 of the Standard Specifications.

2.20.4.2 PERMANENT PAVEMENT MARKING CONSTRUCTION REQUIREMENTS

The Design-Builder shall meet the Construction Requirements of Section 8-22 of the Standard Specifications. The Design-Builder shall provide and apply all necessary control points for preliminary spotting and pavement marking layout.

The Design-Builder shall not grind or blemish pavement after the final lift of pavement is applied.

2.20.4.2.1 Materials

The Design-Builder shall use approved pavement marking materials as required in this Section.

The Design-Builder's submittal package shall contain all supporting documentation and technical literature, including previous testing, analysis, and field performance evaluations, by an independent, third party.

The Design-Builder shall provide WSDOT with a copy of the manufacturer's application instructions. The Design-Builder shall apply the pavement markings according to the manufacturer's recommendations.

2.20.4.2.2 Equipment

The Design-Builder shall use equipment designed for the preparation and application of the appropriate type of pavement marking material as required by the manufacturer.

2.20.4.2.3 Surface Preparation

If required, the Design-Builder shall remove any permanent or temporary pavement markings in accordance with the requirements of Sections 8-22 or 8-23 of the Standard Specifications.

The Design-Builder shall prepare the pavement surface for the application of all pavement markings as recommended by the material manufacturer and/or Section 8-22 of the Standard Specifications. Grinding shall not be allowed after the final paving lift is complete.

2.20.4.2.4 Replacement of Unsatisfactory Pavement Markings

The Design-Builder shall remove and replace pavement markings that meet the following criteria:

- Do not conform to the tolerances established under Section 8-22 of the Standard Specifications;
- Fail to meet retroreflective or chromotacity performance as described in this Section;
- Have visible drag marks, gashes, or gouges;
- Contain foreign material covering the markings;
- Have discolored areas;
- Fail to solidify;
- Do not adhere to the pavement;
- Have areas with a ragged appearance; areas without sharply defined edges; or areas with abrupt unintended changes in alignment; and
- Have more than ten percent of the substrate exposed in a running 2,000-foot section of longitudinal pavement marking line.

2.20.5 SUBMITTALS

All deliverables shall follow the requirements in the Quality Management Plan, in accordance with Section 2.28.

2.20.5.1 PAVEMENT MARKING PLANS (PRELIMINARY DESIGN SUBMITTAL)

The permanent Pavement Marking Plans shall be prepared in accordance with the WSDOT *Plans Preparation Manual*, and shall include the following:

- All existing pavement marking for a minimum of 300-feet past the limits of construction, and adequate transition and tapers to maintain traffic at the design speed. Typical sections in lieu of plans will not be accepted.
- All new pavement marking by material type, color, and line width. The Design-Builder shall dimension the pavement marking across the roadway completely, tying the pavement marking to a construction centerline or a monument line.
- Station and offset for all pavement arrows, legends, crosswalks, and miscellaneous pavement markings.
- Station and offset for the beginning and ending of all pavement markings, and the beginning and ending of each taper. The Design-Builder shall locate the beginning and ending points of all curves and the associated radii.
- Design drawings, other than the Standard Plans, that show details of pavement markings, tapers, and transitions.

The Pavement Marking Plans shall not be combined with the Paving Plans. Refer to Example 4-27 of the WSDOT *Plans Preparation Manual* for sample pavement marking plans.

The preliminary Pavement Marking Plans shall be submitted to WSDOT for Review and Comment as part of the Preliminary Design Submittal.

2.20.5.2 PAVEMENT MARKING PLANS (FINAL DESIGN SUBMITTAL)

Prior to releasing the Final Design Submittal, the Design-Builder shall respond to and incorporate all comments from WSDOT following WSDOT's review of the preliminary Pavement Marking Plans. Refer to Section 2.28 for additional requirements.

End of Section

2.21 TRAFFIC OPERATIONS

2.21.1 GENERAL

A Traffic Analysis has been prepared and is included in the Break In Access Document (BIA) in the Appendix T3.

The Design-Builder shall perform a traffic analysis for alternate configurations from the Conceptual design shown in Appendix M1.

The Design-Builder shall perform traffic analysis for Maintenance of Traffic that has traffic impacts outside of permitted closures (see Section 2.22).

2.21.2 MANDATORY STANDARDS

The following is a list of publications that shall be used for all design and construction. They are listed in hierarchical order, with the most important appearing at the top of the list. This is not a comprehensive list; other applicable publications may be required to complete the design and construction. If the Design-Builder becomes aware of any ambiguities or conflicts relating in any way to the Mandatory Standards, the Design-Builder shall notify WSDOT immediately, so that WSDOT may resolve them.

- Transportation Research Board *Highway Capacity Manual*, 2000.
- WSDOT *Traffic Manual* (M51-02) (Appendix D19).
- Break In Access (BIA) Document/Traffic Analysis (Appendix T3).

2.21.2.1 REFERENCES

The following references shall supplement the Mandatory Standards:

- Federal Highway Administration Guidelines for Applying Traffic Microsimulation Modeling Software.

2.21.3 PERFORMANCE REQUIREMENTS

The Conceptual design configuration is based on the Traffic Analysis presented in the BIA included in Appendix T3. If any configuration elements such as the number of lanes, storage lengths, and lane configurations in the Design-Builder's design vary from the configuration analyzed in the BIA Traffic Analysis, the Design-Builder shall conduct a traffic analysis. The operational performance shall be either equal or superior to the design presented in the BIA Traffic Analysis.

2.21.3.1 PERFORMANCE CRITERIA

The Design-Builder shall analyze the following traffic performance parameters:

- Mainline speed;
- Volume throughput;
- Intersection control delay; and
- Intersection maximum queues.
- Accommodate the Forward Compatible Channelization plan included in Appendix M1.

The traffic performance parameter values obtained from geometric changes being proposed shall be superior to those outlined in the Traffic Analysis presented in the BIA.

2.21.4 CRASH ANALYSIS AND MITIGATIONS PROPOSED

In the event the Design-Builder chooses to analyze an alternate configuration that varies from the Traffic Analysis presented in the BIA, the Design-Builder shall review crash data in the Project area for the latest three-year period available from WSDOT Northwest Region and identify any crash trends. The Design-Builder shall submit a memorandum to WSDOT describing how the proposed design mitigates the crash trends. The Design-Builder shall submit the memorandum to WSDOT prior to submittal of the Design-Builder's Preliminary Design.

2.21.5 TRAFFIC OPERATIONS DURING CONSTRUCTION

Any reduction in the number of lanes within the Project area, outside of closure hours described in Section 2.22, shall require an operational analysis of the impacts to the highways and local streets.

Any reduction in intersection capacity shall require a traffic operations analysis, and the TSIS shall be used for this analysis. Queue distances shall be based on TSIS maximum queue values. All results shall be based on an average of five separate random seed runs.

The analysis shall include the morning and evening peak hour periods, and/or the peak hours within impact periods.

2.21.6 SUBMITTALS

The Design-Builder shall prepare and submit a Traffic Analysis Report for any proposed alternate intersection configuration, together with the proposal for the alternate configurations.

WSDOT will provide review comments within 14 Calendar Days. WSDOT will provide a traffic operational analysis for the mainline within 14 Calendar Days after receipt of the alternate configuration.

2.21.6.1 SUPPORTING DOCUMENTS

The Design-Builder shall provide the following supporting documents:

- Design drawings showing the Design-Builder's proposed configuration;
- CORSIM analysis input files (electronic);
- CORSIM analysis output files for all random seed runs (electronic); and
- CORSIM analysis summary.

The Design-Builder shall provide the following calculations:

- Control delay and Level of Service for every turn movement;
- Average control delay and Level of Service for the entire intersection;
- Volume throughput for every turn movement; and
- Maximum queue lengths.

End of Section

2.22 MAINTENANCE OF TRAFFIC (MOT)

2.22.1 GENERAL

The Design-Builder shall conduct all Work necessary to meet the requirements associated with Maintenance of Traffic (MOT), including providing for the safe and efficient movement of people, goods, and services through and around the Project, while minimizing negative impacts to residents, commuters, and businesses.

The Design-Builder shall prepare a Traffic Management Plan (TMP), a Traffic Incident Management Plan (TIMP), MOT Plans, and shall conduct all on-site activities relating to traffic maintenance in accordance with this Section.

The Design-Builder shall be responsible for coordinating with other projects within the vicinity of the Project, including but not limited to, scheduling of lane closures, detours, temporary alignments, and phasing of construction activity. Construction activities shall be scheduled to minimize the number of required closures; and to maximize the opportunities available to perform work during closures required by other projects. The Design-Builder shall not schedule or perform activities that will impede or hinder the progress and schedule of other projects.

Refer to Section 2.1 for projects anticipated to be under construction at the same time as the Project. The Design-Builder shall coordinate with local municipalities and utility companies to identify other projects scheduled for construction during the duration of the Project.

2.22.2 MANDATORY STANDARDS

The Design-Builder shall use the following list of publications in all design and construction work. They are listed in hierarchical order, with the most important appearing at the top of the list. This is not a comprehensive list; other applicable publications may be required to complete the design and construction. If the Design-Builder becomes aware of any ambiguities or conflicts relating in any way to the Mandatory Standards, the Design-Builder shall notify WSDOT immediately, so that WSDOT may resolve them.

- Special Provisions (Appendix B2).
- Amendments to the Standard Specifications (Appendix B1).
- Standard Specifications (M41-10) (Appendix D18).
- WSDOT *Design Manual* (M22-01) (DM) (Appendix D3).
- Standard Plans* (M21-01) (Appendix D17).
- Washington State *Modifications to the Manual on Uniform Traffic Control Devices* (M24-01) (MUTCD).).(WAC 468-95) http://apps.leg.wa.gov/WAC/default.aspx?cite=468-95
- WSDOT *Materials Manual* (M46-01) (Appendix D10).
- WSDOT *Construction Manual* (M41-01) (Appendix D2).
- WSDOT *Sign Fabrication Manual* (M55-05) (Appendix D25)
- WSDOT *Plans Preparation Manual* (M22-31) (PPM) (Appendix D12).

- WSDOT *Maintenance Manual* (M51-01) (Appendix D9).
- WSDOT *Work Zone Traffic Control Guidelines* (M54-44) (Appendix D27).
- Instructional Letter IL 4008.00, Washington State Patrol Traffic Control Assistance in Work Zones.
- WSDOT Directive D55-20, *Reduced Speed in Maintenance and Construction Zones.*
- WSDOT Work Zone Safety and Mobility Secretary's Executive Order (E 1001.00).
- FHWA *Manual on Uniform Traffic Control Devices for Streets and Highways* (MUTCD), 2003.
- National Cooperative Highway Research Project (NCHRP) Report 350.
- AASHTO *A Policy on Design Standards- Interstate System*, January 2005.
- AASHTO *A Policy on Geometric Design of Highways and Streets*, 5th Edition, 2004.
- AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals*, 4th Edition, 2001, with 2002, 2003, and 2006 Interims.
- AASHTO *Roadside Design Guide*, 3rd Edition, 2002, and 2006 Chapter 6 Update.
- Transportation Research Board *Highway Capacity Manual*, 2000.
- ITE *Traffic Control Devices Handbook*, 2001.
- FHWA *Traffic Control Systems Handbook*, 1996.
- FHWA *Traffic Monitoring Guide*, 2001.
- ITE *Traffic Engineering Handbook*,6th Edition, 2009.
- ITE *Manual of Transportation Engineering Studies*, 2000.
- ATSSA *Quality Guidelines for Work Zone Traffic Control Devices*.
- FHWA Developing and Implementing Transportation Management Plans for Work Zones, 2005
- ADA Accessibility Guideline (ADAAF) US Access Board
- FHWA Final Rule on 23 CFR 630 Subpart J, 2004

* Section K is not for use on the Project. Site-specific MOT Plans are required.

2.22.2.1 CONFORMANCE TO ESTABLISHED STANDARDS

Flagging, signs, and all other traffic control devices and procedures provided by the Design-Builder shall conform to the standards established in the FHWA MUTCD adopted by WSDOT, the Washington State MUTCD, and the FHWA Final Rule - 23 CFR Part 630.

The quality of devices provided shall be based on the ATSSA *Quality Guidelines for Work Zone Traffic Control Devices*.

Copies of the FHWA MUTCD and the ATSSA *Quality Guidelines for Work Zone Traffic Control Devices* may be purchased from the ATSSA, 15 Riverside Parkway, Suite 100, Fredricksburg, Virginia, 22406-1022. The *Washington State Modifications to the MUTCD* may be obtained from the Department of Transportation, Olympia, Washington, 98504.

In addition to the standards of the Washington State and FHWA MUTCDs described above, WSDOT has scheduled the implementation of crashworthiness requirements for most Work zone devices. The NCHRP Report 350 has established requirements for crash testing. Work zone devices are divided into four categories. Each of those categories and, where applicable, the schedule for implementation, is described below:

- Category 1 includes those items that are small and lightweight, channelizing, and delineating that have been in common use for many years and are known to be crashworthy through testing of similar devices, or years of demonstrable safe performance. These devices include cones, tubular markers, flexible delineator posts, and plastic drums. All Category 1 devices used on the Project shall meet the requirements of the NCHRP Report 350 as certified by the manufacturers of the devices.
- Category 2 includes devices that are not expected to produce significant vehicular velocity change, but may otherwise be hazardous. Examples of this class are barricades, portable sign supports and signs, intrusion alarms, and vertical panels. All Category 2 devices shall meet the requirements of the NCHRP Report 350. For the purpose of definition, a sign support and sign shall be considered a single unit.
- Category 3 is for hardware expected to cause significant velocity changes or other potentially harmful reactions to impacting vehicles. Examples of this class are barriers, fixed sign supports, crash cushions, Truck-Mounted Impact Attenuators (TMAs), and other Work zone devices not meeting the definitions of Categories 1 or 2. Many Category 3 devices are defined in the design of the Project. Where this is the case, the NCHRP Report 350 requirements shall be incorporated into the design. Where the device is a product chosen by the Design-Builder, the device chosen must comply with the requirements of the NCHRP Report 350.
- Category 4 includes portable or trailer-mounted devices such as arrow displays, temporary traffic signals, area lighting supports, and Portable Changeable Message Signs (PCMS). Presently, there is no implementation schedule for mandatory crashworthiness compliance of these devices

The condition of signs and traffic control devices shall be new or “acceptable” as defined in the ATSSA *Quality Guidelines for Work Zone Traffic Control Devices*, and will be accepted based on a visual inspection by the Traffic Control Supervisor (TCS). WSDOT may also identify devices that are unacceptable. WSDOT’s decision on the condition of a sign or traffic control device will be final. The Design-Builder shall remove a sign or traffic control device determined to be unacceptable, and replace it within 12 hours of notification.

2.22.3 PERFORMANCE REQUIREMENTS

2.22.3.1 GENERAL

The Design-Builder shall prepare a TMP and a TIMP to be approved by WSDOT, and establish a MOT Task Force prior to any construction activity that may impact traffic. WSDOT will only permit activities such as surveying or environmental and other design-

related Work prior to approval of the TMP and the TIMP, provided the Design-Builder prepares MOT Plans in accordance with the requirements of this Section. MOT plans that are within the jurisdiction of the City of Marysville, the City of Lake Stevens, as well as Snohomish County will require approval from the local jurisdictions before they may be used.

2.22.3.2 TRAFFIC MANAGEMENT PLAN (TMP)

The Design-Builder shall develop a TMP that includes the items from the FHWA Transportation Management Plan Checklist (Appendix T18), and the following items:

- Descriptions of traffic phasing, including conceptual MOT Plans, to accommodate construction staging.
- Descriptions of the requirements for temporary roadways and how long they will be utilized..
- Procedures to identify and incorporate the needs of transit operators, Utility Owners, schools, and business owners in the Project corridor.
- Procedures for obtaining concurrence of stakeholders and implementing road and lane closures.
- Processes for developing and obtaining agreement among stakeholders for switching procedures.
- Procedures to identify and incorporate the needs of local agencies affected by the Work.
- Processes for signing transitions during construction from one stage to the next, and from interim to permanent signing.
- Procedures to identify and incorporate the needs of emergency service providers, law enforcement entities, and other related corridor users. The Design-Builder shall also include procedures to ensure all information required by these agencies to protect the public is made available.
- Provisions for incident and emergency response.
- Processes to identify, produce, and receive acceptance for designs of temporary traffic signals.
- Methods and frequency of inspection and maintenance of all traffic control throughout the Project limits, including response times to correct, modify, or implement changes to pavement marking, signing, temporary lane configurations, and changes in Temporary Concrete Barrier (TCB) configurations.
- Descriptions of contact methods, personnel available, and response times for responses to any conditions requiring attention during off-hours. Include communications plan to WSDOT radio and field offices.
- Identification of measurable limits for the repair and replacement of traffic control devices, including pavement markings.
- Processes to determine the need for revised traffic signal timings, and if revisions are required, detail the procedures for the development, approval, implementation, testing, and maintenance of all affected signals.

- Provisions to maintain existing access to all properties within the Project limits for the duration of the Project, except as provided by other Sections. Appropriate information about access modifications shall be made available to the appropriate parties.
- Provisions to provide continuous access to established truck routes, hazardous material routes, transit routes, and school bus routes.
- Procedures to modify the plans as needed to adapt to current Project circumstances.
- Procedures to determine detour routes, and for obtaining acceptance from all stakeholders for all proposed detour routes. The Design-Builder shall identify special needs for transit service and truck routes.
- Procedures to communicate MOT information to the Design-Builder's public information personnel, and to notify the public of MOT issues in accordance with Section 2.9.
- Procedures to accommodate adjacent project's MOT Plans, if applicable.
- Procedures to accommodate the MOT Plans when the staging schedule of the Project or any adjacent project changes.
- Identify haul routes.
-

2.22.3.3 TRAFFIC INCIDENT MANAGEMENT PLAN (TIMP)

During construction, MOT will become increasingly sensitive to incidents such as equipment malfunctions, traffic crashes, inclement weather, and special events. The Design-Builder shall prepare and implement a formal TIMP to address how these incidents shall be managed.

2.22.3.3.1 General

The IMP shall identify methods for incident detection and verification, response, site management, clearance, and motorist information. The TIMP shall include procedures for interaction with the Traffic Systems Management Center (TSMC). In addition, if any local agencies along the Project corridor have adopted incident management guidelines, the Design-Builder shall be responsible for coordinating with local policies and procedures.

The TIMP shall reflect proposed construction phasing. The Design-Builder shall modify and implement the TIMP in conjunction with planned special events. The TIMP shall include specific time limits for the detection, verification, and classification of incidents, as well as for the dissemination of information about the incidents. The TIMP shall provide a mechanism to review and capture lessons learned from incidents.

The TIMP shall identify and provide for the incorporation of design elements to aid incident management, including turn-around for emergency vehicles, emergency access points, incident investigation sites, and signing to help motorists report the location of incidents in the Project.

2.22.3.3.2 Incident Response Team

Immediately upon detection, the Design-Builder shall notify the TSMC of any vehicles blocking traffic lanes. The Design-Builder shall notify the TSMC of any disabled vehicles

on shoulders. The Design-Builder will not be required to provide additional Incident Response Team equipment or personnel, however, the Design-Builder shall make materials, personnel and equipment available that are on-site as requested by WSDOT or the Washington State Patrol.

Immediately upon detection, the Design-Builder shall notify the TSMC of any roadway debris or animal carcasses that may present a traffic hazard to the public and/or cause traffic to deviate from normal traffic patterns.

2.22.3.3.3 Emergency Vehicle Access

The Design-Builder shall provide coordination with local and regional emergency service providers, law enforcement entities, transit agencies, and other related corridor users including timely communication of lane closure plans, detour plans, and other Project elements that may affect the appropriate delivery of time-sensitive services. Emergency vehicle access shall be maintained through all nighttime, weekend, and evening closures, when feasible.

Refer to Section 2.9 for additional requirements.

2.22.3.3.4 Design-Builder Response Time

The Design-Builder shall have a TCS on-call or on-site equipped with a mobile phone that can respond to and take appropriate action to manage an emergency situation. The TCS shall be on-site within 45 minutes of notification of an emergency situation, in accordance with this Section. Upon arrival, the TCS shall have the experience, resources, and equipment required to set up temporary traffic control, as necessary. This may include closing lanes, ramps, setting up detours, and replacing or repairing TCB.

2.22.3.3.5 Contingency Plan

The Design-Builder shall provide WSDOT with a Contingency Plan for re-opening each closed roadway, lane or shoulder to traffic in the event of an equipment breakdown, shortage of materials, lack of production of materials, other production failure, or when it becomes necessary to re-open the closure for use by traffic. The Design-Builder shall submit the Contingency Plan at least seven Calendar Days prior to the scheduled closure. The submission of a Contingency Plan and its acceptance by WSDOT shall not relieve the Design-Builder from the liquidated damages specified in this Section and in Section 1-08 of the General Provisions.

2.22.3.4 MOT TASK FORCE

2.22.3.4.1 Membership

The Design-Builder shall establish and chair an MOT Task Force, which shall include Design-Builder personnel, and personnel from WSDOT, the City of Marysville, the City of Lake Stevens, as well as Snohomish County, and other agencies and utility companies whose operations affect or are affected by the MOT Plans.

The MOT Task Force will serve as an advisory committee to the Design-Builder. The Design-Builder shall consider all recommendations and input provided by the task force; however, final design and implementation remain the responsibility of the Design-Builder.

2.22.3.4.2 Meetings

The Design-Builder shall schedule and chair MOT Task Force meetings twice each month from Contract execution to Project completion. The meeting schedule and frequency of meetings may be adjusted upon agreement by the MOT Task Force members.

The purpose of the meetings shall be to achieve the following:

- Further refine and develop the MOT Plans and strategies;
- Review the Design-Builder's MOT details;
- Disseminate Project MOT information to task force meeting attendees;
- Obtain MOT input from task force meeting attendees;
- Develop, refine, and review the TIMP and its implementation;
- Review the TCS log; and
- Identify the need for improvements based on traffic control implemented previously.
- Discuss comments/complaints about traffic control from WSDOT and the public, and determine how they will be addressed.
- Discuss work zone related crashes and identify appropriate revisions to traffic control to prevent future crashes.

The Design-Builder shall prepare the agenda, meeting minutes, exhibits, and design plans required for the meetings, and shall invite representatives from adjacent projects to the meetings.

2.22.4 DESIGN AND CONSTRUCTION REQUIREMENTS

2.22.4.1 DESIGN REQUIREMENTS

2.22.4.1.1 Traffic Engineering Manager (WTEM)

The WTEM shall be responsible for ensuring that the design of all elements related to construction phasing, work zone safety, and work zone traffic control are completed and all applicable design requirements are met. The WTEM shall be on site for the duration of the construction phasing and MOT Plan development. The WTEM shall also be available for approval of modifications to the phasing or MOT Plans through Substantial Completion. The WTEM shall be a Professional Engineer, registered in the State of Washington.

The WTEM must have at least three years of recent workzone and/or traffic engineering experience in design and/or construction projects of similar scope and complexity. The WTEM must understand the concepts of traffic modeling and have experience designing construction phasing, work zone safety, and work zone traffic control.

Design elements that the WTEM is responsible for include, but are not limited to, the following:

- Detours;
- TIMP:
- Phasing and MOT Plans;

- Temporary plans for signals, Intelligent Transportation Systems (ITS), lighting, signing, and striping.

2.22.4.1.2 MOT Plans

The Design-Builder shall use the procedures in the TMP to develop detailed MOT Plans that provide for all construction stages and phasing, and identify and implement opportunities to expedite construction throughout the course of the Project. The MOT Plans shall be prepared under the direction of the Design-Builder's Work Zone Traffic Engineering Manager (WTEM).

All construction signs, flaggers, spotters, and other traffic control devices shall be shown on the MOT Plans, except for emergency situations outlined in the Incident Management Plan.

Where mainline MOT Plans are developed with the intent of operating without the use of flaggers or spotters, the MOT Plans shall include a note that states, "NO FLAGGERS OR SPOTTERS". The use of flaggers or spotters will not be allowed, except when no other means of traffic control can be used, or in the event of an emergency. The MOT Plans shall show locations of all required advance warning signs, and a safe, protected location for the flagging station. If flagging is to be performed during hours of darkness, the modified MOT Plans shall require a minimum of 150W illumination for the flagging station.

The MOT Plans shall show the necessary construction signs, flaggers, spotters, and other traffic control devices required to support the Work. The Design-Builder shall be solely responsible for submitting proposed MOT Plans to WSDOT; obtaining WSDOT's comments; releasing the drawings for construction; and providing copies of the MOT Plans to the TCS.

At a minimum, the MOT Plans shall include the following items:

- Complete plan sheets and details for all stages of construction.
- The appropriate details when temporary construction of traffic signals, detour roadways, bridges, retaining structures, drainage, and other miscellaneous construction is required to maintain traffic.
- Roadway plan sheets showing all existing traffic control devices that will be retained, relocated, or removed, and all temporary traffic control devices that will be installed, retained, relocated, or removed.
- The spacing, size, color (legend and background, if applicable) and quantity of all traffic control devices.
- Work areas including ingress and egress for construction vehicles.
- Roadway plan sheets with the location of each sign so it can be easily read in relation to the roadway and other traffic control devices. A small scale layout of each sign shall be shown on the corresponding roadway plan sheet where the sign is to be placed.
- Provisions for using temporary barriers and attenuators to satisfy clear zone requirements, and to protect the traveling public and the Design-Builder's personnel, including lateral displacement distance behind barrier.

- Temporary lighting, signalization, and ITS details, as required. The Design-Builder shall refer to additional requirements described in this RFP.
- Layouts showing the locations of ground-mounted and overhead signs, special sign details, clear zones, and structural and foundation requirements.
- Drawings on how to fabricate any sign not detailed in the WSDOT *Sign Fabrication Manual* showing dimensions, background color, and legend.
- Methods for covering, partially covering, or modifying signs when not applicable to the current phase of construction.
- Striping, crosswalks, intersection details, and traffic delineators temporary and or permanent and identified as such.
- Type and location of all pavement markings to be installed, removed, or renewed for each stage of construction, and locations of the final pavement markings.
- Typical cross-sections covering each change in configuration including, but not limited to, reduction in lane and/or shoulder widths; reduction or increase in number of lanes; and changes of lateral barrier placement or type. Cross-sections shall show lane configuration (including direction of travel) and widths, shoulder widths, lateral buffer distance behind barrier, Work areas, and pavement marking type. Cross-sections shall include the station limits the section applies to. Cross-sections shall be provided covering the entire length of the segment included in the MOT Plans.
- Typical sections shall identify direction of travel, lane widths, lane type (general purpose, shoulder, or turn lane), and number of lanes.
- Access and control of bicyclists and pedestrians including persons with disabilities in accordance with the Americans with Disabilities Act of 1990 (ADA) through the traffic control zones shall be included on the MOT Plans.
- Detail modifications to the MOT Plans to address wintertime conditions or periods of suspended Work.
- A switching procedure for each control stage change identified in the MOT Plans. The switching procedure shall consist of the methods, actions, and signing necessary to complete the switch and the number and duties of traffic personnel assigned to perform the switch.

The MOT Plans shall be complete, including all necessary details. Typical traffic control configurations such as those found in the FHWA MUTCD and the WSDOT Work Zone Traffic Control Guidelines may be used to assist in developing the MOT Plans. Only site-specific MOT Plans that have been Released For Construction shall be used by the Design-Builder. Typical plans are not acceptable unless incorporated as details into the MOT Plans.

The Design-Builder shall prepare documentation to justify all proposed road closures, detour routes, and reductions in lane storage at traffic signals. The documentation shall be submitted to WSDOT for Review and Comment with the proposed MOT Plans.

2.22.4.1.3 Design Vehicle

The design vehicle shall be a WB-67 for SR 9 and SR 92. An SU shall be used for Lake Drive. The Design-Builder shall evaluate traffic patterns and vehicle classifications to

determine an appropriate design vehicle for each traffic control plan. Provisions for oversized vehicles shall be coordinated with WSDOT when detours or limited vertical clearance are required by the MOT Plans.

2.22.4.1.4 Allowable Closures

This Section lists the allowable lane closure hours for SR 9 and SR 92 section of mainline. Any restrictions for roadway segments not listed in this Section require WSDOT approval. No lane closures shall occur outside of the hours specified within this Section, unless approved in advance and in writing by WSDOT. The Design-Builder shall notify the public in advance of closures, in accordance with Section 2.9.

No temporary lane closures or restrictions, including set-up and removal of traffic control devices, will be allowed except during the hours permitted by this Section. In addition, no Work that restricts or interferes with traffic will be allowed from 12 p.m. on the day preceding, through 12 p.m. on the day following, a holiday or holiday weekend. Holidays that occur on Friday, Saturday, Sunday, or Monday are considered a holiday weekend. January 1, the third Monday of January, the third Monday of February, Memorial Day, July 4, Labor Day, November 11, Thanksgiving Day, the day after Thanksgiving, and Christmas Day shall be considered holidays. When any of these holidays fall on a Sunday, the following Monday shall be considered a holiday. When any of these holidays fall on a Saturday, the preceding Friday shall be considered a holiday.

Exceptions to the allowable lane closures may be necessary to accommodate wide loads or other permit loads through the temporary traffic control area. In addition, the Design-Builder shall coordinate with adjacent concurrent projects to provide continuity in the lane configurations.

Road and lane closures will not be allowed during the following events:

Annacortes Oyster Run – Typically held in September

Arlington Fly-In – Typically help in July

Aquafest – Typically held in July

Evergreen State Fair – 12 days event that runs through Labor Day

Granite Falls Railroad Days – Typically help in October

Marysville Strawberry Festival & Parade – Typically help in June

In addition, the Design-Builder shall identify any major event, such as a sporting event or any combination of events with an anticipated combined attendance over 2,500 and adjust closure times to minimize the impact to traffic (see Section 2.9.9). No traffic restrictions shall be implemented between two hours prior to and two hours after the end of events having a significant impact on traffic volumes.

WSDOT reserves the right to not approve traffic restrictions and closures.

Liquidated damages will be assessed for failure to complete Work and open all lanes and ramps to traffic by the specified times (see Section 1-08 of the General Provisions).

2.22.4.1.4.1 *SR 9 & SR 92 Mainline Allowable Lane Closures*

The Design-Builder shall, at a minimum, maintain the existing configuration at all times outside of the allowable closures described in this Section, unless otherwise permitted in this Section.

SR 9				
Existing Configuration	2 thru lanes , 1 auxilliary lane on each SR 9 leg			
Allowable Closure Times	Sun to Mon Mon to Tue Tue to Wed Wed to Thur Thur to Fri			
	From	**To**	**From**	**To**
One lane closed with two-way alternating traffic (requires flagging)	9:30 p.m.	4:30 a.m.		
			.	
SR 92				
Existing Configuration	1 thru lane, 2 auxilliary lanes			
Allowable Closure Times	Sun to Mon Mon to Tue Tue to Wed Wed to Thur Thur to Fri			
	From	**To**	**From**	**To**
One lane closed with two-way alternating traffic (requires flagging)	9:30 pm	4:30am		

2.22.4.1.4.2 *Allowable Auxilliary Lane Closures*

The Design-Builder shall, at a minimum, maintain the existing configuration at all times outside of the allowable closures described in this Section, unless otherwise permitted in this Section. .

