Contract Provisions

For Construction of:

SR 16 MP 0.85 TO MP 4.67

UNION AVE. TO JACKSON AVE. - HOV

PIERCE COUNTY

All Addenda Incorporated

Complete Replacement
Volume 1 of 2
Addendum #12

STATE PROJECT

Washington State Department of Transportation

Washington State
Department of Transportation
Olympia, Washington 98504

SR 16
UNION AVE. TO JACKSON AVE. - HOV

03C501
Pierce County

Notice to All Planholders
The Project Engineer's office assigned to answer questions regarding these bid documents and to show this project to prospective bidders is:

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Randall A. Hain, P.E.
Olympic Region Administrator

As the Engineer in direct responsible charge of developing these contract provisions, I certify these provisions have been developed or incorporated into this project under my supervision or as a result of certified specifications provided by other licensed professionals.

NANCY FENNO BOWE
STATE OF WASHINGTON
35293
REGISTERED PROFESSIONAL ENGINEER

3/23/04

EXPIRES 11-18-04

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INTRODUCTION

The following Amendments and Special Provisions shall be used in conjunction with the 2004 Standard Specifications for Road, Bridge, and Municipal Construction.

AMENDMENTS TO THE STANDARD SPECIFICATIONS

The following Amendments to the Standard Specifications are made a part of this contract and supersede any conflicting provisions of the Standard Specifications. For informational purposes, the date following each Amendment title indicates the implementation date of the Amendment or the latest date of revision.

Each Amendment contains all current revisions to the applicable section of the Standard Specifications and may include references which do not apply to this particular project.

SECTION 1-07, LEGAL RELATIONS AND RESPONSIBILITIES TO THE PUBLIC December 6, 2004

1-07.11(10)B Required Records and Retention

The third and fourth paragraphs are revised to read:

Monthly Employment Utilization Reports

WSDOT Form #820-010 or substitute form as approved by the Contracting Agency. This form is required for all federally assisted projects if the contract is equal to or greater then $10,000 and for every associated subcontract equal to or greater than $10,000. These monthly reports are to be maintained in the respective Contractor or subcontractor's records.

In addition, for contracts with a value of $100,000 or more, the Contractor shall submit copies of the completed WSDOT form 820-010 or approved substitute to the Contracting Agency by the fifth of each month throughout the term of the contract. The Contractor shall also collect and submit these forms monthly from every subcontractor who holds a subcontract with a value of $100,000 or more.

Failure to submit the required reports by their due dates may result in the withholding of progress estimate payments.

1-07.13(4) Repair of Damage

This section is revised to read:

The Contractor shall promptly repair all damage to either temporary or permanent work as directed by the Engineer. For damage qualifying for relief under Sections 1-07.13(1), 1-07.13(2) or 1-07.13(3), payment will be made in accordance with Section 1-04.4 using the estimated bid item "Reimbursement for Third Party Damage".

In the event the Contracting Agency pays for damage to the Contractor's work or for damage to the Contractor's equipment caused by third parties, any claim the Contractor had or may have had against the third party shall be deemed assigned to the Contracting Agency, to the extent of the Contracting Agency's payment for such damage.

Payment will be limited to repair of damaged work only. No payment will be made for delay or disruption of work.

For the purpose of providing a common proposal for all bidders, the Contracting Agency has entered an amount for "Reimbursement For Third Party Damage" in the proposal to become a part of the total bid by the Contractor.

1-07.16(1) Private/Public Property

This section is revised to read:

The Contractor shall not use Contracting Agency owned or controlled property other than that directly affected by the contract work without the approval of the Engineer. If the Engineer grants such approval, the Contractor shall then vacate the area when ordered to do so by the Engineer. Approval to temporarily use the property shall not create any entitlement to further use or to compensation for any conditions or requirements imposed.

The Contractor shall protect private or public property on or in the vicinity of the work site. The Contractor shall ensure that it is not removed, damaged, destroyed, or prevented from being used unless the contract so specifies.

Property includes land, utilities, trees, landscaping, improvements legally on the right-of-way, markers, monuments, buildings, structures, pipe, conduit, sewer or water lines, signs, and other property of all description whether shown on the plans or not.

If the Engineer orders , or if otherwise necessary, the Contractor shall install protection, acceptable to the Engineer, for property such as that listed in the previous paragraph. The Contractor is responsible for locating and protecting all property that is subject to damage by the construction operation.

If the Contractor (or agents/employees of the Contractor) damage, destroy, or interfere with the use of such property, the Contractor shall restore it to original condition. The Contractor shall also halt any interference with the property's use. If the Contractor refuses or does not respond immediately, the Engineer may have such property restored by other means and subtract the cost from money that will be or is due the Contractor.

The Contractor may access the worksite from adjacent properties. The Contractor shall not use or allow others to use this access to merge with public traffic. During non-working hours, the Contractor shall provide a physical barrier that is either locked or physically unable to be moved without equipment. The access shall not go through any existing structures. The access may go through fencing. The Contractor shall control or prevent animals from entering the worksite to the same degree that they were controlled before the fence was removed. The Contractor shall prevent persons not involved in the contract work from entering the worksite through the access or through trails and pathways intersected by the access. If the contract documents require that existing trails or pathways be maintained during construction, the Contractor will insure the safe passage of trail or pathway users. The Contractor shall effectively control airborne particulates that are generated by use of the access. The location and use of the access shall not adversely affect wetlands or sensitive areas in any manner. The Contractor shall be responsible for obtaining all haul road agreements, permits and/or

easements associated with the access. The Contractor shall replace any fence, repair any damage and restore the site to its original state when the access is no longer needed. The Contractor shall bear all costs associated with this worksite access.

1-07.16(2) Vegetation Protection and Restoration

The new paragraph below is inserted to follow the third paragraph:

Any pruning activity required to complete the work as specified shall be performed by persons qualified as a Certified Arborist at the direction of the Engineer.

In the fifth paragraph, "*Guide for Plant Appraisal*, Eighth Edition" is revised to read "*Guide for Plant Appraisal*, Current Edition".

1-07.16(3) Fences, Mailboxes, Incidentals

The first sentence in the first paragraph is revised to read:

The Contractor shall maintain any temporary fencing to prevent pedestrians from entering the worksite and to preserve livestock, crops, or property when working through or adjacent to private property.

1-07.18 Public Liability and Property Damage Insurance

This section is revised to read:

The Contractor shall obtain and keep in force the following policies of insurance. The policies shall be with companies or through sources approved by the State Insurance Commissioner pursuant to Chapter 48.05, RCW. Unless otherwise indicated below, the policies shall be kept in force from the execution date of the contract until the date of acceptance by the Secretary (Section 1-05.12).

1. Owners and Contractors Protective Insurance providing bodily injury and property damage liability coverage with limits of $3,000,000 per occurrence and in the aggregate for each policy period, written on Insurance Services Office (ISO) form CG0009 together with Washington State Department of Transportation Amendatory Endorsement No. CG 29 08, specifying the State of Washington as a named insured.

   The Contractor may choose to terminate this insurance after the date of Substantial Completion as determined by the Engineer or, should Substantial Completion not be achieved, after the date of Physical Completion as determined by the Engineer. In the event the Contractor elects to terminate this coverage, prior to acceptance of the contract, the Contractor shall first obtain an endorsement to the Commercial General Liability Insurance described below that establishes the Contracting Agency on that policy as an additional insured.

2. Commercial General Liability Insurance written under ISO Form CG0001 or its equivalent with minimum limits of $3,000,000 per occurrence and in the aggregate for each policy period. This protection may be a CGL policy or any combination of primary, umbrella or excess liability coverage affording total liability limits of not less than $3,000,000. Products and completed operations coverage shall be provided for a period of one year following final acceptance of the work.

3. Commercial Automobile Liability Insurance providing bodily injury and property damage liability coverage for all owned and nonowned vehicles assigned to or used in the performance of the work with a combined single limit of not less than $1,000,000 each occurrence with the State named as an additional insured in connection with the Contractor's Performance of the contract.

The Owners and Contractors Protective Insurance policy shall not be subject to a deductible or contain provisions for a deductible. The Commercial General Liability policy and the Commercial Automobile Liability Insurance policy may, at the discretion of the Contractor, contain such provisions. If a deductible applies to any claim under these policies, then payment of that deductible will be the responsibility of the Contractor, notwithstanding any claim of liability against the Contracting Agency. However in no event shall any provision for a deductible provide for a deductible in excess of $50,000.00.

Prior to contract execution, the Contractor shall file with the Department of Transportation, Contract Payment Section, P.O. Box 47420, Olympia, WA 98504-7420, ACORD Form Certificates of Insurance evidencing the minimum insurance coverages required under these specifications.

All insurance policies and Certificates of Insurance shall include a requirement providing for a minimum of 45 days prior written notice to the Contracting Agency of any cancellation or reduction of coverage. All insurance coverage required by this section shall be written and provided by "occurrence-based" policy forms rather than by "claims made" forms.

Failure on the part of the Contractor to maintain the insurance as required shall constitute a material breach of contract upon which the Contracting Agency may, after giving five working days notice to the Contractor to correct the breach, immediately terminate the contract or, at its discretion, procure or renew such insurance and pay any and all premiums in connection therewith, with any sums so expended to be repaid to the Contracting Agency on demand, or at the sole discretion of the Contracting Agency, offset against funds due the Contractor from the Contracting Agency.

All costs for insurance, including any payments of deductible amounts, shall be considered incidental to and included in the unit contract prices and no additional payment will be made.

1-07.23(1) Construction Under Traffic

The first paragraph is supplemented with the following:

The Contractor shall enter interstate highways only through legal movements from existing roads, streets, and through other access points specifically allowed by the contract documents.

The fourth sentence in the second paragraph is revised to read:

Deficiencies not caused by the Contractor's operations shall be repaired by the Contractor, when ordered by the Engineer, at the Contracting Agency's expense.

SECTION 1-09, MEASUREMENT AND PAYMENT
April 5, 2004

1-09.6 Force Account

On page 1-91, under "**For Labor**", the fourth and fifth sentences in the second paragraph are deleted.

1-09.7 Mobilization

Under the second paragraph, item 3 is revised to read:

> When the substantial completion date has been established for the project, payment of any amount bid for mobilization in excess of 10 percent of the total original contract amount will be paid.

SECTION 1-10, TEMPORARY TRAFFIC CONTROL
December 6, 2004

Section 1-10 is revised in its entirety to read:

1-10.1 General

The Contractor, utilizing contractor labor and contractor-provided equipment and materials (except when such labor, equipment or materials are to be provided by the Contracting Agency as specifically identified herein), shall plan, manage, supervise and perform all temporary traffic control activities needed to support the work of the contract.

1-10.1(1) Materials

Materials shall meet the requirements of the following sections:

Stop/Slow Paddles	9-35.1
Construction Signs	9-35.2
Wood Sign Posts	9-35.3
Sequential Arrow Signs	9-35.4
Portable Changeable Message Signs	9-35.5
Barricades	9-35.6
Traffic Safety Drums	9-35.7
Barrier Drums	9-35.8
Traffic Cones	9-35.9
Tubular Markers	9-35.10
Warning Lights and Flashers	9-35.11
Truck-Mounted Attenuator	9-35.12

1-10.1(2) Description

The Contractor shall provide flaggers, spotters and all other personnel required for labor for traffic control activities and not otherwise specified as being furnished by the Contracting Agency.

The Contractor shall perform all procedures necessary to support the contract work.

The Contractor shall provide signs and other traffic control devices not otherwise specified as being furnished by the Contracting Agency. The Contractor 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 Contractor'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, of the Contractor's employees, and of the Contracting Agency's personnel and to facilitate the 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 a specific approved traffic control plan.

Upon failure of the Contractor to immediately provide flaggers; erect, maintain, and remove signs; or provide, erect, maintain, and remove other traffic control devices when ordered to do so by the Engineer, the Contracting Agency may, without further notice to the Contractor or the Surety, perform any of the above and deduct all of the costs from the Contractor's payments.

The Contractor 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 the Engineer, furnished by the Contracting Agency, or paid for by the Contracting Agency.

Wherever possible when performing contract work, the Contractor's equipment shall follow normal and legal traffic movements. The Contractor'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 moving backwards through the workzone. When located behind barrier or at other locations shown on approved traffic control plans, equipment may operate in a direction opposite to adjacent traffic.

The Contractor is advised that the Contracting Agency may have entered into operating agreements with one or more law enforcement organizations for cooperative activities. Under such agreements, at the sole discretion of the Contracting Agency, law enforcement personnel may enter the workzone for enforcement purposes and may participate in the Contractor's traffic control activities. The responsibility under the contract for all traffic control resides with the Contractor and any such participation by law enforcement personnel in Contractor traffic control activities will be referenced in the Special Provisions or will be preceded by an agreement and, if appropriate, a cost adjustment. Nothing in this contract is intended to create an entitlement, on the part of the Contractor, to the services or participation of the law enforcement organization.

1-10.2 Traffic Control Management

1-10.2(1) General

It is the Contractor's responsibility to plan, conduct and safely perform the work. The Contractor shall manage temporary traffic control with his or her own staff. Traffic control management responsibilities shall be formally assigned to one or more company supervisors who are actively involved in the planning and management of field contract activities. The Contractor shall provide the Engineer with a copy of the formal assignment. The duties of traffic control management may not be subcontracted.

The Contractor shall designate an individual or individuals to perform the duties of the primary Traffic Control Supervisor (TCS). The designation shall also 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 approved Traffic Control Plans provided by the Contractor.

The designated individuals shall be certified as worksite traffic control supervisors by one of the organizations listed in the Special Provisions. Possession of a current flagging card by the TCS is mandatory. A traffic control management assignment and a TCS designation are required on all projects that will utilize traffic control.

The Contractor shall maintain 24-hour telephone numbers at which the Contractor's assigned traffic control management personnel and the TCS can be contacted and be available upon the Engineer's request at other than normal working hours. These persons shall have the resources, ability and authority to expeditiously correct any deficiency in the traffic control system.

1-10.2(1)A Traffic Control Management

The responsibilities of the Contractor's traffic control management personnel shall include:

1. Overseeing and approving the actions of the Traffic Control Supervisor (TCS) to ensure that proper safety and traffic control measures are implemented and consistent with the specific requirements created by the Contractor's workzones and the Contract. Some form of oversight shall be in place and effective even when the traffic control management personnel are not present at the jobsite.

2. Providing the Contractor's designated TCS with approved Traffic Control Plans (TCPs) which are compatible with the work operations and traffic control for which they will be implemented. Having the latest adopted edition of the *Manual On Uniform Traffic Control Devices for Streets and Highways* (*MUTCD*,) including the *Washington State Modifications to the MUTCD* and applicable standards and specifications available at all times on the project.

3. Discussing proposed traffic control measures and coordinating implementation of the Contractor-adopted traffic control plan(s) with the Engineer.

4. Coordinating all traffic control operations, including those of subcontractors and suppliers, with each other and with any adjacent construction or maintenance operations.

5. Coordinating the project's activities (such as ramp closures, road closures, and lane closures) with appropriate police, fire control agencies, city or county engineering, medical emergency agencies, school districts, and transit companies.

6. Overseeing all requirements of the contract that contribute to the convenience, safety, and orderly movement of vehicular and pedestrian traffic.

7. Reviewing the TCS's diaries daily and being aware of field traffic control operations.

8. Being present on-site a sufficient amount of time to adequately satisfy the above-listed responsibilities.

Failure to carry out any of the above-listed responsibilities shall be a failure to comply with the contract and may result in a suspension of work as described in Section 1-08.6.

1-10.2(1)B Traffic Control Supervisor

A Traffic Control Supervisor (TCS) shall be present on the project whenever flagging or spotting or other traffic control labor is being utilized or less frequently, as authorized by the Engineer.

The TCS shall personally perform all the duties of the TCS. During nonwork periods, the TCS shall be available to the job site within a 45-minute time period after notification by the Engineer.

The TCS's duties shall include:

1. Having a current set of approved traffic control plans (TCPs), applicable contract provisions as provided by the Contractor, the latest adopted edition of the *MUTCD,* including the *Washington State Modifications to the MUTCD*, the book *Quality Guidelines for Work Zone Traffic Control Devices,* and applicable standards and specifications.

2. 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 need to be checked only once a week. Traffic control devices left in place for 24 hours or more shall also be inspected once during the nonworking 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.

3. Preparing a daily traffic control diary on each day that traffic control is performed using DOT Forms 421-040A and 421-040B, and submitting them to the Engineer no later than the end of the next working day. The Contractor may use alternate forms if approved by the Engineer. Diary entries shall include, but not be limited to:

    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 traffic control plan,
    d. Lighting utilized at night, and
    e. Observations of traffic conditions.

4. Making minor revisions to the traffic control plan to accommodate site conditions provided that the original intent of the traffic control plan is

maintained and the revision has the concurrence of both the Contractor and the Engineer.

5. Attending traffic control coordinating meetings or coordination activities as necessary for full understanding and effective performance.

6. Ensuring that all needed traffic control devices and equipment are available and in good working condition prior to the need to install or utilize them.

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

1-10.2(2) Traffic Control Plans

The traffic control plan or plans appearing in the contract documents show a method of handling traffic. All construction signs, flaggers, spotters and other traffic control devices are shown on the traffic control plan(s) except for emergency situations. Where mainline contract traffic control plans are developed with the intent of operating without the use of flaggers or spotters, the plans shall contain a note that states, "NO FLAGGERS OR SPOTTERS". The use of flaggers or spotters to supplement these traffic control plans will not be allowed except in a case where no other means of traffic control can be used or in the event of an emergency. If the Contractor proposes the use of flaggers or spotters with one of these plans, this will constitute a modification requiring approval by the Engineer. The modified plans shall show locations for all the required advance warning signs and a safe, protected location for the flagging station. If flagging is to be performed during hours of darkness, the plan shall include appropriate illumination for the flagging station.

When the Contractor's chosen method of performing the work in the contract requires some form of temporary traffic control, the Contractor shall either: (1.) designate and adopt, in writing, the traffic control plan or plans from the contract documents that support that method; or (2.) submit a Contractor's plan that modifies, supplements or replaces a plan from the contract documents. Any Contractor-proposed modification, supplement or replacement shall show the necessary construction signs, flaggers, spotters and other traffic control devices required to support the work. Any Contractor-proposed traffic control plan shall conform to the established standards for plan development as shown in the *MUTCD*, Part VI. The Contractor's submittal, either designating and adopting a traffic control plan from the contract documents or proposing a Contractor-developed plan, shall be provided to the Engineer for approval at least ten calendar days in advance of the time the signs and other traffic control devices are scheduled to be installed and utilized. The Contractor shall be solely responsible for submitting any proposed traffic control plan or modification, obtaining the Engineer's approval and providing copies of the approved Traffic Control Plans to the Traffic Control Supervisor.

1-10.2(3) Conformance to Established Standards

Flagging, signs, and all other traffic control devices and procedures furnished or provided shall conform to the standards established in the latest WSDOT adopted edition of the *Manual On Uniform Traffic Control Devices for Streets and Highways* (*MUTCD*,) published by the U.S. Department of Transportation and the *Washington State Modifications to the MUTCD*. Judgment of the quality of devices furnished will be based upon *Quality Guidelines for Work Zone Traffic Control Devices*, published by the

American Traffic Safety Services Association. Copies of the *MUTCD* and *Quality Guidelines for Work Zone Traffic Control Devices* may be purchased from the American Traffic Safety Services Association, 15 Riverside Parkway, Suite 100, Fredericksburg, 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 MUTCD described above, the Contracting Agency has scheduled the implementation of crashworthiness requirements for most workzone devices. The National Cooperative Highway Research Project (NCHRP) Report 350 has established requirements for crash testing. Workzone 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 devices that have been in common use for many years and are known to be crashworthy by crash testing of similar devices or years of demonstrable safe performance. These include cones, tubular markers, flexible delineator posts, and plastic drums. All Category 1 devices used on the project shall meet the requirements of NCHRP 350 as certified by the manufacturer of the device.

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 new Category 2 devices purchased after October 1, 2000 shall meet the requirements of NCHRP 350. Existing equipment, purchased prior to October 1, 2000, may be used on the project until December 31, 2007. For the purpose of definition, a sign support and sign shall be considered a single unit. A new sign may be purchased for an existing sign support and the entire unit will be defined as "existing equipment."

Category 3 is for hardware expected to cause significant velocity changes or other potentially harmful reactions to impacting vehicles. Barriers, fixed sign supports, crash cushions, truck mounted attenuators (TMA's) and other work zone devices not meeting the definitions of Category 1 or 2 are examples from this category. Many Category 3 devices are defined in the design of the project. Where this is the case, NCHRP 350 requirements have been incorporated into the design and the Contractor complies with the requirements by constructing devices according to the plans and specifications. Where the device is a product chosen by the Contractor, the device chosen must be compliant with the requirements of NCHRP 350.

Category 4 includes portable or trailer-mounted devices such as arrow displays, temporary traffic signals, area lighting supports, and portable changeable message signs. There is presently no implementation schedule for mandatory crashworthiness compliance for these devices.

The condition of signs and traffic control devices shall be acceptable or marginal as defined in the book *Quality Guidelines for Work Zone Traffic Control Device*s, and will be accepted based on a visual inspection by the Engineer. The Engineer's decision on the condition of a sign or traffic control device shall be final. A sign or traffic control device determined to be unacceptable shall be removed from the project and replaced within 12 hours of notification.

1-10.3 Traffic Control Labor, Procedures and Devices

1-10.3(1) Traffic Control Labor

The Contractor shall furnish all personnel for flagging, spotting, for the execution of all procedures related to temporary traffic control and for the 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 also be worn. The vests and other apparel shall be in conformance with Section 1-07.8.

1-10.3(1)A Flaggers and Spotters

Flaggers and Spotters shall be posted where shown on approved Traffic Control Plans or where directed by the Engineer. All flaggers and spotters shall possess a current flagging card issued by the State of Washington, Oregon, Montana, or Idaho. The flagging card shall be immediately available and shown to the Contracting Agency upon request.

Flagging stations shall be shown on Traffic Control 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 insures that flaggers can easily be seen 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 (foremen, superintendents, etc.).

The Contractor shall furnish the MUTCD standard Stop/Slow paddles for all flagging operations. The specification for Stop/Slow paddles in Section 9-35.1 requires 24" paddles and all new paddles purchased for the project shall conform to those provisions. Previously specified 18" paddles may be used at the request of the Contractor until December 31, 2005.

Spotting stations shall be shown on Traffic Control 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 Contractor shall furnish noise-makers or other effective warning devices for spotting operations. The duties of a spotter shall not include flagging.

1-10.3(1)B Other Traffic Control Labor

In addition to flagging or spotting duties, the Contractor shall provide personnel for all other traffic control procedures required by the construction operations and for the labor to install, maintain and remove any traffic control devices shown on Traffic Control Plans.

1-10.3(2) Traffic Control Procedures

1-10.3(2)A One-Way Traffic Control

The project work may require that traffic be maintained on a portion of the roadway during the progress of the work using one-way traffic control. If this is the case, the Contractor's operation shall be confined to one-half the roadway, permitting traffic on the other half. If shown on an approved traffic control plan or directed by the Engineer, one-way traffic control, in accordance with the MUTCD, shall be provided and shall also conform to the following requirements:

In any one-way traffic control configuration, side roads and approaches will be closed or controlled by a flagger or by appropriate approved signing. A side road flagger will 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 will be allowed to take turns passing through the workzone in the single open lane. When one-way traffic control is in effect, Contractor vehicles shall not use the open traffic lane except while following the same rules and routes required of the public traffic.

As conditions permit, the Contractor shall, at the end of each 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 the Engineer, one-way traffic control cannot be dispensed with after working hours, then the operation will be continued throughout the non-working hours.

1-10.3(2)B Rolling Slowdown

For work operations on multi-lane roadways that necessitate short-term roadway closures of 15 minutes or less, the Contractor may implement a rolling slowdown. Where included in an approved traffic control plan, 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 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 total stoppage of traffic.

A portable changeable message sign 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 will be allowed to travel will 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 Contractor 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 that necessary to clear the roadway shall cease immediately and the roadway shall be cleared and reopened as soon as possible.

All ramps and entrances to the roadway between the moving blockade and work operation shall be temporarily closed using flaggers. 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.

1-10.3(2)C Lane Closure Setup/Takedown

Where allowed by the contract and where shown on approved traffic control plans or directed by the Engineer, the Contractor shall set up traffic control measures to close one or more lanes of a multi-lane facility. When this is to occur, the following sequence shall be followed:

1. Advance warning signs are set up on the shoulder of the roadway opposite the lane to be closed,

2. Advance warning signs are set up on the same shoulder as the lane to be closed,

3. A truck-mounted attenuator, with arrow board, is moved into place at the beginning of the closure taper,

4. Channelization devices are placed to mark the taper and the length of the closure as shown on the traffic control plan.

   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 truck-mounted attenuator 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.

1-10.3(2)D Mobile Operations

Where construction operations are such that movement along the length of a roadway is continuous or near-continuous to the extent that a stationary traffic control layout will not be effective, the Contractor shall implement a moving, or mobile, traffic control scheme. Such moving control shall always be conducted in the same direction as the adjacent traffic.

Where shown on an approved traffic control plan or where directed by the Engineer, mobile traffic control shall consist of portable equipment, moving with the operation. A portable changeable message sign shall be established in advance of the operation, far enough back to provide warning of both the operation and of any queue of traffic that has formed during the operation. The advance sign shall be continuously moved to stay near the back of the queue at all times. A truck-mounted attenuator, with arrow board, shall be positioned and maintained at a fixed distance upstream of the work. A shadow vehicle, with truck-mounted attenuator shall be positioned and maintained immediately upstream of the work.

1-10.3(2)E Patrol & Maintain Traffic Control Measures

At all times, when temporary traffic control measures are in place, the Contractor shall provide for patrolling and maintaining these measures. 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 Contractor, either by or under the direction of the Traffic Control Supervisor. 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 non-working day.

1-10.3(3) Traffic Control Devices

1-10.3(3)A Construction Signs

All construction signs required by approved traffic control plans, as well as any other appropriate signs directed by the Engineer shall be furnished by the Contractor. The Contractor shall provide the posts or supports and erect and maintain the signs in a clean, neat, and presentable condition until the need for them has ended. Post mounted signs shall be installed as shown in Standard Plans G-1 and G-4a. Sign attachment to posts shall conform to the applicable detail shown in Standard Plan G-9b. When the need for construction signs has ended, the Contractor, upon approval of the Engineer, shall remove all signs, posts, and supports from the project and they shall remain the property of the Contractor.

No passing zones on the existing roadway that are marked with paint striping and which striping is to be obliterated by construction operations shall be replaced by "Do Not Pass" and "Pass With Care" signs. The Contractor shall provide and install the posts and signs. The signs shall be maintained by the Contractor until they are removed or until the contract is physically completed. When the project includes striping by the Contractor, the signs and posts shall be removed by the Contractor when the no passing zones are reestablished by striping. The signs and posts will become the property of the Contractor. When the Contractor is not responsible for striping and when the striping by others is not completed when the project is physically completed, the posts and signs shall be left in place and shall become the property of the Contracting Agency.

All existing signs, new permanent signs installed under this contract, and construction signs installed under this contract that are inappropriate for the traffic configuration at a given time shall be removed or completely covered with metal, plywood, or an Engineer approved product specifically manufactured for sign covering during periods when they are not needed.

Construction signs will be 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 will be designated as such on the approved Traffic Control Plan. "Do Not Pass" and "Pass With Care" signs are classified as Class A construction signs. Sign and support installation for Class A signs shall be in accordance with the Contract Plans 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.

Where it is necessary to add weight to signs for stability, the only allowed method will be a bag of sand that will rupture on impact. The bag of sand shall have a maximum weight of 40 pounds, and shall be suspended no more than 1 foot from the ground.

Signs, posts, or supports that are lost, stolen, damaged, destroyed, or which the Engineer deems to be unacceptable while their use is required on the project shall be replaced by the Contractor.

1-10.3(3)B Sequential Arrow Signs

Where shown on an approved traffic control plan or where ordered by the Engineer, the Contractor shall provide, operate and maintain sequential arrow signs. In some locations, the sign will be shown as a unit with an attenuator. In other locations, the plan will indicate a stand-alone unit.

1-10.3(3)C Portable Changeable Message Sign

Where shown on an approved traffic control plan or where ordered by the Engineer, the Contractor shall provide, operate and maintain portable changeable message signs. These signs shall be available, on-site, for the entire duration of their projected use.

1-10.3(3)D Barricades

Where shown on an approved traffic control plan or where ordered by the Engineer, the Contractor shall provide, install and maintain barricades. Barricades shall be kept in good repair and shall be removed immediately when, in the opinion of the Engineer, they are no longer functioning as designed.

Where it is necessary to add weight to barricades for stability, the only allowed method will be a bag of sand that will rupture on impact. The bag of sand shall have a maximum weight of 40 pounds, and shall be suspended no more than 1 foot from the ground.

1-10.3(3)E Traffic Safety Drums

Where shown on an approved Traffic Control Plan, or where ordered by the Engineer, the Contractor shall provide, install and maintain traffic safety drums.

Used drums may be utilized, provided all drums used on the project are of essentially the same configuration.

The 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.

Drums shall be regularly maintained to ensure that they are clean and that the drum and reflective material are in good condition. If the Engineer determines that a drum has been damaged beyond usefulness, or provides inadequate reflectivity, a replacement drum shall be furnished.

When the Engineer determines that the drums are no longer required, they shall be removed from the project and shall remain the property of the Contractor.

1-10.3(3)F Barrier Drums

Where shown on approved Traffic Control Plans and as ordered by the Engineer, barrier drums shall be placed on temporary concrete barrier at the following approximate spacing:

Concrete Barrier Placement	Barrier Drum Spacing in Feet
Tangents ½ mile or less[1]	2 times posted speed limit
Tangents greater than ½ mile[1]	4 times posted speed limit
Tapers and Curves[2]	posted speed limit

Note 1 A minimum of 3 barrier drums shall be used.
Note 2 A minimum of 5 barrier drums shall be used.

Temporary concrete barrier reflectors may be excluded when using barrier drums.

Both legs of the barrier drums shall be completely filled with sand. The top oval should not be filled.

Used barrier drums may be used, provided all barrier drums used on the project are of essentially the same configuration.

Barrier drums shall be regularly maintained to ensure that they are clean and that the barrier drum and reflective material are in good condition. If the Engineer determines that a barrier drum has been damaged beyond usefulness, or provides inadequate reflectivity, a replacement barrier drum shall be furnished.

When the Engineer determines that the drums are no longer required, they shall be removed from the project and shall remain the property of the Contractor.

1-10.3(3)G Traffic Cones

Where shown on an approved traffic control plan or where ordered by the Engineer, the Contractor shall provide, install and maintain traffic cones. Cones shall be kept in good repair and shall be removed immediately when directed by the Engineer. Where wind or moving traffic frequently displace cones, an effective method of stabilizing cones, such as stacking two together at each location, shall be employed.

1-10.3(3)H Tubular Markers

Where shown on an approved traffic control plan or where ordered by the Engineer, the Contractor shall provide, install and maintain tubular markers. Tubular markers shall be kept in good repair and shall be removed immediately when directed by the Engineer. Tubular markers are secondary devices and are not to be used as substitutes for cones or other delineation devices without an approved traffic control plan.

Where the Traffic Control Plan shows pavement-mounted tubular markers, the adhesive used to fasten the base to the pavement shall be suitable for the purpose, as approved by the Engineer. During the removal of pavement-mounted tubular markers, care shall be taken to avoid damage to the existing pavement. Any such damage shall be repaired by the Contractor at no cost to the Contracting Agency.

1-10.3(3)I Warning Lights and Flashers

Where shown attached to traffic control devices on an approved traffic control plan or where ordered by the Engineer, the Contractor shall provide and maintain flashing warning lights. Lights attached to advance warning signs shall be Type B, high-intensity. Lights attached to traffic safety drums, barricades or other signs shall be Type C, steady-burning low intensity or, where attention is to be directed to a specific device, Type A, flashing low-intensity units.

1-10.3(3)J Truck-Mounted Attenuator

Where shown on an approved traffic control plan or where ordered by the Engineer, the Contractor shall provide, operate and maintain truck-mounted impact attenuators (TMA). These attenuators shall be available, on-site, for the entire duration of their projected use.

The TMA shall be positioned to separate and protect construction workzone 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.

1-10.4 Measurement

1-10.4(1) Lump Sum Bid for Project (No Unit Items)

When the bid proposal contains the item "Project Temporary Traffic Control", there will be no measurement of unit items for work defined by Section 1-10 except as described in Section 1-10.4(3). Also, except as described in Section 1-10.4(3), all of Sections 1-10.4(2) and 1-10.5(2) is deleted.

No specific unit of measurement will apply to the lump sum item of "Project Temporary Traffic Control."

1-10.4(2) Item Bids with Lump Sum for Incidentals

When the bid proposal does not contain the item "Project Temporary Traffic Control", Sections 1-10.4(1) and 1-10.5(1) are deleted and the bid proposal will contain some or all of the following items, measured as noted.

No specific unit of measurement will apply to the lump sum item of "Traffic Control Supervisor."

"Flaggers and Spotters" will be measured by the hour. Hours will be measured for each flagging or spotting station, shown on an approved Traffic Control Plan, when that station is staffed in accordance with Section 1-10.3(1)A. When a flagging station is staffed on an intermittent basis, no deduction will be made in measured hours provided that the person staffing the station is in a standby mode and is not performing other duties.

"Other Traffic Control Labor" will be measured by the hour. With the exception of patrolling and maintaining, hours will be measured for each person engaged in any one of the following activities:

- Operating a pilot vehicle during one-way piloted traffic control.

- Operating a traffic control vehicle or a chase vehicle during a rolling slowdown operation.

- Operating a vehicle or placing/removing traffic control devices during the setup or takedown of a lane closure. Performing preliminary work to prepare for placing and removing these devices.

- Operating any of the moving traffic control equipment, or adjusting signing during a mobile operation as described in Section 1-10.3(2)D.

- Patrolling and maintaining traffic control measures as described in Section 1-10.3(2)E. The hours of one person will be measured for each patrol route necessary to accomplish the review frequency required by the provision, regardless of the actual number of persons per route.

- Placing and removing Class B construction signs. Performing preliminary work to prepare for placing and removing these signs.

- Relocation of Portable Changeable Message Signs within the project limits.

- Installing and removing Barricades, Traffic Safety Drums, Barrier Drums, Cones, Tubular Markers and Warning Lights and Flashers to carry out approved Traffic Control Plan(s). Performing preliminary work to prepare for installing these devices.

Time spent on activities other than those listed will not be measured under this item.

"Construction Signs, Class A" will be measured by the square foot of panel area for each sign designated on an approved Traffic Control Plan as Class A or for each construction sign installed as ordered by the Engineer and designated as Class A at the time of the order. Class A signs may be used in more than one location and will be measured for each new installation. Class B construction signs will not be measured. Sign posts or supports will not be measured.

"Sequential Arrow Sign" will be measured by the hour for the time that each sign is operating as shown on an approved Traffic Control Plan or as directed by the Engineer.

"Portable Changeable Message Sign" will be measured per each one time only for each portable changeable message sign used on the project. The final pay quantity shall be the maximum number of such signs in place at any one time as approved by the Engineer.

"Operation of Portable Changeable Message Sign" will be measured by the hour for each hour of operation. The hours of operation will be determined by the Engineer. Hours of operation in excess of those determined by the Engineer will be at the Contractor's expense.

"Truck Mounted Impact Attenuator" will be measured per each one time only for each truck with mounted impact attenuator used on the project. The final pay quantity shall be the maximum number of truck-mounted impact attenuators in place at any one time.

"Operation of Truck-Mounted Impact Attenuator" will be measured by the hour for each truck-mounted attenuator manned and operated. Manned and operated shall be when the truck-mounted impact attenuator has an operator and is required to move, in operating position, with the construction operation or when moving the TMA from one position to another on the project.

No specific unit of measurement will apply to the force account item of "Repair Truck-Mounted Impact Attenuator".

No specific unit of measurement will apply to the lump sum item of "Other Temporary Traffic Control".

1-10.4(3) Reinstating Unit Items with Lump Sum Traffic Control

The contract provisions may establish the project as lump sum, in accordance with Section 1-10.4(1) and also include one or more of the items included above in Section 1-10.4(2). When that occurs, the corresponding measurement provision in Section 1-10.4(2) is not deleted and the work under that item will be measured as specified.

1-10.4(4) Owner-Provided Resources

The contract provisions may call for specific items of labor, materials or equipment, noted in Section 1-10 as the responsibility of the Contractor, to be supplied by the Contracting Agency. When this occurs, there will be no adjustment in measurement of unit quantities.

1-10.5 Payment

1-10.5(1) Lump Sum Bid for Project (No Unit Items)

"Project Temporary Traffic Control", lump sum.
The lump sum contract payment shall be full compensation for all costs incurred by the Contractor in performing the contract work defined in Section 1-10, except for costs compensated by bid proposal items inserted through contract provisions as described in Section 1-10.4(3).

1-10.5(2) Item Bids with Lump Sum for Incidentals

"Traffic Control Supervisor", lump sum.
The lump sum contract payment shall be full compensation for all costs incurred by the Contractor in performing the contract work defined in Section 1-10.2(1)B.

"Flaggers and Spotters", per hour.
The unit contract price, when applied to the number of units measured for this item in accordance with Section 1-10.4(2), shall be full compensation for all costs incurred by the Contractor in performing the contract work defined in Section 1-10.3(1)A.

"Other Traffic Control Labor", per hour.
The unit contract price, when applied to the number of units measured for this item in accordance with Section 1-10.4(2), shall be full compensation for all labor costs

incurred by the Contractor in performing the contract work specifically mentioned for this item in Section 1-10.4(2).

"Construction Signs Class A", per square foot.
The unit contract price, when applied to the number of units measured for this item in accordance with Section 1-10.4(2), shall be full compensation for all costs of labor, materials and equipment incurred by the Contractor in performing the contract work described in Section 1-10.3(3)A. In the event that "Do Not Pass" and "Pass With Care" signs must be left in place, a change order, as described in Section 1-04.4, will be required.

"Sequential Arrow Sign", per hour.
The unit contract price, when applied to the number of units measured for this item in accordance with Section 1-10.4(2), shall be full compensation for all costs of labor, materials and equipment incurred by the Contractor in performing the contract work described in Section 1-10.3(3)B.

"Portable Changeable Message Sign", per each.
The unit contract price, when applied to the number of units measured for this item in accordance with Section 1-10.4(2), shall be full compensation for all costs of labor, materials and equipment incurred by the Contractor in procuring all portable changeable message signs required for the project and for transporting these signs to and from the project.

"Operation of Portable Changeable Message Sign", per hour.
The unit contract price, when applied to the number of units measured for this item in accordance with Section 1-10.4(2), shall be full compensation for all costs of labor, materials and equipment incurred by the Contractor in performing the contract work described in Section 1-10.3(3)C except for costs compensated separately under the items "Other Traffic Control Labor" and "Portable Changeable Message Sign".

"Truck-Mounted Impact Attenuator", per each.
The unit contract price, when applied to the number of units measured for this item in accordance with Section 1-10.4(2), shall be full compensation for all costs of labor, materials and equipment incurred by the Contractor in performing the contract work described in Section 1-10.3(3)J except for costs compensated separately under the items "Operation of Truck-Mounted Impact Attenuator" and "Repair Truck-Mounted Impact Attenuator".

"Operation of Truck-Mounted Impact Attenuator", per hour.
The unit contract price, when applied to the number of units measured for this item in accordance with Section 1-10.4(2), shall be full compensation for all costs of labor, materials and equipment incurred by the Contractor in operating truck-mounted impact attenuators on the project.

"Repair Truck-Mounted Impact Attenuator", by force account.
All costs of repairing or replacing truck-mounted impact attenuators that are damaged by the motoring public while in use as shown on an approved Traffic Control Plan will be paid for by force account as specified in Section 1-09.6. To provide a common proposal for all bidders, the Contracting Agency has estimated the amount of force account for "Repair Truck-Mounted Impact Attenuator" and has entered the amount in the Proposal to become a part of the total bid by the Contractor. Truck-mounted

attenuators damaged due to the Contractor's operation or damaged in any manner when not in use shall be repaired or replaced by the Contractor at no expense to the Contracting Agency.

"Other Temporary Traffic Control", lump sum.
The lump sum contract payment shall be full compensation for all costs incurred by the Contractor in performing the contract work defined in Section 1-10, and which costs are not compensated by one of the above-listed items.

1-10.5(3) Reinstating Unit Items with Lump Sum Traffic Control

The contract provisions may establish the project as lump sum, in accordance with Section 1-10.4(1) and also reinstate the measurement of one or more of the items described in Section 1-10.4(2). When that occurs, the corresponding payment provision in Section 1-10.5(2) is not deleted and the work under that item will be paid as specified.

SECTION 2-02, REMOVAL OF STRUCTURES AND OBSTRUCTIONS
April 5, 2004

2-02.3(3) Removal of Pavement, Sidewalks, and Curbs

The section title is revised to read:

2-02.3(3) Removal of Pavement, Sidewalks, Curbs, and Gutters

The first sentence is revised to read:

In removing pavement, sidewalks, curbs, and gutters, the Contractor shall:

Item 3 is revised to read:

3. Make a vertical saw cut between any existing pavement, sidewalk, curb, or gutter that is to remain and the portion to be removed.

2-02.5 Payment

The second paragraph is revised to read:

If pavements, sidewalks, curbs, or gutters lie within an excavation area, their removal will be paid for as part of the quantity removed in excavation.

SECTION 2-03, ROADWAY EXCAVATION AND EMBANKMENT
January 5, 2004

2-03.3(14)D Compaction and Moisture Control Tests

This section is revised to read:

Maximum density and optimum moisture content shall be determined by one of the following methods:

1. materials with less than 30 percent by weight retained on the U.S. No. 4 sieve shall be determined using FOP for AASHTO T 99 Method A.

2. materials with 30 percent or more by weight retained on the U.S. No. 4 sieve and less than 30 percent retained on the 3/4 inch sieve shall be determined by WSDOT Test Method No. 606 or FOP for AASHTO T 180 Method D. The determination of which test procedure to use will be made solely by the Contracting Agency.

3. materials with 30 percent or more retained on the 3/4 inch sieve shall be determined by WSDOT Test Method No. 606.

In place density will be determined using Test Methods WSDOT FOP for AASHTO T 310 and WSDOT SOP for T 615.

SECTION 2-09, STRUCTURE EXCAVATION
December 6, 2004

2-09.3(1)E Backfilling

The first paragraph under Timing is revised to read:

Backfill shall not be placed against any concrete structure until the concrete has attained 90 percent of its design strength and a minimum age of 14 days, except that reinforced concrete retaining walls 15 feet in height or less may be backfilled after the wall has attained 90 percent of its design compressive strength and curing requirements of Section 6-02.3(11) are met. Footings and columns may be backfilled as soon as forms have been removed, so long as the backfill is brought up evenly on all sides.

2-09.4 Measurement

In the third paragraph, the width for pipes 18 inches and over is revised to (1.5 x I.D.) + 18 inches.

SECTION 2-10, DITCH EXCAVATION
April 5, 2004

2-10.1 Description

The second paragraph is supplemented with the following:

Ditches 8 or more feet wide at the bottom shall be constructed in accordance with the requirements of Section 2-03.3(14)M.

SECTION 4-04, BALLAST AND CRUSHED SURFACING
January 5, 2004

4-04.3(5) Shaping and Compaction

In the first paragraph, the first sentence is revised to read:

Immediately following spreading and final shaping, each layer of surfacing shall be compacted to at least 95 percent of the standard density determined by the requirements of Section 2-03.3(14)D before the next succeeding layer of surfacing or pavement is placed.

SECTION 5-01, CEMENT CONCRETE PAVEMENT REHABILITATION
August 2, 2004

5-01.3(6) Dowel Bar Retrofit

The sixth paragraph is revised to read:

> All slot surfaces shall be cleaned to bare concrete by sand blasting or pressure washing. The cleaning shall remove all slurry, parting compound, and other foreign materials prior to installation of the dowel. If a pressure washer is used to clean the slots the pressure at the nozzle shall not exceed 4000 psi. Any damage to the concrete shall be repaired by the Contractor at no cost to the Contracting Agency. All washwater shall be cleaned from the slots prior to placement of any slot patching material. Traffic shall not be allowed on slots where concrete has been removed.

5-01.5 Payment

The paragraph following the item "Sealing Transverse and Longitudinal Joints" is revised to read:

> The unit contract price per linear foot for "Sealing Transverse and Longitudinal Joints", shall be full payment for all costs to complete the work as specified, including removing incompressible material, preparing and sealing existing transverse and longitudinal joints where existing transverse and longitudinal joints are cleaned and for all incidentals required to complete the work as specified.