SR 9 Auxilliary lanes				
Allowable Closure Times	Sun to Mon Mon to Tue Tue to Wed Wed to Thur Thur to Fri			
	From	**To**	**From**	**To**
North leg left turn lane closure	9:30 p.m.	4:30 a.m.		
South leg right turn lane closure (requires flagging)	9:30 p.m.	4:30 a.m.		

SR 92 Auxilliary lanes		
Allowable Closure Times	Sun to Mon	

	Mon to Tue Tue to Wed Wed to Thur Thur to Fri			
	From	**To**	**From**	**To**
WB left turn lane closure (requires flagging)	9:30pm	4:30am		
WB right turn lane closure				

2.22.4.1.4.3 *Allowable Shoulder Closures*

Shoulder closures will be permitted during the lane closure hours shown above. In addition, temporary shoulder closures will be allowed between 9 a.m. and 3 p.m. daily, including weekends, in accordance with the approved MOT Plans.

2.22.4.2 TRAFFIC OPERATIONS DURING CONSTRUCTION

The Design-Builder shall contact Seattle Radio at (206) 440-4490 when setting up and removing lane, and roadway closures.

The Design-Builder shall use protective vehicles with warning beacons and TMAs for protection of Work zones on roadways with a posted speed limit equal to or greater than 45 mph.

2.22.4.2.1 SR 9 and SR 92 During Construction

Existing shoulders may not be adequate for traffic operations. Refer to Section 2.7 for requirements for temporary use of portions of the existing shoulders as travel lanes.

There may be existing facilities in the existing roadway shoulder which may not be strong enough for traffic to run on without being damaged. These may include, but are not limited to, drainage structures, pipes, junction boxes, cable and drainage vaults, manholes, pull boxes, and the lids for these facilities. Prior to using the existing shoulders for any use, temporary, permanent or construction, as all or part of the traveled way, the Design-Builder shall inspect all existing facilities within the roadway shoulder which may be subjected to traffic; and replace all that are not, with like features that can support traffic. Any damaged facilities shall be replaced at the Design-Builder's expense.

Lanes shall be a minimum of 11 feet wide, and maximum lane widths shall not exceed 13 feet. Lanes shall be 12 feet wide when adequate room and 4-foot shoulders are available.

Tripod-mounted signs are allowed when shoulders are more than 5 feet wide. Tripod-mounted signs shall not be placed in shoulders less than 5 feet wide.

When shoulders are greater than 10 feet wide, the Design-Builder shall place drums at maximum 80-foot spacing, 10 feet from the edge line, supplemented by a minimum of two transverse devices at 500-foot nominal spacing.

The Design-Builder shall provide an 8-foot right shoulder/distress lane, when feasible. Each shoulder shall be a minimum of 2 feet wide and shall be paved. Wider shoulders may be required to accommodate the necessary sight distance.

The Design-Builder shall design any temporary construction and/or widening to withstand the anticipated traffic volumes and loadings during the applicable stage of the Project.

Lanes in the same direction of travel shall not be split or separated.

2.22.4.2.1.1 *Design Criteria*

The design speed for temporary conditions shall not be less than the posted speed. All lane shifting tapers and lane closure tapers shall use a minimum taper rate of 60:1.

2.22.4.2.1.2 *Temporary Lane Closures*

The Design-Builder shall provide written request to WSDOT, the City of Marysville, the City of Lake Stevens , and Snohomish County a minimum of seven Calendar Days prior to any proposed closures. No closures shall be scheduled until the MOT Plans are approved for Construction.

The Design-Builder shall use traffic safety drums on all lane closures.

For lane closures longer than 500 feet, the Design-Builder shall use a minimum of two transverse devices in the closed lane at 500-foot nominal spacing.

2.22.4.2.1.3 *Law Enforcement*

Law enforcement for Work zone shall be provided for , rolling slowdowns, to control intersections when traffic signals are temporarily turned off, and for signal turn-ons The Design Builder shall show the use of Law Enforcement on the MOT Plans submitted for approval and included in the proposal price.

2.22.4.2.1.4 *Sequential Arrow Displays*

Each vehicle used to place, maintain, or remove components of a traffic control system shall be equipped with a sequential arrow display that shall be in operation when the vehicle is in use. Vehicles equipped with sequential arrow displays not involved in placing, maintaining, or removing components when operated within a stationary-type lane closure shall display only the four-corner flash caution mode. The operator of the vehicle shall control the arrow display while the vehicle is in motion. Sequential arrow displays used in moving lane closures shall be truck-mounted. This requirement shall apply to all vehicles placing, maintaining, and removing traffic control devices, including concrete barrier trailers and “cherry pickers". For bi-directional roadways where there is no more than one through lane in each direction, use the four-corner flash caution mode for placing, maintaining or removing components.

2.22.4.2.1.5 *Advance Signing*

The Design-Builder shall furnish and install a G24-501 (modified) signs with the Project hotline phone number in the northbound direction of SR 9, the southbound direction of SR 9, and the westbound direction of SR 92 in the vicinity of the project area. The signs shall be installed within 30 Calendar Days of the date the Contract is executed, and prior to any other construction activity on the Project. The signs shall remain in place until Physical Completion. The Design-Builder shall coordination with adjacent projects for placement of the signs.

2.22.4.2.1.6 *Notice of Closures*

Refer to Section 2.9 and this Section for advance notification, public notification, and signing requirements.

2.22.4.2.1.7 *Late Reopening*

Refer to Section 1-08 of the General Provisions for liquidated damages.

2.22.4.2.2 Local Roads During Construction

All MOT Plans affecting local roads, including but not limited to, entrance and exit points to SR 9 and SR 92 closures, shall follow the requirements of each municipality impacted. The Design-Builder shall be responsible for submitting plans and obtaining approvals from the local jurisdictions for each planned closure. Allowable closure hours for lane closures on local roads shall be included in the city's approvals. The Design-Builder shall coordinate with the City of Marysville , the City of Lake Stevens , and Snohomish County regarding concurrent construction work along city cross streets that may be affected by traffic control for the Project.

No local road closures will be allowed.

2.22.4.2.2.1 *Design Criteria*

The design speed of all local roads during construction shall be at the existing posted speed limit. Any required reduction from the existing posted speed limit shall be identified in the TMP and approved by the local agency.

The existing number of through lanes shall be maintained at all times except as approved by WSDOT, the City of Marysville, , the City of Lake Stevens, and Snohomish County. All lanes for local roads shall be a minimum of 11 feet wide, measured to the front of gutter, unless the existing lane width is less than 11 feet, in which case the lane shall not be less than the existing width.

2.22.4.2.2.2 *Detours*

All detours shall be in place, including all signing, prior to closure of any road. Detours using local roads shall follow traffic control permit requirements for each municipality impacted.

The Design-Builder shall identify all bus routes, including school buses, that may be affected by the detour, and shall coordinate with the bus agency regarding impacts to the schedule and location of the bus stops.

2.22.4.2.3 Temporary Guardrail, Concrete Barrier, and Attenuators

2.22.4.2.3.1 *Vehicle Protection*

The Design-Builder shall be responsible for using temporary guardrail, barrier, and attenuators to protect the traveling public from the following:

- Hitting fixed objects within the clear zone;
- Driving off drop-offs as required by this Section; and
- Driving off slopes steeper than 3H:1V (WSDOT Design team needs to verify).

2.22.4.2.3.2 *Barrier*

Ends of the Temporary Concrete Barrier shall not be placed within the clear zone of approaching traffic unless an appropriate attenuator is used. Refer to Section 710.04 of the WSDOT *Design Manual* for minimum taper rates and additional details.

The Design-Builder shall provide a lateral displacement distance behind all barrier (including TCB) equal to or greater than the longitudinal barrier deflection shown in Figure 710-2 of the WSDOT *Design Manual*. The lateral displacement area shall be kept clear of fixed objects and shall not be used as a Work area.

All concrete barrier shall have reflectorized barrier delineators of the appropriate color with 20-foot maximum spacing. The barrier delineators shall be side-mounted.

2.22.4.2.4 Pedestrian and Bicycle Access During Construction

The Design-Builder shall maintain existing pedestrian access on all sidewalks, paths, or shoulders used by pedestrian or bicyclists. Sidewalks, paths, and shoulders used by pedestrians or bicyclists shall be patrolled and maintained to be clear of all obstructions including construction signs and traffic control devices. Occupational safety regulations that apply to the Project limits shall also be considered the minimum standard for personal safety to pedestrians. If Work will be performed over any pedestrian and bicycle routes, temporary lighted covered walkways shall be provided to protect pedestrians and bicyclists from falling debris.

When the Design-Builder allows work areas to encroach upon a sidewalk, path, or shoulder used by pedestrian or bicyclists, and a minimum clear width of 48-inches cannot be maintained for pedestrian use, an alternative accessible pedestrian route conforming to the MUTCD shall be provided. The Design-Builder shall separate pedestrians from the Work area and vehicular traffic in accordance with the MUTCD.

Protective barricades, fencing, and bridges, together with warning and guidance devices and signs, shall be used so that the passageway for pedestrians (including pedestrians with disabilities) is safe, detectable, and accessible. Whenever pedestrian walkways are provided across excavations, they shall be provided with suitable handrails. Foot bridges shall be safe, strong, and free of bounce and sway; have a slip-resistant coating; and be free of cracks, holes, and irregularities that could cause tripping. Ramps with a maximum slope of 8.3 percent shall be provided at the entrance and exit of all raised footbridges. The maximum cross slope of the ramps shall be 2 percent. When the existing facility is illuminated or Traffic Control Plans require illumination, illumination shall be provided during the hours of darkness. Retroreflective delineation, with or without illumination, shall be provided during hours of darkness.

Where pedestrian routes, including shoulders, are allowed to be closed by the Design-Builder during construction, an alternate accessible pedestrian route shall be provided that complies with the MUTCD. The alternate accessible pedestrian route shall not have abrupt changes in grade or terrain. Barriers and channelizing devices shall be detectable to pedestrians who have visual disabilities. Where it is necessary to divert pedestrians into the roadway, barricading or channelizing devices shall be provided to separate the pedestrian route from the adjacent vehicular traffic lane. Barricading or channelizing devices used to separate pedestrian and vehicular traffic shall be crashworthy and, when struck by vehicles, present a minimum threat to pedestrians, workers, and occupants of impacting vehicles. At no time shall pedestrians be diverted into a portion of the street used concurrently by moving vehicular traffic.

The Design-Builder shall not park motor vehicles or construction equipment on a sidewalk, path, or shoulder used by pedestrians or bicyclists; or use a sidewalk, path, or shoulder used by pedestrians or bicyclists for loading operations, stockpiling of materials, or allow demolished or spoil materials to be deposited on the surface of a sidewalk, path, or shoulder used by pedestrians or bicyclists. Any surface of a sidewalk, path, or shoulder

used by pedestrians or bicyclists affected by the Work shall be restored to its pre-construction condition, or better, prior to re-opening to pedestrian traffic. The surfaces shall be swept or washed free of debris including, but not limited to, mud, gravel, grease, and excavated, spoiled, or stockpiled materials.

If allowed, pedestrian and bicycle access may only be closed during full closures of the adjacent roadways, and a pedestrian access plan shall be implemented with a minimum of 14 Calendar Days advance notice provided to all pedestrians. The Design-Builder shall notify the Cascade Bicycle Club seven Calendar Days prior to closure of bicycle trails, including highway shoulders. A pedestrian access plan shall not require pedestrians to walk or bike more than ¼ mile further than the pre-construction distance. Advance notice shall consist of signs located at the construction limits and at all accesses serving the affected area; and public notification shall be in accordance with Section 2.9. All access closures and pedestrian access plans shall be shown in the MOT Plans. All detours and Work sites shall be signed in accordance with the MUTCD.

2.22.4.3 PUBLIC CONVENIENCE AND SAFETY

2.22.4.3.1 Construction Under Traffic

Work Zone Clear Zone (WZCZ)

The Work Zone Clear Zone (WZCZ) applies during working and non-working hours. During non-working hours, equipment or materials shall not be within the WZCZ unless it is protected by permanent guardrail or TCB.

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

The Design-Builder's non-essential vehicles and employee's private vehicles shall not be permitted to park within the WZCZ at any time,.

The WZCZ applies only to roadside objects introduced by the Design Builder's operations, and is not intended to resolve pre-existing deficiencies in the Design Clear Zone or clear zone values established at the completion of the Project. Work operations or objects that are actively in progress and delineated by approved traffic control measures are not subject to the WZCZ requirements.

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

Posted Speed	Distance from Traveled Way (feet)
35 mph or less	10
40 mph	15
45-55 mph	20
60 mph or greater	30

Construction vehicles using a closed traffic lane shall travel only in the normal direction of traffic flow, unless expressly allowed in the approved MOT Plans. Construction vehicles shall be equipped with flashing or rotating amber lights.

Work over an open lane of traffic shall not be allowed, unless a plan for the protection of the traveling public from debris falling onto the traveled way is approved by the Engineer of Record. This protection shall remain in place during construction, and shall meet minimum vertical clearance for the highway.

2.22.4.3.1.1 *Controlled Construction Access*

The Design-Builder shall not be allowed any special access, egress, including leaving the roadway shoulder to enter the Work area, or breaks in limited access, other than normal legal movements or movements as approved by WSDOT. The Design-Builder shall be allowed short-duration shoulder stops in the Work area, using light vehicles properly equipped with amber warning lights.

All ingress and egress to the Work area shall be shown on site-specific MOT Plans. The Design-Builder shall maximize the distance from the end of lane tapers to the access points. The merging point for construction vehicles and public traffic shall provide a minimum decision sight distance for the traveling public of 1,640 feet. The Design-Builder shall provide appropriate warning signs and traffic control devices when vehicles will be departing or entering traffic flow.

Access to and from an open lane, shall only be between the hours of 9:00 a.m. and 3:00 p.m. daily, and during the lane closure hours described in this Section. Lane closures shall be restricted to the hours described in this Section.

The access locations shall not adversely affect wetlands or other sensitive areas or their buffers. Airborne particulates created as a result of using the access shall be effectively controlled. The continuity of the existing drainage system shall be maintained throughout the access site.

At the completion of the Project, the Design-Builder shall restore the area of the access site to its original, pre-Contract, condition. Any damage to the traveled way, shoulders, auxiliary lanes, side slopes, vegetation or other areas caused by the access shall be repaired. . The Design-Builder shall include all construction access related costs in the proposal price of the Contract.

2.22.4.3.1.2 *Work During Hours of Darkness*

Work during hours of darkness may be required for the Project. The Design-Builder shall obtain any required noise variances, permits or exemptions for such Work. The Design-Builder shall, at no additional cost to WSDOT, including but not limited to, advance notification of adjacent property owners or any other required permit conditions from the local agencies, and any additional Work time incurred due to WSDOT closure hour adjustments as described in this document, make all arrangements for operations during hours of darkness

Flagger stations shall be illuminated using a minimum 150 watt steady-burn floodlight during hours of darkness. Lighting for construction activity shall be directed away from maintained traffic to minimize glare to motorists.

Refer to this Section and Section 1-07 of the General Provisions for additional requirements.

2.22.4.3.1.3 *Signs and Traffic Control Devices*

All signs and traffic control devices for lane, and roadway closures shall be installed only during the hours specified in this Section. If placed earlier than the specified hours of

closure, the construction signs shall be turned or covered so as not to be visible to motorists.

2.22.4.3.1.4 *Advance Notification*

The Design-Builder shall submit MOT Plans for lane and sidewalk closure requests in writing to WSDOT in advance of the proposed closure, in accordance with Section 2.9 and these Technical Requirements.

2.22.4.3.1.5 *Hour Adjustment*

If WSDOT determines that the permitted closure hours adversely affect traffic, causing queues that extend beyond 1.5 miles for any lane, or total roadway closure, WSDOT may adjust the closure hours accordingly. WSDOT will notify the Design-Builder in writing of any change in the closure hours.

2.22.4.3.1.6 *Public Notification*

The Design-Builder shall furnish and install information signs that provide advance notification of road closures a minimum of seven Calendar Days prior to the scheduled closure. The signs shall have a black legend on a white reflective background. Sign locations, messages, letter sizes, and sign sizes shall be shown in the MOT Plans. For local road closures, PCMS shall be used to supplement the required signs. The Design-Builder shall notify the Washington State Patrol, local fire departments, police departments, city engineering departments, public transit agencies, and the affected school districts in writing a minimum of seven Calendar Days prior to scheduled closures. The Design-Builder shall provide written copies of these notifications to WSDOT. Refer to Section 2.9 for additional requirements.

2.22.4.3.1.7 *Mast Arm Erection and Traffic Block Allowance*

During erection of mast arm assemblies, the Design-Builder may, with the authorization of WSDOT, block all traffic for intervals of a maximum of fifteen minutes between the hours of 12:01 a.m. and 4:00 a.m. These fifteen minute blockages shall be separated by an interval long enough to allow the delayed vehicles to clear.

2.22.4.3.2 Construction and Maintenance of Detours

Unless otherwise approved, the Design-Builder shall maintain two-way traffic during construction. The Design-Builder shall build, maintain in a safe condition, keep open to traffic, and remove when no longer needed, the following:

- Detours and detour bridges that will accommodate traffic diverted from the roadway or bridge during construction;
- Detour crossings of intersecting highways; and
- Temporary approaches.

The Design-Builder shall pay all costs to build, maintain, and remove any other detours, whether built for the Design-Builder's convenience or to facilitate construction operations. Any detour proposed by the Design-Builder shall conform to the requirements of the Contract. Surfacing and paving shall be consistent with traffic requirements.

Upon failure of the Design-Builder to immediately provide, maintain, or remove detours or detour bridges, WSDOT may, without further notice to the Design-Builder or the Surety, provide, maintain, or remove the detours or detour bridges, and deduct the costs from any payments due or coming due to the Design-Builder.

2.22.4.4 CONSTRUCTION REQUIREMENTS

2.22.4.4.1 General

The Design-Builder shall plan, manage, supervise, and perform all temporary traffic control activities required to support the Work using labor, equipment, and materials provided by the Design-Builder (except when such labor, equipment, or materials are to be provided by WSDOT as specifically identified herein).

The Design-Builder shall be responsible for all MOT starting at 12:01 a.m. on the day following Notice to Proceed. The traffic control devices, including temporary and permanent signal systems, must be continually and adequately monitored and maintained to ensure proper placement and working order, and to ensure the safe and efficient flow of all traffic through and adjacent to the Project. Such responsibility and maintenance shall continue until 11:59 p.m. on the day of Final Acceptance of the Project by WSDOT. WSDOT may, in writing, temporarily suspend such responsibility in conjunction with an official suspension of work.

2.22.4.4.2 Materials

All materials shall meet the requirements of Section 9-35 of the Standard Specifications. Additionally, all materials shall conform to the requirements of the Special Provision for Traffic Control Materials.

The Design-Builder shall not use the Advanced Dynamic Impact Extension Module (ADIEM) impact attenuators/end treatments for the Project.

2.22.4.4.3 Description

The Design-Builder shall provide flaggers, spotters, and all other personnel required for traffic control activities, and not otherwise specified in the Contract as being provided by WSDOT.

The Design-Builder shall perform all procedures necessary to support the Work.

The Design-Builder shall provide signs and other traffic control devices not otherwise specified in the Contract as being provided by WSDOT. The Design-Builder shall erect and maintain all construction signs, warning signs, detour signs, and other traffic control devices necessary to warn and protect the public at all times from injury or damage as a result of the Design-Builder's operations which may occur on or adjacent to highways, roads, or streets. No Work shall be done on or adjacent to the roadway until all necessary signs and traffic control devices are in place.

The traffic control resources and activities described shall be used for the safety of the public, the Design-Builder's employees, and WSDOT personnel; and to facilitate the safe movement of the traveling public. Traffic control resources and activities may be used for the separation or merging of public and construction traffic when such use is in accordance with the approved MOT Plans.

Upon failure of the Design-Builder to immediately provide flaggers; erect, maintain, and remove signs; or provide, erect, maintain, and remove other traffic control devices when

requested to do so by WSDOT, WSDOT may, without further notice to the Design-Builder or the Surety, perform any of the above and deduct all of the costs from any payments due or coming due to the Design-Builder.

The Design-Builder shall be responsible for providing adequate labor, sufficient signs, and other traffic control devices, and for performing traffic control procedures needed for the protection of the Work and the public at all times regardless of whether or not the labor, devices, or procedures have been ordered by WSDOT, provided by WSDOT, or paid for by WSDOT.

Wherever possible when performing Work, the Design-Builder's equipment shall follow normal and legal traffic movements. The Design-Builder's ingress and egress of the Work area shall be accomplished with as little disruption to traffic as possible. Traffic control devices shall be removed by picking up the devices in a reverse sequence to that used for installation. This may require backing up through the Work area. When located behind barrier or at other locations shown on approved MOT Plans, equipment may operate in a direction opposite to adjacent traffic.

The Design-Builder is advised that WSDOT may have entered into operating agreements with one or more law enforcement agencies for cooperative activities. Under such agreements, at the sole discretion of WSDOT, law enforcement personnel may enter the Work area for enforcement purposes and may participate in the Design-Builder's traffic control activities. Under the Contract, the Design-Builder is responsible for all traffic control, and any such participation by law enforcement personnel in traffic control activities will be preceded by an agreement and, if appropriate, a cost adjustment. Nothing in the Contract is intended to create an entitlement, on the part of the Design-Builder, to the services or participation of the law enforcement organization.

2.22.4.4.4 Signing, Pavement Markings, and Traffic Control Devices During Construction

The Design-Builder shall inspect all signing (existing and temporary) daily, noting damaged signs, misplaced signs, and graffiti affecting legibility of the sign. Every detour route shall be driven hourly to ensure all detour signing is in place. Signing for detours shall be covered or removed when detours are not in use. The Design-Builder shall provide a schedule for repairing, cleaning, or replacing signs; procedures shall address rectifying incorrect or misleading signing that may present a hazard to road users.

The Design-Builder shall ensure there are no conflicting or misleading signs due to adjacent projects. The Design-Builder shall coordinate with adjacent projects and relocate signs as required to avoid conflicting information. Temporary pavement markings shall be installed in accordance with Sections 8-23 and 9-34 of the Standard Specifications.

The Design-Builder shall use the Raised Pavement Marker (RPM) substitution patterns in Standard Plan M-20.50-01, temporary removable preformed tape, or other AASHTO-approved items for temporary pavement marking configurations. Temporary pavement markings shall be identified on the MOT Plans and the TMP.

If paint or temporary removable preformed tape is used for temporary markings that will remain in place for 48 hours or longer, the markings shall be supplemented with Type 2 RPMs installed at 40-foot spacing and in accordance with Standard Plan M-20.30-01. Standard Plan M-20.50-01 shall be used for striping configurations lasting more than 30 Calendar Days.

Use of a grinder to remove painted markings will not be allowed. For removal of plastic markings, grinding will be allowed down to the pavement surface, then water blasting or shot blasting will be required to remove the remainder of the marking.

Temporary pavement markings on the final pavement surface shall be placed only in the final pavement marking configuration.

The Design-Builder shall inspect all pavement markings daily. The Design-Builder shall provide a schedule for replacing damaged pavement markings and establish minimum replacement time frames based on the degree of degradation. If missing or damaged pavement markings present a hazardous condition, WSDOT may require the Design-Builder to close lanes or replace the pavement markings within 24 hours.

The Design-Builder shall clean or replace all pavement markings when they become damaged or lose reflectivity.

The Design-Builder shall replace or clean temporary pavement markings whenever the reflectance of the markings has deteriorated to 80 percent or less of the value specified for the material when new. The Design-Builder shall perform the required tests monthly, at 1-mile intervals, or at specific locations requested by WSDOT.

As each segment is completed, the Design-Builder shall install the final signing and pavement markings required to safely open the road to traffic. This Work shall be completed on or before the date of opening. Overhead signs may be temporarily ground-mounted at the Design-Builder's expense.

The Design-Builder shall have adequate spare sections of temporary barrier and the necessary equipment on-site to replace and repair temporary barrier within four hours of identification by or notice given to the Design-Builder of damaged barrier. This requirement shall include replacement of impact attenuators. Temporary traffic control shall be set up immediately upon notice of damage to ensure vehicle safety.

2.22.4.4.5 Temporary Signalization

This section applies to new temporary signals necessary for detour routes or other construction phasing, if any. Any modifications to existing traffic signals must be shown in the MOT Plans and approved by the operating agency. Modifications proposed for signal timing or phasing shall be coordinated with and approved by the operating agency. A traffic signal warrant analysis may be required for approval.

2.22.4.4.5.1 *Electrical Service*

Refer to Section 2.16.

2.22.4.4.5.2 *Material Requirements*

The Design-Builder shall furnish and install all required materials for the temporary signalization. The Design-Builder shall provide vehicle detection methods to optimize all temporary signal system installations. The Design-Builder may use Type 3 induction loops or video image detection for temporary signal installations.

2.22.4.4.5.3 *WSDOT Inspection*

The Design-Builder shall provide a minimum of seven Calendar Days notice to WSDOT prior to implementing temporary signalization. WSDOT will perform the final electrical

inspection and acceptance of temporary signal systems as required in accordance with WAC 296-46B-040.

2.22.4.4.5.4 *Signal Turn-On*

The Design-Builder shall secure and pay for the services of a law enforcement agency to perform traffic control while the traffic signal is being placed into service. Appropriate signing shall be installed by the Design-Builder in advance of signal turn-on. Hours of signal turn-on will be permitted 12:01 a.m. to 4:30 a.m. Sunday through Friday nightly.

2.22.4.4.5.5 *Operation and Maintenance*

The Design-Builder shall develop timing plans and phasing for the temporary signal operation. WSDOT or the operating agency will enter the timing parameters into the signal controller. The Design-Builder may be allowed to enter the timing parameters into the signal controller with the approval of WSDOT or the operating agency.

WSDOT or the operating agency will operate and maintain the temporary signal systems once the signal is turned on and operational. The Design-Builder shall remove all temporary signal systems upon completion and operation of the new permanent signal systems.

The Design-Builder shall maintain the temporary traffic signals during the duration of construction.

2.22.4.4.6 Temporary Illumination

Typical construction requires reduction in lane and shoulder widths, shifting of lanes, etc. Additional lighting is often necessary for the safety of the traveling public and workers.

The Design-Builder shall evaluate the lighting levels of the existing illumination in relation to the temporary configuration to determine if the existing illumination provides the required illumination levels. If the required illumination levels are not satisfied, the Design-Builder shall provide temporary illumination satisfying the “construction lanes and detours” light level and uniformity ratios in accordance with the WSDOT *Design Manual*.

Where temporary illumination is required, the existing illumination system shall not be removed until the temporary system is operational. Only lighting equipment no longer needed for illumination of the roadway shall be removed.

Existing overhead sign lighting shall be maintained at all times.

The Design-Builder shall provide temporary lighting satisfying the “construction lanes and detours” light level and uniformity ratios when existing lighting must be removed or disconnected, and new lighting is not in operation.

The Design-Builder shall provide temporary lighting for all intersections where traffic control devices are in place. The temporary lighting shall satisfy the greater of the “construction lanes and detours” or the specific intersection light level and uniformity ratios.

Temporary lighting is required when an obstruction (such as a new bridge) is placed over an area requiring illumination, and shall be installed prior to placing the obstruction.

In addition to the requirements of the WSDOT *Design Manual*, the Design-Builder shall provide temporary lighting satisfying the “construction lanes and detours” light level and uniformity ratios for temporary channelization or traffic control.

Flood lights or portable light stands shall not be used for temporary roadway lighting.

At a minimum, the Design-Builder shall provide temporary illumination satisfying the Required Illumination described in the WSDOT *Design Manual*. Temporary illumination shall be in place and in operation prior to implementing the MOT Plans which require the temporary illumination.

2.22.4.4.6.1 ***General***

At a minimum, the Design-Builder, shall perform the following:

- Design temporary lighting plans;
- Maintain current levels of roadway illumination for all roadway segments and interchanges that are currently lit;
- Provide all materials and equipment for temporary lighting installations;
- In the clear zone, provide only lighting units that are breakaway or protected from crash potential; and
- Provide maintenance for the temporary lighting system. Any damage to the existing illumination system shall be repaired prior to hours of darkness on the following day.

Temporary illumination shall be provided in accordance with the requirements of Figure 840-6 for Construction Lanes and Detours of the WSDOT *Design Manual*.

2.22.4.4.6.2 ***Timber Light Standards***

Timber light standards may be used for temporary lighting where breakaway or slip bases are not required. Timber light standards must be outside of the clear zone or protected by barrier.

2.22.4.4.6.3 ***Power Service Costs***

Refer to Section 2.16.

2.22.4.5 TRAFFIC CONTROL PERSONNEL

The Design-Builder shall plan, conduct, and safely perform the Work. The Design-Builder shall manage temporary traffic control. One or more of the Design-Builder's supervisors, who are actively involved in the planning and management of field Contract activities, shall assume the responsibilities for traffic control management. The supervisors shall have at least five years of practical MOT experience with design and/or implementation of traffic control on highway construction projects. The Design-Builder shall provide WSDOT with a copy of the formal assignment. The duties of traffic control management may not be subcontracted.

The Design-Builder shall designate one or more people to perform the duties of the primary TCS, and identify an alternate TCS who can assume the duties of the primary TCS in the event of that person's inability to perform. The TCS shall be responsible for safe implementation of the approved MOT Plans.

The TCS shall be certified as a Work site traffic control supervisor by one of the following agencies:

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

Evergreen Safety Council
401 Pontius Avenue North
Seattle, WA 98109
(800) 521-0778 or (206) 382-4090

American Traffic Safety Services Association
15 Riverside Parkway
Suite 100
Fredericksburg, Virginia 22406
(800)272-8772 or (540)368-1701

Possession of a current flagging card by the TCS is mandatory. A traffic control management assignment and a TCS designation are required for the Project.

The Design-Builder shall provide all personnel for flagging; spotting; execution of all procedures related to temporary traffic control; and setup, maintenance, and removal of all temporary traffic control devices and construction signs necessary to control traffic during construction operations.

Workers engaged as flaggers or spotters shall wear reflective vests and hard hats. During hours of darkness, white coveralls or white or yellow rain gear shall be worn. The vests and other apparel shall be in accordance with Section 1-07 of the General Provisions.