SECTION 5-04, HOT MIX ASPHALT
April 5, 2004

5-04.3(8)A Acceptance Sampling and Testing - HMA Mixture

In item 3, C. (Test Results), the second and third paragraphs are revised to read:

> Sublot sample test results (gradation and asphalt binder content) may be challenged by the Contractor. For HMA mixture accepted by statistical evaluation with a mix design that did not meet the verification tolerances, the test results in the test section including the percent air voids (Va) may be challenged. To challenge test results, the Contractor shall submit a written challenge within five working days after receipt of the specific test results. A split of the original acceptance sample will be sent for testing to either the Region Materials Lab or the State Materials Lab as determined by the Project Engineer. The split of the sample with challenged results will not be tested with the same equipment or by the same tester that ran the original acceptance test. The challenge sample will be tested for a complete gradation analysis and for asphalt binder content.
>
> The results of the challenge sample will be compared to the original results of the acceptance sample test and evaluated according to the following criteria:

Deviation	
U.S. No. 4 sieve and larger	Percent passing ±4.0
U.S. No. 8 sieve	Percent passing ±2.0
U.S. No. 200 sieve	Percent passing ±0.4
Asphalt binder %	Percent binder content ±0.3
Va %	Percent Va ±0.7

Item 3, D. (Test Methods) is revised to read:

D. Test Methods
Testing of HMA for compliance of volumetric properties (VMA, VFA and Va) will be by WSDOT Standard Operating Procedure SOP 731. Testing for compliance of asphalt binder content will be by WSDOT FOP for AASHTO T 308. Testing for compliance of gradation will be by WAQTC FOP for AASHTO T 27/T 11.

5-04.3(13) Surface Smoothness

In the first paragraph, the second sentence is revised to read:

The completed surface of the wearing course shall not vary more than 1/8 inch from the lower edge of a 10-foot straightedge placed on the surface parallel to the centerline.

5-04.4 Measurement

The first sentence is revised to read:

HMA CL. ___ PG ___, HMA for ___ CL. ___ PG ___, and Commercial HMA will be measured by the ton in accordance with Section 1-09.2, with no deduction being made for the weight of asphalt binder, blending sand, mineral filler, or any other component of the mixture.

SECTION 5-05, CEMENT CONCRETE PAVEMENT
December 6, 2004

5-05.3(1) Concrete Mix Design for Paving

Number 1. **Materials**, is revised to read:

1. **Materials.** Materials shall conform to Section 5-05.2. Fine aggregate shall conform to Section 9-03.1(2), Class 1. Coarse aggregate shall conform to Section 9-03.1(4) AASHTO grading No. 467. An alternate combined gradation may be proposed, which has a maximum aggregate size equal to or greater than a 2-inch square sieve. The combined aggregate gradation shall conform to Section 9-03.1(5).

   Fly ash, if used, shall not exceed 35 percent by weight of the total cementitious material, shall conform to Section 9-23.9 and shall be limited to Class F with a maximum CaO content of 15 percent by weight.

   Ground granulated blast furnace slag, if used, shall not exceed 25 percent by weight of the total cementitious material and shall conform to Section 9-23.10. When both ground granulated blast furnace slag and fly ash are included in the concrete mix, the total weight of both these materials is limited to 35 percent by weight of the total cementitious material. As an alternative to the use of fly ash, ground granulated blast furnace slag and cement as separate components, a blended hydraulic cement that meets the requirements of Section 9-01.2(4) Blended Hydraulic Cements may be used.

   The water/cement ratio shall be calculated on the total weight of cementitious material. The following are considered cementitious materials: Portland cement,

fly ash, ground granulated blast furnace slag and microsilica. The minimum cementitious material for any mix design shall be 564 pounds per cubic yard.

SECTION 6-02, CONCRETE STRUCTURES
December 6, 2004

6-02.3(2) Proportioning Materials

This section is revised to read:

The total water soluble Chloride ion (Cl-) content of the mixed concrete shall not exceed 0.06 percent by weight of cementitious material for prestressed concrete nor 0.10 percent by weight of cementitious material for reinforced concrete. An initial evaluation may be obtained by testing individual concrete ingredients for total chloride ion content per AASHTO T 260 and totaling these to determine the total water soluble Chloride ion (Cl-) or the total water soluble Chloride ion (Cl-) in accordance with ASTM C 1218.

Unless otherwise specified, the Contractor shall use Type I or II Portland cement in all concrete as defined in Section 9-01.2(1).

The use of fly ash is required for Class 4000D and 4000P concrete. The use of fly ash and ground granulated blast furnace slag is optional for all other classes of concrete.

Fly ash, if used, shall not exceed 35 percent by weight of the total cementitious material and shall conform to Section 9-23.9. Ground granulated blast furnace slag, if used, shall not exceed 25 percent by weight of the total cementitious material and shall conform to Section 9-23.10. When both ground granulated blast furnace slag and fly ash are included in the concrete mix, the total weight of both these materials is limited to 35 percent by weight of the total cementitious material.

The water/cement ratio shall be calculated on the total weight of cementitious material. The following are considered cementitious materials: Portland cement, fly ash, ground granulated blast furnace slag and microsilica.

As an alternative to the use of fly ash, ground granulated blast furnace slag and cement as separate components, a blended hydraulic cement that meets the requirements of Section 9-01.2(4) Blended Hydraulic Cements may be used.

6-02.3(2)A Contractor Mix Design

The seventh paragraph is revised to read:

A high-range water reducer (superplasticizer) may be used in all mix designs. Microsilica fume may be used in all mix designs. The use of a high-range water reducer or microsilica fume shall be submitted as a part of the Contractor's concrete mix design.

6-02.3(5)A General

In the fourth paragraph, item 2 is revised to read:

2. An individual strength test averaged with the two preceding individual strength tests meets or exceeds specified strength (for the same class and exact mix I.D. of concrete on the same contract).

6-02.3(5)C Conformance to Mix Design

This section is revised to read:

Cement, coarse and fine aggregate weights shall be within the following tolerances of the mix design:

Batch Volumes less than or equal to 4 cubic yards		
Cement	+5%	-1%
Aggregate	+10%	-2%

Batch Volumes more than 4 cubic yards		
Cement	+5%	-1%
Aggregate	+2%	-2%

If the total cementitious material weight is made up of different components, these component weights shall be within the following tolerances:

1. Portland cement weight plus 5% or minus 1 percent of that specified in the mix design.
2. Fly ash weight plus or minus 5 percent of that specified in the mix design.
3. Microsilica weight plus or minus 10 percent of that specified in the mix design.

Water shall not exceed the maximum water specified in the mix design.

6-02.3(6)A Weather and Temperature Limits to Protect Concrete

The section "**Cold Weather Protection**" is revised to read:

The Contractor is solely responsible for protecting concrete from inclement weather during the entire curing period. The Contractor shall provide a written procedure for cold weather concreting to the Engineer for review and approval. The procedure shall detail how the Contractor will prevent the concrete temperature from falling below 50º F. Extra protection shall be provided for areas especially vulnerable to freezing (such as exposed top surfaces, corners and edges, thin sections, and concrete placed into steel forms). Permission given by the Engineer to place concrete during cold weather will in no way ensure acceptance of the work by the Contracting Agency. Should the concrete placed under such conditions prove unsatisfactory in any way, the Engineer shall still have the right to reject the work although the plan and the work were carried out with the Engineer's permission.

If weather forecasts predict air temperatures below 35º F during the seven days just after the concrete placement, the Contractor may place the concrete only if his approved cold weather concreting plan is implemented.

The Contractor shall provide and maintain a maturity meter in the concrete at a location specified by the Engineer for each concrete placement. During curing, data from the maturity meter shall be readily available to the Engineer. The Contractor shall record and provide time and temperature data on hourly intervals.

The Contractor shall not mix nor place concrete while the air temperature is below 35º F, unless the water or aggregates (or both) are heated to at least 70º F. The aggregate shall not exceed 150º F. If the water is heated to more than 150º F, it shall

be mixed with the aggregates before the cement is added. Any equipment and methods shall heat the materials evenly. Concrete placed in shafts and piles is exempt from such preheating requirements.

The Contractor may warm stockpiled aggregates with dry heat or steam, but not by applying flame directly or under sheet metal. If the aggregates are in bins, steam or water coils or other heating methods may be used if aggregate quality is not affected. Live steam heating is not permitted on or through aggregates in bins. If using dry heat, the Contractor shall increase mixing time enough to permit the super-dry aggregates to absorb moisture.

Any concrete placed in air temperatures below 35º F shall be immediately protected. In addition to the monitoring of the concrete temperature with a maturity meter the Contractor shall provide recording thermometers or other approved devices to monitor the surface temperature of the concrete. The concrete surface temperature shall be maintained at or above 50º F and the relative humidity shall be maintained above 80 percent. These conditions shall be maintained for a minimum of seven days or for the cure period required by Section 6-02.3(11), whichever is longer. If artificial heat is used to maintain the temperature inside an enclosure, moisture shall be added to the enclosure to maintain the humidity as stated above. The Contractor shall stop adding moisture 24 hours before removing the heat.

If at any period during curing the concrete temperature falls below 50º F on the maturity meter or recording thermometer, no curing time is awarded for that day and the required curing time will be extended day for day where the temperature falls below 50º F. Should the Contractor fail to adequately protect the concrete and the temperature of the concrete falls below 35º F during curing, the Engineer may reject it.

6-02.3(11) Curing Concrete

In the first paragraph, item 3 is supplemented with the following:

When continuous moisture or wet curing is required, the Contractor shall keep the concrete surfaces wet with water during curing.

In the second paragraph, the first sentence is revised to read:

The Contractor may provide continuous moisture by watering a covering of heavy quilted blankets, by keeping concrete surfaces wet with water continuously and covering with a white reflective type sheeting, or by wetting the outside surfaces of wood forms.

6-02.3(17)K Concrete Forms on Steel Spans

The following new paragraph is inserted between the second and third paragraphs:

The compression member or bottom connection of cantilever formwork support brackets shall bear either within six inches maximum vertically of the bottom flange or within six inches maximum horizontally of a vertical web stiffener. The Contractor shall also furnish and install temporary struts and ties to prevent rotation of the steel girder. Partial depth cantilever formwork support brackets that do not conform to the above requirements shall not be used, unless the Contractor submits details showing the additional formwork struts and ties used to brace the steel girder against web distortion

caused by the partial depth bracket, and receives the Engineer's approval of the submittal.

6-02.3(17)O Early Concrete Test Cylinder Breaks

The third sentence in the first paragraph is revised to read:

> The Contractor shall retain a testing laboratory to perform this work.

The first paragraph is supplemented with the following:

> Testing laboratories' equipment shall be calibrated within one year prior to testing and testers must be ACI certified.

The first sentence in the fifth paragraph is revised to read:

> The Contractor shall furnish the Engineer with all test results, proof of equipment calibration, and tester's certification.

The sixth paragraph is deleted.

6-02.3(19)A Elastomeric Bearing Pads

This section including title is revised to read:

> **6-02.3(19)A Vacant**

6-02.3(19)B Bridge Bearing Assemblies

Item 4 is deleted.

6-02.3(20) Grout for Anchor Bolts and Bridge Bearings

The eighth paragraph is supplemented with the following:

> Grout pad may be loaded when a minimum of 4000 psi compressive strength is attained.

6-02.3(21) Drainage of Box Girder Cells

This section is supplemented with the following:

> All drainage holes shall be screened in accordance with the Plan details.

6-02.3(22) Drainage of Substructure

The second sentence in the first paragraph is supplemented with the following:

> Weep holes shall be covered with geotextile meeting the requirements of Section 9-33.2, Table 2 Class C before backfilling. Geotextile screening shall be bonded to the concrete with an approved adhesive.

6-02.3(24)C Placing and Fastening

The fifteenth paragraph beginning with "Reinforcing steel bars shall not vary..." is supplemented with the following:

> Drilled Shafts top of rebar cage elevation +6 in./-3 in.

6-02.3(24)E Welding Reinforcing Steel

The ninth paragraph is revised to read:

> The minimum preheat and interpass temperature for welding Grade 60 reinforcing bars shall be in accordance with AWS D1.4 Table 5.2 and mill certification of carbon equivalence, per lot of reinforcing. Preheating shall be applied to the reinforcing bars and other splice members within 6 inches of the weld, unless limited by the available lengths of the bars or splice member.

The twelfth paragraph is revised to read:

> Under supervision of the State Materials and Fabrication Inspector, the welder shall weld three test joints of the largest size reinforcing bar to be weld spliced, per type of joint shown in the Plans. Two of the test welds shall be test loaded to no less than 125 percent of the minimum specified yield strength of the bar. The remaining test weld shall be mechanically cut perpendicular to the direction of the welding and macroetched. The macroetch specimen for Flare V groove welds will be inspected for the weld size and effective throat as shown in the Plans. Indirect butt splices shall be cut mechanically at two locations to provide a transverse cross-section of each of the bars spliced in the test assembly. The sections shall show the full cross-section of the weldment, the root of the weld, and any reinforcement. The etched cross-section shall have complete penetration and complete fusion with the base metal and between successive passes in the weld. Groove welds of direct butt splices and flare-groove welds shall not have reinforcement exceeding 1/8 inch in height measured from the main body of the bar and shall have a gradual transition to the base metal surface. No cracks will be allowed in either the weld metal or heat-affected zone. All craters shall be filled to the full cross-section of the weld. Weld metal shall be free from overlay. Undercutting deeper than 1/32 inch will not be allowed except at points where welds intersect the raised pattern of deformations where undercutting less than 1/16 inch deep will be acceptable. The sum of diameters of piping porosity in groove welds shall not exceed 1/8 inch in any linear inch of weld or exceed 9/16 inch in any 6-inch length of weld. Corrections to welds with shielded metal arc, gas metal arc, or flux-cored arc welding processes shall be made in accordance with Engineer's approval.

6-02.3(25) Prestressed Concrete Girders

The fourth paragraph is replaced with the following:

> The various types of girders are:
>
> > **Prestressed Concrete Girder** – Refers to prestressed concrete girders of all types, including prestressed concrete I girders, prestressed concrete wide flange I girders, bulb tee girders, deck bulb tee girders, thin flange deck bulb tee girders, precast prestressed concrete members, spliced prestressed concrete girders, and prestressed concrete tub girders.
> >
> > **Prestressed Concrete I Girder** – Refers to a prestressed concrete girder with a flanged I shaped cross section, requiring a cast-in-place concrete deck to support traffic loads. WSDOT standard girders in this category include Series W42G, W50G, W58G, and W74G.

Prestressed Concrete Wide Flange I Girder – Refers to a prestressed concrete girder with an I shaped cross section with wide top and bottom flanges, requiring a cast-in-place concrete deck to support traffic loads. WSDOT standard girders in this category include Series WF42G, WF50G, WF58G, WF74G, W83G, and W95G.

Bulb Tee Girder – Refers to a prestressed concrete girder, with a wide top flange requiring a cast-in-place concrete deck to support traffic loads. WSDOT standard girders in this category include Series W32BTG, W38BTG, W50BTG, and W62BTG.

Deck Bulb Tee Girder – Refers to a bulb tee girder with a top flange designed to support traffic loads, and designed to be mechanically connected at the flange edges to adjacent girders at the job site. Except where specific requirements are otherwise specified for these girders, deck bulb tee girders shall conform to all requirements specified for bulb tee girders. WSDOT standard girders in this category include Series W35DG, W41DG, W53DG, and W65DG.

Thin Flange Deck Bulb Tee Girder – Refers to a bulb tee girder with a top flange width equal to the girder spacing and requiring a cast-in-place concrete deck to support traffic loads. Except where specific requirements are otherwise specified for these girders, thin flange deck bulb tee girders shall conform to all requirements specified for bulb tee girders. WSDOT standard girders in this category include Series W32TFG, W38TFG, W50TFG, W62TFG, and W74TFG.

Precast Prestressed Member (PCPS Member) – Refers to a precast prestressed slab, precast prestressed ribbed section, or a deck double tee girder. PCPS members are designed to be mechanically connected at the flange or member edges to adjacent PCPS members at the job site. Except where specific requirements are otherwise specified for these girders, PCPS members shall conform to all requirements specified for deck bulb tee girders.

Double Tee Girder – Refers to a hybrid PCPS member that is similar to a deck double tee girder, except that the top surface is a thin top flange requiring a cast-in-place concrete deck to support traffic loads. Double tee girders shall conform to all requirements specified for bulb tee girders and PCPS members.

Spliced Prestressed Concrete Girder – Refers to prestressed concrete girders initially fabricated in segments to be longitudinally spliced together with cast-in-place concrete closures at the job site. Except where specific requirements are otherwise specified for these girders, spliced prestressed concrete girders shall conform to all requirements specified for prestressed concrete girders. Anchorages shall conform to Sections 6-02.3(26)B, 6-02.3(26)C, and 6-02.3(26)D. Ducts shall conform to the Section 6-02.3(26)E requirements for internal embedded installation, and shall be round, unless the Engineer approves use of elliptical shaped ducts. Duct-wedge plate transitions shall conform to Section 6-02.3(26)E. Prestressing reinforcement shall conform to Section 6-02.3(26)F. WSDOT standard girders in this category include Series WF74PTG, W83PTG, and W95PTG.

Prestressed Concrete Tub Girder – Refers to prestressed concrete trapezoidal box or bathtub girders including those fabricated in segments to be spliced

together with cast-in-place concrete closures at the job site. Except where specific requirements are otherwise specified for these girders, prestressed concrete tub girders shall conform to all requirements specified for prestressed concrete girders and spliced prestressed concrete girders. WSDOT standard girders in this category include Series U**G* or Series UF**G*, where U specifies webs without flanges, UF specifies webs with flanges, ** specifies the girder height in inches, and * specifies the bottom flange width in feet.

6-02.3(25)A Shop Plans

The second, third and fourth paragraphs are revised to read:

Shop plans shall show the size and location of all cast-in holes for installation of deck formwork hangers and/or temporary bracing. Holes for formwork hangers shall match approved deck formwork plans designed in accordance with Section 6-02.3(16). There shall be no field-drilled holes in prestressed concrete girders. Post-tensioning ducts in spliced prestressed concrete girders shall be located so their center of gravity is in accordance with the Plans.

The Contractor shall have the option to furnish Series W74G prestressed concrete girders with minor dimensional differences from those shown in the Plans. The 2 5/8-inch top flange taper may be reduced to 1 5/8 inches and the bottom flange width may be increased to 2 feet 2 inches. Other dimensions of the girder shall be adjusted as necessary to accommodate the above mentioned changes. Reinforcing steel shall be adjusted as necessary. The overall height and top flange width shall remain unchanged.

If the Contractor elects to provide a prestressed concrete girder with an increased web thickness, shop plans along with supporting design calculations shall be submitted to the Engineer for approval prior to girder fabrication. The girder shall be designed for at least the same load carrying capacity as the girder shown in the Plans. The load carrying capacity of the mild steel reinforcement shall be the same as that shown in the Plans.

The sixth paragraph is revised to read:

The Contractor shall provide five copies of the shop plans to the Engineer for approval, except as otherwise noted. Shop drawings for spliced prestressed concrete girders shall conform to Section 6-02.3(26)A, and seven copies of the shop drawings shall be submitted to the Engineer for approval. The shop drawings for spliced prestressed concrete girders shall include all details related to the post-tensioning operations in the field, including details of hardware required, tendon geometry, blockout details, and details of additional or modified steel reinforcing bars required in cast-in-place closures. Approval of shop plans means only that the Engineer accepts the methods and materials. Approval does not imply correct dimensions.

6-02.3(25)B Casting

The first paragraph is revised to read:

Before casting girders, the Contractor shall have possession of an approved set of shop drawings. Side forms shall be steel except that cast-in-place concrete closure forms for spliced prestressed concrete girders, interior forms of prestressed concrete tub girders, and end bulkhead forms of prestressed concrete girders may be plywood. Interior

voids for precast prestressed slabs with voids shall be formed by either wax soaked cardboard or expanded polystyrene forms. The interior void forms shall be secured in the position as shown in the Plans and shall remain in place.

The fourth paragraph is revised to read:

Air-entrainment is not required in the concrete placed into prestressed precast concrete girders, including cast-in-place concrete closures for spliced prestressed concrete girders, unless otherwise noted. The Contractor shall use air-entrained concrete in the top two inches, minimum, of the roadway deck flange of deck bulb-tee girders, deck double tee girders, and precast prestressed ribbed sections. All concrete for precast prestressed slabs shall be air entrained, except for slabs where the Engineer approves use of air-entrained concrete in the top two inches, only. Maximum and minimum air content shall be as specified in Section 6-02.3(2)A.

The sixth paragraph is revised to read:

The Contractor may form circular block-outs in the girder top flanges to receive falsework hanger rods. These block-outs shall:

1. Not exceed 1 inch in diameter;

2. Be spaced no more than 72 inches apart longitudinally on the girder;

3. Be located 3 inches or more from the outside edge of the top flange on Series W42G, W50G, and W58G girders, 6 inches or more for Series W74G girders, and 7 inches or more for Series WF42G, WF50G, WF58G, WF74G, WF74PTG, W83G, W83PTG, W95G, W95PTG, W32BTG, W38BTG, W50BTG, W62BTG girders and other bulb tee girders.

6-02.3(25)C Prestressing

The sixth paragraph is revised to read:

Post-tensioning of spliced prestressed concrete girders shall conform to Section 6-02.3(26)G, and the following requirements:

1. Before tensioning, the Contractor shall remove all side forms from the cast-in-place concrete closures. From this point until 48 hours after grouting the tendons, the Contractor shall keep all construction and other live loads off the superstructure and shall keep the falsework supporting the superstructure in place.

2. Once the post-tensioning steel is installed, no welds or welding grounds shall be attached to metal forms, structural steel, or steel reinforcing bars of the structural member.

3. The Contractor shall not tension the post-tensioning reinforcement until the concrete in the cast-in-place closures reaches the minimum compressive strength specified in the Plans (or 5,000 psi if the concrete strength is not specified in the Plans). This strength shall be measured with concrete cylinders made of the same concrete and cured under the same conditions as the cast-in-place closures.

4. All post-tensioning shall be completed before placing the sidewalks and barriers on the superstructure.

6-02.3(25)D Curing

The fourth paragraph is revised to read:

Curing of cast-in-place concrete closures for spliced prestressed concrete girders shall conform to Section 6-02.3(11).

6-02.3(25)E Contractors Control Strength

The sixth through eleventh paragraphs are revised to read:

For precast prestressed members, a test shall consist of four cores measuring 3 inches in diameter by 6 inches in height (for slabs) and by the thickness of the web (for ribbed sections). Two cores shall be taken from each side of the member and on each side of the member's span midpoint, at locations approved by the Engineer. The core locations for precast prestressed slabs shall be near mid-depth of the slab, within the middle third of the span length, and shall avoid all prestressing strands and steel reinforcing bars. The core locations for precast prestressed ribbed sections shall be immediately beneath the top flange, within the middle third of the span length, and shall avoid all prestressing strands and steel reinforcing bars.

For prestressed concrete tub girders, a test shall consist of four cores measuring 3 inches in diameter by the thickness of the web, taken from each web approximately three feet to the left and to the right of the center of the girder span. The cores shall avoid all prestressing strands and steel reinforcing bars.

For all other prestressed concrete girders, a test shall consist of three cores measuring 3 inches in diameter by the thickness of the web and shall be removed from just below the top flange; one at the midpoint of the girder's length and the other two approximately 3 feet to the left and approximately 3 feet to the right.

The cores shall be taken in accordance with AASHTO T 24 and shall be tested in accordance with WSDOT FOP for AASHTO T 22. The Engineer may accept the girder if the average compressive strength of the four cores from the precast prestressed member, or prestressed concrete tub girder, or of the three cores from any other prestressed concrete girder, is at least 85 percent of the specified compressive strength with no one core less than75 percent of specified compressive strength.

If the girder is cored to determine the release strength, the required patching and curing of the patch shall be done prior to shipment. If there are more than three holes or if they are not in a neutral location, the prestress steel shall not be released until the holes are patched and the patch material has attained a minimum compressive strength equal to the required release compressive strength or 4,000 psi, whichever is larger.

The Contractor shall coat cored holes with an epoxy bonding agent and patch the holes using the same type concrete as that in the girder, or a mix approved during the annual plant review and approval. The epoxy bonding agent shall meet the requirements of Section 9-26.1 for Type II, Grade 2 epoxy. The girder shall not be shipped until tests show the patch material has attained a minimum compressive strength of 4,000 psi.

6-02.3(25)F Prestress Release

The third paragraph is revised to read:

The Contractor may request permission to release the prestressing reinforcement at a minimum concrete compressive strength less than specified in the Plans. This request shall be submitted to the Engineer for approval in accordance with Section 6-01.9 and shall be accompanied with calculations showing the adequacy of the proposed release concrete compressive strength. The release strength shall not be less than 3,500 psi, except that the release strength for spliced prestressed concrete girders shall not be less than 4,000 psi. The calculated release strength shall meet the requirements outlined in the Washington State Department of Transportation Bridge Design Manual for tension and compression at release. The proposed minimum concrete compressive strength at release will be evaluated by the Contracting Agency. Fabrication of girders using the revised release strength shall not begin until the Contracting Agency has provided written approval of the revised release compressive strength. If a reduction of the minimum concrete compressive strength at release is allowed, the Contractor shall bear any added cost that results from the change.

6-02.3(25)G Protection of Exposed Reinforcement

The second paragraph is revised to read:

Grouting of post-tensioning ducts for spliced prestressed concrete girders shall conform to Section 6-02.3(26)H.

6-02.3(25)H Finishing

The fourth paragraph is revised to read:

On the deck bulb tee girder section and all precast prestressed members, the Contractor shall test the roadway deck surface portion for flatness. This test shall occur after floating but while the concrete remains plastic. Testing shall be done with a 10-foot straightedge parallel to the girder centerline and with a flange width straightedge at right angles to the girder centerline. The Contractor shall fill depressions, cut down high spots, and refinish to correct any deviation of more than 1/4 inch within the straightedge length. This section of the roadway surface shall be finished to meet the requirements for finishing roadway slabs, as defined in Section 6-02.3(10) except that, if approved by the Engineer, a coarse stiff broom may be used to provide the finish in lieu of a metal tined comb.

6-02.3(25)I Tolerances

The title, first paragraph, and items 7, 10, and 21 following the first paragraph are revised to read:

6-02.3(25)I Fabrication Tolerances

The girders shall be fabricated as shown in the Plans and shall meet the dimensional tolerances listed below. Construction tolerances of cast-in-place closures for spliced prestressed concrete girders shall conform to the tolerances specified for spliced prestressed concrete girders. Actual acceptance or rejection will depend on how the Engineer believes a defect outside these tolerances will affect the structure's strength or appearance:

7. Flange Depth:

For I and Wide Flange I girders:	± 1/4 inch
For bulb tee and deck bulb tee girders:	+ 1/4 inch, - 1/8 inch
For PCPS members:	+ 1/4 inch, - 1/8 inch

10. Longitudinal Position of the Harping Point:

Single harping point	± 18 inches
Multiple bundled strand groups	
First bundled strand group	± 6 inches
Second bundled strand group	± 18 inches
Third bundled strand group	± 30 inches

21. Differential Camber Between Girders in a Span (measured in place at the job site):

For I, Wide Flange I, bulb tee, and spliced prestressed concrete girders:	1/8 inch per 10 feet of beam length.
For deck bulb tee girders:	Cambers shall be equalized by an approved method when the differences in cambers between adjacent girders or stages measured at mid-span exceeds 1/4 inch.
For PCPS members:	± 1/4 inch per ten feet of member length measured at midspan, but not greater than ± 1/2 inch total.
For prestressed concrete tub girders:	± 1/4 inch per ten feet of member length measured at midspan, but not greater than ± 1/2 inch total.

6-02.3(25)J Horizontal Alignment

The fourth paragraph is revised to read:

The maximum deviation of the side of the precast prestressed slab, or the edge of the roadway deck slab of the deck double tee girder or the precast prestressed ribbed section, measured from a chord that extends end to end of the member, shall be ± 1/8 inch per 10 feet of member length, but not greater than 1/2 inch total.

6-02.3(25)L Handling and Storage

The first and second paragraphs are revised to read:

During handling and storage, each girder shall always be kept plumb and upright, and each precast prestressed member and prestressed concrete tub girder shall always be kept in the horizontal position as shown in the Plans. It shall be lifted only by the lifting devices (strand lift loops or high-strength threaded steel bars) at either end. For strand lift loops, a minimum 2 inch diameter straight pin of a shackle shall be used through the loops. For high-strength threaded steel bars, the lifting hardware that connects to the bars shall be designed, detailed, and furnished by the Contractor. Series W42G, WF42G, W50G, WF50G, W58G, and WF58G girders, and Series W32BTG, W38BTG,

W50BTG, W62BTG, and W74G girders up to 145 feet in length, can be picked up at a minimum angle of 60 degrees from the top of the girder. All other prestressed girders shall be picked up within 10 degrees of perpendicular to the top of the girder.

For some girders, straight temporary top flange strands may be specified in the Plans. Pretensioned top temporary strands for full length prestressed concrete girders shall be unbonded over all but the end 10 feet of the girder length. As an alternative for full length prestressed concrete girders, temporary top strands may be post-tensioned prior to shipment. When temporary top strands are specified for spliced prestressed concrete girders, the temporary top strands shall be post-tensioned prior to lifting the assembled girder. When the post-tensioned alternative is used, the Contractor shall be responsible for properly sizing the anchorage plates, and the reinforcement adjacent to the anchorage plates, to prevent bursting or splitting of the concrete in the top flange. Temporary strands shall be cut or released in accordance with Section 6-02.3(25)N.

6-02.3(25)M Shipping

The third and fourth paragraphs are revised to read:

No double tee girder, deck double tee girder, precast prestressed slab or precast prestressed ribbed section shall be shipped for at least three days after concrete placement. No deck bulb tee girder or prestressed concrete tub girder shall be shipped for at least seven days after concrete placement, except that deck bulb tee girders or prestressed concrete tub girders may be shipped three days after concrete placement when L/(bd) is less than or equal to 5.0, where L equals the shipping length of the girder, b equals the girder top flange width (for deck bulb tee girders) or the bottom flange width (for prestressed concrete tub girders), and d equals the girder depth, all in feet. No other girder shall be shipped for at least ten days after concrete placement.

Girder support during shipping shall be located as follows unless otherwise shown in the Plans:

Type of Girder	Centerline Support Within This Distance From Either End
Precast Prestressed Members	2 feet
Series W42G, WF42G, W50G and WF50G	3 feet
All bulb tee and deck bulb tee girders, except as noted	3 feet
Series W58G, WF58G, and W62BTG	4 feet
Series W74G and WF74G	5 feet
Series W83G and W95G	8 feet
Series WF74PTG, W83PTG, and W95PTG segments	4 feet
Prestressed concrete tub girder segment	4 feet

The sixth, seventh and eighth paragraphs are revised to read:

If the Contractor elects to assemble spliced prestressed concrete girders into components of two or more segments prior to shipment, the Contractor shall submit shipment support location working drawings with supporting calculations to the Engineer in accordance with Section 6-01.9. The calculations shall show that concrete stresses in the assembled girders will not exceed those listed below.

Lateral bracing for shipping is not required for prestressed concrete tub girders and precast prestressed members. Other prestressed concrete girders of lengths equal or shorter than the following will not require lateral bracing for shipping:

Type of Girder	Maximum Length Not Requiring Bracing for Shipping
Series W42G, WF42G, W32BTG, and W38BTG	80 feet
Series W50G and WF50G	100 feet
Series W58G, WF58G, W50BTG, and W62BTG	105 feet
All deck bulb tee girders	120 feet
Series W74G and WF74G	130 feet

For all girders exceeding these lengths, and all Series WF74PTG, W83G, W83PTG, W95G, and W95PTG girders, the Contractor shall provide bracing to control lateral bending during shipping, unless the Contractor furnishes calculations in accordance with Section 6-01.9 demonstrating that bracing is not necessary. External bracing shall be attached securely to the top flange of the girder. The Contractor is cautioned that more conservation guidelines for lateral bracing may be required for some delivery routes. The Contractor shall submit a bracing plan, with supporting calculations, to the Engineer for approval in accordance with Section 6-01.9. The Contractor shall not begin shipping the girders until receiving the Engineer's approval of the bracing plan, and shall perform all bracing operations at no additional cost to the Contracting Agency.

Criteria for Checking Girder Stresses
At the Time of Lifting or Transporting and Erecting

Stresses at both support and harping points shall be satisfied based on these criteria:

1. Allowable compression stress, fc = 0.60f'cm
   a. f'cm = compressive strength at time of lifting or transporting verified by test but shall not exceed design compressive strength (f'c) at 28 days in psi + 1,000 psi
2. Allowable tension stress, ksi
   a. With no bonded reinforcement = 3 times square root (f'cm) ≤ 0.20 ksi
   b. With bonded reinforcement to resist total tension force in the concrete computed on the basis of an uncracked section 6.0 times square root (f'cm). The allowable tensile stress in the reinforcement is 30 ksi (AASHTO M-31, Gr. 60)
3. Prestress losses
   a. 1 day to 1 month = computed losses
   b. 1 month to 1 year = 75 percent of computed final losses
   c. 1 year or more = computed final losses
4. Impact on dead load
   a. Lifting from casting beds = 0 percent
   b. Transporting and erecting = 20 percent

6-02.3(25)N Prestressed Concrete Girder Erection

The fifth paragraph is revised to read:

The concrete in piers and crossbeams shall reach at least 80 percent of design strength before girders are placed on them. The Contractor shall hoist girders only by the lifting devices at the ends, always keeping the girders plumb and upright. Once erected, the girders shall be braced to prevent tipping until the intermediate diaphragms are cast and cured. **When temporary strands in the top flange are used, they shall be cut after the girders are braced and before the intermediate diaphragms are cast.** The Contractor shall place the cast-in-place deck on the girders within 30 calendar days of cutting the temporary strands, except as otherwise approved by the Engineer.

For situations where the Contractor proposes to delay placing the cast-in-place deck on the girders beyond 30 calendar days after cutting the temporary strands, the Contractor shall submit supporting girder camber calculations to the Engineer for approval in accordance with Section 6-01.9. The Contractor shall not cut the temporary strands until receiving the Engineer's approval of the girder camber calculations.

6-02.3(25)O Deck Bulb Tee Girder Flange Connection

This section is revised to read:

The Contractor shall submit a method of equalizing deck bulb tee girder (and precast prestressed member) deflections to the Engineer for approval in accordance with Section 6-01.9, except that the submittal shall be made a minimum of 60 days prior to field erection of the deck bulb tee girder. Deflection equalizing methods approved for previous Contracting Agency contracts will be acceptable providing the bridge configuration is similar and the previous method was satisfactory. A listing of the previous Contracting Agency contract numbers for which the method was used shall be included with the submittal. The weld-ties may be used as a component of the equalizing system provided the Contractor's procedure outlines how the weld-ties are to be used, and that the Contractor's submittal includes a list and description of previous bridge projects where the Contractor has successfully used weld-ties as a component of the equalizing system.

The concrete diaphragms for deck bulb tee girders shall attain a minimum compressive strength of 2,500 psi before any camber equalizing equipment is removed.

On deck bulb tee girders, girder deflection shall be equalized utilizing the approved method before girders are weld-tied and before keyways are filled. Keyways between tee girders shall be filled flush with the surrounding surfaces with nonshrink grout. This nonshrink grout shall have a compressive strength of 5,000 psi before the equalizing equipment is removed. Compressive strength shall be determined by fabricating and testing cubes in accordance with WSDOT Test Method 813 and testing in accordance with WSDOT FOP for AASHTO T-106.

Welding ground shall be attached directly to the steel plates being welded when welding the weld-ties on bulb tee girders.

No construction equipment shall be placed on the structure, other than equalizing equipment, until the girders have been weld-tied and the keyway grout has attained a compressive strength of 5,000 psi.

6-02.3(26) Cast-in-Place Prestressed Concrete

6-02.3(26)C Bearing Type Anchorages

Item 6 in the first paragraph is revised to read:

6. For transverse post-tensioning of roadway slabs, the bearing stress shall not exceed 0.9f'c at P_{jack} of all strands (before seating) or 4,000 psi at service load after all losses.

6-02.3(26)H Grouting

The first sentence in the sixth paragraph is revised to read:

The Contractor shall proportion the mix to produce a grout with a flow of 11 to 20 seconds as determined by WSDOT Test Method for ASTM C 939, Flow of Grout for Preplaced Aggregate Concrete (Flow Cone Method).

The third sentence in the seventh paragraph is revised to read:

Cubes shall be made in accordance with WSDOT Test Method T 813 and stored in accordance with WSDOT FOP for AASHTO T 23.

6-02.3(27) Concrete for Precast Units

This section is supplemented with the following:

Self compacting concrete (SCC) may be used for precast concrete barrier covered under Section 6-10 and drainage items covered under Section 9-12. If self compacting concrete has been approved for use the requirements of Section 6-02.3(4)C consistency shall not apply. Self compacting concrete is concrete that is able to flow under its own weight and completely fill the formwork, even in the presence of dense reinforcement, without the need of any vibration, while maintaining homogeneity. When using SCC modified testing procedures for air content and compressive strength will be used. The modification shall be that molds will be filled completely in one continuous lift without any rodding, vibration, tamping or other consolidation methods other than lightly taping around the exterior of the mold with a rubber mallet to allow entrapped air bubbles to escape. In addition the fabricators QC testing shall include Slump Flow Test results, which do not indicate segregation. As part of the plants approval for use of SCC the plant fabricator shall cast one barrier, or drainage item and have that barrier or drainage item sawed in half for examination by the Contracting Agency to determine that segregation has not occurred.

SECTION 6-03, STEEL STRUCTURES
December 6, 2004

6-03.3(14) Edge Finishing

The first and second paragraphs are revised to read:

All rolled, sheared, and thermal cut edges shall be true to line and free of rough corners and projections. Corners along exposed edges shall be rounded to a minimum radius of 1/16 inch.

Sheared edges on plates more than 5/8 inch thick shall be planed, milled, ground, or thermal cut to a depth of at least 1/8 inch.

6-03.3(33) Bolted Connections

Table 4 and the paragraph beneath it are revised to read:

Table 4 Turn-of-Nut Tightening Method Nut Rotational from Snug-Tight Condition			
Bolt Length	**Disposition of Outer Faces of Bolted Parts**		
	Condition 1	*Condition 2*	*Condition 3*
L <= 4D	1/3 turn	1/2 turn	2/3 turn
4D < L<= 8D	1/2 turn	2/3 turn	5/6 turn
8D < L<= 12D	2/3 turn	5/6 turn	1 turn

Bolt length measured from underside of head to top of nut.

6-03.3(39) Swinging the Span

The second paragraph is revised to read:

After the falsework is released (spans swung free) the masonry plates, shoes, and keeper plates are grouted, and before any load is applied, the Engineer will (or, if the Contractor is specified as responsible for surveying, the Contractor shall) measure elevations at the tenth points along the tops of girders and floorbeams.

The Engineer will compare steel mass camber elevations with the elevations measured above, and will furnish the Contractor with new dead-load camber dimensions.

SECTION 6-05, PILING
December 6, 2004

6-05.3(9)A Pile Driving Equipment Approval

The first sentence of the second paragraph is revised to read:

The Contractor shall submit a wave equation analysis for all pile driving systems used to drive piling with required ultimate bearing capacities of greater than 300 tons.

Under the second paragraph the default values and definition for "R_{ult}" are revised as follows:

R_{ult} is the resistance of the pile used in the wave equation analyses. If the ultimate bearing capacity equals the maximum driving resistance, a setup factor of 1.3 may be used in the wave equation analysis to account for pile setup. To use a setup factor in the wave equation analysis, R_{ult} in the analysis is the ultimate bearing capacity divided by 1.3. If the maximum driving resistance exceeds the ultimate bearing capacity, no

setup factor should be used, and R_{ult} is equal to the maximum driving resistance of the pile.

SECTION 6-06, BRIDGE RAILINGS
January 5, 2004

6-06.2 Materials
This section is revised to read:

Materials shall meet the requirements of the following sections:

Timber Railing	9-09
Metal Railing	9-06.18

SECTION 6-07, PAINTING
August 2, 2004

6-07.3(2)A Bridge Cleaning
The third sentence under **Pressure Flushing** is revised to read:

The pressure flushing equipment shall produce (at the nozzle) at least 3,000 psi with a discharge of at least 4 gpm.

SECTION 6-10, CONCRETE BARRIER
August 2, 2004

6-10.3 Construction Requirements
This section is supplemented with the following:

Concrete barrier installed in conjunction with geosynthetic wall moment slabs, light standard foundations, and sign bridge foundations, regardless of the barrier shape, shall be cast-in-place using stationary forms.

6-10.4 Measurement
This section is supplemented with the following:

Concrete barrier transition Type 2 to bridge f-shape shall be precast and will be measured by the linear foot installed. The bridge traffic barrier modification necessary for this installation will not be included in this item of work.

Single slope concrete barrier light standard foundation will be measured by the unit for each light standard foundation installed.

Permanent geosynthetic wall single slope barrier and f-shape barrier will be measured by the linear foot and will include the construction of the concrete moment slab shown in the Standard Plans.

6-10.5 Payment
The new bid items listed below are inserted to follow "Conc. Class 4000", per cubic yard.

"Conc. Barrier Transition Type 2 to Bridge F-Shape", per linear foot.

"Single Slope Conc. Barrier Light Standard Foundation", per each.
"Perm. Geosynthetic Wall Single Slope Barrier", per linear foot.
"Perm. Geosynthetic Wall F-Shape Barrier", per linear foot.

SECTION 6-11, PRECAST CONCRETE RETAINING WALL STEMS
April 5, 2004

This section including title is revised to read:

SECTION 6-11, REINFORCED CONCRETE WALLS

6-11.1 Description

This work consists of constructing reinforced concrete retaining walls, including those shown in the Standard Plans, L walls, and counterfort walls.

6-11.2 Materials

Materials shall meet the requirements of the following sections:

Cement	9-01
Aggregates for Portland Cement Concrete	9-03.1
Gravel Backfill	9-03.12
Premolded Joint Filler	9-04.1(2)
Steel Reinforcing Bar	9-07.2
Epoxy-Coated Steel Reinforcing Bar	9-07.3
Concrete Curing Materials and Admixtures	9-23
Fly Ash	9-23.9
Water	9-25

Other materials required shall be as specified in the Special Provisions.

6-11.3 Construction Requirements

6-11.3(1) Submittals

The Contractor shall submit all excavation shoring plans to the Engineer for approval in accordance with Section 2-09.3(3)D.

The Contractor shall submit all falsework and formwork plans to the Engineer for approval in accordance with Sections 6-02.3(16) and 6-02.3(17).

If the Contractor elects to fabricate and erect precast concrete wall stem panels, the following information shall be submitted to the Engineer for approval in accordance with Sections 6-01.9 and 6-02.3(28)A:

1. Working drawings for fabrication of the wall stem panels, showing dimensions, steel reinforcing bars, joint and joint filler details, surface finish details, lifting devices with the manufacturer's recommended safe working capacity, and material specifications.

2. Working drawings and design calculations for the erection of the wall stem panels showing dimensions, support points, support footing sizes, erection blockouts, member sizes, connections, and material specifications.

3. Design calculations for the precast wall stem panels, the connection between the precast panels and the cast-in-place footing, and all modifications to the cast-in-place footing details as shown in the Plans or Standard Plans.

The Contractor shall not begin excavation and construction operations for the retaining walls until receiving the Engineer's approval of the above submittals.

6-11.3(2) Excavation and Foundation Preparation

Excavation shall conform to Section 2-09.3(3), and to the limits and construction stages shown in the Plans. Foundation soils found to be unsuitable shall be removed and replaced in accordance with Section 2-09.3(1)C.

6-11.3(3) Precast Concrete Wall Stem Panels

The Contractor may fabricate precast concrete wall stem panels for construction of Standard Plan Retaining Wall Types 1 through 6 and 1SW through 6SW. Precast concrete wall stem panels may be used for construction of non-Standard Plan retaining walls if allowed by the Plans or Special Provisions. Precast concrete wall stem panels shall conform to Section 6-02.3(28), and shall be cast with Class 4000 concrete.

The precast concrete wall stem panels shall be designed in accordance with the requirements for Load Factor Design in the following codes:

1. For all loads except as otherwise noted - AASHTO Standard Specifications for Highway Bridges, latest edition and current interims. The seismic design shall use the acceleration coefficient and soil profile type as specified in the Plans.

2. For all wind loads - AASHTO Guide Specifications for Structural Design of Sound Barriers, latest edition and current interims.

The precast concrete wall stem panels shall be fabricated in accordance with the dimensions and details shown in the Plans, except as modified in the shop drawings as approved by the Engineer.

The precast concrete wall stem panels shall be fabricated full height, and shall be fabricated in widths of 8 feet, 16 feet, and 24 feet.

The construction tolerances for the precast concrete wall stem panels shall be as follows:

Height	±¼	inch
Width	±¼	inch
Thickness	+¼	inch
	-1/8	inch
Concrete cover for steel reinforcing bar	+3/8	inch
	-1/8	inch
Width of precast concrete wall stem panel joints	±¼	inch
Offset of precast concrete wall stem panels	±¼	inch
(Deviation from a straight line extending 5 feet on each side of the panel joint)		

The precast concrete wall stem panels shall be constructed with a mating shear key between adjacent panels. The shear key shall have beveled corners and shall be 1-1/2

inches in thickness. The width of the shear key shall be 3-1/2 inches minimum and 5-1/2 inches maximum. The shear key shall be continuous and shall be of uniform width over the entire height of the wall stem.

The Contractor shall provide the specified surface finish as noted, and to the limits shown, in the Plans to the exterior concrete surfaces. Special surface finishes achieved with form liners shall conform to Sections 6-02.2 and 6-02.3(14) as supplemented in the Special Provisions. Rolled on textured finished shall not be used. Precast concrete wall stem panels shall be cast in a vertical position if the Plans call for a form liner texture on both sides of the wall stem panel.