2.22.4.5.1 Traffic Control Management

The Design-Builder's traffic control management personnel shall be responsible for the following:

- Overseeing and approving the actions of the TCS to ensure that proper safety and traffic control measures are implemented and consistent with the specific requirements of the Project. An alternate form of oversight shall be in place and effective when the traffic control management personnel are not present at the Work area.
- Providing the Design-Builder's designated TCS with approved MOT Plans which are compatible with the Work and traffic control for which they will be implemented. Having the latest adopted edition of the FHWA MUTCD and the *Washington State Modifications to the MUTCD*, and applicable standards and specifications available at all times on the Project.
- Discussing proposed traffic control measures and coordinating implementation of the MOT Plans with WSDOT.
- Coordinating all traffic control operations, including those of subcontractors and suppliers, with each other and with any adjacent construction or maintenance operations.
- Coordinating the Project's activities (such as road, lane, and shoulder closures) with appropriate police, fire control agencies, city or county engineering, medical emergency agencies, school districts, and transit companies.

- Overseeing all requirements of the Contract that contribute to the convenience, safety, and orderly movement of vehicular and pedestrian traffic.
- Reviewing the TCS's diaries daily and being aware of field traffic control operations.
- Being present on-site a sufficient amount of time to adequately satisfy the above-referenced responsibilities.

Failure to carry out any of the above-referenced responsibilities shall be considered a failure to comply with the Contract and may result in a suspension of Work as described in Section 1-08 of the General Provisions.

2.22.4.5.2 Traffic Control Supervisor (TCS)

A TCS shall be present on the Project whenever flagging, spotting, or other traffic control is occurring; or less frequently, as authorized by WSDOT.

The TCS shall personally perform all of the duties of the TCS. During non-working hours, the TCS shall be available at the Project within 45 minutes after notification by WSDOT.

The TCS's duties shall include the following:

- Possessing a current set of approved MOT Plans; applicable Contract provisions as provided by the Design-Builder; the latest adopted edition of the Washington State and FHWA MUTCDs, including the *Washington State Modifications to the MUTCD*; the publication *Quality Standards for Work Zone Traffic Control Devices*; and applicable standards and specifications.
- Inspecting traffic control devices and nighttime lighting for proper location, installation, message, cleanliness, and effect on the traveling public. Traffic control devices shall be inspected at least once per hour during working hours, except that Class A signs and nighttime lighting may be inspected only twice a week. Traffic control devices left in place for 24 hours or more shall also be inspected once during non-working hours when they are initially set up (during daylight or darkness, whichever is opposite of the working hours). The TCS shall correct, or arrange to have corrected, any deficiencies noted during these inspections.
- Preparing a daily traffic control diary on each day that traffic control is performed using DOT Forms 421-040A and 421-040B (Appendix F12) and submitting them to the WSDOT Engineer no later than the end of the next business day. The daily traffic control diaries shall be maintained at the Project office and made available to WSDOT at any time upon request. The Design-Builder may use alternate forms if approved by WSDOT. Diary entries shall include, but are not limited to, the following:
    - (a) Time of day when signs and traffic control devices are installed and removed;
    - (b) Location and condition of signs and traffic control devices;
    - (c) Revisions to the MOT Plans;
    - (d) Lighting used at night;
    - (e) Observations of traffic conditions; and

(f) Identify MOT and Traffic Control Plans in use and provide location on the Project where Plans are used.

- Making minor revisions to the MOT Plans to accommodate site conditions, provided that the original intent of the MOT Plans is maintained. The revisions shall be documented in the daily traffic control diary. The MOT Plans shall be revised and re-released when determined necessary by the WTEM.
- Attending traffic control coordination meetings or coordination activities, including meetings and activities for adjacent projects, as necessary, for a complete understanding of the Project and effective performance.
- Ensuring that all required traffic control devices and equipment are available and in good working condition prior to the need to install or use them.

Provided that the duties of the TCS are accomplished, the TCS may perform other duties described in this Section.

The TCS shall be considered a critical component of the Design-Builder's management team, and shall have prior experience managing MOT operations on similarly complex projects. Registration as a licensed Professional Engineer is not required; however, the Design-Builder may elect to use his WTEM in this position. The TCS shall attend all MOT Task Force meetings. The TCS shall also coordinate activities with the public information officer.

The TCS or a designee shall be available on a 24-hour basis with a single contact phone number throughout the duration of the Project; supervise and verify all changes in the MOT setup; and perform daily Project reviews to verify that MOT devices are correctly placed and traffic is safely and efficiently moving through the Project. The TCS or a designee shall be available on the Project within 45 minutes of notification of an emergency situation, and shall be prepared to positively respond to the need to repair the traffic control system or to provide alternate traffic arrangements. The TCS shall have the resources, ability, and authority to expeditiously correct any deficiencies in the traffic control system, or to de-mobilize any construction operation that is resulting in excessive delays to traffic or creating an unsafe condition.

The TCS shall maintain a 30 Calendar Day advance schedule of all traffic control activities and a long-range schedule for all planned ramp and roadway closures. The TCS shall coordinate with the Design-Builder's Public Information Team to ensure the information is disseminated to WSDOT and to the public.

The TCS shall perform drive-through inspections each Calendar Day and immediately after any shift in MOT setup, while crews are still on-site to make modifications. If the Project has signalized intersections, the review shall be done prior to each morning peak traffic period, and each signal cycle shall be reviewed. At least two of the daily inspections each week shall be performed at night so that the arrangement and condition of the lights can be reviewed. The inspections shall also include assurances that pedestrians and bicyclists have a safe travel path around or through the Project area, and that existing businesses have adequate access during business hours, if applicable. The results of the inspections shall be documented in a daily report that, at a minimum, lists the time frame of the drive-through inspection and the defects noted. The report shall also document any maintenance or corrective action ordered as a result of the inspection, and the name and position of the Design-Builder's personnel who have been directed to provide the maintenance or corrective action. The daily report shall state that the MOT setup and all traffic control

devices substantially conform to the Contract requirements, except as noted, and shall be signed by the TCS.

2.22.4.5.3 Flaggers and Spotters

Flaggers and Spotters shall be posted where shown on the approved MOT Plans, or where directed by WSDOT. All flaggers or spotters shall possess a current flagging card issued by the States of Washington, Oregon, Montana, or Idaho. The flagging card shall be immediately available and shown to WSDOT upon request.

Flagging stations shall be shown on MOT Plans at locations where construction operations require stopping or diverting public traffic. Flagging stations shall be staffed only when flagging is required. This staffing may be continuous or intermittent, depending on the nature of the construction activity. Whenever a flagger is not required to stop or divert traffic, the flagger shall move away from the flagging station to a safer location. During hours of darkness, flagging stations shall be illuminated in a manner that ensures that flaggers can be seen easily, but that does not cause glare to the traveling public. Flaggers shall be equipped with portable two-way radios, with a range suitable for the Project. The radios shall be capable of having direct contact with Project management (e.g., foremen and superintendents).

The Design-Builder shall provide the standard Stop/Slow paddles for all flagging operations. The specification for Stop/Slow paddles in Section 9-35 of the Standard Specifications requires 24-inch paddles and all new paddles purchased for the Project shall conform to those provisions.

Spotting stations shall be shown on MOT Plans at locations where a spotter can detect errant drivers or other hazards, and provide an effective warning to other workers. Spotting stations will not be allowed at locations where the spotter will be in unnecessary danger. The Design-Builder shall provide noise-makers or other effective warning devices for spotting operations. The duties of a spotter shall not include flagging.

2.22.4.5.4 Other Traffic Control Labor

In addition to flagging or spotting duties, the Design-Builder shall provide personnel for all other traffic control procedures required by the construction operations, and personnel to install, maintain, and remove any traffic control devices shown on the MOT Plans.

2.22.4.6 VIDEO RECORD

A drive-through video of all MOT devices shall be made each week; immediately after each accident causing injuries; and after each shift in MOT setup. The tapes shall be maintained in a remote, fireproof location, and a log of the tapes with dates and times shall be provided to WSDOT on a monthly basis. WSDOT shall have the right to review the tapes at any time with 24-hours notice to the Design-Builder.

2.22.4.7 TRAFFIC CONTROL PROCEDURES

2.22.4.7.1 One-Way Traffic Control

The Work may require that traffic be maintained on a portion of the roadway using one-way traffic control. If this is the case, the Design-Builder's operation shall be confined to one-half of the roadway, permitting traffic on the other half. If shown on the approved MOT Plans or as directed by WSDOT, one-way traffic control shall be provided and shall also conform to the following requirements:

- In any one-way traffic control configuration, side roads and approaches shall be closed or controlled by a flagger or by appropriate approved signing. A side road flagger shall coordinate with end flaggers where there is line of sight, and with the pilot car where the end flaggers cannot be seen.
- Queues of vehicles shall be allowed to take turns passing through the Work zone in the single open lane. When one-way traffic control is in effect, Design-Builder vehicles shall not use the open traffic lane except while following the same rules and routes required of the public traffic.

The Design-Builder shall, at the end of each Calendar Day, leave the Work area in such condition that it can be traveled without damage to the Work, without danger to traffic, and without one-way traffic control. If, in the opinion of WSDOT, one-way traffic control cannot be dispensed with after working hours, then the operation shall be continued throughout the non-working hours.

2.22.4.7.2 Rolling Slowdown

Rolling slowdown traffic control operations shall not be used for routine Work that can be addressed by standard lane or shoulder closure traffic control. When a short-term roadway closure of 15 minutes or less is needed for an infrequent, non-repetitive Work operation such as a sign bridge removal or utility wire crossing, the Design-Builder may implement a rolling slowdown on a multi-lane roadway, as part of an approved Traffic Control Plan. Rolling slowdowns on SR 9 and SR 92 will only be permitted between 12:01 a.m. and 4:00 a.m., Sunday through Friday.

Where included in the approved MOT Plans, a rolling slowdown shall be accomplished using one traffic control vehicle with flashing amber lights for each lane to be slowed down, plus one control vehicle to serve as a chase vehicle for traffic ahead of the blockade. The Design-Builder shall provide and pay for a minimum of two Washington State Patrol officers per direction, for mainline rolling slowdowns. The traffic control vehicles shall enter the roadway and form a moving blockade to reduce traffic speeds and create a clear area in front of the moving blockade to accomplish the Work without a complete stoppage of traffic.

A PCMS shall be placed ahead of the starting point of the traffic control to warn traffic of the slowdown. The sign shall be placed far enough ahead of the Work to avoid any expected backup of vehicles.

The location where the traffic control vehicles shall begin the slowdown and the speed at which the moving blockade shall be allowed to travel shall be calculated to accommodate the estimated time needed for closure. The chase control vehicle shall follow the slowest vehicle ahead of the blockade. When the chase vehicle passes, the Design-Builder may begin the Work operation. In the event that the Work operation is not completed when the moving blockade reaches the site, all Work, except the Work necessary to clear the roadway, shall cease immediately, and the roadway shall be cleared and re-opened as soon as possible.

All ramps and entrances to the roadway between the moving blockade and the Work operation shall be temporarily closed using construction vehicles. Radio communications between the Work operation and the moving blockade shall be established and utilized to adjust the speed of the blockade to accommodate the closure time needed.

If more than one rolling slowdown occurs during the same period, the Design-Builder shall ensure that any queues originating from previous rolling slowdowns have fully dissipated.

2.22.4.7.3 Lane Closure Setup/Takedown

Where allowed by the Contract and where shown on the approved MOT Plans or as directed by WSDOT, the Design-Builder shall establish traffic control measures to close one or more lanes of a multi-lane facility. When this is scheduled to occur, the Design-Builder shall adhere to the following sequence:

- Set up advance warning signs on the shoulder of the roadway opposite the lane to be closed;
- Set up advance warning signs on the same shoulder as the lane to be closed;
- Move a TMA with arrow board into place at the beginning of the closure taper;
- Place channelization devices to mark the taper and the length of the closure as shown on the MOT plans; and
- Once the lane is closed, the TMA/arrow board combination may be replaced with an arrow board without attenuator.

If additional lanes are to be closed, this shall be done in sequence with previous lane closures, using the same sequence of activities. A TMA with arrow board is required during the process of closing each additional lane, and may be replaced with an arrow board without attenuator after the lane is closed. Each closed lane shall be marked with a separate arrow board at all times.

Traffic control for lane closures shall be removed in the reverse order of its installation.

2.22.4.7.4 Patrol and Maintain Traffic Control Measures

When temporary traffic control measures are in place, the Design-Builder shall patrol and maintain these measures, at all times. The Work shall consist of resetting mislocated devices; assuring visibility of all devices; cleaning and repairing where necessary; providing maintenance for all equipment, including replacing batteries and light bulbs, as well as keeping motorized and electronic items functioning; and adjusting the location of devices to respond to actual conditions, such as queue length, unanticipated traffic conflicts, and other areas where planned traffic control has proven ineffective.

This Work shall be performed by the Design-Builder, either by or under the direction of the TCS. Personnel, with vehicles if necessary, shall be dispatched so that all traffic control can be reviewed at least once per hour during working hours, and at least once during each Calendar Day.

2.22.4.8 TRAFFIC CONTROL DEVICES

Traffic control devices are used to visually guide drivers through Work zones. Signing, channelizing devices, arrow boards, and warning beacons all display a message to the driver. Work zone credibility is established through the proper use of these devices to send correct messages to drivers. Poor Work zone credibility has a direct, negative impact on Work zone safety by causing driver confusion, frustration, and disrespect which results in an increased potential for accidents.

2.22.4.8.1 Construction Signs

All construction signs required by the approved MOT Plans, as well as any other appropriate signs directed by WSDOT, shall be provided by the Design-Builder. The

Design-Builder shall provide the posts or supports, and erect and maintain the signs in a clean, neat, and presentable condition until they are no longer required. Post-mounted signs shall be installed as shown in the Standard Plans. Sign attachment to posts shall conform to the applicable detail shown in the Standard Plans. When the construction signs are no longer required, the Design-Builder shall remove all signs, posts, and supports from the Project and they shall remain the property of the Design-Builder.

No passing zones on the existing roadway, if any, that are marked with paint striping and where striping is anticipated to be destroyed by construction operations shall be replaced by "Do Not Pass" and "Pass With Care" signs. The Design-Builder shall furnish and install the signs and posts. The signs shall be maintained by the Design-Builder until they are removed, or upon Physical Completion. When the Project includes striping by the Design-Builder, the signs and posts shall be removed by the Design-Builder when the no passing zones are re-established by striping. The signs and posts shall become the property of the Design-Builder. When the Design-Builder is not responsible for striping, and when striping by others is not completed by Physical Completion, the signs and posts shall be left in place and shall become the property of WSDOT.

All existing signs, new permanent signs installed as part of the Work, and construction signs installed as part of the Work that are inappropriate for the traffic configuration at a given time, shall be removed or completely covered with metal, plywood, or an approved product specifically manufactured for sign covering, during periods when they are not needed.

Construction signs are divided into two classes. Class A construction signs are those signs that remain in service throughout the construction or during a major phase of the Work. They are mounted on posts, existing fixed structures, or substantial supports of a semi-permanent nature. Class A signs shall be designated as such on the approved MOT Plans. "Do Not Pass" and "Pass With Care" signs are Class A construction signs. Sign and support installation for Class A signs shall be in accordance with the Contract or the Standard Plans. Class B construction signs are those signs that are placed and removed daily, or are used for short durations which may extend for one or more days. They are mounted on portable or temporary mountings.

Class A construction signs mounted behind traffic barrels shall be mounted a minimum of 5 feet above the ground (ground to bottom of sign).

Where it is necessary to add weight to signs for stability, the Design-Builder shall follow the manufacturer's recommendations for sign ballasting.

Signs, posts, or supports that are lost, stolen, damaged, destroyed, or which WSDOT deems to be unacceptable while used on the Project, shall be replaced by the Design-Builder.

2.22.4.8.2 Sequential Arrow Signs

Sequential arrow signs shall be shown on the MOT Plans as either a stand-alone unit without a TMA or as a unit with a TMA. When required, and as shown on the MOT Plans, the Design-Builder shall provide, operate, and maintain the sequential arrow signs.

2.22.4.8.3 Portable Changeable Message Signs (PCMS)

Where shown on the approved MOT Plans or when requested by WSDOT, the Design-Builder shall provide, operate, and maintain PCMS. The Design-Builder shall provide a minimum of three PCMS available for use throughout the duration of the Project, and

shall provide additional PCMS as required. These signs shall be available on-site for the entire duration of their anticipated use.

2.22.4.8.4 Barricades

Where shown on the approved MOT Plans or when requested by WSDOT, the Design-Builder shall furnish, install, and maintain barricades. Barricades shall be kept in good repair, and shall be removed and/or replaced immediately when they are no longer functioning as designed.

Where it is necessary to add weight to barricades for stability, the Design-Builder shall follow the manufacturer's recommendations for sign ballasting.

2.22.4.8.5 Traffic Safety Drums

Where shown on the approved MOT Plans, or when requested by WSDOT, the Design-Builder shall furnish, install, and maintain traffic safety drums.

Used traffic safety drums may be utilized, provided all drums used on the Project are of essentially the same configuration and in acceptable condition.

Traffic safety drums shall be designed to resist overturning by means of a weighted lower unit that will separate from the drum when impacted by a vehicle.

Traffic safety drums shall be regularly maintained to ensure that they are clean and that the drum and reflective material are in good condition. When a drum has been damaged beyond usefulness, or provides inadequate reflectivity, a replacement drum shall be provided by the Design-Builder at no cost to WSDOT.

When the traffic safety drums are no longer required, they shall be removed from the Project and shall remain the property of the Design-Builder.

2.22.4.8.6 Traffic Cones

Where shown on the approved MOT Plan, or when requested by WSDOT, the Design-Builder shall furnish, install, and maintain traffic cones. The Design-Builder shall not use traffic cones on state highways . Traffic cones shall be kept in good repair, and shall be removed immediately when directed by WSDOT. Where wind or moving traffic frequently displaces cones, an effective method of stabilizing cones, such as stacking two together at each location, shall be employed.

2.22.4.8.7 Tubular Markers and Tall Channelizing Devices

The Design-Builder shall not use tubular markers or tall channelizing devices on state highways.

2.22.4.8.8 Warning Lights and Flashers

The Design-Builder shall provide and maintain Type C, steady-burning lights attached to traffic safety drums, barricades, or other traffic control devices used for lane closures or shifting tapers during hours of darkness.

2.22.4.8.9 Truck-Mounted Attenuator (TMA)

Where shown on the approved MOT Plans, or when requested by WSDOT, the Design-Builder shall provide, operate, and maintain TMA. These TMAs shall be available, on-site, for the entire duration of their anticipated use.

The TMA shall be positioned to separate and protect construction Work zone activities from normal traffic flow. During use, the attenuator shall be in the full down-and-locked position. For stationary operations, the truck's parking brake shall be set.

2.22.4.8.10 Temporary Concrete Barrier (TCB)

Impact attenuators shall be used to protect the ends of barrier within the clear zone. See Sections 6-10 and 8-17 of the Standard Specifications and Chapters 710, 720, 810 and Section 830.05 of the WSDOT *Design Manual* for material and construction details regarding the barrier, glare screen, attenuators, and barrier delineators. Glare screen on TCB shall conform to the requirements of this Section and Appendix B.

2.22.5 SUBMITTALS

The TMP and TIMP shall be submitted and approved by WSDOT prior to commencement of any construction activity that has the potential to impact traffic. MOT Plans for individual construction phases require a Preliminary Design Submittal and a Final Design Submittal prior to approval for each phase of construction.

2.22.5.1 TRAFFIC MANAGEMENT PLAN (TMP)

The Design-Builder shall submit six copies of the Draft TMP to WSDOT. WSDOT will respond to the submittal within 14 Calendar Days of receipt.

The Design-Builder shall prepare a Final TMP for WSDOT's approval, responding to all WSDOT comments. The Final TMP shall carry the WTEM's Professional Engineering stamp. The Design-Builder shall submit six copies and an electronic copy of the Final TMP to WSDOT. WSDOT will respond to the Final TMP within 14 Calendar Days of receipt. The TMP must be approved prior to commencement of any construction activity that has the potential to impact traffic.

2.22.5.2 TRAFFIC INCIDENT MANAGEMENT PLAN (TIMP)

The Design-Builder shall submit six copies of the Draft TIMP to WSDOT within 30 Calendar Days of the date the Contract is executed. WSDOT will provide comments on the Draft TIMP within 14 Calendar Days of receipt.

The Design-Builder shall prepare a Final TIMP for WSDOT approval responding to all WSDOT comments. The Final TIMP shall carry the WTEM's Professional Engineering stamp. The Design-Builder shall submit six copies and an electronic copy of the Final TIMP to WSDOT. WSDOT will respond to the Final TIMP within 14 Calendar Days of receipt. The TIMP must be approved prior to commencement of any construction activity that has the potential to impact traffic.

2.22.5.3 MAINTENANCE OF TRAFFIC (MOT) PLANS

The Design-Builder shall submit MOT Plans to WSDOT for review with the Preliminary and Final Design Submittals. The Design-Builder may submit MOT Plans separately for each phase of construction. The plans must be distributed and approved prior to implementation. The Design-Builder shall consider the review times when planning for implementation of the MOT phases.

The Design-Builder shall prepare plan sheets in MicroStation format and in accordance with Section 2.28, the I-405 Congestion Relief and Bus Rapid Transit Project, and the WSDOT *Plans Preparation Manual*.

The Preliminary Design Submittal shall show lane configurations including typical cross sections, signing, and Work zones. General notes to show the intent shall also be included; however, it is not required that stations and offsets be identified for all elements. The Design-Builder shall submit six copies and one electronic copy of the MOT Plans to WSDOT for review. WSDOT will provide comments on the Preliminary Design Submittal MOT Plans within 14 Calendar Days of receipt.

The Final Design Submittal shall include, at a minimum, all required details including station and offset for all elements, cross sections, temporary paving, pavement marking details, signing, traffic control devices, temporary or modified traffic signals, and temporary lighting. The Design-Builder shall submit six copies and one electronic copy of the MOT Plans to WSDOT for review. WSDOT will provide comments on the Final Design Submittal MOT Plans within 14 Calendar Days of receipt.

When all comments from the Final Design Submittal MOT Plans have been incorporated, the Design-Builder shall prepare Released for Construction MOT Plans, carrying the stamp of a Professional Engineer licensed under Title 18 RCW. For roadways outside of limited access, the Design-Builder shall submit plans for review and approval to the local jurisdiction responsible for the roadway. The Design-Builder shall provide an informational copy of the submittal to WSDOT. The Design-Builder shall allow a minimum of 14 Calendar Days for the local jurisdiction to review the plans. If the plans are not approved, they must be corrected and resubmitted until they are approved. Once approval is received and all requirements of the Quality Management Plan are satisfied, the plans may be Released For Construction. The Design-Builder shall provide four sets of the approved Released for Construction MOT Plans to WSDOT prior to implementation.

The Released for Construction MOT Plans shall be distributed to all stakeholders a minimum of 14 Calendar Days prior to implementation of any lane, ramp, sidewalk, or roadway closures or detours, in order to allow for public notification.

2.22.5.4 TEMPORARY SIGNAL PLANS

Temporary signal plans shall be submitted to WSDOT or the operating agency for approval prior to commencement of construction for temporary signals. Temporary signal plans shall be submitted as part of the MOT Plans packages for the phase in which they will be required.

2.22.5.5 TEMPORARY ILLUMINATION PLANS

Lighting level calculations, including electronic files, shall be submitted to WSDOT for Review and Comment prior to planning any pavement marking changes. When the analysis shows temporary illumination is required, the Design-Builder shall submit temporary illumination plans as part of the MOT Plans package for the stage in which the illumination will be required.

2.22.5.6 TRANSFER/TRANSPORT VEHICLE (TTV) AND QUICKCHANGE MOVEABLE BARRIER (QMB)

If QMB is used, the Design-Builder shall submit a list of TTV/QMB operators and mechanics certified by Barrier Systems Incorporated to WSDOT for Review and Comment. Certified operators and mechanics shall be trained in the manufacturer's recommended operations, maintenance, and repair procedures for the TTV and QMB. Training shall be obtained through Barrier Systems Incorporated, and shall be completed a

minimum of 21 Calendar Days prior to pickup of the TTV and QMB. Only certified personnel shall operate, maintain, or repair the TTV and QMB.

The Design-Builder shall submit monthly maintenance records to WSDOT at the end of each month that the Design-Builder is in possession of QMB and/or TTV provided by WSDOT.

2.22.5.7 OTHER SUBMITTAL REQUIREMENTS

The Design-Builder shall deliver to WSDOT a list of all parties invited to take part in the MOT Task Force, and the responses to all of the invitations. The Design-Builder shall take meeting minutes and distribute them to all task force members in accordance with Section 2.1.

A copy of the MOT diary shall be submitted to WSDOT on a monthly basis. Upon completion of the Project, the MOT diaries shall be delivered to and become the property of WSDOT.

End of Section

2.24 RIGHT OF WAY (ROW)

2.24.1 GENERAL

2.24.1.1 AVAILABLE RIGHT OF WAY

WSDOT will acquire Right of Way (ROW) for the Work as shown in the Conceptual Plans (Appendix M1), and the Right of Way Plans (Appendix R1). The Design-Builder shall have access to the ROW upon Notice to Proceed.

WSDOT anticipates ROW to be available by March 1, 2012.

If the ROW is not available by March 1, 2012, WSDOT will consider an extension of time in accordance with Section 1-08 of the General Provisions.

WSDOT has prepared mapping, monumentation, and survey control for the Project as described in Section 2.5, and as shown in the Right of Way Plans and Record of Survey (Appendix R2). Prior to entering or using any areas located outside of the existing ROW fencing, the Design-Builder shall verify and confirm the location and accuracy of the ROW boundaries.

2.24.2 MANDATORY STANDARDS

The following is a list of publications that shall be used for all design and construction. They are listed in hierarchical order, with the most important appearing at the top of the list. This is not a comprehensive list; other applicable publications may be required to complete the design and construction. If the Design-Builder becomes aware of any ambiguities or conflicts relating in any way to the Mandatory Standards, the Design-Builder shall notify WSDOT immediately, so that WSDOT may resolve them.

- RCW – Relocation Assistance Real Property Acquisition Policy RCW 8.26.
- WAC – Uniform Relocation Assistance and Real Property Acquisition WAC 468-100.
- WSDOT *Right of Way Manual* (M26-01) (Appendix D14).
- WSDOT *Plans Preparation Manual* (M22-31) (PPM) (Appendix D12).

2.24.3 ADDITIONAL RIGHT OF WAY ACQUISITION

2.24.3.1 ADDITIONAL RIGHT OF WAY

If the Design-Builder's proposed design requires the acquisition of property outside of the ROW, the Design-Builder shall identify the type and location of the ROW and submit a request for additional ROW to WSDOT for review and approval, in accordance with this Section and Section 1-04 of the General Provisions.

The time required to acquire ROW varies. In the event that the Design-Builder determines additional ROW will be required, the Design-Builder may contact WSDOT to obtain an approximate amount of time that would be required for acquisition. Refer to Section 2.10 for the Utility relocation process.

2.24.3.2 RIGHT OF WAY REQUIREMENTS DETERMINATION

Any additional ROW necessary to construct the Project will be acquired by WSDOT.

If the Design-Builder requests additional ROW, the Design-Builder shall reimburse WSDOT for the costs of such review. The costs of the review shall be paid regardless of whether or not the request is approved. In addition, all acquisition costs such as property surveys; title reports; appraisals; condemnation and relocation assistance; schedule delays and cost of schedule delays, regardless of the outcome, shall be paid by the Design-Builder.

WSDOT will provide an estimate of costs to the Design-Builder following receipt of the request for additional ROW. The cost estimate will serve as the basis for a price adjustment as described in Section 1.04 of the General Provisions.

The Design-Builder's request for additional ROW shall include the following:

- A letter indicating the Design-Builder's name, the Project name, the Project location, the Contract number, the submittal date, and the submittal type.
- A plan of sufficient scale and detail to show the existing and proposed roadway ROW, and the proposed easements, in accordance with the WSDOT *Plans Preparation Manual*.
- An outline of what will be required for WSDOT to acquire the ROW, including, but not limited to, additional land ownership, airspace, Utility corridors, access rights, and permanent or temporary easements.
- A discussion of the impacts to the Project schedule, and a proposed plan to recover the Project schedule.
- If applicable, a demolition plan of all buildings, structures, and other improvements located in the ROW. The plan shall also include the inspection, sampling, and testing of any lead based paint, asbestos, or other hazardous materials, in accordance with applicable Washington regulations. The Design-Builder shall provide WSDOT with a hazardous materials abatement plan for Review and Comment. All Utilities installed on or connected to buildings, structures, or other improvements in the ROW shall be abandoned or removed in accordance with the requirements of the applicable Utility Owner as part of the demolition , unless otherwise specified. All costs associated with the demolition shall be paid by the Design-Builder.

Any acquisition of ROW requested by the Design-Builder shall be performed in accordance with all applicable laws, including the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended; the Uniform Relocation Assistance and Real Property Acquisition, WAC 468-100; and 49 CFR Part 24.

2.24.3.3 RIGHT OF WAY ACQUISITION

Upon approval of the request for additional ROW, WSDOT will establish a ROW work order funded by the Design-Builder, and initiate the ROW acquisition process. Any offer that exceeds the mutually agreed-upon estimated cost for properties that will be acquired must be approved by the Design-Builder prior to the settlement offer.

In order to minimize the impacts of acquisition on the property owners, and to acquire the necessary property expeditiously, all additional ROW, whether permanent or temporary, from a property owner who owns multiple properties in the ROW, shall be acquired in a single offer. The Design-Builder, in accordance with applicable laws, may acquire permits where no permanent rights are needed.

Upon successful acquisition of the ROW, WSDOT will provide the Design-Builder with copies of construction commitments (in the form of a memorandum) and, if requested, documentation of WSDOT ownership.

2.24.3.4 OTHER PROPERTY RIGHTS

The Design-Builder may acquire any rights or interests in real property that, in the Design-Builder's discretion, are deemed necessary or advisable to acquire. Such real property may be required for workspace, lay-down areas, material storage areas, or other convenience. WSDOT will not be obligated to exercise its power of eminent domain; will not come into title to the property; and will not take any responsibility for the acquisition, maintenance, or disposition of additional properties or of any temporary rights of interest therein.

The Design-Builder shall submit to WSDOT a signed and notarized copy of any other property right described in this Section that the Design-Builder has acquired for the Project.

2.24.4 PROPERTY MANAGEMENT

The Design-Builder shall be responsible for the maintenance of improvements and for providing reasonable safety and security measures relative to the preservation of the ROW parcels acquired for the Project.

The Design-Builder shall assume responsibility for the ROW parcels indicated above beginning on the 30th Calendar Day after Notice to Proceed, and ending on the 30th Calendar Day following Physical Completion. The Design-Builder shall establish a Property Management Plan and shall submit the Plan to WSDOT for Review and Comment within seven Calendar Days after Notice to Proceed. The Plan shall assure that all acquired ROW is maintained in a manner that will prevent, minimize, or correct problems such as vandalism, trespassing, rodent infestation, and illegal dumping or disposal of rubble and debris within the ROW.