The precast concrete wall stem panel shall be rigidly held in place during placement and curing of the footing concrete.

The precast concrete wall stem panels shall be placed a minimum of one inch into the footing to provide a shear key. The base of the precast concrete wall stem panel shall be sloped ½ inch per foot to facilitate proper concrete placement.

To ensure an even flow of concrete under and against the base of the wall panel, a form shall be placed parallel to the precast concrete wall stem panel, above the footing, to allow a minimum one foot head to develop in the concrete during concrete placement.

The steel reinforcing bars shall be shifted to clear the erection blockouts in the precast concrete wall stem panel by 1-1/2 inches minimum.

All precast concrete wall stem panel joints shall be constructed with joint filler installed on the rear (backfill) side of the wall. The joint filler material shall extend from two feet below the final ground level in front of the wall to the top of the wall. The joint filler shall be a nonorganic flexible material and shall be installed to create a waterproof seal at panel joints.

The soil bearing pressure beneath the falsework supports for the precast concrete wall stem panels shall not exceed the maximum design soil pressure shown in the Plans for the retaining wall.

6-11.3(4) Cast-In-Place Concrete Construction

Cast-in-place concrete for concrete retaining walls shall be formed, reinforced, cast, cured, and finished in accordance with Section 6-02, and the details shown in the Plans and Standard Plans. All cast-in-place concrete shall be Class 4000.

The Contractor shall provide the specified surface finish as noted, and to the limits shown, in the Plans to the exterior concrete surfaces. Special surface finishes achieved with formliners shall conform to Sections 6-02.2 and 6-02.3(14) as supplemented in the Special Provisions.

Cast-in-place concrete for adjacent wall stem sections (between vertical expansion joints) shall be formed and placed separately, with a minimum 12 hour time period between concrete placement operations.

Premolded joint filler, 1/2" thick, shall be placed full height of all vertical wall stem expansion joints in accordance with Section 6-01.14.

6-11.3(5) Backfill, Weepholes and Gutters

Unless the Plans specify otherwise, backfill and weepholes shall be placed in accordance with Standard Plan D-4 and Section 6-02.3(22). Gravel backfill for drain shall be compacted in accordance with Section 2-09.3(1)E. Backfill within the zone defined as bridge approach embankment in Section 1-01.3 shall be compacted in accordance with Method C of Section 2-03.3(14)C. All other backfill shall be compacted in accordance with Method B of Section 2-03.3(14)C, unless otherwise specified.

Cement concrete gutter shall be constructed as shown in the Standard Plans.

6-11.3(6) Traffic Barrier and Pedestrian Barrier

When shown in the Plans, traffic barrier and pedestrian barrier shall be constructed in accordance with Sections 6-02.3(11)A and 6-10.3(2), and the details shown in the Plans and Standard Plans.

6-11.4 Measurement

Concrete Class 4000 for retaining wall will be measured as specified in Section 6-02.4.

Steel reinforcing bar for retaining wall and epoxy-coated steel reinforcing bar for retaining wall will be measured as specified in Section 6-02.4.

Traffic barrier and pedestrian barrier will be measured as specified in Section 6-10.4 for cast-in-place concrete barrier.

6-11.5 Payment

Payment will be made in accordance with Section 1-04.1 for each of the following bid items when they are included in the proposal:

"Conc. Class 4000 For Retaining Wall", per cubic yard.
All costs in connection with furnishing and installing weep holes and premolded joint filler shall be included in the unit contract price per cubic yard for "Conc. Class 4000 for Retaining Wall".

"St. Reinf. Bar For Retaining Wall", per pound.
"Epoxy-Coated St. Reinf. Bar For Retaining Wall", per pound.

"Traffic Barrier", per linear foot.
"Pedestrian Barrier", per linear foot.
The unit contract price per linear foot for "___ Barrier" shall be full pay for constructing the barrier on top of the retaining wall, except that when these bid items are not included in the proposal, all costs in connection with performing the work as specified shall be included in the unit contract price per cubic yard for "Conc. Class 4000 For Retaining Wall", and the unit contract price per pound for "___ Bar For Retaining Wall".

SECTION 6-12, NOISE BARRIER WALLS
April 5, 2004

6-12.1 Description
This work consists of constructing cast-in-place concrete, precast concrete, masonry, and timber noise barrier walls, including those shown in the Standard Plans.

6-12.2 Materials
Materials shall meet the requirements of the following sections:

Cement	9-01
Aggregates for Portland Cement Concrete	9-03.1
Gravel Backfill	9-03.12
Premolded Joint Filler	9-04.1(2)
Bolts, Nuts, and Washers	9-06.5(1)
Steel Reinforcing Bar	9-07.2
Epoxy-Coated Steel Reinforcing Bar	9-07.3
Paints	9-08
Concrete Curing Materials and Admixtures	9-23
Fly Ash	9-23.9
Water	9-25

Other materials required shall be as specified in the Special Provisions.

6-12.3 Construction Requirements

6-12.3(1) Submittals
All noise barrier walls not constructed immediately adjacent to the roadway, and which require construction of access for work activities, shall have a noise barrier wall access plan. The Contractor shall submit the noise barrier wall access plan to the Engineer for approval in accordance with Section 6-01.9. The noise barrier wall access plan shall include, but not be limited to, the locations of access to the noise barrier wall construction sites, and the method, materials, and equipment used to construct the access, remove the access, and recontour and reseed the disturbed ground.

For construction of all noise barrier walls with shafts, the Contractor shall submit a shaft construction plan to the Engineer for approval in accordance with Section 6-01.9, including but not limited to the following information:

1. List and description of equipment to be used to excavate and construct the shafts, including description of how the equipment is appropriate for use in the expected subsurface conditions.

2. The construction sequence and order of shaft construction.

3. Details of shaft excavation methods, including methods to clean the shaft excavation.

4. Details and dimensions of the shaft, and casing if used.

5. The method used to prevent ground caving (temporary casing, slurry, or other means).

6. Details of concrete placement including procedures for deposit through a conduit, tremie, or pump.

7. Method and equipment used to install and support the steel reinforcing bar cage.

For construction of precast concrete noise barrier walls, the Contractor shall submit shop drawings for the precast concrete panels to the Engineer in accordance with Section 6-02.3(28)A. In addition to the items listed in Section 6-02.3(28)A, the precast concrete panel shop drawings shall include the following:

1. Construction sequence and method of forming the panels.

2. Details of additional reinforcement provided at lifting and support locations.

3. Method and equipment used to support the panels during storage, transporting, and erection.

4. Erection sequence, including the method of lifting the panels, placing and adjusting the panels to proper alignment and grade, and supporting the panels during bolting, grouting, and backfilling operations.

The Contractor shall not begin noise barrier wall construction activities, including access construction and precast concrete panel fabrication, until receiving the Engineer's approval of all appropriate and applicable submittals.

6-12.3(2) Work Access and Site Preparation

The Contractor shall construct work access in accordance with the work access plan as approved by the Engineer. The construction access roads shall minimize disturbance to the existing vegetation, especially trees. Only trees and shrubs in direct conflict with the approved construction access road alignment shall be removed. Only one access road into the noise barrier wall from the main roadway and one access road from the noise barrier wall to the main roadway shall be constructed at each noise barrier wall.

Existing vegetation that has been identified by the Engineer shall be protected in accordance with Sections 1-07.16 and 2-01, and the Special Provisions.

6-12.3(3) Shaft Construction

The Contractor shall excavate and construct the shafts in accordance with the shaft construction plan as approved by the Engineer.

The shafts shall be excavated to the required depth as shown in the Plans. The excavation shall be completed in a continuous operation using equipment capable of excavating through the type of material expected to be encountered.

If the shaft excavation is stopped, the Contractor shall secure the shaft by installing a safety cover over the opening. The Contractor shall ensure the safety of the shaft and surrounding soil and the stability of the side walls. A temporary casing, slurry, or other methods approved by the Engineer shall be used as necessary to ensure such safety and stability.

When caving conditions are encountered, the Contractor shall stop further excavation until implementing the method to prevent ground caving as specified in the shaft construction plan approved by the Engineer.

When obstructions are encountered, the Contractor shall notify the Engineer promptly. An obstruction is defined as a specific object (including, but not limited to, boulders, logs, and man made objects) encountered during the shaft excavation operation which prevents or hinders the advance of the shaft excavation. When efforts to advance past the obstruction to the design shaft tip elevation result in the rate of advance of the shaft drilling equipment being is significantly reduced relative to the rate of advance for the rest of the shaft excavation, then the Contractor shall remove the obstruction under the provisions of Section 6-12.5 as supplemented in the Special Provisions. The method of removal of such obstructions, and the continuation of excavation shall be as proposed by the Contractor and approved by the Engineer.

The Contractor shall use appropriate means to clean the bottom of the excavation of all shafts. No more than two inches of loose or disturbed material shall be present at the bottom of the shaft just prior to beginning concrete placement.

The Contractor shall not begin placing steel reinforcing bars and concrete in the shaft until receiving the Engineer's approval of the shaft excavation.

The steel reinforcing bar cage shall be rigidly braced to retain its configuration during handling and construction. The Contractor shall not place individual or loose bars. The Contractor shall install the steel reinforcing bar cage as specified in the shaft construction plan as approved by the Engineer. The Contractor shall maintain the minimum concrete cover shown in the Plans.

If casings are used, the Contractor shall remove the casing during concrete placement. A minimum five feet head of concrete shall be maintained to balance soil and water pressure at the bottom of the casing. The casing shall be smooth. Where the top of the shaft is above the existing ground, the Contractor shall case the top of the hole prior to placing the concrete.

Concrete for shafts shall conform to Class 4000P. The Contractor shall place concrete in the shaft immediately after completing the shaft excavation and receiving the Engineer's approval of the excavation. The Contractor shall place the concrete in one continuous operation to the elevation shown in the Plans, using a method to prevent segregation of aggregates. The Contractor shall place the concrete as specified in the approved shaft construction plan. If water is present, concrete shall be placed in accordance with Section 6-02.3(6)B.

6-12.3(4) Trench, Grade Beam, or Spread Footing Construction

Where the noise barrier wall foundations exist below the existing groundline, excavation shall conform to Section 2-09.3(4), and to the limits and construction stages shown in the Plans. Foundation soils found to be unsuitable shall be removed and replaced in accordance with Section 2-09.3(1)C.

Where the noise barrier wall foundations exist above the existing groundline, the Contractor shall place and compact backfill material in accordance with Section 2-03.3(14)C.

Concrete for trench, grade beam, or spread footing foundations shall conform to Class 4000.

Cast-in-place concrete shall be formed, placed, and cured in accordance with Section 6-02, except that concrete for trench foundations shall be placed against undisturbed soil.

The excavation shall be backfilled in accordance with item 1 of the **Compaction** subsection of Section 2-09.3(1)E.

The steel reinforcing bar cage and the noise barrier wall anchor bolts shall be installed and rigidly braced prior to grade beam and spread footing concrete placement to retain their configuration during concrete placement. The Contractor shall not place individual or loose steel reinforcing bars and anchor bolts, and shall not install anchor bolts during or after concrete placement.

6-12.3(5) Cast-In-Place Concrete Panel Construction

Construction of cast-in-place concrete panels for noise barrier walls shall conform to Section 6-11.3(4). For noise barrier walls with traffic barrier, the construction of the traffic barrier shall also conform to Section 6-10.3(2).

The top of the cast-in-place concrete panels shall conform to the top of wall profile shown in the Plans. Where a vertical step is constructed to provide elevation change between adjacent panels, the dimension of the step shall be 2 feet. Each horizontal run between steps shall be a minimum of 48 feet.

6-12.3(6) Precast Concrete Panel Fabrication and Erection

The Contractor shall fabricate and erect the precast concrete panels in accordance with Section 6-02.3(28), and the following requirements:

1. Concrete shall conform to Class 4000.

2. Except as otherwise noted in the Plans and Special Provisions, all concrete surfaces shall receive a Class 2 finish in accordance with Section 6-02.3(14)B.

3. The precast concrete panels shall be cast in accordance with Section 6-02.3(28)B. The Contractor shall cast the precast concrete panels horizontally, with the traffic side surface cast against the form liner on the bottom. The Contractor shall fully support the precast concrete panel to avoid bowing and sagging surfaces.

   After receiving the Engineer's approval of the shop drawings, the Contractor shall cast one precast concrete panel to be used as the sample panel. The Contractor shall construct the sample panel in accordance with the procedure and details specified in the shop drawings approved by the Engineer. The Contractor shall make the sample panel available to the Engineer for approval.

   Upon receiving the Engineer's approval of the sample panel, the Contractor shall continue production of precast concrete panels for the noise barrier wall. All precast concrete panels will be evaluated against the sample panel for the quality of workmanship exhibited. The sample panel shall be retained at the fabrication site until all precast concrete panels have been fabricated and have received the Engineer's approval. After completing precast concrete panel fabrication, the Contractor may utilize the sample panel as a production noise barrier wall panel.

4. In addition to the fabrication tolerance requirements of Section 6-02.3(28)F, the precast concrete panels for noise barrier walls shall not exceed the following scalar tolerances:

   Length and Width: ± 1/8 inch per five feet, not to exceed 1/4 inch total.

   Thickness: ± 1/4 inch.

   The difference obtained by comparing the measurement of the diagonal of the face of the panels shall not be greater than 1/2 inch.

   Dimension tolerances for the traffic barrier portion of precast concrete panels formed with traffic barrier shapes shall conform to Section 6-10.3(2).

5. After erection, the precast concrete panels shall not exceed the joint space tolerances shown in the Plans. The panels shall not exceed 3/8 inch out of plumb in any direction.

   The Contractor shall seal the joints between precast concrete panels with a backer rod and sealant system as specified. The Contractor shall seal both sides of the joint full length.

The top of precast concrete panels shall conform to the top of wall profile shown in the Plans. Where a vertical step is constructed to provide elevation change between adjacent panels, the dimension of the step shall be 2 feet. Each horizontal run between steps shall be a minimum of 48 feet.

6-12.3(7) Masonry Wall Construction

Construction requirements for masonry noise barrier wall panels shall be as specified in the Special Provisions.

6-12.3(8) Fabricating and Erecting Timber Noise Barrier Wall Panels

Construction requirements for timber noise barrier wall panels shall be as specified in the Special Provisions.

6-12.3(9) Access Doors and Concrete Landing Pads

The Contractor shall install access doors and door frames as shown in the Plans and Standard Plans. The Contractor shall install the access doors to open toward the roadway side. The door frames shall be set in place with grout conforming to Section 6-02.3(20), with the grout completely filling the void between the door frame and the noise barrier wall panel.

The Contractor shall apply two coats of paint, as specified in the Special Provisions, to all exposed metal surfaces of access doors and frames, except for stainless steel surfaces. Each coat shall be 3 mils minimum wet film thickness.

The Contractor shall construct a concrete landing pad on the roadway side of each access door location as shown in the Plans. The concrete shall conform to Section 6-02.3(2)B.

6-12.3(10) Finish Ground Line Dressing

The Contractor shall contour and dress the ground line on both sides of the noise barrier wall, providing the minimum cover over the foundation as shown in the Plans. The Contractor shall contour the ground adjacent to the barrier to ensure good drainage away from the barrier.

After the access roads are no longer needed for noise barrier wall construction activities, the Contractor shall restore the area to the original condition. The Contractor shall recontour the access roads to match into the surrounding ground and shall reseed all disturbed areas in accordance with the Section 8-01 and the Special Provisions, and the noise barrier wall access plan as approved by the Engineer.

6-12.4 Measurement

Noise barrier wall will be measured by the square foot area of one face of the completed wall panel in place. Except as otherwise noted, the bottom limit for measurement will be the top of the trench footing, spread footing, or shaft cap. For Noise Barrier Type 5, the bottom measurement limit will be the optional construction joint at the base of the traffic barrier. For Noise Barrier Type 7, the bottom measurement limit will be base of the traffic barrier. For Noise Barrier Types 8, 11, 12, 14, 15, and 20, the bottom measurement limit will be the base of the wall panel.

Noise barrier wall access door will be measured once for each access door assembly with concrete landing pad furnished and installed.

6-12.5 Payment

Payment will be made in accordance with Section 1-04.1 for each of the following bid items when they are included in the proposal:

"Noise Barrier Wall Type __", per square foot.
The unit contract price per square foot for "Noise Barrier Wall Type __" shall be full pay for constructing the noise barrier walls as specified, including constructing and removing access roads, excavating and constructing foundations and grade beams, constructing cast-in-place concrete, and masonry wall panels, fabricating and erecting precast concrete, and timber wall panels, applying sealer, and contouring the finish ground line adjacent to the noise barrier walls.

"Noise Barrier Wall Access Door", per each.
The unit contract price per each for "Noise Barrier Wall Access Door" shall be full pay for furnishing and installing the access door assembly as specified, including painting the installed access door assembly and constructing the concrete landing pad.

SECTION 6-13, STRUCTURAL EARTH WALLS
April 5, 2004

6-13.1 Description

This work consists of constructing structural earth walls (SEW).

6-13.2 Materials

Materials shall meet the requirements of the following sections:

Cement	9-01

Aggregates for Portland Cement Concrete	9-03.1
Gravel Backfill	9-03.12(2)
Premolded Joint Filler	9-04.1(2)
Steel Reinforcing Bar	9-07.2
Epoxy-Coated Steel Reinforcing Bar	9-07.3
Concrete Curing Materials and Admixtures	9-23
Fly Ash	9-23.9
Water	9-25

Other materials required shall be as specified in the Special Provisions.

6-13.3 Construction Requirements

Proprietary structural earth wall systems shall be as specified in the Special Provisions.

6-13.3(1) Quality Assurance

The structural earth wall manufacturer shall provide a qualified and experienced representative to resolve wall construction problems as approved by the Engineer. The structural earth wall manufacturer's representative shall be present at the beginning of wall construction activities, and at other times as needed throughout construction. Recommendations made by the structural earth wall manufacturer's representative and approved by the Engineer shall be followed by the Contractor.

The completed wall shall meet the following tolerances:

1. Deviation from the design batter and horizontal alignment, when measured along a ten foot straight edge, shall not exceed the following:

    a. Welded wire faced structural earth wall: 2 inches

    b. Precast concrete panel and concrete block faced structural earth wall: 3/4 inch

2. Deviation from the overall design batter of the wall shall not exceed the following per ten feet of wall height:

    a. Welded wire faced structural earth wall: 1.5 inches

    b. Precast concrete panel and concrete block faced structural earth wall: 1/2 inch

3. The maximum outward bulge of the face between welded wire faced structural earth wall reinforcement layers shall not exceed two inches. The maximum allowable offset in any precast concrete facing panel joint shall be 3/4 inch. The maximum allowable offset in any concrete block joint shall be 3/8 inch.

4. The base of the structural earth wall excavation shall be within three inches of the staked elevations, unless otherwise approved by the Engineer.

5. The external structural earth wall dimensions shall be placed within two inches of that staked on the ground.

6. The backfill reinforcement layers shall be located horizontally and vertically within one inch of the locations shown in the structural earth wall working drawings as approved by the Engineer.

At least five working days prior to the Contractor beginning any structural earth wall work at the site, a structural earth wall preconstruction conference shall be held to discuss construction procedures, personnel, and equipment to be used, and other elements of structural earth wall construction. Those attending shall include:

1. (representing the Contractor) The superintendent, on site supervisors, and all foremen in charge of excavation, leveling pad placement, concrete block and soil reinforcement placement, and structural earth wall backfill placement and compaction.

2. (representing the Structural Earth Wall Manufacturer) The qualified and experienced representative of the structural earth wall manufacturer as specified at the beginning of this Section.

3. (representing the Contracting Agency) The Project Engineer, key inspection personnel, and representatives from the WSDOT Construction Office and Materials Laboratory Geotechnical Services Branch.

6-13.3(2) Submittals

The Contractor, or the supplier as the Contractor's agent, shall furnish to the Engineer a Manufacturer's Certificate of Compliance in accordance with Section 1-06.3, certifying that the structural earth wall materials conform to the specified material requirements. This includes providing a Manufacturer's Certificate of Compliance for all concrete admixtures, cement, fly ash, steel reinforcing bars, reinforcing strips, reinforcing mesh, tie strips, fasteners, welded wire mats, backing mats, construction geotextile for wall facing, drainage geosynthetic fabric, block connectors, and joint materials. The Manufacturer's Certificate of Compliance for geogrid reinforcement shall include the information specified in Section 9-33.4(4) for each geogrid roll, and shall specify the geogrid polymer types for each geogrid roll.

A copy of all test results, performed by the Contractor or the Contractor's supplier, which are necessary to assure compliance with the specifications, shall submitted to the Engineer along with each Manufacturer's Certificate of Compliance.

Before fabrication, the Contractor shall submit a field construction manual for the structural earth walls, prepared by the wall manufacturer, to the Engineer for approval in accordance with Section 6-01.9. This manual shall provide step-by-step directions for construction of the wall system.

The Contractor, or the supplier as the Contractor's agent, shall submit detailed design calculations and working drawings to the Engineer for approval in accordance with Section 6-01.9.

The design calculation and working drawing submittal shall include detailed design calculations and all details, dimensions, quantities, and cross-sections necessary to construct the wall. The calculations shall include a detailed explanation of any symbols and computer programs used in the design of the walls. All computer output submitted shall be accompanied by supporting hand calculations detailing the calculation process.

The design calculations shall be based on the current AASHTO Standard Specifications for Highway Bridges including current interims, and also based on the following:

1. The factor of safety for overturning and sliding are 2.0 and 1.5 respectively for AASHTO Load Group I, and 1.5 and 1.1 respectively for AASHTO Load Group VII.

2. The wall surcharge conditions (backfill slope) shown in the Plans.

3. If a highway is adjacent to and on top of the wall, a two foot surcharge shall be used in the design.

4. If the Plans detail a traffic barrier on top of the wall, the barrier and wall shall be capable of resisting a 10,000 pound horizontal load applied at the top of the barrier.

5. The geotechnical design parameters for the wall shall be as specified in the Special Provisions.

A minimum of six sets of working drawings shall be fully detailed and shall include, but not be limited to, the following items:

1. A plan and elevation sheet or sheets for each wall, containing the following:

    a. An elevation view of the wall which shall include the following:

        i. the elevation at the top of the wall, at all horizontal and vertical break points, and at least every 50 feet along the wall;

        ii. elevations at the base of welded wire mats or the top of leveling pads and foundations, and the distance along the face of the wall to all steps in the welded wire mats, foundations and leveling pads;

        iii. the designation as to the type of panel, block, or module;

        iv. the length, size, and number of geogrids or mesh or strips, and the distance along the face of the wall to where changes in length of the geogrids or mesh or strips occur; or

        v. the length, size, and wire sizes and spacings of the welded wire mats and backing mats, and the distance along the face of the wall to where changes in length, size, and wire sizes and spacings of the welded wire mats and backing mats occur; and

        vi. the location of the original and final ground line.

    b. A plan view of the wall which shall indicate the offset from the construction centerline to the face of the wall at all changes in horizontal alignment; the limit of the widest module, geogrid, mesh, strip or welded wire mat, and the centerline of any drainage structure or drainage pipe which is behind or passes under or through the wall.

c. General notes, if any, required for design and construction of the wall.

d. All horizontal and vertical curve data affecting wall construction.

e. A listing of the summary of quantities provided on the elevation sheet of each wall for all items including incidental items.

f. Cross-section showing limits of construction. In fill sections, the cross-section shall show the limits and extent of select granular backfill material placed above original ground.

g. Limits and extent of reinforced soil volume.