2.24.5 RIGHT OF ENTRY

WSDOT has not obtained permission for right of entry from property owners.

If the Design-Builder determines that there is a need to enter property not owned by WSDOT, it shall be the Design-Builder's responsibility to obtain permission to enter that property from the legal property owner.

The Design-Builder shall submit a letter to the property owner that includes the following:

- Request for permission to enter the owner's property;
- An explanation of the type of work that will take place, and the type of equipment that will be used;
- A statement that any damage to the property will be repaired to the property owner's satisfaction at the Design-Builder's expense;
- Date, time, and duration the Design-Builder will be on the property;
- A statement that the permission for right of entry is between the Design-Builder and the property owner, and that WSDOT is not liable in any way; and
- A signature and date block for the property owner's signature.

The Design-Builder shall submit a copy of the signed letter to WSDOT, prior to entering the private property.

2.24.6 INTENTIONALLY OMITTED

2.24.7 NOTIFICATION

The Design-Builder shall notify WSDOT as Work is completed on the individual parcels. WSDOT will notify the appropriate WSDOT Real Estate Manager of the completion for title clearing purposes.

2.24.8 SUBMITTALS

Project submittals include, but are not limited to, the following:

- Request for additional ROW;
- Property Management Plan;
- Right of entry letter, together with all supporting documentation for right of entry; and
- Temporary Construction Easements.

End of Section

2.25 CONTROL OF MATERIALS

2.25.1 GENERAL

The Design-Builder shall be responsible for the quality of materials, methods of construction, and testing incorporated into the Project, and shall comply with FHWA and WSDOT requirements for approval of materials, sampling, and testing used in the Project. The Design-Builder's Quality Assurance (QA) procedures shall ensure that operational techniques and activities comply with the Contract, and that all materials used in the Work are of acceptable quality.

Refer to Section 2.28 for information regarding the Quality Management Plan.

2.25.2 MANDATORY STANDARDS

The following is a list of publications that shall be used for control of materials on the project. They are listed in hierarchical order, with the most important appearing at the top of the list. This is not a comprehensive list; other applicable publications may be required to complete the design and construction. If the Design-Builder becomes aware of any ambiguities or conflicts relating in any way to the Mandatory Standards, the Design-Builder shall notify WSDOT immediately, so that WSDOT may resolve them.

- WSDOT Special Provisions (Appendix B2)
- WSDOT Amendments to the Standard Specifications (Appendix B1).
- WSDOT Standard Specifications (M41-10) (Appendix D18).
- WSDOT *Construction Manual* (M41-01) (Appendix D2).
- WSDOT *Materials Manual* (M46-01) (Appendix D10).
- WSDOT *Qualified Products List* (M46-02) (QPL) (Appendix D13).
- AASHTO *Guide Specifications for LRFD Seismic Bridge Design*,1st Edition, 2009.
- AASHTO *LRFD Bridge Design Specifications*, Customary U.S. Units, 4th Edition, with 2008 and 2009 interim Revisions.
- AASHTO *LRFD Bridge Construction Specifications*, 2nd Edition with 2006, 2007, 2008, and 2009 Interims.

2.25.3 INTENTIONALLY OMITTED

2.25.4 MATERIALS APPROVAL

The Design-Builder shall use the WSDOT Qualified Products List or the Request for Approval of Materials form, which can be accessed online at the following Web site:

www.wsdot.wa.gov.

All permanent equipment, materials, and articles incorporated into the Project, and any temporary equipment, materials, and articles that have a specification shown in Division 9 of the WSDOT Standard Specifications, such as erosion control devices and temporary traffic control devices, shall adhere to the following standards:

- Shall be new, unless specified otherwise in these Technical Requirements;

- Shall meet the requirements of the Contract and shall be approved by the Materials Approval Engineer;
- Shall be inspected or tested in accordance with these Technical Requirements, WSDOT standards, and WSDOT manuals; and
- Shall not be used in the Work if they become unfit after being previously approved.

Prior to use by the Design-Builder, all materials shall be reviewed and approved by the Materials Approval Engineer. Refer to Section 9-1.3 of the WSDOT Construction Manual. Materials submittals may be in the form of a Qualified Products List, QPL, Request for Approval of Materials (RAM) or may list the materials in the plans and specifications that have been stamped by the Engineer of Record. The Construction QA Manager shall establish the materials acceptance requirements of the material approved by the Materials Approval Engineer on the Record of Materials ROM.

The Design-Builder shall be responsible for approval and acceptance of all materials by means of testing, inspection, and documentation. A Materials Certification Package, as described in this Section and approved by the Design-Builder's Construction QA Manager, shall be submitted to WSDOT prior to Completion of the Project.

Qualified Products List (QPL) – The Design-Builder may use products listed on the most recent edition of WSDOT's QPL, without submitting a RAM. It is possible for a manufacturer to be listed in the QPL, but not for the product the Design-Builder may be intending to use. The QPL is defined in Section 9-1.3A of the WSDOT Construction Manual. The Design-Builder shall follow the acceptance requirements listed in the QPL for the product/material used. The current QPL can be accessed online at the following Web site:

www.wsdot.wa.gov/biz/mats/QPL/QPl.cfm.

Request for Approval of Materials (RAM) – The RAM shall be used if the Design-Builder elects not to use the QPL; or if the material is not listed in the QPL or not shown on the plans and specifications stamped by the Engineer of Record. The RAM shall be prepared by the Design-Builder and submitted to the Materials Approval Engineer for approval before the material is incorporated into the Work. Approval of the material does not constitute acceptance of the material for incorporation into the Work. The current RAM Form can be accessed online at the following web site:

www.wsdot.wa.gov/biz/mats/RAM/

Proprietary Items – Proprietary Items are those items that the Engineer of Record has identified on the plans and specifications as a single source by manufacturer's make and model number. These items are considered approved if they are shown on the plans and specifications stamped by the Engineer of Record. Acceptance shall follow the requirements in Section 2.25.5, Acceptance of Materials

WSDOT Aggregate Source Approval (ASA) Database – The Design-Builder may use any approved aggregate that is included in the WSDOT ASA Database. If the Design-Builder wishes to use an aggregate source that is not in the WSDOT ASA Database, preliminary samples shall be evaluated for quality, in addition to the testing performed for acceptance. The WSDOT ASA Database can be accessed online at the following Web site:

www.wsdot.wa.gov/biz/mats/ASA.

Optional Approval – The Design-Builder's Construction QA Manager may elect to request to accept materials listed in Table 9-1 of the WSDOT Construction Manual by invoking Section 9-1.1D – Optional Approval/Acceptance for Materials of the WSDOT Construction Manual. The

request must be approved by the Materials Approval Engineer with concurrence of the WSDOT Project Engineer and submitted to the Quality Assurance Team for final approval.

WSDOT Oversight – The Design-Builder shall distribute copies of all documents that list materials which have been approved to WSDOT for review within three Calendar Days of receipt of approval. WSDOT will use these documents to verify the materials being used.

Use of Materials Found on the Project – With the WSDOT Engineer's written approval, the Design-Builder may use on the Project:

- Stone, gravel, sand, other materials from on-site excavation, or timbers removed in the course of the Work.

Approval will not be granted if:

1. The excavated materials or timber fail to meet Contract requirements;
2. The excavated materials or timber are required for other use under the Contract; or
3. Such use is not in the best interests of WSDOT as determined by the WSDOT Engineer, whose decision shall be final as provided in Section 1-05.1 of the WSDOT Standard Specifications.

Any material disturbed by, but not used in, the Work shall be disposed of as provided elsewhere in the Contract or as directed by WSDOT.

The Design-Builder shall not create borrow pits on the WSDOT Right-of-Way unless specifically provided for in the Contract."

2.25.5 ACCEPTANCE OF MATERIALS

2.25.5.1 GENERAL

All materials that the Design-Builder intends to use shall be approved prior to use by the Materials Approval Engineer, shall be listed on the Record of Materials with the established materials acceptance requirements, and shall be tested and/or inspected, field-verified, and documented. The Design-Builder shall also track and maintain a daily listing of material quantities. The materials acceptance program shall be in accordance with the WSDOT *Construction Manual*, the WSDOT *Materials Manual*, the WSDOT Standard Specifications, or other provisions of the Contract.

For most materials, the method of acceptance can be found in Chapter 9 of the WSDOT *Construction Manual*.

Record of Materials (ROM) – The Design-Builder shall develop a tracking system for the ROM that will number and list all materials used on the Project; track the estimated quantities required; and identify the required acceptance criteria, acceptance frequency, and number of tests and/or inspections required for the estimated quantities. The ROM will also be used for tracking the quantities of materials used; the number of acceptance tests or inspections performed; and all acceptance documents and the status for each (i.e. approved or rejected). The ROM shall be updated daily; kept at the Project Office, and available for WSDOT review.

Upon award of the Contract, WSDOT will provide the Design-Builder's Construction QA Manager with a CD ROM containing the most recent listing of the method of acceptance for materials, to assist the Design-Builder in developing the ROM.

Visual Acceptance – If a visual acceptance is required as part of the acceptance method for materials, or is the acceptance criteria, the materials shall be inspected by the Construction QA Inspector to ensure the materials meet the specifications. The QA Inspector shall document the results of the inspection.

Manufacturer's Certificate of Compliance – If a Manufacturer's Certificate of Compliance is required as part of the acceptance criteria for materials; the Construction QA Manager shall review the certificate for compliance with the required specification prior to incorporating the materials into the Project. The Manufacturer's Certificate of Compliance shall meet the requirements of this Section.

Field Verification – The Construction QA Inspector shall field-verify all materials permanently incorporated into the Project. The field verification or visual inspection shall occur prior to or during placement of materials. The QA inspector shall inspect the product, material and construction processes for conformity to the contract requirements. The QA inspector shall also inspect the product or material for shipment and handling damage. When the Design Builder gives authorization of payment of the materials placed, they are affirming that items requiring field verification have been checked and have been found to be acceptable. The field verification information is the link between what is specified by the Engineer of Record or approved on the RAM or QPL, and what is placed.

Proprietary Items – Proprietary Items that have been approved on the plan sheets shall require acceptance by testing, inspection, or other forms of acceptance as required by the Contract, and shall also require field verification.

Tested Materials – The Design-Builder's QA staff shall test materials that require testing for acceptance. All materials with three or more sublots as listed in Table 6 of Section 2.25.12, or any other materials where three or more tests are required, shall be statistically accepted. In order to use the Design-Builder's QA test results for acceptance, the QA test results shall be statistically validated by comparing them with WSDOT's independent Quality Verification (QV) test results.

Materials that only require one or two QA tests for acceptance or that have less than three sublots will require validation using the QA test results and WSDOT's QV test results in accordance with this Section.

All field and laboratory materials testing by the Design-Builder shall follow the methods described in the WSDOT *Materials Manual* and the Contract.

Optional Acceptance – The Design-Builder's Construction QA Manager may elect to request to accept materials listed in Table 9-1 of the WSDOT Construction Manual by invoking Section 9-1.1D – Optional Approval/Acceptance for Materials of the WSDOT Construction Manual. These materials would be accepted by Visual Acceptance. The request is required to be approved by the Materials Approval Engineer with concurrence of the WSDOT Project Engineer and submitted to the Quality Assurance Team for final approval.

2.25.5.2 VALIDATION BY F AND † TEST ANALYSIS

The Construction QA Manager shall be responsible for statistically evaluating all the QA test results against WSDOT's QV test results to determine the acceptability of the QA test results. This evaluation shall be performed by using the F and t Test analysis as described in Section 2.28.

If the test results are validated, then the QA test results shall be used for acceptance. If the test results are not validated, then an investigation shall be conducted by the Quality Assurance Team,

as described in Section 2.28, to resolve the discrepancy. If a resolution cannot be reached, then WSDOT's QV test results will be used for acceptance.

2.25.5.3 STATISTICAL ACCEPTANCE OF MATERIALS

Where specified, QA sampling and testing will be performed by the Design-Builder's Quality Assurance Organization. For materials with quantities greater than two QA sublots as defined in Table 6 of Section 2.25.12, statistical evaluation shall be the method of evaluation for acceptance decisions.

The Construction QA Manager shall be responsible for statistically evaluating the validated QA test results using the Statistical Analysis of Materials (SAM) software to determine the acceptability of the test data, the total percent of the lot that is within specification limits and to determine an appropriate pay factor as described in Section 2.28. Refer to Section 2.25.11 for the statistical acceptance requirements.

2.25.5.4 NON-STATISTICAL ACCEPTANCE OF MATERIALS

When materials are not statistically evaluated, the material shall meet the minimum and maximum specifications. The Construction QA Manager shall be responsible for comparing the difference between the Design-Builder's QA test results and WSDOT's QV test results to determine the acceptability of the test results. This validation process compares the differences between the QA and QV test results to the limits in Table 3 of Section 2.25.12, or to the precision and bias statement in the test procedure. If the test results are within the tolerances, then the Design-Builder's QA test results shall be used for acceptance. If the test results are outside of the tolerances, then WSDOT's QV test results shall be used for acceptance.

2.25.5.5 SAMPLE AND TESTING FREQUENCY

Table 6 of Section 2.25.12 is to be used in conjunction with the testing frequencies defined in the WSDOT Standard Specifications and WSDOT Construction Manual. This table replaces Section 9-3.7 of the WSDOT Construction Manual. Additional testing requirements can be found in the WSDOT Standard Specifications and these Technical Requirements.

If the tables do not define a material test or material sample rate, the Quality Assurance team will establish the testing attributes and frequency. The QV sampling and testing will occur at a frequency of one test or sample per five (5) QA tests or samples.

During operational startup or unprecedented Project testing, the QV sampling and testing shall be required at the same frequency as the Design Builder's QA frequency for the first five (5) samples to be able to establish a statistical base for verification and acceptance and on a more frequent basis as needed until the process is established to be under good control. Additional testing may be performed for validation of statistical modeling if the Construction QA Manager and WSDOT deem it necessary. If the Design Builder elects to take extra QA samples and tests to insure quality, the QV sampling frequency will continue to be based on the quantity stated in Table 6.

2.25.5.6 MANUFACTURER'S CERTIFICATE OF COMPLIANCE

When authorized by these Technical Requirements and prior to use, the Construction QA Manager may accept certain materials on the basis of a Manufacturer's Certificate of Compliance as an alternative to material inspection and testing.

The Manufacturer's Certificate of Compliance must identify the manufacturer; the type and quantity of material being certified; the applicable specifications being affirmed, and the signature of a responsible corporate official of the manufacturer; and include supporting mill tests or documents. A Manufacturer's Certificate of Compliance shall be furnished with each lot of material delivered to the Project, and the lot shall be clearly identified in the Certificate.

Upon receipt of the Manufacturer's Certificate of Compliance, the Construction QA Manager shall review it for compliance with the specifications using the WSDOT Manufacturer's Certificate of Compliance Checklist Form 350-572, or Design-Builder's own checklist with the same information.

All materials used on the basis of a Manufacturer's Certificate of Compliance may be sampled and tested at any time by the Construction QA Manager or by WSDOT. Any material not conforming to the requirements will be subject to rejection whether or not it has been used. The Construction QA Manager has the authority to refuse to accept materials on the basis of a Manufacturer's Certificate of Compliance.

In lieu of using the material without a proper Manufacturer's Certificate of Compliance, the Design-Builder may request that the Construction QA Manager sample and test the materials prior to incorporating them into the Project. Any material not conforming to the requirements will be subject to rejection whether or not it has been used.

2.25.5.7 ACCEPTANCE OF SMALL QUANTITIES OF MATERIALS

Upon the request of the Design-Builder, the Construction QA Manager may elect to accept small quantities of materials without normal sampling and testing frequencies. The request is required to be approved by the Materials Approval Engineer with concurrence of the WSDOT Project Engineer and submitted to the Quality Assurance Team for final approval.

A material can be accepted as a small quantity if the proposed total quantity for the specific material is less than one testing frequency for the entire project.

Questions that the Design-Builder shall consider prior to use of small quantity acceptance are:

- Has the material been previously approved?
- Is the material certified?
- Is there a current mix design or reference design?
- Has it been recently tested with satisfactory results?
- Is the material structurally significant?

Small quantity acceptance may be accomplished by visual inspection, certification, or other methods. Acceptance of small quantities of materials by these methods shall be fully documented. Documentation of materials shall be provided by the Design-Builder's QA Inspector accepting the material. For visual acceptance, the Construction QA Manager shall have written documentation, such as an entry in the Construction QA Inspector's Daily Report or a note on field records, with a statement as to the basis of acceptance of the material and the approximate quantity involved.

Small quantity acceptance may be used for any quantity of the following:

- Curbs and sidewalks;
- Driveways; and
- Paved ditches and slopes.

2.25.5.8 FABRICATION INSPECTION

The WSDOT Fabrication Inspection Office will be responsible for in-plant inspection and approval of items fabricated specifically for the Project as detailed in the WSDOT Construction Manual and as determined by the Design-Builder and WSDOT.

The Design-Builder shall notify WSDOT at least 60 Calendar Days prior to fabrication to allow for fabrication plant approval. If deficiencies are found during the plant approval process, additional time will be required to obtain fabrication plant approval.

The Design-Builder shall include the fabrication schedule in a detailed report submitted to WSDOT as part of the Monthly Contract Schedule Update. Any change to the current published fabrication schedule shall be communicated in writing to WSDOT at least three Calendar Days before the proposed effective date.

The Design-Builder shall notify WSDOT 14 Calendar Days prior to commencing fabrication of any item, and provide two copies of plans, specifications, and approved shop drawings for items being fabricated. No fabrication inspection will be performed until the fabrication facility has been approved by WSDOT, and the approved shop drawings have been received.

A pre-fabrication meeting shall be held prior to fabrication of any major item requiring WSDOT fabrication inspection and approval. Major items include, but are not limited to, the following:

- Precast concrete wall panels;
- Prestresssed concrete products;
- Precast three-sided structures;
- Steel pedestrian and highway bridges;
- Wood bridges;
- Bridge bearings;
- Modular expansion joints; and
- Sign bridges and cantilever sign bridges.

The Design-Builder shall be responsible for scheduling the pre-fabrication meeting which shall be held at the facility where the fabrication will take place. The pre-fabrication meeting may be waived upon mutual agreement between WSDOT and the Design-Builder. At a minimum, the fabricator's Production Manager and QA Manager, the Construction QA Manager, and the WSDOT fabrication office representative shall attend the pre-fabrication meeting.

WSDOT's Fabrication Inspector will be responsible for the following:

- Collecting and reviewing all material certification documents for acceptance;
- Collecting and reviewing all of the fabricator's inspection reports for acceptance;
- Visually inspecting the fabricated items for acceptance; and
- Maintaining the Inspection Daily Report.

Items requiring fabrication inspection will be stamped or tagged for approval as specified in Section 9-2 of the WSDOT *Construction Manual* prior to the item being shipped to the job site. Exceptions to in-plant inspections are described in Section 9-4 of the WSDOT *Construction Manual*.

WSDOT will perform random dimensional inspections. The fabricator or the Design-Builder shall be responsible for assuring compliance with the Contract, performing the QC inspections, and maintaining all QC records. These records shall be available for review by WSDOT.

All items requiring WSDOT fabrication inspection shall be inspected and approved prior to being incorporated into the Project. All documentation collected as part of the WSDOT fabrication inspection shall be retained in the WSDOT Fabrication Inspection Office.

The fabricator or the Design-Builder shall be responsible for all materials QC sampling and testing. WSDOT's Fabrication Inspector shall be responsible for sampling and testing moisture-cured polyurethane, prestressing strand, and high strength bolts that are being used by the fabricator and the shop coating facilities prior to their use.

In the event of non-compliance that will prevent approval of a fabricated item, WSDOT's Fabrication Inspector will notify the fabricator, the Construction QA Manager, and the WSDOT Engineer's office for resolution. All risk for schedule delay due to non-approval of a fabricated item shall be borne by the Design-Builder.

2.25.6 HANDLING AND STORING MATERIALS

In storage and handling, the Design-Builder shall protect materials against damage from careless handling, exposure to weather, mixture with foreign matter, and all other causes. The Construction QA Manager shall reject and refuse to test materials improperly handled or stored.

The Design-Builder shall repair, replace, or make good all WSDOT-provided materials that are damaged or lost due to the Design-Builder's operation or while in the Design-Builder's possession, at no expense to WSDOT.

2.25.7 PORTLAND CEMENT CONCRETE MIX DESIGN AND BATCH PLANT

The Design-Builder, or its designee, shall develop the concrete mix design in accordance with the WSDOT Standard Specifications. The Construction QA Manager shall certify that the concrete mix design conforms to the Contract provisions and to the WSDOT Standard Specifications.

The concrete batch plant that the Design-Builder uses for the production of Portland Cement Concrete shall have a current National Ready Mix Concrete Association plant certification. The certification shall be maintained for the duration of the Contract.

2.25.8 HOT MIX ASPHALT (HMA) MIX DESIGN AND ASPHALT CONCRETE PLANT

HMA Mix Design – The Design-Builder or mix supplier shall submit a mix design to the WSDOT Project Engineer on WSDOT Form 350-042 EF (Appendix F8 HMA Mix Design Submittal Form) prior to the initial production of HMA and prior to the production of HMA each calendar year thereafter. For a mix design that was originally developed for another WSDOT contract the Design Builder or mix supplier shall also submit WSDOT Form 350-041 EF (Appendix F7 Request for Reference HMA Mix Design) and include all changes to the job mix formula that have been approved on other contracts. The mix design aggregate structure and asphalt binder content shall be determined in accordance with WSDOT Standard Operating Procedure 732 and meet the requirements of Sections 9-03.8(2) and 9-03.8(6) of the WSDOT Standard Specifications.

Mix designs that were developed during the calendar year prior to current year's production of HMA that have been issued a WSDOT mix design report will be accepted provided the Design-Builder or mix supplier submits a certification letter stating that the aggregate and asphalt binder have not changed. Changes to the aggregate that may require a new mix design include the source of material or a change in the percentage of material from a stockpile greater than five percent. 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 Design-Builder or mix supplier shall submit representative samples of the mineral materials that are to be used in the HMA production. WSDOT 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 T718. Verification testing of HMA mix designs proposed by the Design-Builder or mix supplier that includes recycled asphalt pavement (RAP) will be completed without inclusion of the RAP. Submittal of RAP samples is not required.

A mix design report will be provided within 25 Calendar Days after a mix design submittal has been received in the State Materials Laboratory in Tumwater, Washington. No paving shall begin prior to issuance of the mix design report or reference mix design report for that year.

The mix design shall be the initial job mix formula (JMF) for the class of mix. The Design-Builder or mix supplier may request a change in the JMF. Any adjustment to the JMF will require the approval of the WSDOT Project Engineer in accordance with Section 9-03.8(7) of the WSDOT Standard Specifications.

Asphalt Plant - The asphalt concrete plants that the Design-Builder uses for the production of asphalt concrete shall meet all of the requirements of the WSDOT Standard Specifications. The Construction QA Manager shall inspect the asphalt concrete plants and document that they meet all requirements.

2.25.9 STATE INSPECTED AND TESTED ITEMS

Certain items have been identified by WSDOT as critical to the everyday operations of the Project. These items shall be inspected and tested by WSDOT to ensure that they meet State and Federal requirements. These items include the following:

Traffic Signs – All traffic signs will be inspected at the point of fabrication by WSDOT. All inspected traffic signs will be tagged by WSDOT's Fabrication Inspector prior to shipment.

Traffic Signal Controllers –Traffic signal controllers supplied by the Design-Builder shall be tested by WSDOT in accordance with WSDOT Standard Operating Procedure 429 at the State Materials Laboratory in Tumwater, Washington. The Design-Builder is advised that the time necessary to test a traffic signal controller is dependent upon the quality of the product submitted, and the response time of the vendor in correcting deficiencies in the programming or circuitry. Typically, it will take approximately 20 Calendar Days for testing if everything is correct. Only traffic signal controllers tested by WSDOT shall be installed. The Design-Builder shall be responsible for delivery and pick up of traffic signal controllers.

Intelligent Transportation Systems –Refer to Section 2.18 for the division of responsibility between WSDOT and the Design-Builder for testing of the Intelligent Transportation System equipment and system.

Hot Mix Asphalt (HMA) and Asphalt Treated Base (ATB) – Unless otherwise explicitly stated elsewhere in these Technical Requirements, the verification and anti-strip requirements for the HMA and ATB mix designs shall be performed by the State Materials Laboratory in Tumwater, Washington. All acceptance testing for HMA and ATB aggregate, mixture, in-place density, cyclic density, longitudinal joint density, and coring as required shall be performed by WSDOT or its representatives.

Miscellaneous Materials Testing – The materials listed below are not statistically accepted and are not included in Table 6 of Section 2.25.12, but may still require testing. These materials shall

generally require a single sample for each lot of material to be tested for acceptance. The Design-Builder shall be responsible for sampling the materials; providing the proper paperwork as described in Chapter 9 of the WSDOT *Construction Manual;* and delivering the samples to the State Materials Laboratory in Tumwater, Washington. The Design-Builder shall provide notice to WSDOT 14 Calendar Days prior to sampling, and coordinate these activities with the WSDOT Engineer. The sampling requirements and the testing procedures shall be in accordance with the WSDOT *Construction Manual:*

- Premolded joint filler;
- Joint sealant and longitudinal joint seal;
- Hot-poured joint sealant;
- Elastomeric expansion joint seals;
- Two-component poured rubber joint sealer;
- Hot melt traffic button adhesive;
- Plastic raised pavement marker (RPMs);
- Thermoplastic RPMs;
- Bagged Portland cement;
- Aggregate extenders;
- Rubberized asphalt;
- Mineral filler;
- Epoxy systems and epoxy resin;
- Crack injection resin;
- Pigmented sealer;
- Paint for structures;
- Abrasive sand;
- Construction geosynthetic;
- Curing compound;
- Pre-packaged concrete;
- Rigid galvanized steel RGS conduit;
- Electrical conductors;
- Chain link fabric;
- Wire mesh;
- Fencing tension and barbed wire;
- Grade 1 fence posts;
- Wire fence line posts; and
- Mechanical rebar splices.

2.25.10 SUBMITTALS

2.25.10.1 OWNERS MANUALS, OPERATING INSTRUCTIONS, AND PRODUCT DATA

For equipment and materials that are permanently incorporated in the Work, the Design Builder shall provide WSDOT all owner manuals and operating instructions furnished by the equipment or material manufacturer. The Design-Builder shall also submit two hard copies of all manufacturer's warranties, guarantees, instruction sheets, parts lists, and other product data to WSDOT for acceptance within 20 Calendar Days of installation of the items to which they relate. WSDOT will advise the Design-Builder of the status of this product data within 14 Calendar Days of receipt. Refer to additional warranty requirements in other Sections of the RFP.

The Design-Builder shall submit two hard copies of all inspection reports to WSDOT daily, and copies of testing reports within 24 hours of test completion. The Design-Builder shall ensure that the product data cited in this Section is organized and indexed in a manner to allow easy retrieval of information.

2.25.10.2 MATERIALS CERTIFICATION PACKAGE

The Design-Builder shall submit a final Materials Certification Package to WSDOT. The Materials Certification shall be signed by the Engineer of Record, and the Construction Quality Assurance Manager. The Design-Builder may use WSDOT Form 350-115 EF, (Appendix F10 Contract Materials Checklist), or develop its own checklist with the same information. The Materials Certification Package shall include all necessary supporting documentation. This documentation shall consist of all documentation practices used for material acceptance, and an explanation of any deficiencies noted in the checklist. The summary of this documentation shall be organized in an order similar to Division 9 of the WSDOT Standard Specifications.

2.25.11 STATISTICAL EVALUATION OF MATERIALS FOR ACCEPTANCE

2.25.11.1 GENERAL

Acceptance of materials shall be based on statistical evaluation for the applicable elements as defined in Table 6 of Section 2.25.12. The applicable “Adjustment Factor” for various materials is shown in Table 4 of Section 2.25.12. The Design-Builder shall use WSDOT’s Statistical Analysis of Materials Software. The material shall be sampled at the point of acceptance in accordance with the applicable test procedure and specifications.

Since these specifications designate the payment of the material by other than a unit bid price basis, the unit price for calculating a “Price Adjustment” as stated in Table 5 of Section 2.25.12 will be used. The credit payment for the Price Adjustment shall be made under the item “Non-specification Material Price Adjustment” and “Non-specification Material Compaction Price Adjustment.”

Sections 5-04.5(1) and 6-02.3(5)L of the WSDOT Standard Specifications have been deleted and replaced by these Technical Requirements.

For the purpose of statistical acceptance sampling and testing, a lot is defined as a minimum of 3 sublots and a maximum of 15 sublots, except that the final lot may be increased to a maximum of 25 sublots. All of the test results obtained for a material type, such as gravel backfill for walls, CSBC or gravel borrow shall be evaluated collectively, except for the following:

- Concrete – Each concrete mix design shall be evaluated collectively.
- Hot Mix Asphalt – Each job mix formula, and all changes to that job mix formula shall be evaluated collectively. A compaction lot for HMA shall be according to WSDOT Standard Specifications Section 5-04.3(10)B.
- Portland Cement Concrete Pavement – Each concrete mix design shall be evaluated collectively. The total volume of concrete for each lot shall be based on the calculated volume as defined in WSDOT Standard Specification Section 5-05.4. All tests performed for QA purposes shall be recorded and incorporated into the lot.

The quantity represented by each sample will constitute a sublot. Sampling and testing for statistical acceptance shall be performed on a random basis at the frequency of one sample per sublot. A Lot shall be not less than three uniform sized sublots with a maximum sublot size as stated in Table 6 of Section 2.25.12 for the material being sampled and tested.

After the first three sublots have been tested the Design-Builder Construction QA Manager shall compute and maintain the Composite Pay Factor (CPF) of the completed sublots. The Design-Builder Construction QA Manager shall furnish WSDOT with a copy of the results of all Quality Assurance testing and the composite pay factor calculations within 24 hours of completing the testing or the next day of business.

2.25.11.2 FINANCIAL INCENTIVE

As an incentive to produce superior quality material, an item pay factor greater than 1.00 may be obtained with the maximum item pay factor being 1.05, with the maximum composite incentive pay factor being 1.00. The maximum composite incentive pay factor for Portland Cement Concrete Pavements, (PCCP), (compressive strength and air content) and Hot Mix Asphalt, (HMA) (gradation, binder content, volumetrics, and in-place density) will be 1.05. A lot containing non-specification material will be accepted provided the Composite Pay Factor reaches the minimum value specified elsewhere. A lot containing non-specification material which fails to obtain at least the specified minimum Composite Pay Factor shall be rejected by the Construction QA Manager. The Construction QA Manager shall take one or more of the following actions when rejected material has been incorporated into the work:

1. Require complete removal and replacement with specification material at no additional cost to WSDOT.
2. At the Design-Builder's written request, and with WSDOT concurrence, allow corrective work at no additional cost to WSDOT and then an appropriate price reduction that may range from no reduction to no payment based on the unit prices in Table 5 of Section 2.25.12.

Any lot for which at least three samples have been obtained, and all of the test results meet one of the appropriate criteria listed below, will receive at least a 1.00 Composite Pay Factor:

1. All test results are within the allowable limits specified for the item, or
2. All test results that only have a lower specification limit are greater than or equal to that limit, or
3. All test results that only have an upper specification limit are less than or equal to that limit.

Lots represented by less than 3 samples or unsampled lots will be exempt from statistical based acceptance.

2.25.11.3 REJECTED MATERIAL

The following actions shall be taken regarding defective materials and compaction:

(a) **Rejected by the Design-Builder -** The Design-Builder may, prior to sampling, elect to remove any defective material and replace it with new material at no expense to WSDOT. Any such new material will be sampled, tested and evaluated for acceptance as a part of the sublot in accordance with this statistical sampling and testing procedure.

The Construction QA Manager may also reject a sublot which tests show to be defective. Such rejected material shall not be used in the Work, and the results of tests run on the rejected material will not be included in the original lot acceptance tests.

(b) **Partial Sublot -** In addition to the preceding random acceptance sampling and testing, WSDOT or the QA tester may also isolate from a normal sublot any material that is suspected of being defective. Such isolated material will not include any original sample locations. A minimum of three random samples of the suspect material will be obtained and tested. The material will then be statistically evaluated as an independent lot in accordance with the statistical acceptance section.

(c) **An Entire Sublot -** An entire sublot that is suspected of being defective may be rejected. When a sublot is rejected, a minimum of two additional random samples from this sublot will be obtained. These additional samples and the original sublot will be evaluated as an independent lot.

(d) **A Lot In Progress -** The Design-Builder shall shut down operations and shall not resume placement until such time as the Construction QA manager is satisfied that specification material can be produced:

1. When the Composite Pay Factor (CPF) of a lot in progress drops below 1.00 and the Design-Builder is taking no appropriate corrective action; or
2. When the Pay Factor (PF) for any constituent of a lot in progress drops below 0.95 and the Design-Builder is taking no appropriate corrective action; or
3. When either the Individual Pay Factor (PF_i) for any constituent or the CPF of a lot in progress is less than 0.75

(e) **An Entire Lot -** An entire lot with a CPF of less than 0.75 will be rejected.

2.25.11.4 QUALITY LEVEL ANALYSIS

2.25.11.4.1 General

Quality level analysis is a statistical procedure for determining the percent compliance of the material with the Contract. Quality level is the computed percent of material meeting these Specifications and is determined from the arithmetic mean, (X_m), and the sample standard deviation (S), for each constituent of the lot.

The quality level calculations for HMA and other materials are completed using the formulas in Section 2-25.11.4.4. For HMA the definition of the “x” value used in the calculations and the definition of the upper and lower specification limit are in Section 2.25.11.4.2. For other materials the definition of the “x” value used in the calculations and the definition of the upper and lower specification limit are in Section 2.25.11.4.3. All other terms and variables are the same for all calculations.

Any necessary rounding off of test results or calculations will be accomplished according to the individual testing procedure, or, if not defined in the procedure then according to the following rule:

1. The final significant digit will not be changed when the succeeding digit is less than 5.
2. The final significant digit will be increased by one when the succeeding digit is 5 or greater.

2.25.11.4.2 Hot Mix Asphalt

For gradation and percent binder, x = difference between an individual test value and the job mix formula (JMF).

For voids and VMA, x = individual test value.

USL = maximum allowable limit in Section 9-03.8(7) of the WSDOT Standard Specifications.

LSL = minimum allowable limit in Section 9-03.8(7) of the WSDOT Standard Specifications.

2.25.11.4.3 Other Materials

x = individual test value.

USL = upper specification limit.

LSL = lower specification limit.

2.25.11.4.4 Quality Level Calculation

Procedures for determining the quality level and pay factors for a material are as follows:

1. Determine the arithmetic mean, (Xm), for each specified material constituent:

$$X_m = \frac{\sum x}{n}$$

where: $\sum$ = summation of
n = total number test values

2. Compute the sample standard deviation, "S", for each constituent:

$$S = \left[\frac{n\sum x^2 - \left(\sum x\right)^2}{n(n-1)} \right]^{1/2}$$

where: $\sum x^2$ = summation of the squares of individual test values
$(\sum x)^2$ = summation of the individual test values squared

3. Compute the upper quality index, (Q_U), for each constituent:

$$Q_U = \frac{USL - X_m}{S}$$

4. Compute the lower quality index, (Q_L), for each constituent:

$$Q_L = \frac{X_m - LSL}{}$$

S

5. For each constituent determine P_U (the percent within the upper specification limit which corresponds to a given Q_U) from Table 1 of Section 2.25.12. If the USL is 100.00 percent or is not specified, P_U will be 100.

   For negative values of Q_U, P_U is equal to 100 minus the table P_U (e.g. N = 15 and Q_U = - 0.5 will result in P_U = 30. If the value of Q_U does not correspond exactly to a figure in the table, use the next higher value.

6. For each constituent determine P_L (the percent within the lower specification limit which corresponds to a given Q_L) from Table 1 of Section 2.25.12. If a LSL is zero or not specified, P_L will be 100.

   For negative values of Q_L, P_L is equal to 100 minus the table P_L.
   If the value of Q_L does not correspond exactly to a figure in the table, use the next higher value.

7. For each constituent determine the quality level (the total percent within specification limits):

   Quality Level = (P_U + P_L) - 100.

8. Using the quality level from step 7, determine the Individual Pay Factor (PF_i) from Table 2 of Section 2.25.12 for each constituent tested.

   where: PF_i = Individual Pay Factor (Pay Factor for each constituent being tested.)

9. Determine the Composite Pay Factor (CPF) for each lot:

$$CPF = \frac{f_1\left(\overline{PF_1}\right) + f_2\left(\overline{PF_2}\right) + \cdots + f_i\left(\overline{PF_i}\right)}{\sum_{i=1 \text{ to } j} f_i}$$

   where: CPF = Composite Pay Factor (composite of all individual Pay Factors for each lot)

   f_i = price adjustment factor listed in this RFP for the applicable material

   j = number of constituents being evaluated.

10. Determine an item adjustment factor:

   (item) adjustment factor = CPF – 1.

11. Determine the Materials Compliance Price Adjustment:

Compliance Price Adjustment = Total Quantity of Material * Unit Price * Item Adjustment Factor.

2.25.12 MATERIALS TABLES

2.25.12.1 TABLE 1 - QUALITY LEVELS / QUALITY LEVEL ANALYSIS BY STANDARD DEVIATION METHOD

Estimated Percent of Work Within Specification Limits

Estimated Percent Within Specification Limits (P_U or P_L)	Upper Quality Index Q_U or Lower Quality Index Q_L								
	n=3	n=4	n=5	n=6	n=7	n=8	n=9	n=10 to n=11	n=12 to n=14
100	1.16	1.49	1.72	1.88	1.99	2.07	2.13	2.20	2.28
99	-	1.46	1.64	1.75	1.82	1.88	1.91	1.96	2.01
98	-	1.43	1.58	1.66	1.72	1.75	1.78	1.81	1.84
97	1.15	1.40	1.52	1.59	1.63	1.66	1.68	1.71	1.73
96	-	1.37	1.47	1.52	1.56	1.58	1.60	1.62	1.64
95	1.14	1.34	1.42	1.47	1.49	1.51	1.52	1.54	1.55
94	-	1.31	1.38	1.41	1.43	1.45	1.46	1.47	1.48
93	1.13	1.28	1.33	1.36	1.38	1.39	1.40	1.41	1.41
92	1.12	1.25	1.29	1.31	1.33	1.33	1.34	1.35	1.35
91	1.11	1.22	1.25	1.27	1.28	1.28	1.29	1.29	1.30
90	1.10	1.19	1.21	1.23	1.23	1.24	1.24	1.24	1.25
89	1.09	1.16	1.18	1.18	1.19	1.19	1.19	1.19	1.20
88	1.07	1.13	1.14	1.14	1.15	1.15	1.15	1.15	1.15
87	1.06	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.11
86	1.04	1.07	1.07	1.07	1.07	1.06	1.06	1.06	1.06
85	1.03	1.04	1.03	1.03	1.03	1.03	1.02	1.02	1.02
84	1.01	1.01	1.00	0.99	0.99	0.99	0.99	0.98	0.98
83	0.99	0.98	0.97	0.96	0.95	0.95	0.95	0.95	0.94
82	0.97	0.95	0.93	0.92	0.92	0.92	0.91	0.91	0.91
81	0.95	0.92	0.90	0.89	0.88	0.88	0.88	0.87	0.87
80	0.93	0.89	0.87	0.86	0.85	0.85	0.84	0.84	0.84
79	0.91	0.86	0.84	0.82	0.82	0.81	0.81	0.81	0.80
78	0.88	0.83	0.81	0.79	0.79	0.78	0.78	0.77	0.77
77	0.86	0.80	0.77	0.76	0.75	0.75	0.74	0.74	0.74
76	0.83	0.77	0.74	0.73	0.72	0.72	0.71	0.71	0.70
75	0.81	0.74	0.71	0.70	0.69	0.69	0.68	0.68	0.67
74	0.78	0.71	0.68	0.67	0.67	0.65	0.65	0.65	0.64
73	0.75	0.68	0.65	0.64	0.63	0.62	0.62	0.62	0.61
72	0.73	0.65	0.62	0.61	0.60	0.59	0.59	0.59	0.58
71	0.70	0.62	0.59	0.58	0.57	0.57	0.56	0.56	0.55
70	0.67	0.59	0.56	0.55	0.54	0.54	0.53	0.53	0.52
69	0.64	0.56	0.53	0.52	0.51	0.51	0.50	0.50	0.50
68	0.61	0.53	0.50	0.49	0.48	0.48	0.48	0.47	0.47
67	0.58	0.50	0.47	0.46	0.45	0.45	0.45	0.44	0.44
66	0.55	0.47	0.45	0.43	0.43	0.42	0.42	0.42	0.41
65	0.51	0.44	0.42	0.40	0.40	0.39	0.39	0.39	0.38
64	0.48	0.41	0.39	0.38	0.37	0.37	0.36	0.36	0.36
63	0.45	0.38	0.36	0.35	0.34	0.34	0.34	0.33	0.33
62	0.41	0.35	0.33	0.32	0.32	0.31	0.31	0.31	0.30
61	0.38	0.30	0.30	0.30	0.29	0.28	0.28	0.28	0.28
60	0.34	0.28	0.28	0.25	0.25	0.25	0.25	0.25	0.25
59	0.31	0.27	0.25	0.23	0.23	0.23	0.23	0.23	0.23
58	0.30	0.25	0.23	0.20	0.20	0.20	0.20	0.20	0.20
57	0.25	0.20	0.18	0.18	0.18	0.18	0.18	0.18	0.18
56	0.20	0.18	0.16	0.15	0.15	0.15	0.15	0.15	0.15
55	0.18	0.15	0.13	0.13	0.13	0.13	0.13	0.13	0.13
54	0.15	0.13	0.10	0.10	0.10	0.10	0.10	0.10	0.10
53	0.10	0.10	0.08	0.08	0.08	0.08	0.08	0.08	0.08
52	0.08	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
51	0.05	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

(continued)

Table 1 (continued)
Estimated Percent of Work Within Specification Limits

Estimated Percent Within Specification Limits (P_U or P_L)	Upper Quality Index Q_U or Lower Quality Index Q_L					
	n=15 to n=17	n=18 to n=22	n=23 to n=29	n=30 to n=42	n=43 to n=66	n=67 to ∞
100	2.34	2.39	2.44	2.48	2.51	2.56
99	2.04	2.07	2.09	2.12	2.14	2.16
98	1.87	1.89	1.91	1.93	1.94	1.95
97	1.75	1.76	1.78	1.79	1.80	1.81
96	1.65	1.66	1.67	1.68	1.69	1.70
95	1.56	1.57	1.58	1.59	1.59	1.60
94	1.49	1.50	1.50	1.51	1.51	1.52
93	1.42	1.43	1.43	1.44	1.44	1.44
92	1.36	1.36	1.37	1.37	1.37	1.38
91	1.30	1.30	1.31	1.31	1.31	1.31
90	1.25	1.25	1.25	1.25	1.26	1.26
89	1.20	1.20	1.20	1.20	1.20	1.20
88	1.15	1.15	1.15	1.15	1.15	1.15
87	1.11	1.11	1.11	1.11	1.11	1.11
86	1.06	1.06	1.06	1.06	1.06	1.06
85	1.02	1.02	1.02	1.02	1.02	1.02
84	0.98	0.98	0.98	0.98	0.98	0.98
83	0.94	0.94	0.94	0.94	0.94	0.94
82	0.91	0.90	0.90	0.90	0.90	0.90
81	0.87	0.87	0.87	0.87	0.87	0.87
80	0.83	0.83	0.83	0.83	0.83	0.83
79	0.80	0.80	0.80	0.80	0.80	0.79
78	0.77	0.76	0.76	0.76	0.76	0.76
77	0.73	0.73	0.73	0.73	0.73	0.73
76	0.70	0.70	0.70	0.70	0.70	0.70
75	0.67	0.67	0.67	0.67	0.67	0.66
74	0.64	0.64	0.64	0.64	0.64	0.63
73	0.61	0.61	0.61	0.61	0.61	0.60
72	0.58	0.58	0.58	0.58	0.58	0.57
71	0.55	0.55	0.55	0.55	0.55	0.54
70	0.52	0.52	0.52	0.52	0.52	0.52
69	0.49	0.49	0.49	0.49	0.49	0.49
68	0.47	0.46	0.46	0.46	0.46	0.46
67	0.44	0.44	0.43	0.43	0.43	0.43
66	0.41	0.41	0.41	0.41	0.41	0.40
65	0.38	0.38	0.38	0.38	0.38	0.38
64	0.36	0.35	0.35	0.35	0.35	0.35
63	0.33	0.33	0.33	0.33	0.33	0.32
62	0.30	0.30	0.30	0.30	0.30	0.30
61	0.28	0.28	0.28	0.28	0.28	0.28
60	0.25	0.25	0.25	0.25	0.25	0.25
59	0.23	0.23	0.23	0.23	0.23	0.23
58	0.20	0.20	0.20	0.20	0.20	0.20
57	0.18	0.18	0.18	0.18	0.18	0.18
56	0.15	0.15	0.15	0.15	0.15	0.15
55	0.13	0.13	0.13	0.13	0.13	0.13
54	0.10	0.10	0.10	0.10	0.10	0.10
53	0.08	0.08	0.08	0.08	0.08	0.08
52	0.05	0.05	0.05	0.05	0.05	0.05
51	0.03	0.03	0.03	0.03	0.03	0.03
50	0.00	0.00	0.00	0.00	0.00	0.00

2.25.12.2 TABLE 2 – PAY FACTORS

PAY FACTOR	Minimum Required Percent of Work Within Specification Limits for a Given Factor ($P_U + P_L$) – 100														
Category	n=3	n=4	n=5	n=6	n=7	n=8	n=9	n=10 to n=11	n=12 to n=14	n=15 to n=17	n=18 to n=22	n=23 to n=29	n=30 to n=42	n=43 to n=66	n=67 to ∞
1.05						100	100	100	100	100	100	100	100	100	100
1.04					100	99	97	95	96	96	96	97	97	97	97
1.03				100	98	96	94	92	93	93	94	95	95	96	96
1.02				99	97	94	91	89	90	91	92	93	93	94	94
1.01	100	100	100	98	95	92	89	87	88	89	90	91	92	92	93
1.00	69	75	78	80	82	83	84	85	86	87	88	89	90	91	92
0.99	66	72	76	78	80	81	82	83	84	85	86	87	89	90	91
0.98	64	70	74	76	78	79	80	81	82	84	85	86	87	88	90
0.97	63	68	72	74	76	77	78	79	81	82	83	84	86	87	88
0.96	61	67	70	72	74	75	76	78	79	81	82	83	84	86	87
0.95	59	65	68	71	72	74	75	76	78	79	80	82	83	84	86
0.94	58	63	67	69	71	72	73	75	76	78	79	80	82	83	85
0.93	57	62	65	67	69	71	72	73	75	76	78	79	80	82	84
0.92	55	60	63	66	68	69	70	72	73	75	76	78	79	81	82
0.91	54	59	62	64	66	68	69	70	72	74	75	76	78	79	81
0.90	53	57	61	63	65	66	67	69	71	72	74	75	77	78	80
0.89	51	56	59	62	63	65	66	68	69	71	72	74	75	77	79
0.88	50	55	58	60	62	64	65	66	68	70	71	73	74	76	78
0.87	49	53	57	59	61	62	63	65	67	68	70	71	73	75	77
0.86	48	52	55	58	59	61	62	64	66	67	69	70	72	74	76

Note: If the value of ($P_U + P_L$) - 100 does not correspond to a ($P_U + P_L$) - 100 value in this table, use the next smaller ($P_U + P_L$) - 100 value.

(continued)

Table 2 - Pay Factors (continued)

PAY FACTOR	Minimum Required Percent of Work Within Specification Limits for a Given Pay Factor ($P_U + P_L$) - 100														
Category	n=3	n=4	n=5	n=6	n=7	n=8	n=9	n=10 to n=11	n=12 to n=14	n=15 to n=17	n=18 to n=22	n=23 to n=29	n=30 to n=42	n=43 to n=66	n=67 to ∞
0.85	46	51	54	56	58	60	61	62	64	66	67	69	71	72	75
0.84	45	49	53	55	57	58	60	61	63	65	66	68	70	71	73
0.83	44	48	51	54	56	57	58	60	62	64	65	67	69	70	72
0.82	43	47	50	53	54	56	57	59	61	62	64	66	67	69	71
0.81	41	46	49	51	53	55	56	58	59	61	63	64	66	68	70
0.80	40	44	48	50	52	54	55	56	58	60	62	63	65	67	69
0.79	39	43	46	49	51	52	54	55	57	59	61	62	64	66	68
0.78	38	42	45	48	50	51	52	54	56	58	59	61	63	65	67
0.77	36	41	44	46	48	50	51	53	55	57	58	60	62	64	66
0.76	35	39	43	45	47	49	50	52	54	56	57	59	61	63	65
0.75	33	38	42	44	46	48	49	51	53	54	56	58	60	62	64
REJECT	Values Less Than Those Shown Above														

Reject Quality Levels Less Than Those Specified for a 0.75 Pay Factor

Note: If the value of ($P_U + P_L$) - 100 does not correspond to a ($P_U + P_L$) - 100 value in this table, use the next smaller ($P_U + P_L$) - 100 value.

2.25.12.3 TABLE 3 – ALLOWABLE TOLERANCE FOR NON-STATISTICAL MATERIALS

Quality Verification Test vs. Quality Assurance Test

SOILS	
TEST	**QUALITY VERIFICATION TEST vs. QUALITY ASSURANCE TEST, +/-**
Plasticity Index (AASHTO T90)	3
No. 200 Sieve, % (AASHTO T11/T27)	1.5
Optimum Moisture, % (AASHTO T265)	1.0
Proctor Density, lb/ft^3 (AASHTO T99)	2
Compaction, % (AASHTO T310)	2.0
Aggregate (Base, Subbase, Backfill, and Mineral Aggregates)	
TEST	**QUALITY VERIFICATION TEST vs. QUALITY ASSURANCE TEST, +/-**
Sieve Analysis (Non-statistical Item)AASHTO T11/T27	
No. 4 sieve & larger	5.0
No. 6 sieve to No. 10 sieve	4.0
No. 10 sieve to No. 80 sieve	3.0
No. 80 sieve and No. 200 sieve	2.0
Fractured Faces (AASHTO T 335)	5
Sand Equivalent (AASHTO T 176)	5
HOT MIX ASPHALT	
TEST	**QUALITY VERIFICATION TEST vs. QUALITY ASSURANCE TEST, +/-**
Sieve Analysis (Non-statistical Item)AASHTO T11/T27	
No. 4 sieve & larger	5.0
No. 6 sieve to No. 10 sieve	4.0
No. 10 sieve to No. 80 sieve	3.0
No. 80 sieve and No. 200 sieve	2.0
HMA Binder (AASHTO T308)	0.3
Compaction, % (WAQTC TM8)	2.0
PORTLAND CEMENT CONCRETE	
TEST	**QUALITY VERIFICATION TEST vs. QUALITY ASSURANCE TEST, +/-**
Slump of Concrete, mm (AASHTO T119)	
3/4 inch Max. Aggregate and Specified Slump 3 inch or less	1/2
1 1/2 inch Max. Aggregate and Specified Slump greater than 3 inch	1
Air Content, % (AASHTO T152)	1.0
Temperature, °F (AASHTO T 309)	1

2.25.12.4 TABLE 4 – PRICE ADJUSTMENT FACTORS

Item	Maximum Size Sieve: 100 % pass (Note 1)	Nominal Maximum Size Sieve (Note 2)	Other Specification Sieves #4 and Larger	Specification sieves #8 to #100	#200 Sieve	Sand Equivalent	Fracture (Note 3)	Dust Ratio	Other	Compaction
Crushed Cover Stone & Screening	2	2	5	5	10	15	15	-		
Ballast	2	2	5	5	10	15	-	15		(Note 4)
Permeable Ballast	2	2	5	5	-	-	15	-		(Note 4)
Crushed Surfacing	2	2	5	5	10	15	15	-		(Note 4)
Maintenance Rock	2	2	5	5	10	15	15	-		
Streambed Sediment	2	2	5	5	10	-	-	-		
Gravel Base	-	2	5	-	6	10	-	10		(Note 4)
Gravel Backfill for Foundations Class A	2	2	5	5	6	10	15	10		(Note 4)
Gravel Backfill for Foundations Class B	-	2	5	-	6	10	-	10		(Note 4)
Gravel Backfill for Walls	2	2	5	-	6	10	-	10		(Note 4)
Gravel Backfill for Pipe Zone Bedding	2	2	5	5	6	10	-	-		(Note 4)
Gravel Backfill for Drains	2	2	5	-	6	-	-	-		
Gravel Backfill for Drywells	2	2	5	-	6	-	-	-		
Backfill for Sand Drains	-	2	5	3	10	-	-	-		
Sand Drainage Blankets	-	2	5	3	10	-	-	-		
Gravel Borrow	2	2	5	5	6	10	-	-		
Select & Common Borrow	2	2	5	5	6	10	-	-		
Gravel Borrow for Geosynthetic Walls	2	2	5	-	6	10	-	10		
Foundation Material, Class A & B	-	2	3	-	-	-	-	-		
Foundation Material Class C	2	-	3	-	-	-	-	-		
Bank Run Gravel for Trench Backfill	2	2	5	-	6	10	-	10		(Note 4)
Hot Mix Asphalt and ATB	2	2	2	15	20	-	-	-	Asphalt Binder Content 40 / Voids 20	(Note 4)
HMA Mineral Aggregate, Fracture and SE	-	-	-	-	-	15	5			
Concrete	-	-	-	-	-	-	-	-	Cylinder Strength 6	
Paving Concrete	-	-	-	-	-	-	-	-	Cylinder Strength 6 / Air Content 4	
Concrete Aggregate	2	2	2	10	20	-	-	-		
Embankment									Compaction 10	

Note 1: 100% passing size shall be analyzed with a LSL of 99%

Note 2: Nominal maximum size sieve is the largest sieve in the applicable specifications upon which any material is permitted to be retained

Note 3: Price adjustment factor applies where criteria is contained in the material specification.

Note 4: The CPF for Material is calculated at 60 % of the Unit Bid Price and a separate CPF for Compaction is calculated at 40% of Unit Bid Price

2.25.12.5 TABLE 5 – MATERIALS UNIT PRICES

Material	Unit Price/Ton	Unit Price/CY
Common Borrow	$20.00	$40.00
Select Borrow	$15.00	$30.00
Gravel Borrow	$15.00	$30.00
Foundation Material Class A & B	$25.00	$50.00
Foundation Material Class C	$25.00	$50.00
Bank Run Gravel for Trench Backfill	$30.00	$60.00
Ballast	$20.00	$40.00
Permeable Ballast	$25.00	$50.00
Streambed Sediment	$30.00	$60.00
Crushed Surfacing	$20.00	$40.00
Maintenance Rock	$20.00	$40.00
Gravel Base	$15.00	$30.00
Crushed Cover Stone & Crushed Screenings	$20.00	$40.00
Gravel Backfill for Walls	$30.00	$60.00
HMA - Mineral Aggregate, Fracture and SE	$20.00	$40.00
Hot Mix Asphalt - All Mixes	$85.00	
Asphalt Treated Base	$50.00	
Gravel Backfill for Foundation Cl. A	$30.00	$60.00
Gravel Backfill for Foundation Cl. B	$30.00	$60.00
Gravel Backfill for Pipe Zone Bedding	$30.00	$60.00
Gravel Backfill for Drains	$30.00	$60.00
Gravel Backfill for Drywalls	$30.00	$60.00
Backfill for Sand Drains	$30.00	$60.00
Sand Drainage Blanket	$30.00	$60.00
Concrete Aggregate	$15.00	$30.00
Portland Cement Concrete		$300.00
Portland Cement Concrete Pavement		$150.00
Gravel Backfill for Geosynthetic Retaining Walls	$30.00	$60.00
Roadway Excavation (compaction)		$8.00
Embankment	$6.00	$12.00

2.25.12.6 TABLE 6 – SAMPLING AND TESTING FREQUENCY

Materials or Item	Test Description	Test Method	Quality Assurance Sample	Quality Verification Sample	F and t Statistical Evaluation	Statistical Acceptance
Aggregates						
Gravel Borrow	Grading	WAQTC FOP for AASHTO T27/11	1-4,000 Ton	1-20,000 Ton	Yes	Yes
	Sand Equivalent	WSDOT FOP for AASHTO T176	1-4,000 Ton	1-20,000 Ton	Yes	Yes
Select Borrow	Grading	WAQTC FOP for AASHTO T27/11	1-4,000 Ton	1-20,000 Ton	Yes	Yes
	Sand Equivalent	WSDOT FOP for AASHTO T176	1-4,000 Ton	1-20,000 Ton	Yes	Yes
Sand Drainage Blanket	Grading	WAQTC FOP for AASHTO T27/11	1-4,000 Ton	1-20,000 Ton	Yes	Yes
Gravel Base	Grading	WAQTC FOP for AASHTO T27/11	1-4000 Ton	1-20,000 Ton	Yes	Yes
	Sand Equivalent	WSDOT FOP for AASHTO T176	1-4,000 Ton	1-20,000 Ton	Yes	Yes
	Dust Ratio	Calculate	1-4,000 Ton	1-20,000 Ton	Yes	Yes
Crushed Surfacing Top Course (CSTC)	Grading	WAQTC FOP for AASHTO T27/11	1-2,000 Ton	1-10,000 Ton	Yes	Yes
	Sand Equivalent	WSDOT FOP for AASHTO T176	1-2,000 Ton	1-10,000 Ton	Yes	Yes
	Fracture	WSDOT FOP for AASHTO T335	1-2,000 Ton	1-10,000 Ton	Yes	Yes
Crushed Surfacing Base Course (CSBC)	Grading	WAQTC FOP for AASHTO T27/11	1-2,000 Ton	1-10,000 Ton	Yes	Yes
	Sand Equivalent	WSDOT FOP for AASHTO T176	1-2,000 Ton	1-10,000 Ton	Yes	Yes
	Fracture	WSDOT FOP for AASHTO T335	1-2,000 Ton	1-10,000 Ton	Yes	Yes

Table 6 – Sampling and Testing Frequency (Continued)

Aggregates						
Maintenance Rock	Grading	WAQTC FOP for AASHTO T27/11	1-2,000 Ton	1-10,000 Ton	Yes	Yes
	Sand Equivalent	WSDOT FOP for AASHTO T176	1-2,000 Ton	1-10,000 Ton	Yes	Yes
	Fracture	WSDOT FOP for AASHTO T335	1-2,000 Ton	1-10,000 Ton	Yes	Yes
Streambed Sediment	Grading	WAQTC FOP for AASHTO T27/11	1-500 Ton	1-2,500 Ton	Yes	Yes
Ballast	Grading	WAQTC FOP for AASHTO T27/11	1-2,000 Ton	1-10,000 Ton	Yes	Yes
	Sand Equivalent	WSDOT FOP for AASHTO T176	1-2,000 Ton	1-10,000 Ton	Yes	Yes
	Dust Ratio	Calculate	1-2,000 Ton	1-10,000 Ton	Yes	Yes
Permeable Ballast	Grading	WAQTC FOP for AASHTO T27/11	1-2,000 Ton	1-10,000 Ton	Yes	Yes
	Fracture	WSDOT FOP for AASHTO T335	1-2,000 Ton	1-10,000 Ton	Yes	Yes
Backfill for Sand Drain	Grading	WAQTC FOP for AASHTO T27/11	1-2,000 Ton	1-10,000 Ton	Yes	Yes
Crushed Coverstone	Grading	WAQTC FOP for AASHTO T27/11	1-1,000 Ton	1-5,000 Ton	Yes	Yes
	Sand Equivalent	WSDOT FOP for AASHTO T176	1-1,000 Ton	1-5,000 Ton	Yes	Yes
	Fracture	WSDOT FOP for AASHTO T 335	1-1,000 Ton	1-5,000 Ton	Yes	Yes

Table 6 – Sampling and Testing Frequency (Continued)

Aggregates						
Crushed Screenings	Grading	WAQTC FOP for AASHTO T27/11	1-1,000 Ton	1-5,000 Ton	Yes	Yes
	Fracture	WSDOT FOP for AASHTO T 335	1-1,000 Ton	1-5,000 Ton	Yes	Yes
Gravel Backfill for Foundations	Grading	WAQTC FOP for AASHTO T27/11	1-1,000 Ton	1-5,000 Ton	Yes	Yes
	Fracture	WSDOT FOP for AASHTO T335	1-1,000 Ton	1-5,000 Ton	Yes	Yes
Gravel Backfill for Walls	Grading	WAQTC FOP for AASHTO T27/11	1-1,000 Ton	1-5,000 Ton	Yes	Yes
	Fracture	WSDOT FOP for AASHTO T335	1-1,000 Ton	1-5,000 Ton	Yes	Yes
	Dust Ratio	Calculate	1-1,000 Ton	1-5,000 Ton	Yes	Yes
Gravel Backfill for Pipe Zone Bedding	Grading	WAQTC FOP for AASHTO T27/11	1-1,000 Ton	1-5,000 Ton	Yes	Yes
	Sand Equivalent	WSDOT FOP for AASHTO T176	1-1,000 Ton	1-5,000 Ton	Yes	Yes
Gravel Backfill for Drains, and Drywells	Grading	WAQTC FOP for AASHTO T27/11	1-500 Ton	1-2,500 Ton	Yes	Yes