2. All details including steel reinforcing bar bending details. Bar bending details shall be in accordance with Section 9-07.1.

3. All details for foundations and leveling pads, including details for steps in the foundations or leveling pads, as well as allowable and actual maximum bearing pressures for AASHTO Load Groups I and VII.

4. All modules and facing elements shall be detailed. The details shall show all dimensions necessary to construct the element, all steel reinforcing bars in the element, and the location of reinforcement element attachment devices embedded in the precast concrete facing panel or concrete block.

5. All details for construction of the wall around drainage facilities, sign, signal, luminaire, and noise barrier wall foundations, and structural abutment and foundation elements shall be clearly shown.

6. All details for connections to traffic or pedestrian barriers, coping, parapets, noise barrier walls, and attached lighting shall be shown.

7. All details for the traffic or pedestrian barrier attached to the top of the wall (if shown in the Plans) including interaction with bridge approach slabs.

The Contractor shall not begin wall construction (including precast concrete facing panel fabrication) until receiving the Engineer's written approval of the material certifications and test results, design calculations and working drawing submittals.

6-13.3(3) Excavation and Foundation Preparation

Excavation shall conform to Section 2-09.3(4) and to the limits and construction stages shown in the Plans. Foundation soils found to be unsuitable shall be removed and replaced in accordance with Section 2-09.3(1)C. The foundation for the structure shall be graded level for a width equal to or exceeding the length of reinforcing as shown in the structural earth wall working drawings as approved by the Engineer and, for walls with geogrid reinforcing, in accordance with Section 2-12.3. Prior to wall construction, the foundation, if not in rock, shall be compacted as approved by the Engineer.

At the foundation level of the bottom course of precast concrete facing panels and concrete blocks, an unreinforced concrete leveling pad shall be provided as shown in the Plans. The leveling pad shall be cured a minimum of 12 hours and have a minimum compressive

strength of 1500 psi before placement of the precast concrete facing panels or concrete blocks.

6-13.3(4) Precast Concrete Facing Panel and Concrete Block Fabrication

Concrete for precast concrete facing panels shall meet the following requirements:

1. Have a minimum 28 day compressive strength of 4,000 pounds per square inch, unless otherwise specified in the Special Provisions for specific proprietary wall systems.

2. Contain a water-reducing admixture meeting AASHTO M 194 Type A, D, F, or G.

3. Be air-entrained, 6 percent ± 1 1/2 percent.

4. Have a maximum slump of four inches, or six inches if a Type F or G water reducer is used.

Concrete for dry cast concrete blocks shall meet the following requirements:

1. Have a minimum 28 day compressive strength of 4,000 psi.

2. Conform to ASTM C 1372, except as otherwise specified.

3. The lot of blocks produced for use in this project shall conform to the following freeze-thaw test requirements when tested in accordance with ASTM C 1262. Minimum acceptable performance shall be defined as weight loss at the conclusion of 150 freeze-thaw cycles not exceeding one percent of the block's initial weight for a minimum of four of the five block specimens tested.

4. The concrete blocks shall have a maximum water absorption of one percent above the water absorption content of the lot of blocks produced and successfully tested for the freeze-thaw test specified in item 3 above.

Precast concrete facing panels and concrete blocks will be accepted based on successful compressive strength tests and visual inspection. The precast concrete facing panels and concrete blocks shall be considered acceptable regardless of curing age when compressive test results indicate that the compressive strength conforms to the 28-day requirements and when the visual inspection is satisfactorily completed. Testing and inspection of precast concrete facing panels shall conform to Section 6-02.3(28). Testing and inspection of dry cast concrete blocks shall conform to ASTM C 140.

All precast concrete facing panels shall be five feet square, except:

1. for partial panels at the top, bottom, and ends of the wall, and

2. as otherwise shown in the Plans.

All precast concrete facing panels shall be manufactured within the following tolerances:

1. All dimensions ± 3/16 inch.

2. Squareness, as determined by the difference between the two diagonals, shall not exceed 1/2 inch.

3. Surface defects on smooth formed surfaces measured on a length of 5 feet shall not exceed 1/8 inch. Surface defects on textured-finished surfaces measured on a length of five feet shall not exceed 5/16 inch.

All concrete blocks shall be manufactured within the following tolerances:

1. Vertical dimensions shall be ± 1/16 inch of the plan dimension, and the rear height shall not exceed the front height.

2. The dimensions of the grooves in the top and bottom faces of the concrete blocks shall be formed within the tolerances specified by the proprietary wall manufacturer, for the fit required for the block connectors.

3. All other dimensions shall be ± 1/4 inch of the plan dimension.

Tie attachment devices, except for geosynthetic reinforcement, shall be set in place to the dimensions and tolerances shown in the Plans prior to casting.

The forms forming precast concrete facing panels, including the forms for loop pockets and access pockets, and the forms forming the concrete blocks, shall be removed in accordance with the recommendations of the wall manufacturer, without damaging the concrete.

The concrete surface for the precast concrete facing panel shall have the finish shown in the Plans for the front face and an unformed finish for the rear face. The rear face of the precast concrete facing panel shall be roughly screeded to eliminate open pockets of aggregate and surface distortions in excess of 1/4 inch.

The concrete surface for the front face of the concrete block shall be flat, and shall be a conventional "split face" finish in accordance with the wall manufacturer's specifications. The concrete surface of all other faces shall be Class 2 in accordance with Section 6-02.3(14)B. The finish and appearance of the concrete blocks shall also conform to ASTM C 1372. The color of the concrete block shall be concrete gray, unless otherwise shown in the Plans.

The date of manufacture, production lot number, and the piece-mark, shall be clearly marked on the rear face of each precast concrete facing panel, and marked or tagged on each pallet of concrete blocks.

All precast concrete facing panels and concrete blocks shall be handled, stored, and shipped in accordance with Sections 6-02.3(28)G and 6-02.3(28)H to prevent chipping, cracks, fractures, and excessive bending stresses.

Precast concrete facing panels in storage shall be supported on firm blocking located immediately adjacent to tie strips to avoid bending the tie strips.

6-13.3(5) Precast Concrete Facing Panel and Concrete Block Erection

The precast concrete facing panels shall be placed vertically. During erection, precast concrete facing panels shall be handled by means of a lifting device set into the upper edge of the panels.

Concrete blocks shall be erected in a running bond fashion in accordance with the wall manufacturer's field construction manual, and may be placed by hand. The top surface of each course of concrete blocks, including all pockets and recesses, shall be cleaned of backfill and all extraneous materials prior to connecting the reinforcing strips or geosynthetic reinforcing, and placing the next course of concrete blocks. Concrete blocks receiving geosynthetic reinforcement shall be connected as specified in the Special Provisions. Cap block top courses shall be bonded to the lower course of concrete blocks as specified below. All other concrete blocks shall be connected with block connectors or pins placed into the connector slots.

Precast concrete facing panels and concrete blocks shall be placed in successive horizontal lifts as backfill placement proceeds in the sequence shown in the structural earth wall working drawings as approved by the Engineer.

External bracing is required for the initial lift for precast concrete facing panels.

As backfill material is placed behind the precast concrete facing panels, the panels shall be maintained in vertical position by means of temporary wooden wedges placed in the joint at the junction of the two adjacent panels on the external side of the wall.

Reinforcing shall be placed normal to the face of the wall, unless otherwise shown in the Plans or directed by the Engineer. Prior to placement of the reinforcing, backfill shall be compacted.

Geosynthetic reinforcing shall be placed in accordance with Section 2-12.3 and as follows:

1. The Contractor shall stretch out the geosynthetic in the direction perpendicular to the wall face to remove all slack and wrinkles, and shall hold the geosynthetic in place with soil piles or other methods as recommended by the geosynthetic manufacturer, before placing backfill material over the geosynthetic to the specified cover.

2. The geosynthetic reinforcement shall be continuous in the direction perpendicular to the wall face from the back face of the concrete panel to the end of the geosynthetic or to the last geogrid node at the end of the specified reinforcement length. Geosynthetic splices parallel to the wall face will not be allowed.

At the completion of each course of concrete blocks and prior to installing any block connectors or geosynthetic reinforcement at this level, the Contractor shall check the blocks for level placement in all directions, and shall adjust the blocks by grinding or rear face shimming, or other method as recommended by the structural earth wall manufacturer's representative and as approved by the Engineer, to bring the blocks into a level plane.

For concrete block wall systems receiving a cap block top course, the cap blocks shall be bonded to the lower course with mortar, or with an adhesive capable of bonding the concrete block courses together.

6-13.3(6) Welded Wire Faced Structural Earth Wall Erection

The Contractor shall erect the welded wire wall reinforcement in accordance with the wall manufacturer's field construction manual and as approved by the Engineer. Construction geotextile for wall facing shall be placed between the backfill material within the reinforced

zone and the coarse granular material immediately behind the welded wire wall facing, as shown in the Plans and the structural earth wall working drawings as approved by the Engineer.

6-13.3(7) Backfill

Backfill placement shall closely follow erection of each course of welded wire mats and backing mats, precast concrete facing panels, or concrete blocks. Backfill shall be placed in such a manner as to avoid any damage or disturbance to the wall materials or misalignment of the welded wire mats and backing mats, precast concrete facing panels, or concrete blocks. Backfill shall be placed in a manner that segregation does not occur.

The Contractor shall place wall backfill over geosynthetic reinforcement, or construction geotextile for wall facing, in accordance with Section 2-12.3 and as follows:

1. The Contractor shall ensure that six inches minimum of backfill shall be between the geogrid reinforcement, or construction geotextile for wall facing, and any construction vehicle or equipment tires or tracks at all times.

Misalignment or distortion of the precast concrete facing panels or concrete blocks due to placement of backfill outside the limits of this specification shall be corrected in a manner as approved by the Engineer.

The moisture content of the backfill material prior to and during compaction shall be uniformly distributed throughout each layer of material. The moisture content of all backfill material shall conform to Sections 2-03.3(14)C and 2-03.3(14)D.

Backfill shall be compacted in accordance with Method C of Section 2-03.3(14)C, except as follows:

1. The maximum lift thickness after compaction shall not exceed ten inches.

2. The Contractor shall decrease this lift thickness, if necessary, to obtain the specified density.

3. The Contractor shall not use sheepsfoot rollers or rollers with protrusions for compacting backfill reinforced with geosynthetic layers, or for compacing the first lift of backfill above the construction geosynthetic for wall facing for each layer of welded wire mats. Rollers shall have sufficient capacity to achieve compaction without causing distortion to the face of the wall in accordance with the tolerances specified in Section 6-13.3(1).

4. The Contractor shall compact the zone within three feet of the back of the wall facing panels without causing damage to or distortion of the wall facing elements (welded wire mats, backing mats, construction geotextile for wall facing, precast concrete facing panels, and concrete blocks) by using light mechanical tampers as approved by the Engineer. No soil density tests will be taken within this area.

5. For wall systems with geosynthetic reinforcement, the minimum compacted backfill lift thickness of the first lift above each geosynthetic reinforcement layer shall be six inches.

At the end of each day's operation, the Contractor shall shape the last level of backfill to permit runoff of rainwater away from the wall face. In addition, the Contractor shall not allow surface runoff from adjacent areas to enter the wall construction site.

Wall materials damaged or disturbed during backfill placement shall be either removed and replaced, or adjusted and repaired, by the Contractor as approved by the Engineer at no additional expense to the Contracting Agency.

6-13.3(8) Guardrail Placement

Where guardrail posts are required, the Contractor shall not begin installing guardrail posts until completing the structural earth wall to the top of wall elevation shown in the Plans. The Contractor shall install the posts in a manner that prevents movement of the precast concrete facing panels or concrete blocks, and prevents ripping, tearing, or pulling of the wall reinforcement.

The Contractor may cut welded wire reinforcement of welded wire faced structural earth walls to facilitate placing the guardrail posts, but only in the top two welded wire reinforcement layers and only with the approval of the Engineer in a manner that prevents bulging of the wall face and prevents ripping or pulling of the welded wire reinforcement. Holes through the welded wire reinforcement shall be the minimum size necessary for the post. The Contractor shall demonstrate to the Engineer prior to beginning guardrail post installation that the installation method will not rip, tear, or pull the wall reinforcement.

The Contractor shall place guardrail posts between the reinforcing strips, reinforcing mesh, and tie strips of the non-geosynthetic reinforced precast concrete panel or concrete block faced structural earth walls. Holes through the reinforcement of geosynthetic reinforced walls, if necessary, shall be the minimum size necessary for the guardrail post.

6-13.3(9) SEW Traffic Barrier and SEW Pedestrian Barrier

SEW traffic barrier and SEW pedestrian barrier, if shown in the Plans, shall be constructed in accordance with Sections 6-02.3(11)A and 6-10.3(2), the details in the Plans and in the structural earth wall working drawings as approved by the Engineer, except as follows:

1. The slip-form method of barrier construction will not be allowed for SEW traffic barrier and SEW pedestrian barrier.

2. The Contractor shall not begin placing backfill above the bottom of the SEW traffic barrier and SEW pedestrian barrier until removing the forms from the portion of the barrier being embedded. The Contractor shall not remove forms from the embedded portion of the barrier until the concrete has set for at least three days or has attained a minimum compressive strength of 2,400 psi.

6-13.4 Measurement

Structural earth wall will be measured by the square foot of completed wall in place. The bottom limits for vertical measurement will be the bottom of the bottom mat, for welded wire faced structural earth walls, or the top of the leveling pad (or bottom of wall if no leveling pad is present) for precast concrete panel or concrete block faced structural earth walls. The top limit for vertical measurement will be the top of wall as shown in the Plans. The horizontal limits for measurement are from the end of the wall to the end of the wall.

Backfill for structural earth wall including haul will be measured by the cubic yard in place determined by the limits shown in the Plans.

SEW traffic barrier, and SEW pedestrian barrier will be measured as specified in Section 6-10.4 for cast-in-place concrete barrier.

6-13.5 Payment

Payment will be made in accordance with Section 1-04.1 for each of the following bid items when they are included in the proposal:

"Structural Earth Wall", per square foot.
All costs in connection with furnishing materials for, and constructing, structural earth walls, including constructing leveling pads when specified, shall be included in the unit contract price per square foot for "Structural Earth Wall".

"Backfill for Structural Earth Wall Incl. Haul", per cubic yard.
All costs in connection with furnishing and placing backfill for structural earth wall, including hauling and compacting the backfill, and furnishing and placing the wall facing backfill for welded wire faced structural earth walls, shall be included in the unit contract price per cubic yard for "Backfill for Structural Earth Wall Incl. Haul".

"SEW Traffic Barrier", per linear foot.
"SEW Pedestrian Barrier", per linear foot.
The unit contract price per linear foot for "SEW ___ Barrier" shall be full pay for constructing the barrier on top of the structural earth wall, except that when these bid items are not included in the proposal, all costs in connection with performing the work as specified shall be included in the unit contract price per square foot for "Structural Earth Wall".

SECTION 6-14, GEOSYNTHETIC RETAINING WALLS
April 5, 2004

6-14.1 Description

This work consists of constructing geosynthetic retaining walls, including those shown in the Standard Plans.

6-14.2 Materials

Materials shall meet the requirements of the following sections:

Gravel Borrow For Geosynthetic Retaining Wall	9-03.14(4)
Construction Geosynthetic	9-33

The requirements specified in Section 2-12.2 for geotextiles shall also apply to geosynthetic and geogrid materials used for permanent and temporary geosynthetic retaining walls.

Other materials required shall be as specified in the Special Provisions.

6-14.3 Construction Requirements

Temporary geosynthetic retaining walls are defined as those walls and wall components constructed and removed or abandoned before the physical completion date of the project or as shown in the Plans. All other geosynthetic retaining walls shall be considered as permanent.

6-14.3(1) Quality Assurance

The Contractor shall complete the base of the retaining wall excavation to within plus or minus three inches of the staked elevations unless otherwise directed by the Engineer. The Contractor shall place the external wall dimensions to within plus or minus two inches of that staked on the ground. The Contractor shall space the reinforcement layers vertically and place the overlaps to within plus or minus one inch of that shown in the Plans.

The completed wall(s) shall meet the following tolerances:

	Permanent Wall	Temporary Wall
Deviation from the design batter and horizontal alignment for the face when measured along a ten foot straight edge at the midpoint of each wall layer shall not exceed:	3 inches	5 inches
Deviation from the overall design batter per ten feet of wall height shall not exceed:	2 inches	3 inches
Maximum outward bulge of the face between backfill reinforcement layers shall not exceed:	4 inches	6 inches

6-14.3(2) Submittals

A minimum of 14 calendar days prior to beginning construction of each wall the Contractor shall submit detailed plans for each wall in accordance with Section 6-01.9. As a minimum, the submittals shall include the following:

1. Detailed wall plans showing the actual lengths proposed for the geosynthetic reinforcing layers and the locations of each geosynthetic product proposed for use in each of the geosynthetic reinforcing layers.

2. The Contractor's proposed wall construction method, including proposed forming systems, types of equipment to be used and proposed erection sequence.

3. Manufacturer's Certificate of Compliance, samples of the retaining wall geosynthetic and sewn seams for the purpose of acceptance as specified.

4. Details of geosynthetic retaining wall corner construction, including details of the positive connection between the wall sections on both sides of the corner.

5. Details of terminating a top layer of retaining wall geosynthetic and backfill due to a changing retaining wall profile.

Approval of the Contractor's proposed wall construction details and methods shall not relieve the Contractor of their responsibility to construct the walls in accordance with the requirements of these Specifications.

6-14.3(3) Excavation and Foundation Preparation

Excavation shall conform to Section 2-09.3(4), and to the limits and construction stages shown in the Plans. Foundations soils found to be unsuitable shall be removed and replaced in accordance with Section 2-09.3(1)C.

The Contractor shall direct all surface runoff from adjacent areas away from the retaining wall construction site.

6-14.3(4) Erection and Backfill

The Contractor shall begin wall construction at the lowest portion of the excavation and shall place each layer horizontally as shown in the Plans. The Contractor shall complete each layer entirely before beginning the next layer.

Geotextile splices shall consist of a sewn seam or a minimum 1'-0" overlap. Geogrid splices shall consist of adjacent geogrid strips butted together and fastened using hog rings, or other methods approved by the Engineer, in such a manner to prevent the splices from separating during geogrid installation and backfilling. Splices exposed at the wall face shall prevent loss of backfill material through the face. The splicing material exposed at the wall face shall be as durable and strong as the material to which the splices are tied. The Contractor shall offset geosynthetic splices in one layer from those in the other layers such that the splices shall not line up vertically. Splices parallel to the wall face will not be allowed, as shown in the Plans.

The Contractor shall stretch out the geosynthetic in the direction perpendicular to the wall face to ensure that no slack or wrinkles exist in the geosynthetic prior to backfilling.

For geogrids, the length of the reinforcement required as shown in the Plans shall be defined as the distance between the geosynthetic wrapped face and the last geogrid node at the end of the reinforcement in the wall backfill.

The Contractor shall place fill material on the geosynthetic in lifts such that six inches minimum of fill material is between the vehicle or equipment tires or tracks and the geosynthetic at all times. The Contractor shall remove all particles within the backfill material greater than three inches in size. Turning of vehicles on the first lift above the geosynthetic will not be permitted. The Contractor shall not end dump fill material directly on the geosynthetic without the prior approval of the Engineer.

Should the geosynthetic be damaged or the splices disturbed, the backfill around the damaged or displaced area shall be removed and the damaged strip of geosynthetic replaced by the Contractor at no expense to the Contracting Agency.

The Contractor shall use a temporary form system to prevent sagging of the geosynthetic facing elements during construction. A typical example of a temporary form system and sequence of wall construction required when using this form are detailed in the Plans. Soil piles or the geosynthetic manufacturer's recommended method, in combination with the forming system shall be used to hold the geosynthetic in place until the specified cover material is placed.

The Contractor shall place and compact the wall backfill in accordance with the wall construction sequence detailed in the Plans and Method C of Section 2-03.3(14)D, except as follows:

1. The maximum lift thickness after compaction shall not exceed ten inches

2. The Contractor shall decrease this lift thickness, if necessary, to obtain the specified density.

3. Rollers shall have sufficient capacity to achieve compaction without causing distortion to the face of the wall in accordance with Section 6-14.3(1).

4. The Contractor shall not use sheepsfoot rollers or rollers with protrusions.

5. The Contractor shall compact the zone within three feet of the back of the wall facing panels without causing damage to or distortion of the wall facing elements (welded wire mats, backing mats, construction geotextile for wall facing, precast concrete facing panels, and concrete blocks) by using light mechanical tampers as approved by the Engineer. No soil density tests will be taken within this area.

6. For wall systems with geosynthetic reinforcement, the minimum compacted backfill lift thickness of the first lift above each geosynthetic reinforcement layer shall be six inches.

The Contractor shall construct wall corners at the locations shown in the Plans, and in accordance with the wall corner construction sequence and method submitted by the Contractor and approved by the Engineer. Wall angle points with an interior angle of less than 150 degrees shall be considered to be a wall corner. The wall corner shall provide a positive connection between the sections of the wall on each side of the corner such that the wall backfill material cannot spill out through the corner at any time during the design life of the wall. The Contractor shall construct the wall corner such that the wall sections on both sides of the corner attain the full geosynthetic layer embedment lengths shown in the Plans.

Where required by retaining wall profile grade, the Contractor shall terminate top layers of retaining wall geosynthetic and backfill in accordance with the method submitted by the Contractor and approved by the Engineer. The end of each layer at the top of the wall shall be constructed in a manner which prevents wall backfill material from spilling out the face of the wall throughout the life of the wall. If the profile of the top of the wall changes at a rate of 1:1 or steeper, this change in top of wall profile shall be considered to be a corner.

6-14.3(5) Guardrail Placement

The Contractor shall install guardrail posts as shown in the Plans after completing the wall, but before the permanent facing is installed. The Contractor shall install the posts in a manner that prevents bulging of the wall face and prevents ripping, tearing, or pulling of the geosynthetic reinforcement. Holes through the geosynthetic reinforcement shall be the minimum size necessary for the post. The Contractor shall demonstrate to the Engineer prior to beginning guardrail post installation that the installation method will not rip, tear, or pull the geosynthetic reinforcement.