Table 6 – Sampling and Testing Frequency (Continued)

PCC Paving						
Coarse Aggregate	Grading	WAQTC FOP for AASHTO T27/11	1-2,000 CY of concrete	1-10,000 CY of concrete	Yes	Yes
Fine Aggregate	Grading	WAQTC FOP for AASHTO T27/11	1-2,000 CY of concrete	1-10,000 CY of concrete	Yes	Yes
Combined Aggregate	Grading	WAQTC FOP for AASHTO T27/11	1-2,000 CY of concrete	1-10,000 CY of concrete	Yes	Yes
PCC Paving (Completed Mix)	Compressive Strength (28 day)	WSDOT FOP for AASHTO T23	1 set – 500 CY	1 set –2,500 CY	Yes	Yes
	Air Content	WAQTC FOP for AASHTO T152	1-500 CY	1-2,500 CY	Yes	Yes
PCC Paving Cores	Density	WSDOT T810	1-500 CY	1– 2,500 CY	No	Yes
	Thickness	WSDOT T812	1-500 CY	1– 2,500 CY	No	No
PCC Paving Cement	Chemical and Physical		Certification			

Table 6 – Sampling and Testing Frequency (Continued)

PCC Structures						
Coarse Aggregate	Grading	WAQTC FOP for AASHTO T27/11	1-1,000 CY of concrete	1-5,000 CY of concrete	Yes	Yes
Fine Aggregate	Grading	WAQTC FOP for AASHTO T27/11	1-1,000 CY of concrete	1-5,000 CY of concrete	Yes	Yes
Combined Aggregate	Grading	WAQTC FOP for AASHTO T27/11	1-1,000 CY of concrete	1-5,000 CY of concrete	Yes	Yes
PCC Structures (Completed Mix)						
	Slump – Consistency	WSDOT FOP for AASHTO T119	For placements with 50 cubic yards or less, test until 1 load meets specification. Quantities greater than 50 cubic yards, test the first load, the second load, and continue until 2 successive loads are in specification, then 1 per every 5 loads (50 CY) there after until 300 cubic yards. When the quantity reaches 301 cubic yards, then 1 test for every 10 loads (100 CY). See Note 1	1-250 CY	No	No
	Air Content	WAQTC FOP for AASHTO T152	The Testing frequency shall be the same as Slump-Consistency shown above.	1-250 CY	Yes	No
	Compressive Strength (28 day)	WSDOT FOP for AASHTO T23	The Testing frequency shall be the same as Slump-Consistency shown above.	1-250 CY	Yes	Yes
PCC Structures Cement	Chemical and Physical		Certification			
Grouts	Grout Cube Strength	WSDOT FOP for AASHTO T106	1 set per day	1 set for every 5 days	Yes	Yes

Table 6 – Sampling and Testing Frequency (Continued)

Asphalt Concrete Pavement						
Asphalt Concrete Pavement (Completed Mix) See Note 2	Grading	WSDOT FOP for AASHTO T308 and WAQTC FOP for T27/11		1-800 Ton	No	Yes
	Asphalt Content	WSDOT FOP for AASHTO T308		1-800 Ton	No	Yes
	Voids	WSDOT FOP for AASHTO T312 and WSDOT SOP 731		1-800 Ton	No	Yes
	Maximum Density (Rice Density)	WSDOT FOP for AASHTO T209		1-800 Ton	No	Yes
	Compaction	WAQTC FOP for TM8		1-80 Ton	No	Yes
	Cyclic Density	WSDOT SOP 733		As needed	No	No
	Longitudinal Joint Density	WSDOT SOP 735		1-400 Ton	No	No
Combined Aggregate	Sand Equivalent (Sampled at cold feed)	WSDOT FOP for AASHTO T176		1-1,600 Ton	No	Yes
	Fracture (Sampled at cold feed)	WSDOT FOP for AASHTO T 335		1-1,600 Ton	No	Yes
Blend Sand	Sand Equivalent	WSDOT FOP for AASHTO T176		1-1,600 Ton	No	Yes
Mineral Filler	Sp. G and PI			Certification		

Table 6 – Sampling and Testing Frequency (Continued)

Asphalt Treated Base						
Aggregate	Grading	WSDOT FOP for AASHTO T308 and WAQTC FOP for AASHTO T27/11		1-1,000 Ton	No	Yes
	Sand Equivalent	WSDOT FOP for AASHTO T176		1-1,000 Ton	No	Yes
Completed Mix	Grading	WAQTC FOP for AASHTO T27/11		1-1,000 Ton	No	Yes
	Asphalt Content	WSDOT FOP for AASHTO T308		1-1,000 Ton	No	Yes
	Asphalt Compaction	WAQTC FOP for TM8		5 per day. For daily quantity of less than 200 tons, a minimum of 2 gauge readings will be taken.	No	Yes

Table 6 – Sampling and Testing Frequency (Continued)

Asphalt Materials						
Paving Asphalt (AR, PG, Etc.)	Sampling for DOT Verification Testing	WAQTC FOP for AASHTO T40		2 - 1 Qt. cans Every other mix acceptance sample of HMA	No	N/A
Liquid Asphalt (Cutback, Emulsion)	Sampling for DOT Verification Testing	WAQTC FOP for AASHTO T40		2 - 1 Qt. cans Every other mix acceptance sample of HMA	No	N/A
Emulsion for HMA Tack Coat					No	N/A
Rubberized Asphalt	Sampling for DOT Verification Testing	WAQTC FOP for AASHTO T40		2 - 1 Qt. cans Every other mix acceptance sample of HMA	No	N/A

Table 6 – Sampling and Testing Frequency (Continued)

Compaction						
Embankment	Compaction	WSDOT FOP for AASHTO T310 and WSDOT SOP 615	1-2,500 CY	1 per 12,500 CY	Yes	Yes
Cut Section	Compaction	WSDOT FOP for AASHTO T310 and WSDOT SOP 615	1-500 LF	1 per 2,500 LF	Yes	Yes
Surfacing	Compaction	WSDOT FOP for AASHTO T310 and WSDOT SOP 615	1-1,000 LF per layer	1 per 5,000 LF	Yes	Yes
Backfill	Compaction	WSDOT FOP for AASHTO T310 and WSDOT SOP 615	1-500 CY (for Qty less than 2000 CY) 1-1000 CY (for Qty greater than 2001 CY)	1 per 1,000 CY	Yes	Yes

Table 6 – Sampling and Testing Frequency (Continued)

Compaction Standards						
Subgrade Embankment	Granular Compaction Standards	WSDOT T606 or WSDOT FOP for AASHTO T180 Method D	Develop density curve for each material type used on Project.	Split sample provided to QV for testing	N/A	N/A
	Moisture Density Curve	WSDOT FOP for AASHTO T99, T272	Develop density curve for each material type used on Project.	Split sample provided to QV for testing	N/A	N/A
Granular Embankment	Granular Compaction Standards	WSDOT T606 or WSDOT FOP for AASHTO T180 Method D	Develop density curve for each material type used on Project.	Split sample provided to QV for testing	N/A	N/A
	Moisture Density Curve	WSDOT FOP for AASHTO T99, T272	Develop density curve for each material type used on Project.	Split sample provided to QV for testing	N/A	N/A
Backfill	Granular Compaction Standards	WSDOT T606 or WSDOT FOP for AASHTO T180 Method D	Develop density curve for each material type used on Project.	Split sample provided to QV for testing	N/A	N/A
	Moisture Density Curve	WSDOT FOP for AASHTO T99, T272	Develop density curve for each material type used on Project.	Split sample provided to QV for testing	N/A	N/A
Surfacing	Granular Compaction Standards	WSDOT T606 or WSDOT FOP for AASHTO T180 Method D	Develop density curve for each material type used on Project.	Split sample provided to QV for testing	N/A	N/A
	Moisture Density Curve	WSDOT FOP for AASHTO T99, T272	Develop density curve for each material type used on Project.	Split sample provided to QV for testing	N/A	N/A

Note 1: If at any time one load of concrete fails to meet specifications for slump, air content, or temperature, continue testing every load until two successive loads meet specifications, and then continue with the established sampling frequency.

Note 2: Mix design conformation samples shall be submitted to the State Materials Laboratory Bituminous Concrete Section. For all projects, submit one sample per day from the first five days of production for each plant and one sample every fifth day of production thereafter. The conformation samples should be taken in conjunction with and be a representative quarter of the acceptance samples taken for the project as described in WSDOT Test Method 712.

If no acceptance sample is required for any day of production no conformation sample will be required either.

End of Section

2.27 MINORITY AND WOMEN'S BUSINESS ENTERPRISES (MWBE) GOALS

2.27.1 MWBE PARTICIPATION

The Design-Builder shall submit a MWBE Participation Plan to WSDOT for Review and Comment within 30 Calendar Days of Notice to Proceed. The MWBE Participation Plan shall detail the Design-Builder's methodology for achieving the MWBE voluntary goal in the amount of 13% (percent) of the Contract price. Although the MWBE goal is voluntary, the outreach efforts to provide MWBEs with maximum practicable opportunities are not. *MWBE Participation Plan Drafting Guidelines* are included in Appendix K2.

2.27.2 REPORTING OF VOLUNTARY MWBE GOALS

The Design-Builder shall certify the amounts paid to MWBEs that were used as subcontractors, lower tier subcontractors, manufacturers, regular dealers, or service providers on the Contract. The certification shall be submitted to WSDOT using WSDOT Form 421-023, "Annual Report of Amounts Paid as MBE/WBE Participants". The certification shall include information for Washington State's fiscal quarters of July 1st through September 30th, October 1st through December 31st, January 1st through March 31st, and April 1st through June 30th; or through Physical Completion of the Contract, whichever occurs earliest. The certification shall be submitted no later than 21 Calendar Days after each fiscal quarter-end, and 28 Calendar Days after Physical Completion of the Contract.

End of Section

2.28 DESIGN-BUILD QUALITY MANAGEMENT PLAN (QMP) REQUIREMENTS

2.28.1 GENERAL

The Quality Management Plan (QMP) shall be consistent with the Summary Information submitted with the Design-Builder's proposal, and shall be approved in writing by WSDOT. A draft QMP shall be submitted to WSDOT within 30 Calendar Days of Notice to Proceed. WSDOT will not accept any Final Design Submittals until the Design-Builder's Final QMP for design has been approved in writing by WSDOT. No construction Work activities that require Quality Assurance (QA)/Quality Control (QC) inspection and testing shall commence until the Design-Builder's Final QMP for construction has been approved in writing by WSDOT. The QMP shall remain in effect until all requirements of the Contract have been fulfilled and the Project is accepted.

WSDOT has developed a non-project-specific Quality Management Plan Outline (QMP Outline) that is available at the following Web site:

http://www.wsdot.wa.gov/Projects/delivery/designbuild/

In developing its own QMP, the Design-Builder is encouraged to follow the organization and format of the QMP Outline. The Design-Builder may elect to use all or part of the QMP Outline. When using the QMP Outline, the Design-Builder shall make changes to section headings and text as needed to meet project-specific requirements and the Design-Builder's own quality approach. The QMP Outline is provided for informational purposes only. WSDOT accepts no responsibility for the content of the QMP Outline, nor does WSDOT warrant that use of the QMP Outline will result in Contract compliance.

The QA organization is responsible for obtaining all documentation necessary for approval and acceptance of materials; obtaining materials certifications as required; ensuring that all required materials testing is completed; and ensuring that all tests results meet the contract requirements before the materials are incorporated into the Project. The QA organization shall inspect all work and ensure that sufficient QA staff is present to determine whether the Work complies with Contract Requirements, in accordance with the process required in the Contract Documents and the Approved QMP.

The QMP shall detail how the Design-Builder shall provide QA and QC for design and construction of the Project, and verify that all environmental and permit commitments are met to ensure the Work conforms to the Contract requirements. The Design-Builder shall comply with the applicable environmental requirements and the WSDOT and AASHTO publications listed in these Technical Requirements preparing the QMP. The Design-Builder shall revise the QMP and its implementation when repetitive or recurring quality issues arise.

The Design-Builder's QMP shall include an organizational chart of the QA and QC personnel, listing the number of full-time equivalent employees, specific responsibilities for each employee, and the lines of authority and reporting responsibilities. The QA and QC organizations and personnel shall be completely independent of each other, with separate reporting authorities. The personnel and organizations performing QA functions shall have sufficient authority and organizational autonomy to identify quality issues, and to be able to initiate, recommend, and verify implementation of Corrective Action Plans. Personnel performing QA functions shall be at an organizational level that ensures they will not be influenced by the impact of the QA measures on the Project schedule,

performance, or cost. The QMP shall list by discipline the name, qualifications, applicable certifications, duties, responsibilities, and authority for all personnel proposed to be responsible for QA and QC. All personnel performing QA functions shall be exclusively assigned to those functions, and shall not be assigned to perform conflicting duties.

2.28.1.1 PARTNERING AND DISPUTE RESOLUTION

Partnering shall be considered an integral part of the QMP. A partnering agreement is recommended for handling disputes. During the initial partnering session, a separate procedure for conflict resolution shall be developed and agreed to by the partners. The procedure shall include, but is not limited to, the following elements:

- Before the Project begins, a time frame for resolving disputes at each level of authority shall be established and a list of typical disputes that could occur on the Project shall be developed.
- Disputes shall be delegated to the lowest appropriate level of authority on the Project team for resolution within the specified time frame.
- If the dispute is not resolved to the satisfaction of both parties within the specified time frame, the dispute shall be automatically elevated to the next level of authority on the Project team. The elevation process shall be developed by and agreed to by both WSDOT and the Design-Builder at the conclusion of the initial partnering session.
- If still unresolved, the dispute shall then be directed to the highest level of authority where a final resolution shall be arbitrated by an unbiased third party, whose selection would be agreed upon in advance as part of the QMP.
- A written report prepared by the Design-Builder and signed by both WSDOT and the Design-Builder, describing the dispute, all subsequent actions, and final disposition of the dispute shall be submitted to the Project records.
- If subsequent disputes arise regarding the same issue, the written report shall be included as a resource during the resolution process.

Disputes not resolved informally through the partnering process may be brought to the Disputes Review Board in accordance with Section 1-04.5 of the General Provisions.

2.28.1.2 PRE-ACTIVITY MEETINGS

Prior to the start of any Work activity, the Design-Builder shall hold Pre-Activity Meetings to ensure that all Project personnel have a thorough understanding of the Work to be accomplished. Work activities include design, survey, fabrication, and construction activities that generally correspond to the Sections of the WSDOT Standard Specifications, such as clearing and grubbing, earthwork, aggregate base, and Hot Mix Asphalt (HMA), or a definable feature of Work such as pre-paving conference, and pre-pour conferences for bridge decks.

The Pre-Activity Meetings should include discussions relating to what type of work shall be accomplished, by whom it will be performed, and where, when, and how the Work will be done. The Pre-Activity Meetings are to ensure that all parties have the same understanding of the design intent; have the appropriate plans, specifications, and any special details; and are aware of safety regulations and procedures that need to be followed. The QA Inspection Checklist for each activity should be reviewed in the meeting.

Pre-Activity Meetings shall be scheduled a minimum of seven Calendar Days in advance of the start of any Work activity to allow for additional preparation, if necessary. The Design-Builder's Design QA Manager and/or Construction QA Manager shall plan, conduct, and take minutes at the Pre-Activity Meetings. The Design-Builder shall document any clarifications and understandings related to the Work activity that are not documented elsewhere in the minutes of the meeting. The Design-Builder shall distribute the minutes to attendees and other QA, QC, and Quality Verification (QV) staff who require the information. Pre-Activity Meetings are classified as Hold Points, and shall be identified in the QMP.

Example topics for a Pre-Activity Meeting:

- Scope (design criteria and intent, constraints);
- Applicable documents;
- Work activity outline and schedule (what, where, who, when, and how);
- Staking plan;
- Safety regulations and procedures;
- Maintenance of Traffic (MOT) Plan;
- Work area ingress/egress;
- Coordination and utilities;
- Inspection Plan/QA procedures;
- Concurrent work activities and QA staff coverage;
- Status of submittals;
- Acceptance criteria, including Hold Points;
- Status of materials approval and acceptance requirements
- Frequency of materials testing;
- Examination of the Work area;
- Examination of stored material; and
- Open discussion.

2.28.1.3 QUALITY ASSURANCE TEAM

WSDOT and the Design-Builder will jointly form a Quality Assurance Team. The team meetings will address and rectify issues relating to inspection, substandard material quality, inadequate QA and QC processes that need to be adjusted, test results that are out of tolerance, disparity between QA and QV test data, future quality concerns, and any issues that WSDOT and the Design-Builder may have regarding quality of the Project.

At a minimum, the Design-Builder shall assign the superintendents, personnel in charge of QA and QC activities, and any other personnel the Design-Builder acknowledges as having quality-related concerns from the Design-Build team to the Quality Assurance Team. WSDOT may assign similar personnel related to the Project or others having quality concerns on the Project to the Quality Assurance Team.

The Project Quality Manager (described below) or the Construction QA Manager shall be responsible for setting the meeting schedule and agenda, and documenting the meeting minutes and distribution to attendees. At the start of the design and construction phases, meetings shall be held weekly to discuss quality issues. The meeting frequency may decrease as quality issues decrease. In the event that Contract performance becomes substandard, WSDOT will require that the Quality Assurance Team meet more frequently.

The Design-Builder shall review all of the current and unresolved Nonconformance Reports (NCRs) and Nonconforming Issues (NCI) during the Quality Assurance Team meetings. For each NCR and NCI, the Design-Builder shall address the following items at the Quality Assurance Team meetings:

- Action taken by QC – How will QC or production ensure the NCR/NCI will not be repeated? How has this action been addressed in the QMP?
- Action taken by QA – How will QA ensure the NCR/NCI will not be repeated? How has this action been addressed in the QMP?
- Resolution of the initial issue that caused the NCR/NCI – How was it corrected?
- How to prevent the issue from becoming a recurring error?

Example topics for a weekly Quality Assurance Team Meeting:

- Safety;
- Schedule;
- Review of previous action items from prior weeks;
- Current and upcoming activities;
- QA/QC inspections and testing;
- Review of statistical materials evaluation;
- Open NCRs/NCIs; and
- New issues.

Note: For each item, the Design-Builder shall record clear action items, due dates, and responsibilities in the meeting minutes.

2.28.1.4 EXECUTIVE MANAGEMENT REVIEW

The Design-Builder's Executive Management shall approve the QMP, and conduct a review or an internal audit of the QMP at least quarterly, and more frequently if repetitive QA issues and if Corrective Action Reports have been issued. This review or internal audit shall ensure the QMP's ongoing suitability and effectiveness in satisfying the requirements of the Contract and the Design-Builder's stated quality policy and objectives.

The Design-Builder shall invite WSDOT to participate in the Executive Management Reviews.

At a minimum, the Executive Management Review or internal audit shall evaluate the results of the review, WSDOT audit results, Corrective Action Reports, and plans implemented as a result of the NCRs and NCIs. The Design-Builder shall respond within 20 Calendar Days to requests for the implementation of Corrective Action Plans that result from Executive Management Reviews. The Design-Builder shall incorporate the updated

Corrective Action Plan into the QMP in a timely manner. Any changes to the QMP shall be approved by WSDOT.

2.28.1.5 QUALITY SYSTEM

2.28.1.5.1 General

The Design-Builder shall prepare a QMP that includes a Quality System which meets the Contract requirements.

The hierarchy of the documents describing the Quality System shall be:

- Quality Policy (for the entire system);
- Quality objectives;
- Resources (for each section of the QMP);
- Procedures; and
- Work instructions.

The QMP shall include a flow chart or other graphical representation showing the processes and their relationships to each other, the inspection and test controls, and a narrative for each process.

The QMP shall include written procedures that describe the purpose, overview, responsibilities, and steps of the Quality System process, and records resulting from the process.

2.28.1.5.2 Quality Planning

The QMP shall include an Inspection and Test Plan describing all of the proposed QA inspections and tests to be performed throughout the construction process. Activity specific Inspection and Test Plans shall be prepared during the preparatory phase for each definable feature of Work. The Inspection and Test Plans shall be updated when new subcontractor or supplier contracts are implemented. The Construction QA Manager shall review and approve all Inspection and Test Plans prior to submittal to WSDOT for review at least 14 Calendar Days prior to the start of the Work activity.

Inspection and Test Plans shall:

- Identify Hold Points when Work shall be accepted by QA personnel prior to proceeding to the next stage of the Work.
- Define the activity to be tested/inspected, the agency/laboratory to perform the test/inspection, the frequency of the test/inspection, the test/inspection procedure or reference standard, the specified requirement reference, and the record that documents the results.
- Develop the Test Plan for materials that will be statistically accepted, for materials that will be non-statistically accepted, and for materials that will be accepted by small quantities according to these Technical Requirements.

In addition, the QMP shall:

- Describe all of the material receiving, in-process, and final inspections and tests to be undertaken.

- Show what products or services are to be subcontracted.
- Describe process to verify compliance by suppliers and subcontractors with requirements.
- Identify who within the Construction QA organization has stop work authority.

2.28.1.5.3 Other Project Documents

The QMP shall describe how it is applied to all submittals required by the Contract. The following is a list of plans and documents that are required in addition to the design and construction documents specifically addressed in this Section. This is not a comprehensive list; other documents may be required to complete the Work.

- Safety Management Plan, including Accident Prevention Program, and Site Safety Plan;
- Public Information Plan;
- Environmental Compliance Plan;
- Environmental Commitment Close-Out Report;
- Environmental permit application materials;
- Utility Management Plan;
- Project progress schedule;
- Submittal schedules;
- Design schedule, acknowledging documents, and/or packages that will be submitted for review;
- Roadside Work Plan;
- Traffic Management Plan;
- Traffic Incident Management Plan;
- Document Control Work Plan; and
- Construction documentation including, but not limited to:
    - Inspector's Daily Reports;
    - Non-Conformance Reports;
    - QA and QC Inspection Checklists;
    - Materials Testing Reports; and
    - Traffic Control Supervisor's Daily Report.

2.28.1.6 PRE-APPROVED CORRECTIVE ACTION PLAN

The Design-Builder shall develop a Pre-Approved Corrective Action Plan that shall be incorporated into the QMP. The Pre-Approved Corrective Action Plan shall be approved by WSDOT.

The Pre-Approved Corrective Action Plan shall address Work that does not meet specifications, out of specification material, or pre-approved re-work or repair procedures.

The following is a sample list of items for which pre-approved re-testing and/or re-work or repair procedures are commonly needed. Anticipated failures may include, but are not limited to, the following:

Soil

- Use of improper or incorrect density standards;
- Lack of compaction;
- Subgrade too wet;
- Subgrade too soft;
- Materials out of specification; and
- Soil too wet.

Hot Mix Asphalt (HMA)

- Materials out of specification; and
- Low density.

Rebar

- Poor or incorrect locations;
- Insufficient clearance or lack of support; and
- Damaged epoxy coating on reinforcing steel, including damage due to field cutting or bending;
- Broken ties or displaced bars;
- Out-of specification post-tension tendon elongations; and
- Post tensioning ducts that fail air pressure testing.

Concrete

- Slump out of specification;
- Improper cold weather curing;
- Rock pockets, small and large;
- Repair of cracked concrete;
- Temperature out of specification;
- Air content out of specification (too low or too high);
- Inadequate counter reporting;
- Improper certification of compliance;
- Exceeding maximum allowed time between concrete lifts
- Over time limit; and
- Incorrect mix design.

The Design-Builder shall add re-testing and/or rework and repair procedures to the QMP as repetitive nonconformances are identified.

2.28.2 DESIGN-BUILDER QUALITY ASSURANCE (QA) AND QUALITY CONTROL (QC) STAFF

At a minimum, the Design-Builder's QA and QC staff shall include the following personnel:

2.28.2.1 PROJECT QUALITY MANAGER

The Design-Builder shall designate a Project Quality Manager who shall be responsible for developing and updating the QMP, and scheduling and facilitating the Executive Management Review. The Project Quality Manager shall report directly to the person or group with overall Project management responsibilities, such as the Project Manager, an offsite principle or project sponsor, or an executive oversight committee established for the Project.

Minimum Qualifications

The Project Quality Manager must have at least ten years of recent experience in the management of a quality management program for a major urban freeway projects.

2.28.2.2 DESIGN QUALITY ASSURANCE (QA) MANAGER

The Design QA Manager shall have overall responsibility for the design portion of the QMP. Through audits, the Design QA Manager shall be responsible for verifying and validating that the QA and QC procedures required by the QMP are administered and being followed. The Design QA Manager shall report to the person or group with overall Project management responsibilities.

In accordance with this Section and the QMP, the Design QA Manager shall certify that all Design Documents have been subjected to all required QC checking procedures; all documentation has been completed and filed in an acceptable manner; and all design packages have been subjected to a QA audit prior to submittal to WSDOT or prior to release.

Minimum Qualifications

The Design QA Manager must be a Licensed Professional Engineer in the State of Washington, and have at least ten years of recent experience in the design or quality management of major urban freeway projects.

2.28.2.3 CONSTRUCTION QUALITY ASSURANCE (QA) MANAGER

The Construction QA Manager shall have overall responsibility for implementation of the construction portion of the QMP. The Construction QA Manager shall be responsible for implementing, monitoring, and adjusting the processes to assure acceptable quality. The Construction QA Manager shall report directly to the person or group with overall Project management responsibilities. It is the responsibility of the Construction QA Manager to implement quality planning; oversee the QA testing and inspection; and coordinate with WSDOT's verification testing, inspection, and Independent Assurance (IA) requirements. All duties listed for the Project Engineer in Section 9-1.4 of the WSDOT *Construction Manual* shall be the responsibility of the Construction QA Manager or designee. The Construction QA Manager shall not be assigned any other duties or responsibilities on the Project. The Construction QA Manager shall have the authority to stop any Work that does not meet the standards, specifications, or criteria established for the Project.

The Construction QA Manager or a designated Assistant Construction QA Manager shall be available so that they can be on the Project site within two hours of being notified of a problem regarding the QA of any Work being performed by the Design-Builder, or any of its subcontractors or agents.

Minimum Qualifications

The Construction QA Manager must have at least six years of recent experience overseeing the inspection and materials testing on major highway construction projects. Of the six years minimum, the Construction QA Manager shall have a minimum of three years experience in construction materials acceptance administration and a minimum of three years experience in construction inspection administration. The experience of an assistant to the Construction QA Manager may be used to meet the experience requirement of up to three years of either construction inspection or construction materials administration.

2.28.2.4 MATERIALS APPROVAL ENGINEER

The Materials Approval Engineer shall have authority for the approval of all materials and shall review and approve all materials submitted through RAM, QPL, and proprietary items for the project in accordance with Section 9-1.3 of the WSDOT *Construction Manual* for the project.

Minimum Qualifications

The Materials Approval Engineer must have 5 years of design experience in major highway design or equivalent, and must be a registered Professional Engineer in the State of Washington, and shall be an employee of the firm that leads the design for the Design-Builder.

2.28.2.5 ENVIRONMENTAL COMPLIANCE MANAGER (ECM)

Refer to Section 2.8.

2.28.2.6 QUALITY TESTING SUPERVISOR (QTS)

The Quality Testing Supervisor (QTS) may be an employee of the Design-Builder's QA testing laboratory or of the testing laboratory hired by the Design-Builder to perform the QA testing. The QTS or their representative shall be at the site where the testing is being performed. The QTS shall schedule, review, and verify for compliance all test reports performed by the QA testing laboratory. The QTS shall report to the Construction QA Manager.

Minimum Qualifications

The QTS shall meet one of the following qualifications:

- Professional Engineer license; an Engineer-In-Training; or a Bachelor of Science Degree in Civil Engineering, Civil Engineering Technology, Construction, or related experience; and at least four years of highway materials testing experience; or
- Certification by the National Institute for Certification in Engineering Technologies in the Construction Materials Testing field as an Engineering Technician (Level III) or higher, with at least four years of experience in the appropriate subfield in which sampling and testing is being performed; or
- Eight years of highway materials testing and construction experience.

2.28.2.7 ELECTRICAL/INTELLIGENT TRANSPORTATION SYSTEMS (ITS) INSPECTOR

The Design-Builder's Electrical and ITS Inspector shall have the following minimum qualifications:

- Administrator and Master Electrician certificate (AD-01) issued by the Washington State Department of Labor and Industries, and four years of experience supervising the installation of highway electrical and/or ITS systems; or
- Eight years of experience in engineering highway electrical systems including illumination, traffic signals, and/or ITS systems, and four years of full-time experience as an electrical inspector on highway construction projects.

The Design-Builder's Electrical and ITS Inspector shall notify WSDOT when electrical and ITS components are ready to be inspected for code compliance, functionality, and acceptance as required by WAC 296-46B-010.

2.28.2.8 QA Testing Technicians and QA Inspection Technicians

The QA Testing Technicians and QA Inspection Technicians shall perform the required QA inspections and tests. The QA Testing Technicians and QA Inspection Technicians shall have the following qualifications:

QA Testing Technicians - The Design-Builder shall have acceptance testing performed by qualified QA Testing Technicians, who shall be qualified in accordance with AASHTO R-18, using the procedural checklist in the WSDOT *Materials Manual*. The qualifications of the laboratory technicians employed by an AASHTO accredited laboratory will be accepted for performing AASHTO test methods only when confirmed by the laboratory's training and evaluation records. The competency of each QA Testing Technician shall be re-evaluated annually in all tests they perform, in accordance with the laboratory's Laboratory Quality Systems Manual approved by WSDOT.

A testing technician currently qualified in concrete testing by the American Concrete Institute (Level I) will be considered qualified to perform concrete tests.

The QA Testing Technicians performing the field and laboratory QA sampling and testing shall be employed by the Design-Builder or an agent's laboratory, and supervised by the QTS or the Construction QA Manager. The QA Testing Technicians shall not be affiliated with or employed by any materials supplier or the QC organization. The QA Testing Technicians shall not perform QC testing.

QA Inspection Technicians -The QA Inspection Technicians shall inspect, verify materials, and document all construction activities for compliance to the Contract. The QA Inspection Technicians shall report to the Construction QA Manager. The QA Inspection Technicians shall not be affiliated with or employed by any materials suppliers or subsidiaries. The QA Inspection Technicians shall not perform QC inspection. The QA Inspection Technicians shall have a minimum of four years of qualifying experience in roadway construction inspection.

2.28.2.8.1 Quality Assurance (QA) Staff Training

QA staff shall be trained in the applicable procedures for inspection of Work, geotechnical and environmental monitoring, and material sampling and testing. The professional training and experience of the QA staff (including biologists, hydrologists, and geotechnical engineers) shall be commensurate with the scope, complexity, and nature of the activity to be inspected, monitored, or tested.

The QA Testing Technicians and construction inspectors may attend the instructional courses WSDOT provides its personnel on a space-available basis, at no cost to the Design-Builder. These classes may be offered only once a year. The following classes will be available:

Course	Hours
Asphalt Paving Street Inspection	4
Drainage Inspection	4
Bridge Substructure Inspection	4
Bridge Superstructure Inspection	4
Drilled Shafts	4
MSE Walls	4
Project Documentation	4
Excavation and Embankment Inspection	4
Nuclear Gauge, Embankment/Surfacing/Pavement Applications	4
PCC Pavement Production, Placement, and Field Testing Procedures	4
Electrical – Illumination and Signals	4

2.28.2.8.2 Quality Assurance (QA) Staffing Levels

QA staffing levels shall be identified in the QMP and updated as necessary during the course of the Project to reflect the actual construction schedule. The size of the QA staff shall reflect the complexity, needs, shifts, and composition of the construction activities consistent with the construction schedule, relative locations of the Work to be covered, geotechnical considerations, environmentally sensitive areas, and specific nature of the Work. WSDOT will review and comment on proposed staffing levels to ensure the Project requirements are adequately met. Construction shall not take place when QA staffing levels are inadequate to provide the inspection and testing required by the Contract. At a minimum, there shall be at least one QA Inspector on the Project site at all times when permanent Work is being incorporated into the Project. Design Builder shall identify and provide adequate QA staff to fulfill all inspection and testing requirements, particularly during concurrent work activities.

2.28.2.8.3 Restrictions on Quality Assurance (QA) Staff

The restrictions for QA staff are included in the Restrictions on QA Staff (Appendix V1).

2.28.2.8.4 Rights to Remove Quality Assurance (QA) Staff

By written notice, WSDOT reserves the right to permanently remove any of the following personnel from the Project:

- A QA Testing Technician who does not perform the QA tests in accordance with the test methods.
- A QA Testing Technician who does not report test results accurately.
- A QA Inspecting Technician or geotechnical or environmental monitor who, in the opinion of WSDOT, does not exercise good judgment in the performance of their duty.
- A QA Testing Technician who is not certified in accordance with the Contract requirements.

2.28.2.9 QUALITY CONTROL (QC) TESTERS AND PERSONNEL

The Design-Builder shall perform, control, and ensure that operational techniques and activities provide acceptable quality, and are in compliance with the Contract. The QC personnel may be a separate organization within the Design Builder's organization; the Design-Builder's front line supervisors; the supplier, producer, or manufacturer; but in no case shall be associated with the QA organization. The QC personnel shall be trained and provided the necessary tools, testing procedures, and inspection checklists to ensure the Work product meets the Contract requirements. The QC Testers and Inspectors shall report to the Construction Manager or designee. The designee shall not be the Construction QA Manager.

2.28.3 DESIGN QUALITY ASSURANCE (QA) AND QUALITY CONTROL (QC) REQUIREMENTS OF THE QUALITY MANAGEMENT PLAN (QMP)

2.28.3.1 GENERAL

The QMP shall specify all aspects of the QA and QC for design. The QA and QC procedures for each type of Design Document and Released for Construction (RFC) Document shall be organized by engineering discipline. The Design-Builder shall include measures and objective evidence to ensure that appropriate quality standards are specified and included in the Design Documents and RFC Documents, and to control deviations from the standards. The Design-Builder shall not deviate from the standards unless the deviation has been approved by WSDOT.

The QMP shall include the following:

- QA and QC procedures for preparing, submitting, checking, back checking, correcting and verifying all plans, calculations, drawings, and other items to ensure that they are independently checked and back-checked by experienced architects and engineers, in accordance with generally accepted architectural and engineering practices. The Design Builder originator, checker, back checker, corrector and verifier shall be clearly identified on the face of all submittals.
- Specific procedures for validating computer programs used on the Project.
- QA and QC procedures for verifying that all submittals meet the requirements of the Contract.
- Assurance that all materials, equipment, and elements of Work have been provided for and designed to perform satisfactorily for the purpose intended.

- A defined process for stamping, signing, and dating, plans, reports, and other documents by the responsible Professional Engineer licensed under Title 18 RCW in the State of Washington, where required by the Contract.
- The level, frequency, and methods of review for the adequacy of the design of the Project.
- The method by which drawing changes are incorporated into a revision change.
- The procedures for coordinating Work performed by different personnel in the same area, in adjacent areas, or on related tasks to ensure that conflicts, omissions, or misalignments do not occur between the drawings or between the drawings and the specifications; and to coordinate the review, approval, release, distribution, and revision of documents involving such personnel.
- Identification of those elements of the Contract, Design Documents, or RFC Documents requiring special QA and/or QC attention or emphasis, including applicable standards of quality or practice to be met, and level of completeness and/or extent of detailing required.
- Identification by discipline of the name, qualifications, duties, responsibilities, and authorities for all persons responsible for QA and QC.
- Description of the name, qualifications, duties, responsibilities, and authorities of external technical experts necessary to ensure the quality of the design of the Project. Information regarding the anticipated timing, use, anticipated availability, and any coordination required with respect to any experts.
- Procedures for assuring that the documents fully provide for constructability and compatibility of materials.
- Identification of the inspection guidelines for each item of Work to determine what significant characteristics of each item needs to be monitored during the construction phase to ensure that the completed Project will function in accordance with the design intent over its expected lifetime. The inspection guidelines shall include the appropriate criteria, tests, and inspection requirements described in this Section.
- Descriptions of the required design QA and QC functions, including scheduled activities for design QA and QC identifying the Design Documents and RFC Documents to be delivered to WSDOT for its review at each stage of the design or construction phase of the Project. The QMP shall specify written certifications by the Design QA Manager for each submittal document showing that all QMP requirements have been completed satisfactorily.
- Development and maintenance of an accessible Document Control System (DCS) by the Design-Builder to provide all relevant design inputs, including a list of references to design inputs that should be used by design personnel in the design.
- Verification by the Design-Builder that the design inputs are communicated to, and accessible by, the relevant designers responsible for incorporating design inputs into the design.
- Specification of QA procedures to verify the construction surveying, property surveying, establishment of Right of Way markers, as-built plans, re-established city, county and subdivision monuments, and Record of Survey Map.

- A defined process for tracking the design drawings through the Final Design Documents including the RFC Documents.

The QMP shall describe procedures to require that a written certification is signed by the Design QA Manager verifying that all quality procedures have been completed in accordance with the QMP prior to being sent to WSDOT for design review.

2.28.3.2 WSDOT DESIGN REVIEW

The QMP shall define the timing, content, and format of all design reviews. The Design-Builder shall provide a 14 Calendar Day review period for WSDOT Review and Comment on all design submittals. WSDOT reserves the right to extend the review time by up to seven Calendar Days for submittals that are received between November 15th and January 1st, and for submittals with overlapping review periods which are being reviewed by the same discipline team.

The Design-Builder shall address all comments made by WSDOT in each submittal, and shall include comment resolutions in subsequent submittals.

The Design-Builder shall schedule and maintain minutes of all resolution meetings with the appropriate WSDOT staff to document and resolve the Design-Builder's responses to the comments. It is intended that all comments will be resolved at these meetings. If agreement is not reached on any specific comment, it shall be resolved as described in the QMP.

2.28.3.3 DESIGN TASK FORCES AND OVER-THE-SHOULDER REVIEWS

The QMP shall also include processes and procedures for how regular (weekly) scheduled coordination meetings between WSDOT and the Design-Builder will be used to support quality goals. These meetings, combined with over-the-shoulder reviews, shall be an integral part of the process to discuss and resolve design issues outside of the formal review process.

The QMP shall define how over-the-shoulder reviews with WSDOT during the course of the development of each design package will be included. The over-the-shoulder reviews are not Hold Points that restrict the progress of design. They are reviews of the design as it progresses, and opportunities for WSDOT to provide comments and feedback on the design.

2.28.3.4 RELEASED FOR CONSTRUCTION (RFC) DOCUMENT REVIEW

At a minimum, the Design-Builder shall provide a preliminary and a final submittal of all plans and Technical Specifications and resolve all comments prior to being Released for Construction. Special Provisions taken from Appendix B2 shall not be included by reference, but shall have their full text included in the final design submittal and Released for Construction documents. Special Provisions from Appendix B2 that are not part of the Work shall not be included in the Released for Construction documents. Any deviation from the Mandatory Standards and Technical Requirements shall be approved by WSDOT prior to a submittal being Released for Construction.

2.28.3.4.1 Technical Specifications

The WSDOT Standard Specifications are supplemented and modified by the Amendments to the Standard Specifications, the Special Provisions, and these Technical Requirements. The Design-Builder shall develop any additional Technical Specifications required to

address Work not covered by the WSDOT Standard Specifications, Amendments to the Standard Specifications, Special Provisions, or these Technical Requirements.

2.28.3.4.2 Preliminary Design Submittal

The intent of the Preliminary Design Submittal is to provide a formal opportunity for WSDOT, the Design-Builder, various design team disciplines, and other approved Project stakeholders to review the construction documents in order to ensure that the design is progressing appropriately and proceeding in the right direction; the plans reflect Design-Builder requirements for construction; design features are coordinated; and there are no fatal flaws within a given discipline or between disciplines. The contents of the Preliminary Design Submittal for each discipline shall be as specified in these Technical Requirements and as mutually agreed upon by members of the applicable task force, or by agreement between WSDOT and the Design-Builder if no specific task force applies.

2.28.3.4.3 Final Design Submittal

The Final Design Submittal shall be prepared when the design for a given element or area is 100 percent complete. The Final Design Submittal shall include plan sheets, specifications, technical memos, reports, calculations, and other pertinent data, as applicable. As a result of the on-going discussion and resolution of design and construction issues through the regularly-scheduled task force meetings and over-the-shoulder reviews, it is anticipated that there will be very few revisions or changes at this stage.

The Final Design Submittal shall include all specifications, including but not limited to, all Amendments to the WSDOT Standard Specifications, Special Provisions, Technical Requirements, and Technical Specifications, necessary to construct the Work represented in the submittal. Following resolution of all comments, the Final Design Submittal may proceed through the written certification process described below in preparation for being Released for Construction.

2.28.3.4.4 Released for Construction (RFC) Documents

The QMP shall describe how the Design-Builder will ensure that the RFC Documents reflect all QA, QC, and design reviews required by the QMP and the Contract. The QMP shall also describe the written certification process to be used to verify to WSDOT that all QA procedures have been completed to ensure that all review comments have been incorporated as agreed to during the comment resolution process among WSDOT, any affected municipalities, and the Design-Builder, and that the documents are ready to be Released for Construction.

Each sheet of the plan set and the cover of each set of Technical Specifications in the RFC Documents shall carry the Professional Engineer’s stamp and signature, and shall be stamped "Released For Construction" by the Design QA Manager. The cover of the WSDOT Amendments to the WSDOT Standard Specifications does not need to carry a Professional Engineer’s stamp.

Once plans and Technical Specifications have been Released for Construction, the Design-Builder shall provide WSDOT with six hard copies and electronic files (in both MicroStation and PDF formats) on CDROM of all RFC Documents. The electronic drawing files shall include copies of all sheet and reference files used in the RFC Documents.

Prior to submittal, electronic files for all RFC Documents, except the MOT Plans, shall be checked by the Design-Builder to ensure that they conform to the WSDOT Plans Preparation Manual file naming and drawing symbology (e.g., level contents, and line and text symbology). The drawing symbology and file naming for each electronic drawing file shall meet or exceed a minimum conformance level of 90 percent, and the average conformance level for all drawing files shall be 95 percent or greater. MOT Plans are not required to meet the conformance level criteria. The Design-Builder shall provide WSDOT with a Microsoft Excel (version 2007) spreadsheet for each RFC Submittal containing the file name and the corresponding conformance level for every file that is part of the submittal. WSDOT will provide a template that shall be used for this task. Certain files provided to the Design-Builder by WSDOT, such as base mapping or vicinity maps, may be excluded from the conformance level requirement. The Design-Builder shall obtain written confirmation from WSDOT as to which files are exempt from compliance with the WSDOT Plans Preparation Manual.

Construction shall not proceed on any element of Work until the relevant submittal is stamped "Released for Construction" by the Design QA Manager, and all required government and private approvals have been obtained by the Design-Builder.

2.28.3.5 QUALITY ASSURANCE (QA) AND QUALITY CONTROL (QC) OF DESIGN CHANGES

The QMP shall describe the process for implementing design changes, including field changes, shown on the Design Documents and RFC Documents. The design changes shall be subject to QA and QC measures and procedures, commensurate with those applied to the original design or that portion of the Project under consideration for change.

The QMP shall also address and clearly define the number of changes to a drawing that will result in a drawing revision, and the time frame for the release of the updated drawing. Each drawing revision shall be assigned a number. The revision number shall be assigned sequentially, with each change in a document or plan sheet identified by the revision number. The assigned number shall be located both at the location of the change on the sheet and in the revision block of the document, together with an explanation of the change.

2.28.3.6 SHOP AND FALSEWORK DRAWINGS

The QMP shall describe the personnel assigned to shop drawing review and approval, including falsework drawings, forms, temporary structures, construction processes, and other critical structure shop drawings; the procedures for documenting reviews and obtaining approvals; the process for implementing corrective actions; the procedures for auditing and checking compliance to shop and falsework drawings; and the distribution to WSDOT for review and comment.

The Design-Builder shall submit all shop drawings to WSDOT, prior to implementation. The submittal shall include one hard copy and one electronic copy of shop drawings. The Design-Builder shall submit shop drawings for all steel elements, pre-cast concrete elements and post-tensioning reinforcement to WSDOT prior to implementation. The submittal shall include one hard copy and one electronic copy. If the WSDOT Engineer offers any comments, they will be submitted to the Design-Builder in accordance with this section.

Prior to submittal to WSDOT, the Design-Builder shall mark the shop drawings in the lower right corner with one of the two following indicators:

- APP'D (Approved, no corrections required); and
- AAN (Approved-As-Noted, minor corrections only. The Design-Builder shall not place written questions on Approved-As-Noted sheets, but shall clearly note the corrections).

2.28.3.7 AS-BUILT DOCUMENTATION

The QMP shall describe how the Design-Builder will ensure that the As-Built Documents meet the requirements of the Contract and accurately represent the as-constructed conditions in the field; and how the As-Built Documents are updated continuously and made available for periodic reviews conducted by WSDOT or their designees.

2.28.3.8 DOCUMENT AND DATA CONTROL

The QMP shall describe the procedures to be used in managing and documenting all Project files. The Design-Builder shall establish and maintain its own DCS to store and record hard copies and electronic records including, but not limited to, all correspondence, meeting minutes, design inputs, drawings, progress reports, technical reports, specifications, Contract documents, submittals, calculations, test results, inspection reports, NCRs, administrative documents, and other documents generated under the Contract. The Design-Builder shall ensure that its DCS is compatible with the DCS used by WSDOT.

The QMP shall describe the methods by which all documents issued and received by the Design-Builder will contain a unique serialization, date issued or received, Project name, Contract name, Contract number, specific subject or content of the correspondence, name of the sender or recipient, and reference information to which the correspondence relates to, such as prior correspondence. The Design-Builder shall maintain separate incoming and outgoing correspondence logs.

All documents shall be maintained by the Design-Builder for the duration of the Contract, and shall be organized, indexed, and delivered to WSDOT upon Final Acceptance unless required to be delivered earlier pursuant to the Contract; or within seven Calendar Days of receipt of request from WSDOT, even if the documents are incomplete. The documents shall include all test documentation including those prepared by WSDOT.

2.28.3.8.1 Document and Data Approval and Issuance

The QMP shall include a requirement that all deliverables include a signed and dated certification by the originator of the deliverable, and that the deliverable is complete and meets the Contract requirements.

2.28.3.8.2 Document and Data Changes

The QMP shall include a requirement that any changes to documents provided to WSDOT are in a format that shows the changes clearly, and in a method that is easily trackable (e.g., documents use the redline/strikeout method).

2.28.3.9 DESIGN VALIDATION

The QMP shall describe all verification, validation, monitoring, inspection, and activities to be carried out for the purposes of demonstrating that the Work is acceptable.

2.28.4 MATERIALS QUALITY ASSURANCE (QA) AND QUALITY CONTROL (QC) PLAN REQUIREMENTS

2.28.4.1 GENERAL

The QMP shall specify all aspects of the Materials QA and QC Plan. At a minimum, the Materials QA and QC Plan shall include the items described in this Section to verify that all materials conform to the Contract requirements. The Materials QA and QC shall be separate functions performed by separate personnel who have no affiliation to each other or to the same organization.

2.28.4.2 DESIGN-BUILDER RESPONSIBILITIES

The Design-Builder shall be responsible for the quality of construction and materials incorporated into the Project. The Design-Builder's QC measures are intended to ensure that operational techniques and activities provide material of acceptable quality.

The Materials QA organization shall be responsible for the acceptance of all materials and workmanship incorporated into the Project. The Materials QA organization shall also perform sampling and testing, determine acceptance or rejection of the materials, and implement a tracking system to monitor nonconforming materials and disposition of nonconforming materials, according to the Contract.

2.28.4.3 MATERIALS TESTING QUALITY PROGRAM

The Design-Builder shall monitor and measure the characteristics of all Work activities to verify that all Project requirements have been met. This monitoring and measurement shall be carried out at appropriate stages of construction in accordance with the planned Work and minimum frequencies for sampling and testing as described in Table 6, Section 2.25 of the Technical Requirements.

The Design-Builder's QA test data shall be used for acceptance, provided it can be statistically verified by WSDOT's QV test data except as noted in Section 2.25. In the event of discrepancies between WSDOT's and the Design-Builder's test data, the Quality Assurance Team will attempt to resolve them prior to work. If a resolution cannot be reached, then WSDOT's QV test results will be used for acceptance.

The five levels of quality management provided by the Design-Builder and WSDOT where testing is being used for acceptance are:

Quality Control (QC): The Design-Builder shall be responsible for QC, which is defined as activities performed by the Design-Builder, the producer, or the manufacturer to ensure that a product is of uniform quality meeting the Contract requirements. Components of QC may include inspecting and obtaining material certifications, materials handling, construction procedures, calibration and maintenance of equipment, production process controls, and any sampling, testing, or re-testing conducted for these purposes.

Quality Assurance (QA): The Construction QA Manager shall be responsible for the materials sampling, testing, and processes for QA. Testing for QA includes all planned (e.g., audits and assessments) and systematic actions necessary to ensure that all materials incorporated into the Work meet the Contract requirements for the material being used, and will perform satisfactorily for the purposes intended. All materials sampling and testing for QA will be performed by a statistically valid, random sampling method using testing methods and minimum frequencies defined in Section 2.25 of the Technical Requirements, the WSDOT *Construction Manual*, the WSDOT *Materials Manual*, and the Contract.

Quality Verification (QV): WSDOT or its agent will perform an independent materials QV to validate the Design-Builder's sampling and testing QA program. All verification sampling and testing will be performed by a statistically valid, random sampling method using testing methods defined in the WSDOT *Construction Manual*, the WSDOT *Materials Manual*, and the Contract.

Independent Assurance (IA): The IA is an independent verification performed by WSDOT which includes an observation of sampling and testing procedures, a review of the qualifications of the tester, and a verification of the testing equipment used to perform acceptance testing activities. The IA will validate both the Design-Builder's QA processes and WSDOT's QV processes. The IA may include auditing of acceptance testing records, observing the tests being performed by the Design-Builder's technicians, or taking split samples with the Design-Builder on a random basis for verifying the Design-Builder's testing equipment. WSDOT will enter findings of all IA observations into the Construction Audit Tracking Systems (CATS). Any deficiency will result in a NCI. The Design-Builder shall take corrective action immediately for any noted deficiencies.

Quality Assessment: WSDOT will perform non-scheduled Quality Assessments of the Design-Builder's Work, including sampling, testing, and documentation reviews.

2.28.4.4 MATERIALS TESTING LABORATORY

All QA testing that will be used for acceptance of materials shall be performed by a laboratory approved by WSDOT. The laboratory shall report directly to the Construction QA Manager. The Design-Builder or a subcontractor shall employ the laboratory personnel. The materials testing laboratory that is used for QA testing shall not perform QC testing, and shall not be owned, operated, equipped, or staffed by material suppliers. The laboratory shall meet the requirements of AASHTO R-18 for qualified testers and calibrated/verified equipment, and be able to accomplish the testing according to the test procedure they are performing.

The Design-Builder's laboratory shall develop and maintain a Laboratory Quality Systems Manual. The Manual shall include the following:

- Staff qualifications, position descriptions, and the qualification process;
- Listing of test procedures approved for performance throughout the Project;
- Equipment including verification, calibration, recall procedures, and inventory;
- Test reports, worksheet, summary logs, and forms;
- Sample management procedures;
- Diagnostic and Corrective Action Reports; and
- Quality Systems review.

WSDOT will perform an on-site evaluation of the facility, in accordance with WSDOT QC 3, Quality Systems Laboratory Review in the WSDOT *Materials Manual*, to ensure all Work is being performed according to the Contract. The evaluation will include audit and inspection functions; review of training, equipment calibration, and verification of records; and observance of testers as they perform the test procedures. For laboratories located outside of Washington State, or laboratories performing only minor testing, WSDOT may use the AASHTO Accreditation program, or another state's Department of Transportation to inspect the laboratory.

The Design-Builder shall request the WSDOT inspection a minimum of 14 Calendar Days prior to the start of construction. Together with the request, the Design-Builder shall submit a copy of the Laboratory Quality Systems Manual, and a list of the testing procedures that the laboratory shall perform throughout the Project. The laboratory shall be properly equipped, staffed, and fully operational at the time of WSDOT's inspection and for the duration of its use on the Project.

WSDOT will advise the Design-Builder in writing of any deficiencies noted during the inspection, and the Design-Builder shall take immediate action to correct them. Work requiring laboratory acceptance will not proceed until the laboratory and its staff has been inspected and has received written approval from the WSDOT Engineer.

The test equipment for the following test procedure shall be as shown below and in the Field Operation Procedure in accordance with the WSDOT *Materials Manual* so that proper correlation between the QA and QV test results may be established.

- WSDOT Field Operation Procedure for AASHTO T-310 In-place Densities by Nuclear Method (Troxler 3430, or 3440 Series Moisture/Density Gauge).

2.28.4.5 MATERIALS TESTING FREQUENCIES AND RANDOM SAMPLING

The Design-Builder shall perform field and laboratory sampling and testing as specified in the WSDOT Standard Specifications and the WSDOT *Materials Manual* to control these processes. Sampling and testing shall be performed by qualified testing personnel described in this Section. Representative samples shall be randomly obtained by the Design-Builder at specified frequencies as shown in Table 6, Section 2.25 of the Technical Requirements. The Design-Builder shall furnish copies of all test results to WSDOT within 24 hours of completion of the test or the next business day. For concrete cylinders, the test results shall be furnished within 24 hours after cylinder break.

WSDOT or its agent will perform independent materials QV sampling and testing to validate the Design-Builder's sampling and testing QA program. Typically, the testing rate will be one verification test to every five of the Design-Builder's acceptance tests. During production startup, the QV testing will be performed at the same frequency as the Design-Builder's QA program for the first five samples, to establish a statistical base for verification and acceptance. If at any time the QA and QV testing do not statistically validate, the QV testing may be increased until the F and t variances is considered to be under control. When QV testing reaches 25 samples, and the QA and QV testing can be statistically validated, the frequency of the QV tests may be reduced to one in 20. If at any time the QA and QV testing results have wide variances or cannot be validated, the QV testing frequency shall be increased to one in 5 until 25 samples are reached again with satisfactory statistical validation.

If the Design-Builder elects to take extra samples, the QV sampling frequency will continue to be based on the frequency described in Table 6, Section 2.25 of the Technical Requirements.

For HMA, WSDOT will conduct the acceptance testing for Asphalt Treated Base and HMA aggregate, mixture, in-place density, cyclic density, and longitudinal joint density at the frequency described in Table 6, Section 2.25 of the Technical Requirements.

Materials that require less than five tests for acceptance, or that have less than five sublots, will require WSDOT and the QA personnel to test at the same frequency. Refer to Chapter 9 of the WSDOT *Construction Manual* for testing requirements. For all materials that are not addressed by WSDOT standards, the material testing specifications, testing procedures,

and frequencies will be determined by the Quality Assurance Team with the Engineer of Record's concurrence.

Small quantities of materials can be accepted without sampling and testing when the quantity of materials proposed for use by the Design-Builder are less than the minimum sampling and testing frequencies. Structural concrete will not be considered as a small quantity. The Construction QA Manager shall follow the procedure for acceptance of small quantities described in Section 2.25.

2.28.4.6 TESTING PLAN

All acceptance and verification sampling and testing shall be randomly obtained, at the location and frequency stated in the Contract. The Design-Builder shall provide a Testing Plan for each material to WSDOT. The Testing Plan shall identify the frequency, location for testing, test procedures, attributes to test, material acceptance requirements, Sampling Plan developed using WSDOT Test Method T 716 Method of Random Sampling, or other random number generator, and the estimated Project quantity. The Testing Plan shall be submitted prior to the beginning of production or placement of the material. The QMP shall include a method for notifying the QA organization of the quantity of material produced, placed, or delivered to the Project, so that the testing effort can be current.

2.28.4.7 MATERIALS QUALITY ANALYSIS PROGRAM

The Design-Builder's QA sampling and testing results shall be used for acceptance, provided that they are validated by WSDOT's QV sampling and testing.

Both the Design-Builder's QA and WSDOT's QV test results shall be recorded in the Statistical Analysis of Materials, SAM software that will be provided by WSDOT. This software shall be used to statistically evaluate the QA test data against the QV test data to determine the acceptability of the QA test data. This evaluation will be performed by using the F and t Test analysis tool. This evaluation will be performed on all test results for the total quantity of material placed for a single material type such as gravel backfill for walls, CSBC or gravel borrow. There needs to be at least 3 QA and 3 QV test results to perform the F and t analysis.

The Construction QA Manager shall be responsible for performing this evaluation. Any test data that is found to be outside the normal F and t distribution shall be reviewed by the Quality Assurance Team, and a determination shall be made as to why the test data is outside the normal distribution.

The Quality Assurance Team shall identify the cause of discrepancies in the test results and generate a report defining the problems, the cause of the problems, and the solutions to prevent a recurrence. At a minimum, the review shall include the following actions:

- A check of test data, calculations, and results;
- An observation of the sampling and testing by the IA Inspector; and
- A check of test equipment by the IA Inspector.

If the Quality Assurance Team fails to identify the cause of discrepancies in the test results, then WSDOT's QV test results will be used for acceptance.

2.28.4.8 MATERIALS DOCUMENTATION REVIEW

The Design-Builder shall schedule regular documentation reviews to ensure that all materials documentation and certifications are complete prior to the material being installed on the Project.

WSDOT will perform periodic formal materials documentation reviews at approximately 25 percent and 75 percent completion of construction. Items to be reviewed will be randomly selected by WSDOT. These reviews are intended to ensure the Design-Builder is maintaining all necessary materials documentation and records. A final review will be performed at the completion of the Project to review all materials documentation.

In addition to the formal reviews, WSDOT on-site personnel will perform periodic materials documentation checks. Examples of these checks include materials approval, materials acceptance, and field verification that the approved material was placed.

2.28.5 CONSTRUCTION QUALITY ASSURANCE (QA) AND QUALITY CONTROL (QC) PLAN REQUIREMENTS

2.28.5.1 GENERAL

The QMP shall include a program for construction inspections, examinations, measurements, and tests of materials or elements for each Work operation, where appropriate, to verify quality. The requirement for these inspections is not limited to those required for quality testing purposes.

The QMP shall specify all aspects of QA and QC for construction. At a minimum, the QMP shall include the following items to verify that all construction activities conform to the Contract requirements:

- Project progress schedule;
- Submittal schedule;
- Design schedule, acknowledging documents, and/or packages that will be submitted for review;
- Inspection requirements;
- Instrumentation and survey monitoring for verification of the performance of the Project geotechnical features;
- Specific documentation for QA and QC activities, including control charts; and
- WSDOT requirements for corrective action and Corrective Action Plans when QC and/or acceptance QA criteria are not met.

2.28.5.2 WEEKLY SCHEDULING NOTICE TO WSDOT

The Design-Builder shall notify WSDOT in writing before the close of business on Thursday of each week of planned construction activities, including fabrication, and shall describe the anticipated construction activities for the following week (Sunday through Saturday) to allow WSDOT to schedule its resources. For activities occurring further then 60 miles from the Project, the Design-Builder shall give WSDOT notification at least 14 Calendar Days prior to the planned Work.

2.28.5.3 COORDINATION AND NOTIFICATION

The Construction QA Manager shall designate a primary point of contact for notifications of inspections at Hold Points. An alternate contact may be designated to function in the primary contact's absence. WSDOT will designate one person to handle responses to the Design-Builder for written reports or releases for Hold Points.

The time necessary to respond to the notification for inspection at Hold Points shall be included in the QMP, and mutually agreed to by the Design-Builder and WSDOT.

2.28.5.4 HOLD POINTS

Hold Points shall be identified in the construction process where critical characteristics are to be measured and maintained, and at points where it is impractical to determine the adequacy of either materials or workmanship once Work proceeds past this point. Pre-Activity Meetings shall be included in the Design-Builder's QMP as Hold Points. Hold Points shall be established where required QA inspection is mandatory. The Design-Builder shall provide WSDOT with three Calendar Days notice of each Hold Point so that WSDOT, at its discretion, can observe or visually examine a specific Work operation or test. Work shall not proceed until inspection is performed and a written release is granted by the Design-Builder's QA organization.

The Engineer of Record and the Designer of Record shall submit specific Hold Points with the RFC Documents.

At a minimum, the Construction QA Manager shall establish Hold Points at the stages listed below. The QMP shall identify any additional Hold Points necessary to certify compliance. The following Hold Points are not intended to limit or diminish the Design-Builder's responsibility to inspect all construction Work.

Utility Relocations

- Prior to any relocation of existing utilities.
- Prior to backfill of utility relocations and as required by Utility Owner's permit.

Temporary Erosion and Sediment Control

- After installation of high visibility fencing around environmentally sensitive areas, clearing limits, travel corridors, and stockpile sites.
- After completion of placement of Temporary Erosion and Sediment Control devices, and prior to any construction operations.
- Prior to any TESC Dewatering Operations.

Embankments (includes backfill behind walls and abutments)

- After completion of drainage embankment and utility installations, and before backfill.
- At intervals of embankment construction every 5 vertical feet.

Structures (bridge, abutment and retaining walls, noise walls, curtain walls, and end walls)

- At completion of bridge embankment or excavation, and before the start of structure foundation.
- Before saw-cutting of concrete occurs.
- Before pile driving or drilled shaft operations.