6-14.3(6) Permanent Facing

The Contractor shall apply a permanent facing to the surface of all permanent geosynthetic retaining walls as shown in the Plans. Shotcrete facing, if shown in the Plans, shall conform to Section 6-18. Concrete fascia panel, if shown in the Plans, shall conform to Section 6-15.3(9).

6-14.3(7) Geosynthetic Retaining Wall Traffic Barrier and Geosynthetic Retaining Wall Pedestrian Barrier

Geosynthetic retaining wall traffic barrier and geosynthetic retaining wall pedestrian barrier, if shown in the Plans, shall be constructed in accordance with Sections 6-02.3(11)A and 6-10.3(2), and the details in the Plans, except as follows:

1. The slip-form method of barrier construction will not be allowed for geosynthetic retaining wall traffic barrier and geosynthetic retaining wall pedestrian barrier.

2. The Contractor shall not begin placing backfill above the bottom of the geosynthetic retaining wall traffic barrier and geosynthetic retaining wall pedestrian barrier until removing the forms from the portion of the barrier being embedded. The Contractor shall not remove forms from the embedded portion of the barrier until the concrete has set for at least three days or has attained a minimum compressive strength of 2,400 psi.

6-14.4 Measurement

Permanent geosynthetic retaining wall and temporary geosynthetic retaining wall will be measured by the square foot of face of completed wall.

Gravel borrow for geosynthetic retaining wall backfill will be measured as specified in Section 2-03.4.

Shotcrete facing and concrete fascia panel will be measured by the square foot surface area of the completed facing or fascia panel, measured to the neat lines of the facing or panel as shown in the Plans.

Geosynthetic retaining wall traffic barrier and geosynthetic retaining wall pedestrian barrier will be measured as specified in Section 6-10.4 for cast-in-place concrete barrier.

6-14.5 Payment

Payment will be made in accordance with Section 1-04.1 for each of the following bid items when they are included in the proposal:

"Geosynthetic Retaining Wall", per square foot.
"Temporary Geosynthetic Retaining Wall", per square foot.
All costs in connection with constructing the temporary or permanent geosynthetic retaining wall as specified shall be included in the unit contract price per square foot for "Geosynthetic Retaining Wall" and "Temporary Geosynthetic Retaining Wall", including compaction of the backfill material and furnishing and installing the temporary forming system.

"Borrow for Geosynthetic Wall Incl. Haul", per ton or per cubic yard.
All costs in connection with furnishing and placing backfill material for temporary or permanent geosynthetic retaining walls as specified shall be included in the unit contract price per ton or per cubic yard for "Gravel Borrow for Geosynthetic Wall Incl. Haul".

"Concrete Fascia Panel", per square foot.
All costs in connection with constructing the concrete fascia panels as specified shall be included in the unit contract price per square foot for "Concrete Fascia Panel", including

all steel reinforcing bars, premolded joint filler, polyethylene bond breaker strip, joint sealant, pvc pipe for weep holes, exterior surface finish, and pigmented sealer (when specified).

Shotcrete facing will be paid for in accordance with Section 6-18.5.

"Geosynthetic Retaining Wall Traffic Barrier", per linear foot.
"Geosynthetic Retaining Wall Pedestrian Barrier", per linear foot.
The unit contract price per linear foot for "Geosynthetic Retaining Wall ___ Barrier" shall be full pay for constructing the barrier on top of the geosynthetic retaining wall.

SECTION 6-15, SOIL NAIL WALLS
April 5, 2004

6-15.1 Description
This work consists of constructing soil nail walls.

6-15.2 Materials
Materials shall meet the requirements of the following section:

Prefabricated Drainage Mat	9-33.2(3)

Other materials required, including materials for soil nails, shall be as specified in the Special Provisions.

6-15.3 Construction Requirements

6-15.3(1) General Description
Soil nailing shall consist of excavating to the layer limits shown in the Plans, drilling holes at the specified angle into the native material, placing and grouting epoxy coated or encapsulated steel reinforcing bars (soil nails) in the drilled holes, placing prefabricated drainage material and steel reinforcement, and applying a shotcrete facing over the steel reinforcement. After completing the wall to full height, the Contractor shall construct the concrete fascia panels as shown in the Plans.

All proprietary items used in the soil nailed structure shall be installed in accordance with the manufacturer's recommendations. In the event of a conflict between the manufacturer's recommendations and these specifications, these specifications shall prevail.

6-15.3(2) Contractor's Experience Requirements
The Contractor or Subcontractor performing this work shall have completed at least five projects, within the last five years, involving construction of retaining walls using soil nails or ground anchors or shall have completed the construction of two or more projects totaling at least 15,000 square feet of retaining wall with a minimum total of 500 soil nails or ground anchors.

The Contractor shall assign an engineer with at least three years of experience in the design and construction of permanently anchored or nailed structures to supervise the work. The Contractor shall not use consultants or manufacturer's representatives in order to meet the requirements of this section. Drill operators and on-site supervisors shall have a minimum of one year experience installing permanent soil nails or ground anchors.

Contractors or Subcontractors that are specifically prequalified in Class 36 work will be considered to have met the above experience requirements.

6-15.3(3) Submittals

Work shall not begin on any soil nail wall system until the Engineer has approved all of the required submittals. The Contractor shall submit the following information in accordance with Section 6-01.9 not less than 30 calendar days prior to the start of wall excavation.

1. A brief description of each project satisfying the Contractors Experience Requirements with the Owner's name and current phone number (this item is not required if the Contractor or Subcontractor is prequalified in Class 36).

2. A list identifying the following personnel assigned to this project and their experience with permanently anchored or nailed structures:

    a. Supervising Engineer

    b. Drill Operators

    c. On-site Supervisors who will be assigned to the project.

3. The proposed detailed construction procedure which includes:

    a. Proposed method(s) of excavation of the soil and/or rock.

    b. A plan for the removal and control of groundwater encountered during excavation, drilling, and other earth moving activities. Include a list of the equipment used to remove and control groundwater.

    c Proposed drilling methods and equipment.

    d. Proposed hole diameter(s).

    e. Proposed method of soil nail installation.

    f. Grout mix design and procedures for placing the grout.

    g. Shotcrete mix design with compressive strength test results.

    h. Procedures for placing the shotcrete (include placement in conditions when ground water is encountered).

    i. Encapsulation system for additional corrosion protection selected for the soil nails and anchorages requiring encapsulation.

4. Detailed working drawings of the method proposed for the soil nail testing which includes:

    a. All necessary drawings and details to clearly describe the proposed system of jacking support, framing, and bracing to be used during testing.

b. Calibration data for each load cell, test jack, pressure gauge, stroke counter on the grout pump, and master gauge to be used. The calibration tests shall have been performed by an independent testing laboratory, and tests shall have been performed within 60 calendar days of the date submitted. Testing or work shall not commence until the Engineer has approved the load cell, jack, pressure gage, and master pressure gauge calibrations.

5. Certified mill test results and typical stress-strain curves along with samples from each heat, properly marked, for the soil nail steel. The typical stress-strain curve shall be obtained by approved standard practices. The guaranteed ultimate strength, yield strength, elongation, and composition shall be specified.

6-15.3(4) Preconstruction Conference

A soil nail preconstruction conference shall be held at least five working days prior to the Contractor beginning any permanent soil nail work at the site to discuss construction procedures, personnel and equipment to be used. The list of materials specified on the Record of Materials Form (ROM) for this item of work will also be discussed. Those attending shall include:

1. (representing the Contractor) The superintendent, on site supervisors, and all foremen in charge of excavating the soil face, drilling the soil nail hole, placing the soil nail and grout, placing the shotcrete facing, and tensioning and testing the soil nail.

2. (representing the Contracting Agency) The Project Engineer, key inspection personnel, and representatives from the WSDOT Construction Office and Materials Laboratory Geotechnical Services Branch.

If the Contractor's key personnel change, or if the Contractor proposes a significant revision of the approved permanent soil nail installation plan, an additional conference shall be held before any additional permanent soil nail operations are performed.

6-15.3(5) Earthwork

The ground contour above the wall shall be established to its final configuration and backslope as shown in the Plans prior to beginning excavation of the soil for the first row of soil nails. All excavation shall conform to Section 2-03.

The excavation shall proceed from the top down in a horizontal lift sequence with the ground level excavated no more than 3 feet below the elevation of the row of nails to be installed in that lift. The excavated vertical wall face should not be left open more than 24 hours for any reason. A lift shall not be excavated until the nail installation and reinforced shotcrete placement for the preceding lift has been completed and accepted. After a lift is excavated, the cut surface shall be cleaned of all loose materials, mud, rebound, and other foreign matter that could prevent or reduce shotcrete bond.

The accuracy of the ground cut shall be such that the required thickness of shotcrete can be placed within a tolerance of plus or minus 2 inches from the defined face of the wall, and overexcavation does not damage overlying shotcrete sections by undermining or other causes.

The Contractor should review the geotechnical recommendations report prepared for this project for further information on the soil conditions at the location of each wall. Copies of the geotechnical recommendations report are available for review by prospective bidders at the location identified in the Special Provisions.

6-15.3(6) Soil Nailing

The Contractor shall not handle and transport the encapsulated soil nails until the encapsulation grout has reached sufficient strength to resist damage during handling. The Contractor shall handle the encapsulated soil nails in such a manner to prevent large deflections or distortions during handling. When handling or transporting encapsulated soil nails, the Contractor shall provide slings or other equipment necessary to prevent damage to the soil nails and the corrosion protection. The Engineer may reject any encapsulated nail which is damaged during transportation or handling. Damaged or defective encapsulation shall be repaired in accordance with the manufacturer's recommendations and as approved by the Engineer.

Soil nails shall be handled and sorted in such a manner as to avoid damage or corrosion. Prior to inserting a soil nail in the drilled hole, the Contractor and the Engineer will examine the soil nail for damage. If, in the opinion of the Engineer, the epoxy coating or bar has been damaged, the nail shall be repaired. If, in the opinion of the Engineer, the damage is beyond repair, the soil nail shall be rejected.

If, in the opinion of the Engineer, the epoxy coating can be repaired, the Contractor shall patch the coating with an Engineer approved patching material.

Nail holes shall be drilled at the locations shown in the Plans or as staked by the Engineer. The nails shall be positioned plus or minus 6 inches from the theoretical location shown in the Plans. The Contractor shall select the drilling method and the grouting pressure used for the installation of the soil nail. The drill hole shall be located so that the longitudinal axis of the drill hole and the longitudinal axis of the nail are parallel. At the point of entry the soil nail shall be installed within plus or minus three degrees of the inclination from horizontal shown in the Plans, and the nail shall be within plus or minus three degrees of a line drawn perpendicular to the face of the wall unless otherwise shown in the Plans.

Water or other liquids shall not be used to flush cuttings during drilling, but air may be used. After drilling, the nail shall be installed and fully grouted before placing the shotcrete facing. The nail shall be inserted into the drilled hole with centralizers to the desired depth in such a manner as to prevent damage to the drilled hole, sheathing or epoxy during installation. The centralizers shall provide a minimum of 0.5 inches of grout cover over the soil nail and shall be spaced no further than eight feet apart. When the soil nail cannot be completely inserted into the drilled hole without difficulty, the Contractor shall remove the nail from the drilled hole and clean or redrill the hole to permit insertion. Partially inserted soil nails shall not be driven or forced into the hole. Subsidence, or any other detrimental impact from drilling shall be cause for immediate cessation of drilling and repair of all damages in a manner approved by the Engineer at no additional cost to the Contracting Agency.

If caving conditions are encountered, no further drilling will be allowed until the Contractor selects a method to prevent ground movement. The Contractor may use temporary casing. The Contractor's method to prevent ground movement shall be approved by the Engineer. The casings for the nail holes, if used, shall be removed as the grout is being placed.

Where necessary for stability of the excavation face, a sealing layer of shotcrete may be placed before drilling is started, or the Contractor shall have the option of drilling and grouting of nails through a stabilizing berm of native soil at the face of the excavation. The stabilizing berm shall extend horizontally from the soil face and from the face of the shotcrete a minimum distance of one foot, and shall be cut down from that point at a safe slope, no steeper than 1H:1V unless approved by the Engineer. The berm shall be excavated to final grade after installation and full length grouting of the nails. Nails damaged during berm excavation shall be repaired or replaced by the Contractor, to the satisfaction of the Engineer, at no added cost to the Contracting Agency.

If sections of the wall are constructed at different times than the adjacent soil nail sections, the Contractor shall use stabilizing berms, temporary slopes, or other measures, as approved by the Engineer, to prevent sloughing or failure of the adjacent soil nail sections.

If cobbles and boulders are encountered at the soil face during excavation, the Contractor shall remove all cobbles and boulders that protrude from the soil face into the design wall section and fill the void with shotcrete. All shotcrete used to fill voids created by removal of cobbles and boulders shall be incidental to shotcrete facing.

The grout equipment shall produce a grout free of lumps and undispersed cement. A positive displacement grout pump shall be used. The pump shall be equipped with a pressure gauge near the discharge end to monitor grout pressures. The pressure gauge shall be capable of measuring pressures of at least 150 psi or twice the actual grout pressures used by the Contractor, whichever is greater. The grouting equipment shall be sized to enable the grout to be pumped in one continuous operation. The mixer shall be capable of continuously agitating the grout.

The grout shall be injected from the lowest point of the drilled hole. The grout shall be pumped through grout tubes after insertion of the soil nail. The quantity of the grout and the grout pressures shall be recorded. The grout pressures and grout takes shall be controlled to prevent excessive ground heave.

6-15.3(7) Shotcrete Facing

Prior to placing any shotcrete on an excavated layer, the Contractor shall vertically center prefabricated drainage mat between the columns of nails as shown in the Plans. The prefabricated drainage mat shall be installed in accordance with the manufacturer's recommendations. The permeable drain side shall be placed against the exposed soil face. The prefabricated drainage mat shall be installed after each excavation lift and shall be hydraulically connected with the prefabricated drainage mat previously placed, such that the vertical flow of water is not impeded. The Contractor shall tape all joints in the prefabricated drainage mat to prevent shotcrete intrusion during shotcrete application.

The Contractor shall place steel reinforcing bars and welded wire fabric, and apply the shotcrete facing in accordance with Section 6-18 and the details shown in the Plans.

The shotcrete shall be constructed to the minimum thickness as shown in the Plans. Costs associated with additional thickness of shotcrete due to overexcavation or irregularities in the cut face shall be borne by the Contractor.

Each soil nail shall be secured at the shotcrete facing with a steel plate as shown in the Plans. The plate shall be seated on a wet grout pad of a pasty consistency similar to that of mortar for brick-laying. The nut shall then be sufficiently tightened to achieve full bearing

surface behind the plate. After the shotcrete and grout have had time to gain the specified strength, the nut shall be tightened with at least 100 foot-pounds of torque.

6-15.3(8) Soil Nail Testing and Acceptance

Both verification and proof testing of the nails is required. The Contractor shall supply all materials, equipment, and labor to perform the tests. The Contractor shall submit all test data to the Engineer.

The testing equipment shall include a dial gauge or vernier scale capable of measuring to 0.001 inch of the ground anchor movement. A hydraulic jack and pump shall be used to apply the test load. The movement-measuring device shall have a minimum travel equal to the theoretical elastic elongation of the total nail length plus 1 inch. The dial gauge or vernier scale shall be aligned so that its axis is within 5 degrees from the axis of the nail and shall be monitored with a reference system that is independent of the jacking system and excavation face.

The jack and pressure gauge shall be calibrated by an independent testing laboratory as a unit. Each load cell, test jack and pressure gauge, grout pump stroke counter, and master gauge, shall be calibrated as specified in Section 6-15.3(3) item 4b. Additionally, the Contractor shall not use load cells, test jacks and pressure gauges, grout pump stroke counters, and master gauges, greater than 60 calendar days past their most recent calibration date, until such items are re-calibrated by an independent testing laboratory.

The pressure gauge shall be graduated in 100 psi increments or less. The pressure gauge will be used to measure the applied load. The pressure gauge shall be selected to place the maximum test load within the middle two-thirds of the range of the gauge. The ram travel of the jack shall not be less than the theoretical elastic elongation of the total length at the maximum test load plus 1 inch. The jack shall be independently supported and centered over the nail so that the nail does not carry the weight of the jack. The Contractor shall have a second calibrated jack pressure gauge at the site. Calibration data shall provide a specific reference to the jack and the pressure gauge.

The loads on the nails during the verification and proof tests shall be monitored to verify consistency of load – defined as maintaining the test load within five percent of the specified value. Test loads less than 20,000 pounds shall be monitored by the jack pressure gauge. Test loads equal to or greater than 20,000 pounds shall be monitored with an electric or hydraulic load cell. The Contractor shall provide the load cell, the readout device, and a recent calibration curve. The load cell shall be selected to place the maximum test load within the middle two-thirds of the range of the load cell. The stressing equipment shall be placed over the nail in such a manner that the jack bearing plates, load cell and stressing anchorage are in alignment.

Nails to be tested shall be initially grouted no closer to the excavation face than the dimension shown in the Plans. After placing the grout, the nail shall remain undisturbed until the grout has reached a strength sufficient to provide resistance during testing. Grouting to the excavation face shall be completed after successful testing has been performed. Test nails which are not part of the permanent wall may be left in the ground, provided the drill holes for the nails are completely filled with grout or non-structural filler after testing.

Load testing shall be performed against a temporary bearing yoke or reaction frame which bears directly against the existing soil or the shotcrete facing. Temporary bearing pads shall

be kept a minimum of 12 inches from the edges of the drilled hole unless a rigid steel plate is used to distribute the stress around the drilled hole. If a steel plate is used, it shall be a minimum of 3 feet square and of sufficient thickness that it will distribute the load evenly to the soil. Where the reaction frame bears directly against the shotcrete, the reaction frame shall be designed to prevent fracture of the shotcrete. No part of the reaction frame shall bear within 12 inches of the edge of the test nail blockout unless otherwise approved by the Engineer.

6-15.3(8)A Verification Testing

Verification testing shall be performed on nails installed within the pattern of production nails to verify the Contractor's procedures, hole diameter, and design assumptions. No drilling or installation of production nails will be permitted in any ground/rock unit unless successful verification testing of anchors in that unit has been completed and approved by the Engineer, using the same equipment, methods, nail inclination, nail length, and hole diameter as planned for the production nails. Changes in the drilling or installation method may require additional verification testing as determined by the Engineer and shall be done at no additional expense to the Contracting Agency. Verification tests may be performed prior to excavation for the soil nail wall.

Successful verification tests are required within the limits as specified in the Special Provisions. Test nail locations within these limits shall be at locations selected by the Engineer.

The design details of the verification testing, including the system for distributing test load pressures to the excavation surface and appropriate nail bar size and reaction plate, shall be developed by the Contractor, subject to approval by the Engineer. The intent is to stress the bond between the grout and the surrounding soil/rock to at least twice the design load transfer.

The bar shall be proportioned such that the maximum stress at 200 percent of the test load does not exceed 80 percent of the yield strength of the steel. The jack shall be positioned at the beginning of the test such that unloading and repositioning of the jack during the test will not be required. The verification tests shall be made by incrementally loading the nails in accordance with the following schedule of hold time:

AL	1 minute
0.25TL	10 minutes
0.50TL	10 minutes
0.75TL	10 minutes
1.00TL	10 minutes
1.25TL	10 minutes
1.50TL	60 minutes
1.75TL	10 minutes
2.00TL	10 minutes

AL = Nail Alignment Load
TL = Nail Test Load

The test load shall be determined by the following equation = Test Load (TL) = Bond Length (BL) X Design Load Transfer (DLT).

The load shall be applied in increments of 25 percent of the test load. Each load increment shall be held for at least 10 minutes. Measurement of nail movement shall be obtained at

each load increment. The load-hold period shall start as soon as the load is applied and the nail movement with respect to a fixed reference shall be measured and recorded at 1 minute, 2, 3, 5, 6, 10, 20, 30, 50, and 60 minutes.

The Engineer will evaluate the results of each verification test and make a determination of the suitability of the test and of the Contractor's proposed production nail design and installation system. Tests which fail to meet the design criteria will require additional verification testing or an approved revision to the Contractor's proposed production nail design and installation system. If a nail fails in creep, retesting will not be allowed.

A verification tested nail with a 60 minute load hold at 1.50TL is acceptable if:

1. The nail carries the test load with a creep rate that does not exceed 0.08 inch per log cycle of time and is at a linear or decreasing creep rate.

2. The total movement at the test load exceeds 80 percent of the theoretical elastic elongation of the non-bonded length.

Furthermore, a pullout failure shall not occur for the verification test anchor at the 2.0TL maximum load. Pullout failure load is defined as the load at which attempts to increase the test load result only in continued pullout movement of the test nail without a sustainable increase in the test load.

The nails used for verification tests shall be sacrificial and shall not be used for production. The Contractor shall cut and remove the exposed end of all soil nails used for verification tests a minimum of two feet inside the finished groundline.

6-15.3(8)B Proof Testing

Proof tests shall be performed on production nails at the locations selected by the Engineer. Up to five percent of the production nails will be tested. Prior to testing, only the bond length (BL) portion of the nail shall be grouted. The Contractor shall maintain the side-wall stability of the drill hole for the non-grouted portion during the test. Once proof testing is completed, the remainder of the proof tested nail shall be grouted. The bond length shall be determined from the Nail Schedule and Test Nail Detail shown in the Plans.

Proof tests shall be performed by incrementally loading the nail in accordance with the schedule below. The anchor movement shall be measured and recorded to the nearest 0.001 inch with respect to an independent fixed reference point in the same manner as for the verification tests at the alignment load and at each increment of load. The load shall be monitored in accordance with Section 6-15.3(8). The scheduling of hold times shall be as follows:

AL	1 minute
0.25TL	5 minutes
0.50TL	5 minutes
0.75TL	5 minutes
1.00TL	5 minutes
1.25TL	5 minutes
1.50TL	10 minutes

AL = Nail Alignment Load
TL = Nail Test Load

The maximum load in a proof test shall be held for 10 minutes. The load hold period shall start as soon as the maximum load is applied and the nail movement with respect to an independent fixed reference shall be measured and recorded at 1, 2, 3, 4, 5, 6, and 10 minutes. The nail movement between 1 minute and 10 minutes shall not exceed 0.04 inches. If the nail movement between 1 and 10 minutes exceeds 0.04 inches, the maximum load shall be held an additional 50 minutes. If the load hold is extended, the nail movement shall be recorded at 20, 30, 50, and 60 minutes. If a nail fails in creep, retesting will not be allowed.

A proof tested nail is acceptable if:

1. The nail carries the maximum load with less than 0.04 inches of movement between 1 minute and 10 minutes, unless the load hold extended to 60 minutes, in which case the nail would be acceptable if the creep rate does not exceed 0.08 inches per log cycle of time.