- After completion of the first piling driven at each structure support, and at the completion of each pile group, for each structure support.
- After completion of each drilled shaft along with Cross Hole Sonic Logging testing, and at the completion of each drilled shaft group, for each structure support.
- Before concrete placement of any subsurface element including concrete for cast in place piles and drilled shafts.
- Grout pad or anchor bolts prior to setting bearing or girder.
- After girder and diaphragm placement.
- Before concrete placement of bridge deck, approach slabs, diaphragms, moment slabs, traffic barrier, and parapet walls (with formwork, inserts, and reinforcement in place).
- After completion of excavation and prior to box culvert construction.
- Before concrete placement for cast-in-place box culverts with formwork, inserts, and reinforcement in place.
- Prior to installation of post tensioning strands or bars.
- Prior to jacking operations for post tensioning with a hydraulic jack on the job site.
- After completion of bridge deck grinding and deck repair.

Retaining Wall

- After completion of soil foundation and before the placement of the leveling pad of a Structural Earth wall or the foundation of any other type of retaining wall.
- Panel tolerances after completion of placement of panels for each Structural Earth wall prior to beginning of coping placement.
- Before concrete placement for cast-in-place retaining walls with formwork, inserts, and reinforcement in place.
- Before installation of any soldier pile, tieback or ground anchor wall and before/after verification tests.

Drainage

- After placement of pipe or box culvert and prior to backfilling.
- After installation and placement of bands or gaskets and prior to backfilling.
- After placement of catch basins and manholes and prior to backfilling.
- After completion of drainage systems behind walls and before backfill of walls.

Storm Water Facility (including bioswales)

- After layout of storm water facility.
- After excavation and prior to installation of drainage structures.
- Prior to operation of facility.

In-Water Work

- Before conducting any in-water construction activities and prior to operating any equipment below the ordinary high water mark. This includes Work in wetlands, streams, or mitigation sites.
- Culvert replacement, removal, and extensions.
- Prior to capturing and removing fish from the job site at any area that includes water bypass, in-water coffer dam, and any water area likely to be disturbed.
- Prior to installing riprap or other bank stabilization.

Subgrade, Surfacing, and Pavement

- After completion of subgrade and prior to surfacing placement.
- After completion of surfacing placement and prior to Asphalt Treated Base, HMA, and reinforcement for approach slab placement.

Signs

- After sign are staked in the field and prior to installation.

Local Jurisdiction

- Prior to any work within local jurisdiction ROW.

Electrical, ITS, and Illumination

- Prior to removal of existing ITS equipment, and after new or temporary ITS equipment is in place and operational, in accordance with Section 2.18.
- Prior to removal of existing CCTV cameras, and after new CCTV cameras is in place and operational.
- As required by WAC 296-46B-010, inspection of electrical and traffic management systems that will be performed by WSDOT.
- Prior to removal of existing illumination, and after new or temporary illumination are in place or operational, in accordance with Section 2.16.

Landscaping and Aesthetics

- After planting area preparation and prior to planting any plant material.

2.28.5.5 TRAFFIC ELECTRICAL INSPECTION

The Design-Builder shall inspect all electrical and ITS systems. In addition, WSDOT will inspect all electrical and ITS systems for code compliance, functionality, and acceptance as required by WAC 296-46B-040. Refer to Section 2.18.

2.28.5.6 PERFORMANCE VERIFICATION OF PROJECT GEOTECHNICAL ELEMENTS/FEATURES

The QMP shall include inspection and tests to verify the integrity of foundation structures and elements, and to verify that their performance is as anticipated from the design. For drilled shaft foundations, refer to the Special Provision shown in Appendix B5.

Walls shall be designed for anticipated total and differential settlements based on site geotechnical analyses. The QMP shall include inspection, wall face tolerance and

deflection measurements, and verification and proof tests for anchors and soil nails, to determine the integrity of foundation structures and wall elements, and to verify that the wall performance is as anticipated from the design.

The Design-Builder shall use geotechnical instrumentation in accordance with the Geotechnical Report described in Section 2.6, to verify the performance of areas with significant cuts or fills to determine deformation and stability, in particular where soft or otherwise unstable ground is present, or to control filling or cutting rates to maintain stability.

If soil densification or other foundation soil stabilization techniques are used, the Design-Builder's QMP shall address how the integrity and success of the soil densification technique will be investigated, monitored, and compared to the intended design.

2.28.5.7 WSDOT OVERSIGHT

WSDOT will periodically audit the field performance of the Design-Builder's QA staff, testing frequencies, and acceptance testing results. WSDOT will conduct oversight inspection audits to verify the adequacy of the Design-Builder's inspection activities and testing procedures.

If WSDOT observes nonconforming Work, an NCI report will be generated in the CATS program.

2.28.5.8 QUALITY ASSURANCE INSPECTION

The QMP shall contain inspection plans for each construction Work item included in the Project, whether performed by the Design-Builder, a subcontractor, or a vendor. Work items may be definable features or items of Work defined by the WSDOT Standard Specifications.

2.28.5.9 INSPECTION GUIDELINES

During the design of the Project, the Design-Builder shall review each item of Work to determine which significant characteristics of the items need to be monitored during the construction phase, to ensure that the completed Project will function in accordance with the design intent over its expected lifetime. The inspection guidelines shall include the appropriate criteria, tests, and inspection requirements identified in the WSDOT Standard Specifications, the WSDOT *Construction Manual*, and the WSDOT *Materials Manual*. The Inspection Plan shall address the following elements within each item of Work:

- Identification - Work items included in the Inspection Plan.
- Characteristics - What characteristics of the item will be inspected?
- Acceptance Criteria - Directly or by reference, the Design-Builder shall provide sufficient information for the inspector to use to determine if the item or activity is conforming or nonconforming. Maximum use of checklists shall be made for this purpose.

Inspections shall be performed during all phases of the Project from start to completion in order to ensure that the Work meets and is being performed in accordance with the Contract, RFC Documents, approved submittals, and any requirements of local jurisdictions.

The Design-Builder shall conduct an examination of the quality of workmanship to confirm that all Work is being performed in accordance with the RFC Documents, and any understandings reached at the Pre-Activity Meeting for that item of Work.

The Design-Builder shall conduct appropriate follow-up inspections, and sampling and testing of materials as each item of Work progresses, to assure consistency in workmanship, compliance with Contract requirements, Design Documents, and RFC Documents; and to assure satisfactory performance of the Work in service.

2.28.5.10 INSPECTION DOCUMENTATION

Each of the QA Inspectors shall summarize their daily inspections, tests, and material sampling activities in a daily report. The QA Inspectors shall use WSDOT's Inspectors Daily Report or a similar form to maintain a written record of inspection results, and shall provide copies of the daily reports to WSDOT the next business day. The Inspector's Daily Reports shall include the following key points of record:

- Work performed by the Design-Builder, subcontractor, or material supplier;
- Weather conditions;
- Inspections performed and their results, including any corrective actions taken;
- Materials used, the manufacturer or source, product identity, and quantities;
- Communications;
- Type, location, and results of all tests performed;
- Delays encountered;
- Type of traffic control setup in accordance with approved MOT plans, and any inspection and corrective action taken by the Design-Builder;
- Any safety-related problems and corrective action taken;
- All nonconforming Work and the corrective action taken;
- A copy of any checklist used for the inspection; and
- The Inspector's signature.

2.28.5.11 CONSTRUCTION INSPECTION FORMS AND CHECKLISTS

The Design-Builder's QMP shall include construction inspection forms and checklists for all anticipated construction operations and processes, which shall be used by the Design-Builder's QA inspection personnel and other personnel responsible for QC, such as foremen and individual workers.

Construction inspection forms shall be used to document all construction Work activities required in the QMP. For each critical construction Work activity, construction inspection forms shall include activity specific checklists approved by WSDOT, prior to the start of the Work activity. The checklist for each Work activity shall include the construction requirements described in the WSDOT Standard Specifications or the Contract for that Work activity. At a minimum, each checklist shall address the following:

Date

Time	
Location	> Pier or structure component > Drainage code # > Compaction Report (referenced to centerline station and subgrade elevation, etc.)
Type of Inspection	Completion of drainage code, final check, pre-pour check, etc.
Specification Requirement	List of applicable specifications for this item
Frequency	Indicated test or inspection frequency if any (see Section 2.25 of Technical Requirements for material test requirements)
Items Inspected	List elements or items inspected (e.g., rebar, chair placement or pipe size and type, grate box, pipe bedding, etc.)
Conformation to Specifications	Verify Work and materials meet the appropriate specifications
Deficiencies Noted	Note any deficiencies to specifications
Individual Notified	Individual notified for corrective action (WSDOT notified)
Corrective Action Noted	What corrective action is required to ensure products conform to specifications

2.28.5.12 NONCONFORMING WORK

The construction QA staff shall identify and document all elements of Work that have not, or are believed to have not, been constructed in accordance with the approved drawings and specifications, and the reason for nonconformance in a NCR. The NCR shall be submitted to WSDOT in writing within 24 hours of identification, and a copy sent to the Design Manager or designated Engineers.

2.28.5.13 NONCONFORMANCE REPORT (NCR) REMEDIATION

The Design Manager or a designated Engineer shall evaluate and determine whether a nonconformance exists; and the effect of the nonconformance on performance, safety, durability, long-term maintenance, and the life of the item of Work.

If required, documented remedial actions shall be stamped by a Professional Engineer licensed under Title 18 RCW in the State of Washington. The Design-Builder shall submit copies to WSDOT for review within 24 hours, and prior to performing the remedial action. The Construction QA Manager shall also sign the NCR stating that the remedial actions to be implemented have undergone the same level of inspection and testing as required by the original design.

If the nonconforming condition is repetitive and recurring, the Design-Builder shall develop and implement a Corrective Action Plan to eliminate the nonconforming conditions.

2.28.5.14 WORK WITH NONCONFORMANCE (NCR) REPORTS

When WSDOT does not agree with the remedial actions set forth in the NCR, WSDOT has the authority to call for removal of the nonconforming Work, or to stop Work within that area until the Corrective Action Plan has been approved by WSDOT.

2.28.5.15 NCR REPORTING

The Construction QA Manager shall maintain a log of all NCRs and Corrective Action Plans, and present them at the Quality Assurance Team Meetings. The Construction QA Manager shall number each NCR and Corrective Action Plan sequentially, and shall maintain an active summary log that provides a brief description and status of the nonconforming Work. The Construction QA Manager shall not grant acceptance for any portion of Work that has an outstanding NCR.

2.28.5.16 WSDOT NONCONFORMING ISSUES (NCIS) AND AUDIT FINDINGS

WSDOT shall retain the right to write its own NCIs and Audit Findings based on its observance of Work. NCIs and Audit Findings generated by WSDOT will be entered into the Construction Audit Tracking System, CATS program, and will require the same review and ultimate closure as NCRs generated by the Construction QA Manager.

2.28.5.17 RIGHT TO STOP WORK

If there is evidence that QMP procedures are not adequate, or if a problem is encountered during the oversight inspections or becomes evident during construction, WSDOT may, at its sole discretion, stop Work until appropriate quality procedures have been established and implemented.

In addition, WSDOT retains authority to stop Work without liability wholly or in part, if the Design-Builder fails to perform the following:

- Correct conditions that are unsafe for Project personnel or the general public; and
- Correct unacceptable construction practices.

2.28.6 SUBMITTALS

2.28.6.1 QUALITY MANAGEMENT PLAN (QMP)

The Design-Builder shall submit six hard copies and one electronic copy on CD ROM of the Draft QMP for evaluation. WSDOT will provide comments to the Design-Builder on the Draft QMP. Following resolution of the comments, and receipt of a written approval from WSDOT, the Design-Builder shall submit six hard copies and six electronic copies on CD ROM of the Final QMP.

Modifications to the Final QMP shall be approved in writing by WSDOT. When the modifications are approved, the Design-Builder shall correct the six hard copies of the Final QMP, and submit six electronic copies of the revised QMP on CD ROM. Each hard copy or CD ROM shall be clearly marked with the revision that has been included in that copy.

2.28.6.2 EXECUTIVE MANAGEMENT REVIEWS AND INTERNAL AUDITS

The Design-Builder shall provide a hard copy of its Executive Management Review to WSDOT within 20 Calendar Days of completion of the review.

The Design-Builder shall provide a hard copy of its internal audit of the QMP to WSDOT within 20 Calendar Days of completion of the audit.

2.28.6.3 REVIEW DOCUMENTS

Prior to every design review, the Design-Builder shall provide WSDOT with six hard copies and a complete set of electronic files on CD ROM of each design submittal to be reviewed, unless specified otherwise in these Technical Requirements.

2.28.6.4 QUALITY ASSURANCE (QA)/QUALITY CONTROL (QC) DOCUMENTATION

The Design-Builder shall include documentation with each submittal showing that the QA and QC processes have been completed. WSDOT will not accept submittals without documentation that the QA and QC processes have been completed. Acceptable documentation for design submittals will include a marked set and a corrected clean set of plans and specifications, including originator, checker, back-checker, corrector and verifier annotations as described in this section and per industry standards. The Design-Builder has the option of producing deliverables in accordance with the approved SR 520 Quality Control/Quality Assurance (QC/QA) process.

End of Section

2.29 MAINTENANCE DURING CONSTRUCTION

2.29.1 GENERAL

The Design-Builder shall conduct all Work necessary to meet the maintenance requirements described in this Section and in GCA-6511 (Appendix Z1), WSDOT and the City of Marysville Cooperative Agreement for Design and Construction of the SR 9 SR 92 Intersection Improvement Project (Appendix Z1), and the attached "CITY STREETS AS PART OF STATE HIGHWAY GUIDELINES OF RCW 47.24 AND FIGURES OF WAC 468-18-050 FOR THE CONSTRUCTION, OPERATIONS AND MAINTENANCE RESPONSIBILITIES OF WSDOT AND CITIES FOR SUCH STREETS".. Elements of Work shall include operation, maintenance, and repair of the existing facilities, and facilities constructed under the Contract beginning at Notice to Proceed, and ending on the day of Physical Completion, at which time the product warranty shall govern the Work. Refer to Section 2.30 for product warranty provisions.

The Design-Builder shall perform maintenance during construction in a safe, reasonable, and prudent manner, and shall employ good business practices and appropriate management techniques. The Design-Builder shall furnish all labor, materials, equipment and necessary services, such as highway safety controls, in connection with maintenance during construction.

For the purpose of maintenance during construction, the Project limits are defined as all Right of Way, including any easements that may be necessary to construct the Project.

Following Notice to Proceed, the Design-Builder shall provide maintenance, inspections, and repairs required on an "as needed" basis throughout the duration of the Contract in a manner acceptable to WSDOT. The Design builder shall document on a monthly basis, any inspections, repairs or maintenance activities. If WSDOT determines that the Design-Builder has failed to provide adequate routine maintenance; emergency and operational response; or inspections and repairs, WSDOT will issue a verbal notification of the failure to the Design-Builder.

The only maintenance WSDOT or the Cities will perform within the Project limits will be snowplowing, and the application of de-icing agents and/or abrasives on the roadways open to the use by the general public on SR 9 and SR 92. WSDOT or the City will perform these functions all hours and as needed

WSDOT will follow the verbal notification with a written notification to commence and continue correction of the failure. Failure by the Design-Builder to correct the stated deficiency within 24 hours of the verbal notification may result in WSDOT performing the Work without prejudice to other remedies WSDOT may have. In such case, WSDOT will deduct the cost of correcting such deficiencies from payments then or thereafter due to the Design-Builder. If payments then or thereafter due are not sufficient to cover the cost of correcting the deficiencies, the Design-Builder shall pay the difference to WSDOT upon demand.

2.29.2 MANDATORY STANDARDS

The following is a list of publications that shall be used for all design and construction. They are listed in hierarchical order, with the most important appearing at the top of the list. This is not a comprehensive list; other applicable publications may be required to complete the design and construction. If the Design-Builder becomes aware of any

ambiguities or conflicts relating in any way to the Mandatory Standards, the Design-Builder shall notify WSDOT immediately, so that WSDOT may resolve them.

- Special Provisions (Appendix B2).
- Amendments to the Standard Specifications (Appendix B1).
- Standard Specifications (M41-10) (Appendix D18).
- WSDOT *Maintenance Manual* (M51-01) (Appendix D9).
- WSDOT *Roadside Manual* (M25-30) (Appendix D16).
- WSDOT *Northwest Region, Area 3, Integrated Roadside Vegetation Management Plan*(Appendix D28)
- WSDOT *Right of Way Manual* (M26-01) (Appendix D14).

2.29.3 MAINTENANCE OF THE RIGHT OF WAY

2.29.3.1 GENERAL

The Design-Builder shall maintain the roadway vegetation outside the limits of vegetation disturbed by the Design-Builder's operations and outside the sensitive area boundaries. The Work includes nuisance vegetation control, noxious weed control, tree and brush control, and turf and grass care. Refer to Section 2.15 for Roadside Restoration requirements.

2.29.3.2 NUISANCE VEGETATION CONTROL

The Design-Builder shall remove or cut to within 6 inches of ground line scotchbroom and blackberry bushes that are within 30 feet from the edge of the paved shoulder. Scotchbroom shall be cut prior to the blooming of any flower on the plant.

2.29.3.3 NOXIOUS WEED CONTROL

Design-Builder shall assume the role of property owner as it pertains to RCW 17.10 within the project limits and for the duration of the project. If the Design-Builder fails to comply with RCW 17.10 or respond to the Local County Weed Board's notice to comply, the Design-Builder shall pay all fines assessed by the Local County Weed Board, outlined in RCW 17.10 and WAC 16-750-020.

Any delay to the Design-Builder from the control of noxious weeds by the Local Weed board performing in an enforcement action as outlined in RCW 17.10 shall not be reason for an extension of time or additional compensation, including claims of differing site conditions.

2.29.3.4 TREE AND BRUSH CONTROL

The Design-Builder shall remove or trim any trees or brush that obscure any roadway signs or cause a reduction in sight distance. The -Builder shall remove any trees that are identified as hazards or dangers within the Project limits, roadway, or structures adjacent to or within the Right of Way. WSDOT will identify and notify the Design-Builder of any trees and brush that fall within this criteria. The Design-Builder shall remove any fallen and/or standing danger/hazard trees within 24 hours of verbal and/or written notification from WSDOT. The Design-Builder shall remove any downed trees that have fallen and

are within 30 feet of the edge of paved shoulder of an active travel lane, or that may be a safety concern for public travel.

2.29.3.5 TURF AND GRASS CARE

The Design-Builder shall mow existing turf or grasses from the edge of pavement to a point 16 feet from the edge. The grass or turf shall be mowed, at least once around mid July. The Design-Builder shall not scalp the ground within sensitive areas. Mowing will not be required on slopes steeper than 2:1.

2.29.3.6 HEALTH HAZARDS

The Project area is occupied by birds, bats, and rodents, and will contain biological and associated physical hazards.

Health and Safety Requirements

The Design-Builder shall communicate with the WSDOT Engineer to ensure a coordinated effort for providing and maintaining a safe Project area for WSDOT's and the Design-Builder’s personnel.

Within the project limits Design-Builder will comply with corrective action requirements imposed by the local Health Department. Failure to correct violations assessed by the local Health Department will be the Design-Builder’s sole responsibility to pay fines and or enforcement actions assessed. Any delay to the Design-Builder from the Health Department performing an enforcement action shall not be reason for an extension of time or additional compensation, including claims of differing site conditions.

Construction Requirements

The Design-Builder shall be responsible for the sanitation measures required to provide and maintain a safe and healthy Project area for the duration of the Project, in accordance with applicable laws and this RFP. The Design-Builder shall develop and maintain a plan for mitigation of health hazards at the Project site. The plan shall be available at WSDOT's request.

2.29.4 MAINTENANCE OF ROADWAYS

2.29.4.1 GENERAL

The Design-Builder shall complete all components of the Work to allow for unrestricted traffic access to lanes and shoulders unless Work requires any closures and shall have obtained WSDOT approved TMP and TIMP in accordance with Section 2.22.

2.29.4.2 ROADWAY SWEEPING

The Design-Builder shall maintain all paved areas within the Project limits to prevent the accumulation of dirt and gravel. The Design-Builder shall periodically, and when directed by WSDOT, perform street sweeping or other best management practices to remove debris from the roadway and shoulders.

The Design-Builder shall take care to prevent material spillage. If spillage occurs, the Design-Builder shall remove it and clean the area within one hour of the spillage being observed or verbal notification from WSDOT. Tracking of dirt and gravel from the Work zone is prohibited. The Work shall be performed in accordance with the Fugitive Dust Control Plan described in Section 2.8.

2.29.4.3 EXISTING PAVEMENT

The Design-Builder shall maintain all existing pavement including pothole repair. Any pothole greater than a total of 36 cubic inches in volume and/or 3 inches in depth shall be repaired within 24 hours of being observed by the Design-Builder or notified by WSDOT. If the pothole is causing traffic to slow and/or deviate from normal traffic patterns, and/or reported by Law Enforcement Agency as a hazard, the Design-Builder shall perform pothole repair within one hour of being observed by the Design-Builder or notified by WSDOT. Temporary pothole repairs will be allowed if the material is pre-approved by WSDOT; if weather conditions will not allow for permanent repairs; and if traffic conditions dictate that permanent repairs are scheduled for another time to reduce impacts. All temporary pavement repairs shall be inspected by the Design-Builder at least once every business day or more often if the temporary repair shows any signs of failure. If the temporary repair shows signs of imminent failure, the repair shall be reinforced within one hour of being observed by the Design-Builder, or verbal notification from WSDOT.

Permanent pothole repair shall be performed in accordance with Section 2.7. Materials used for permanent pothole repair shall be of the same type and depth as the adjacent pavement.

2.29.4.4 PAVEMENT MARKINGS

The Design-Builder shall maintain existing and new pavement with painted, plastic, or raised pavement markings. WSDOT will indicate where existing markings require refreshing. Paint for temporary pavement markings shall be in accordance with Section 9-34 of the Standard Specifications. The Design-Builder shall anticipate that, at a minimum, existing markings will need to be refreshed once per calendar year between the periods of March 31st and before October 31st

All costs to maintain, install, move or remove permanent or temporary pavement markings, lines, or raised pavement markings within the Project limits or outside of the Project limits, that are considered part of the Work, are the responsibility of the Design-Builder.

WSDOT will maintain the existing striping until the Design-Builder begins Work for the Project.

2.29.4.5 TRAFFIC CONTROL DEVICES

The Design-Builder shall be responsible for maintaining active travel lanes free from traffic control devices such as traffic barrels, cones, and other devices.

All traffic control devices shall be placed behind barrier or guardrail away from traffic when not in use. In areas where traffic control devices cannot be placed behind barrier or guardrail, the devices may be placed on the shoulder of the roadway when the shoulder width is 5 feet or greater. When the shoulder width is less than 5 feet, the devices shall be placed off the paved shoulder and a minimum of 8 feet from the traveled lanes. The Design-Builder shall locate traffic control devices so as to not block access to pedestrians, and provide adequate space and accessibility for wheelchairs.

2.29.4.6 GUARDRAIL, CONCRETE BARRIER, AND ATTENUATORS

The Design-Builder shall replace or repair any guardrail, concrete barrier, and attenuators that become damaged by the public or by the Design-Builder's operations. Attenuators that are damaged and must be replaced shall meet current National Cooperative Highway Research Program and WSDOT standards. Any parts used to repair a damaged attenuator

shall be direct replacement parts as required by the manufacturer. Payment for any damaged guardrail, concrete barrier, or attenuators qualifying for relief under Section 1-07 of the General Provisions, shall be in accordance with Section 1-09 of the General Provisions, except for temporary devices installed by the Design-Builder.

2.29.4.7 TRAFFIC SYSTEM SIGNS

The Design-Builder shall be responsible for maintenance of existing permanent signs. Maintenance of existing permanent signs includes cleaning, repairing, and replacing damaged signs and posts. Cleaning will only be required when directed by WSDOT. Payment for maintenance of existing permanent signs shall be in accordance with Section 1-09 of the General Provisions.

Payment for repairing permanent signs qualifying for relief under Section 1-07 of the General Provisions shall be in accordance with Section 1-09 of the General Provisions. Repair of damage caused by the Design-Builder's operations shall be at the Design-Builder's expense.

2.29.4.8 STORMWATER MANAGEMENT

The Design-Builder shall maintain and provide adequate stormwater management on the Project until Physical Completion. Maintenance shall include cleaning and repair of riprap, cribbing, ditches, channels,curbing, culverts, cross drains, drainage structures, and gutters.

Existing or constructed sediment ponds and sand filters shall not be used as de-watering sites for construction waste water without WSDOT approval and mitigation. If sediment ponds or sand filters become inundated with sediments from construction or any other source during the project they will be restored to original specifications with new filter media at the completion of the project.

2.29.4.9 PROTECTION OF DRAINAGE STRUCTURES AND ELECTRICAL BOXES

The Design-Builder shall verify that all existing and new drainage structures and electrical boxes located within 2 feet of temporary or permanent travel lanes have sufficient strength to safely carry highway traffic loads without failing. If any of these structures or boxes have insufficient strength, they shall be reinforced and/or protected prior to opening the travel lanes to traffic.

2.29.5 SNOW AND ICE OPERATIONS

2.29.5.1 PUBLIC TRAVEL WAY

WSDOT and/or the City will perform snowplowing and application of de-icer or abrasives for public travel lanes per RCW 47.02. The snowplowing will be done as part of the normal course of plowing the public roadways within and in the vicinity of the Project. WSDOT or the City will not remove snow and/or ice from the public travel lanes to facilitate the Work or construction.

When plowing within the Project limits, WSDOT or the City will take no special measures to protect materials, traffic control devices, or equipment the Design-Builder has stored or stockpiled on shoulders or within the Project limits. The Design-Builder shall maintain any channelization devices that may be displaced or damaged by snowplowing operations and application of de-icer or abrasives.

WSDOT will not remove snow, ice, abrasives, or other debris such as car parts and tire chains, that are plowed or migrate from the public traffic lanes or shoulders into the Work area. Any removal of this material within the Project limits shall be at the Design-Builder's expense.

2.29.5.2 WORK ZONE

The Design-Builder shall perform any snow and ice removal for the Design-Builder's operations within the Work area. The Design-Builder shall not allow any snow and ice removal from its operations to be placed within the public traffic lanes.

2.29.6 ELECTRICAL

2.29.6.1 SIGNALS

2.29.6.1.1 Existing Signals

Refer to Section 2.17 for maintenance of signals.

2.29.6.2 INTELLIGENT TRANSPORTATION SYSTEMS (ITS)

All ITS equipment within the Project limits shall be maintained by the Design-Builder. Refer to Section 2.18 for ITS requirements.

2.29.6.3 LUMINAIRES

The Design-Builder shall maintain and operate all lighting systems in accordance with Section 2.16. Maintenance and operation shall include, but is not limited to, the following:

- Replacement of lamps, as required;
- Replacement or repair of any damaged equipment or underground cable;
- Maintenance concerning a public safety issue (including exposed wires and knockdowns), within one hour of notice from WSDOT; and
- Routine maintenance and other maintenance that does not affect the public safety, within 24 hours of notice from WSDOT.

Payment for repairing damaged permanent luminaires qualifying for relief under Section 1-07 of the General Provisions shall be in accordance with Section 1-09 of the General Provisions.

2.29.7 HAZARDOUS SPILLS RESPONSE

2.29.7.1 PUBLIC TRAVEL WAY

Cleanup of hazardous spills within the open public traffic lanes and shoulders will be the responsibility of WSDOT and the Washington State Department of Ecology. The Design-Builder shall allow access to the Project area for spill response. The Design-Builder shall make personnel and equipment available to respond to all emergencies, except when such emergencies are life threatening to the personnel.

In the event the hazardous spill is caused by the Design-Builder's equipment, operations, or Work, the Design-Builder shall be responsible for costs incurred by WSDOT, the Washington State Department of Ecology, and other resource agencies and/or contractors required to mitigate the hazard.

2.29.7.2 WORK ZONE

Any hazardous spills within the Work area and outside of the public travel lanes or shoulders shall be the responsibility of the Design-Builder. The Work shall be performed in accordance with the Spill Prevention, Control, and Countermeasures Plan described in Section 2.8.

2.29.8 INTENTIONALLY OMITTED

2.29.9 EMERGENCY RESPONSE

2.29.9.1 COOPERATION

The Design-Builder shall cooperate with law enforcement and other emergency response agencies in response to accidents, fires, spills, or other emergencies in any area affected by the Project, including the Project area and public traffic lanes. The Design-Builder shall cooperate in all WSDOT investigations of accidents and other incidents within the Project area. Refer to Section 2.9 for additional public information requirements regarding emergency response.

2.29.9.2 EMERGENCY ACCESS

The Design-Builder shall work with emergency service providers to address their concerns about emergency access to and through the Project corridor. This may include installing gates to allow emergency personnel to access the Project area. Refer to Section 2.22 for additional Maintenance of Traffic requirements.

2.29.9.3 NOTIFICATION

The Design-Builder shall notify WSDOT, the Washington State Patrol, and all emergency service providers in the affected area in writing of any access closures at the construction site. Notification shall include the names, pager numbers, telephone numbers (business, residence, and cellular) of Project personnel to contact in case of emergencies. This contact list shall be updated as necessary. Refer to Section 2.9 for additional public information requirements.

2.29.9.4 USE OF DESIGN-BUILDER RESOURCES

The Design-Builder shall make personnel and equipment available to respond to all emergencies, except when the emergency posses a life-threatening risk to the personnel. Refer to Section 2.22 for additional Maintenance of Traffic requirements.

2.29.10 MAINTENANCE OF PROPERTY

2.29.10.1 GENERAL

The Design-Builder shall preserve public and private property at all times in accordance with Section 1-07 of the General Provisions.

The Design-Builder shall witness or reference land monument and property marker locations by a Land Surveyor licensed in the State of Washington, before moving, disturbing, or damaging any property. Refer to Section 2.5 for additional requirements regarding monumentation and surveying.

2.29.10.2 RESTORATION OF PROPERTY AND LANDSCAPE

The Design-Builder shall restore, at its own cost, property and landscaping that is damaged in the course of construction, to a condition similar, equal, or better to that existing prior to the occurrence of damage by repairing, replacing in kind, rebuilding, replanting, or compensating the property owner.

2.29.11 MAINTENANCE OF AESTHETIC TREATMENT

2.29.11.1 GENERAL

The Design-Builder shall monitor the appearance of the aesthetic treatments on walls or bridges for any defects, flaws, or vandalism until Physical Completion. The Design-Builder shall note and bring to WSDOT's attention defects, flaws, and vandalism.

Defects and flaws shall be corrected in accordance with Section 1-05 of the General Provisions.

The Design-Builder shall be responsible for cleaning up and restoring property impacted by vandalism until Physical Completion.

The use of paint and/or permanent marking of any type on permanent barrier, railing, and walls will not be allowed except as required by the Contract.

2.29.12 SUBMITTALS

2.29.12.1 HERBICIDE APPLICATION

A copy of the application record of herbicide for noxious weed removal shall be submitted to WSDOT within two Calendar Days.

End of Section