2. The total movement at the maximum load exceeded 80 percent of the theoretical elastic elongation of the non-bonded length.

3 The creep rate is not increasing with time during the load hold period.

Due to the requirement for a non-bonded zone for testing purposes, the Contractor shall develop an installation method which will assure the stability of the non-bonded portion of the hole during testing and will allow for the non bonded zone to be grouted against the ground after testing.

If a proof test fails, the Engineer may direct the Contractor to replace some or all of the installed production nails between the failed test and an adjacent proof test nail that has met the test criteria. The Engineer may also require additional proof testing. All additional proof tests, and all installation of additional or modified nails, shall be performed at no additional expense to the Contracting Agency.

6-15.3(9) Concrete Fascia Panels

The Contractor shall construct the concrete fascia panels in accordance with Section 6-02 and the details in the Plans. The concrete fascia panels shall be cured in accordance with the Section 6-02.3(11) requirements specified for retaining walls. The Contractor shall provide the specified surface finish as noted, and to the limits shown, in the Plans to the exterior concrete surface. When noted in the Plans, the Contractor shall apply pigmented sealer to the limits shown in the Plans.

Asphalt or cement concrete gutter shall be constructed as shown in the Plans and as specified in Section 8-04.

6-15.4 Measurement

Prefabricated drainage mat will be measured by the square yard of material furnished and installed.

Soil nails will be measured per each for each soil nail installed and accepted.

The soil nail verification testing program will not be measured but will be paid for on a lump sum basis.

Shotcrete facing and concrete fascia panel will be measured by the square foot surface area of the completed facing or fascia panel, measured to the neat lines of the facing or panel as shown in the Plans.

6-15.5 Payment

Payment will be made in accordance with Section 1-04.1 for each of the following bid items when they are included in the proposal:

"Soil Nail – Epoxy Coated", per each.
"Soil Nail – Encapsulated", per each.
All costs in connection with furnishing and installing the soil nails as specified shall be included in the unit contract price per each for "Soil Nail - ___", including all drilling, grouting, centralizers, bearing plates, welded shear connectors, nuts, proof testing, and other work required for installation of each soil nail.

"Prefabricated Drainage Mat", per square yard.

"Soil Nail Verification Test", lump sum.

"Concrete Fascia Panel", per square foot.
All costs in connection with constructing the concrete fascia panels as specified shall be included in the unit contract price per square foot for "Concrete Fascia Panel", including all steel reinforcing bars, premolded joint filler, polyethylene bond breaker strip, joint sealant, pvc pipe for weep holes, exterior surface finish, and pigmented sealer (when specified).

Shotcrete facing will be paid for in accordance with Section 6-18.5.

Unless otherwise specified, all costs in connection with excavation in front of the back face of the shotcrete facing shall be included in the unit contract price per cubic yard for "Roadway Excavation" or "Roadway Excavation Incl. Haul" as specified in Section 2-03.5.

SECTION 6-16, SOLDIER PILE AND SOLDIER PILE TIEBACK WALLS
April 5, 2004

6-16.1 Description

This work consists of constructing soldier pile walls and soldier pile tieback walls.

6-16.2 Materials

Materials shall meet the requirements of the following sections:

Controlled Density Fill	2-09.3(1)E
Cement	9-01
Aggregates for Portland Cement Concrete	9-03.1
Gravel Backfill	9-03.12
Premolded Joint Filler	9-04.1(2)
Welded Shear Studs	9-06.15
Steel Reinforcing Bar	9-07.2
Epoxy-Coated Steel Reinforcing Bar	9-07.3
Paints	9-08

Timber Lagging	9-09.2
Preservative Treatment for Timber Lagging	9-09.3(1)
Soldier Piles	9-10.5
Concrete Curing Materials and Admixtures	9-23
Fly Ash	9-23.9
Water	9-25
Prefabricated Drainage Mat	9-33.2(3)

Other materials required shall be as specified in the Special Provisions.

6-16.3 Construction Requirements

6-16.3(1) Quality Assurance

The steel soldier piles shall be placed so that the center line of the pile at the top is within 1 inch of the plan location. The steel soldier pile shall be plumb, to within 0.5 percent of the length based on the total length of the pile.

Welding, repair welding, and welding inspection shall conform to the Section 6-03.3(25) requirements for welding, repair welding, and welding inspection for all other steel fabrication.

6-16.3(2) Submittals

The Contractor shall submit shop plans as specified in Section 6-03.3(7) for all structural steel, including the steel soldier piles and the permanent ground anchors to the Engineer for approval.

The Contractor shall submit the permanent ground anchor grout mix design and the procedures for placing the grout to the Engineer for approval.

The Contractor shall submit forming plans for the concrete fascia panels, as specified in Sections 6-02.3(16) and 6-02.3(17), to the Engineer for approval.

1. Where the lateral pressure from concrete placement, as specified in Section 6-02.3(17)J, is less than or equal to the design earth pressure, the Contractor may tie forms directly to the soldier piles.

2. Where the lateral pressure from concrete placement, as specified in Section 6-02.3(17)J, is greater than the design earth pressure, the Contractor shall follow one of the following procedures:

    a. Tie the forms to strongbacks behind the lagging, or use some other system that confines the pressure from concrete placement between the lagging and the form panels, in addition to the ties to the soldier piles.

    b. Reduce the rate of placing concrete to reduce the pressure from concrete placement to less than or equal to the design earth pressure in addition to the ties to the soldier piles.

    c. Follow a procedure with a combination of a. and b.

3. The Contractor shall design the forms for an appropriate rate of placing concrete so that no cold joints occur, considering the wall thickness and height, and volume of concrete to be placed.

The Contractor shall submit four copies of a shaft installation plan in accordance with Section 6-01.9 not less than 30 calendar days prior to the beginning of shaft construction. In preparing the submittal, the Contractor shall reference the available subsurface data provided in the contract test hole boring logs and the geotechnical report(s) prepared for this project. This plan shall provide at least the following information:

1. An overall construction operation sequence and the sequence of shaft construction.

2. List, description, and capacities of proposed equipment including but not limited to cranes, drills, augers, bailing buckets, final cleaning equipment, and drilling units. The narrative shall describe why the equipment was selected, and describe equipment suitability to the anticipated site and subsurface conditions. The narrative shall include a project history of the drilling equipment demonstrating the successful use of the equipment on shafts of equal or greater size in similar soil/rock conditions.

3. Details of shaft excavation methods including proposed drilling methods, methods for cleanout of the shafts, disposal plan for excavated material and drilling slurry (if applicable), and a review of method suitability to the anticipated site and subsurface conditions.

4. Details of the method(s) to be used to ensure shaft stability (i.e., prevention of caving, bottom heave, etc. using temporary casing, slurry, or other means) during excavation and concrete placement. This shall include a review of method suitability to the anticipated site and subsurface conditions. If temporary casings are proposed, casing dimensions and detailed procedures for casing installation and removal shall be provided. If slurry is proposed, detailed procedures for mixing, using, maintaining, and disposing of the slurry shall be provided. A detailed mix design, and a discussion of its suitability to the anticipated subsurface conditions shall also be provided for the proposed slurry.

5. Details of soldier pile placement including internal support bracing and centralization methods.

6. Details of concrete placement including proposed operational procedures for pumping and/or tremie methods.

7. Details of the device used to prevent unauthorized entry into a shaft excavation.

8. The method to be used to form the horizontal construction joint at the top elevation specified for concrete Class 4000P in the shaft.

Work shall not begin until the appropriate submittals have been approved in writing by the Engineer.

6-16.3(3) Shaft Excavation

Shafts shall be excavated to the required depth as shown in the Plans. The minimum diameter of the shaft shall be as shown in the Plans. The excavation shall be completed in a continuous operation using equipment capable of excavating through the type of material expected to be encountered.

The Contractor may use temporary telescoping casing to construct the shafts.

If the shaft excavation is stopped the shaft shall be secured by installation of a safety cover. It shall be the Contractor's responsibility to ensure the safety of the shaft and surrounding soil and the stability of the side walls. A temporary casing, slurry, or other methods specified in the shaft installation plan as approved by the Engineer shall be used if necessary to ensure such safety and stability.

Where caving in conditions are encountered, no further excavation will be allowed until the Contractor has implemented the method to prevent ground caving as submitted in accordance with item 4 of the Shaft Installation Plan and as approved by the Engineer.

The Contractor shall use appropriate means such as a cleanout bucket, or air lift to clean the bottom of the excavation of all shafts. No more than 2 inches of loose or disturbed material shall be present at the bottom of the shaft just prior to beginning concrete placement.

The excavated shaft shall be inspected and approved by the Engineer prior to proceeding with construction.

When obstructions are encountered, the Contractor shall notify the Engineer promptly. An obstruction is defined as a specific object (including, but not limited to, boulders, logs, and man made objects) encountered during the shaft excavation operation which prevents or hinders the advance of the shaft excavation. When efforts to advance past the obstruction to the design shaft tip elevation result in the rate of advance of the shaft drilling equipment being significantly reduced relative to the rate of advance for the rest of the shaft excavation, then the Contractor shall remove the obstruction under the provisions of Section 6-16.5 as supplemented in the Special Provisions. The method of removal of such obstructions, and the continuation of excavation shall be as proposed by the Contractor and approved by the Engineer.

Excavation of shafts shall not commence until a minimum of 12 hours after the shaft backfill for the adjacent shafts has been placed.

The temporary casings for the shafts shall be removed. A minimum 5 foot head of concrete shall be maintained to balance the soil and water pressure at the bottom of the casing. The casing shall be smooth.

6-16.3(4) Installing Soldier Piles

Soldier piles, if spliced, shall conform to all requirements of Section 6-05.3(6).

The prefabricated steel soldier piles shall be lowered into the drilled shafts and secured in position. Concrete cover over the soldier pile shall be 1 inch minimum.

The steel soldier piles and attachments shall be shop painted after fabrication to the limits shown in the Plans with one coat of inorganic zinc primer. Application of the one coat of

primer shall be in accordance with Section 6-07. The welded shear studs may be attached before or after painting. Paint damaged by welding shear studs in place does not require repair.

6-16.3(5) Backfilling Shaft

The excavated shaft shall be backfilled with either controlled density fill (CDF), lean concrete, or concrete Class 4000P, as shown in the Plans.

Placement of the shaft backfill shall commence immediately after completing the shaft excavation and receiving the Engineer's approval of the excavation. Concrete Class 4000P and lean concrete shall be placed in one continuous operation to the elevation shown in the Plans. CDF shall be placed in one continuous operation to the top of the shaft. Vibration of shaft backfill is not required.

If water is not present, the shaft backfill shall be deposited by a method which prevents segregation of aggregates. The shaft backfill shall be placed such that the free-fall is vertical down the shaft without hitting the sides of the soldier pile or the excavated shaft. The Contractor's method for depositing the shaft backfill shall have approval of the Engineer prior to the placement of the shaft backfill.

If water is present, the shaft backfill shall be deposited in accordance with Section 6-02.3(6)B.

6-16.3(6) Installing Timber Lagging and Permanent Ground Anchors

The excavation and removal of CDF and lean concrete for the lagging installation shall proceed in advance of the lagging. The bottom of the excavation in front of the wall shall be level. Excavation shall conform to Section 2-03.

For walls without permanent ground anchors, the bottom of excavation shall be not more than three feet below the bottom level of the timber lagging already installed. For walls with permanent ground anchors, the bottom of excavation shall be not more than 3 feet below tieback anchor level until all permanent ground anchors at that level are installed and stressed. Installing, stressing, and testing the permanent ground anchors shall be in accordance with Section 6-17 and the construction sequence specified in the Plans.

Unless otherwise specified, timber lagging in walls with concrete fascia panels shall be untreated. Timber lagging for all other walls shall be treated.

The lagging shall be installed from the top of the pile proceeding downward. The timber lagging shall make direct contact with the soil. Voids shall be filled with gravel backfill for walls, which shall be considered incidental to the installation of the timber lagging.

Where timber lagging and backfill are above the existing or excavated groundline, the lagging and backfill shall be placed concurrently. The backfill layers shall be placed in accordance with Section 2-03.3(14) except that all layers shall be compacted to 90 percent of maximum density.

6-16.3(7) Prefabricated Drainage Mat

For walls with concrete fascia panels, prefabricated drainage mat shall be installed full height of the concrete fascia panel and full width between soldier pile flanges, unless otherwise shown in the Plans.

The prefabricated drainage mat shall be attached to the lagging in accordance with the manufacturer's recommendations. The fabric side shall face the lagging. Splicing of the prefabricated drainage mat shall be in accordance with the manufacturer's recommendations.

The Contractor shall ensure the hydraulic connection of the prefabricated drainage mat to the previously installed material so that the vertical flow of water is not impeded.

The Contractor shall tape all joints in the prefabricated drainage mat to prevent concrete intrusion during concrete fascia panel construction.

6-16.3(8) Concrete Fascia Panel

The Contractor shall construct the concrete fascia panels as shown in the Plans, and in accordance with the forming plan as approved by the Engineer. The concrete fascia panels shall be cured in accordance with the Section 6-02.3(11) requirements specified for retaining walls.

The Contractor shall provide the specified surface finish as noted, and to the limits shown, in the Plans to the exterior concrete surface. When noted in the Plans, the Contractor shall apply pigmented sealer to the limits shown in the Plans.

Asphalt or cement concrete gutter shall be constructed as shown in the Plans.

6-16.4 Measurement

Soldier pile shaft construction will be measured by the linear foot of shaft excavated below the top of ground line for the shaft, defined as the highest existing ground point within the shaft diameter.

Furnishing soldier pile will be measured by the linear foot of pile assembly specified in the Proposal, including adjustments to the Plan quantity made in accordance with Section 1-04.4.

Timber lagging will be measured by the thousand board feet measure (MBM) installed. The quantity will be computed using the nominal thickness and width dimensions of the timber lagging members, and the center to center spacing of the soldier piles as the length dimension.

Prefabricated drainage mat will be measured by the square yard of material furnished and installed.

Concrete fascia panel will be measured by the square foot surface area of the completed fascia panel, measured to the neat lines of the panel as shown in the Plans.

6-16.5 Payment

Payment will be made in accordance with Section 1-04.1 for each of the following bid items when they are included in the proposal:

"Shaft - ___ Diameter", per linear foot.
All costs in connection with constructing soldier pile shafts shall be included in the unit contract price per linear foot for "Shaft - ___ Diameter", including shaft excavation, temporary casing if used, CDF, lean concrete, concrete Class 4000P, and installing the soldier pile assembly.

"Furnishing Soldier Pile - ___", per linear foot.
All costs in connection with furnishing soldier pile assemblies shall be included in the unit contract price per linear foot for "Furnishing Soldier Pile - ___", including fabricating and painting the pile assemblies. Payment will be made based on the quantity specified in the Proposal unless changes are made to this quantity in accordance with Section 1-04.4, in which case the quantity specified in the Proposal will be adjusted by the amount of the change and will be paid for in accordance with Section 1-04.4.

"Timber Lagging", per MBM.
All costs in connection with furnishing and installing timber lagging shall be included in the unit contract price per MBM for "Timber Lagging", including preservative treatment when specified, and filling voids behind the lagging with gravel backfill for wall.

"Prefabricated Drainage Mat", per square yard.

"Concrete Fascia Panel", per square foot.
All costs in connection with constructing the concrete fascia panels as specified shall be included in the unit contract price per square foot for "Concrete Fascia Panel", including all steel reinforcing bars, premolded joint filler, polyethylene bond breaker strip, joint sealant, pvc pipe for weep holes, exterior surface finish, and pigmented sealer (when specified).

Unless otherwise specified, all costs in connection with non-shaft excavation, including all excavation required for placement of timber lagging, shall be included in the unit contract price per cubic yard for "Roadway Excavation" or "Roadway Excavation Incl. Haul" as specified in Section 2-03.5.

SECTION 6-17, PERMANENT GROUND ANCHORS
April 5, 2004

6-17.1 Description
This work consists of constructing permanent ground anchors.

6-17.2 Materials
Materials required, including materials for permanent ground anchors, shall be as specified in the Special Provisions.

6-17.3 Construction Requirements
The Contractor shall select the ground anchor type and the installation method, and determine the bond length and anchor diameter. The Contractor shall install ground anchors that will develop the load indicated in the Plans and verified by tests specified in Sections 6-17.3(8)A, 6-17.3(8)B, and 6-17.3(8)C.

6-17.3(1) Definitions
Anchor Devices: The anchorhead wedges or nuts which grip the prestressing steel.

Bearing Plate: The steel plate which evenly distributes the ground anchor force to the structure.

Bond Length: The length of the ground anchor which is bonded to the ground and transmits the tensile force to the soil or rock.

Ground Anchor: A system, referred to as a tieback or as an anchor, used to transfer tensile loads to soil or rock. A ground anchor includes all prestressing steel, anchorage devices, grout, coatings, sheathings and couplers if used.

Maintaining Consistency of Load: Maintaining the test load within five percent of the specified value.

Minimum Guaranteed Ultimate Tensile Strength (MUTS): The minimum guaranteed breaking load of the prestressing steel as defined by the specified standard.

Tendon Bond Length: The length of the tendon which is bonded to the anchor grout.

Tendon Unbonded Length: The length of the tendon which is not bonded to the anchor grout.

Total Anchor Length: The unbonded length plus the tendon bond length.

6-17.3(2) Contractor Experience Requirements

The Contractor or Subcontractor performing this work shall have installed permanent ground anchors for a minimum of three years. Prior to the beginning of construction, the Contractor shall submit a list containing at least five projects on which the Contractor has installed permanent ground anchors. A brief description of each project and a reference shall be included for each project listed. As a minimum, the reference shall include an individual's name and current phone number.

The Contractor shall assign an engineer to supervise the work with at least three years of experience in the design and construction of permanently anchored structures. The Contractor shall not use consultants or manufacturer's representatives in order to meet the requirements of this section. Drill operators and on-site supervisors shall have a minimum of one year experience installing permanent ground anchors.

Contractors or Subcontractors that are specifically prequalified in Class 36 work will be considered to have met the above experience requirements.

The Contractor shall allow up to 15 calendar days for the Engineer's review of the qualifications and staff as noted above. Work shall not be started on any anchored wall system nor materials ordered until approval of the Contractor's qualifications are given.

6-17.3(3) Submittals

The Contractor shall submit working drawings and structural design calculations in accordance with Section 6-01.9 for the ground anchor system or systems intended for use.

The Contractor shall submit a detailed description of the construction procedure proposed for use to the Engineer for approval.

The Contractor shall submit a ground anchor schedule giving:

1. Ground anchor number
2. Ground anchor design load

3. Type and size of tendon
4. Minimum total bond length
5. Minimum anchor length
6. Minimum tendon bond length
7. Minimum unbonded length

The Contractor shall submit working drawings of the ground anchor tendon and the corrosion protection system. Include details of the following:

1. Spacers and their location
2. Centralizers and their location
3. Unbonded length corrosion protection system, including the permanent rubber seal between the trumpet and the tendon unbonded length corrosion protection.
4. Bond length corrosion protection system
5. Anchorage and trumpet
6. Anchorage corrosion protection system
7. Anchors using non-restressable anchorage devices

The Contractor shall submit shop plans as specified in Section 6-03.3(7) for all structural steel, including the permanent ground anchors to the Engineer for review and approval.

The Contractor shall submit the grout mix designs and the procedures for placing the grout to the Engineer for approval. The Contractor shall also submit the methods and materials used in filling the annulus over the unbonded length of the anchor.

The Contractor shall submit five copies of detailed working drawings in accordance with Section 6-01.9 for the method proposed to be followed for the permanent ground anchor testing to the Engineer for approval prior to the tests. This shall include all necessary drawings and details to clearly describe the method proposed.

The Contractor shall submit to the Engineer calibration data for each load cell, test jack, pressure gauge and master pressure gauge to be used. The calibration tests shall have been performed by an independent testing laboratory and tests shall have been performed within 60 calendar days of the date submitted. The Engineer shall approve or reject the calibration data after receipt of the data. Testing shall not commence until the Engineer has approved the load cell, jack, pressure gauge and master pressure gauge calibrations.

Work shall not begin until the appropriate submittals have been approved in writing by the Engineer.

6-17.3(4) Preconstruction Conference

A permanent ground anchor preconstruction conference shall be held at least five working days prior to the Contractor beginning any permanent ground anchor work at the site to discuss construction procedures, personnel, and equipment to be used. The list of materials specified on the Record of Materials Form (ROM) for this item of work will also be discussed. Those attending shall include:

1. (representing the Contractor) The superintendent, on site supervisors, and all foremen in charge of drilling the ground anchor hole, placing the permanent ground anchor and grout, and tensioning and testing the permanent ground anchor.

2. (representing the Contracting Agency) The Project Engineer, key inspection personnel, and representatives from the WSDOT Construction Office and Materials Laboratory Geotechnical Services Branch.

If the Contractor's key personnel change, or if the Contractor proposes a significant revision of the approved permanent ground anchor installation plan, an additional conference shall be held before any additional permanent ground anchor operations are performed.

6-17.3(5) Tendon Fabrication

The tendons can be either shop or field fabricated. The tendon shall be fabricated as shown in the approved shop plans.

The Contractor shall select the type of tendon to be used. The tendon shall be sized so the design load does not exceed 60 percent of the minimum guaranteed ultimate tensile strength of the tendon. In addition, the tendon shall be sized so the maximum test load does not exceed 80 percent of the minimum guaranteed ultimate tensile strength of the tendon.

The Contractor shall be responsible for determining the bond length and tendon bond length necessary to develop the design load indicated in the Plans in accordance with Sections 6-17.3(8)A, 6-17.3(8)B, and 6-17.3(8)C. The minimum bond length shall be ten feet in rock and 15 feet in soil.

When the Plans require the tendon bond length to be encapsulated, the tendon bond length portion of the tendon shall be corrosion protected by encapsulating the tendon in a grout-filled PE or PVC tube as specified in Section 6-17.2 as supplemented in the Special Provisions. The tendons can be grouted inside the encapsulation prior to inserting the tendon in the drill hole or after the tendon has been placed in the drill hole. Expansive admixtures can be mixed with the encapsulation grout if the tendon is grouted inside the encapsulation while outside the drill hole. The tendon shall be centralized within the bond length encapsulation with a minimum of 0.20 inches of grout cover. Spacers shall be used along the tendon bond length of multi-element tendons to separate the elements of the tendon so the prestressing steel will bond to the encapsulation grout.

Centralizers shall be used to provide a minimum of 0.5 inches of grout cover over the tendon bond length encapsulation. Centralizers shall be securely attached to the encapsulation and the center-to-center spacing shall not exceed ten feet. In addition, the upper centralizer shall be located a maximum of five feet from the top of the tendon bond length and the lower centralizer shall be located a maximum of one foot from the bottom of the tendon bond length.

The centralizer shall be able to support the tendon in the drill hole and position the tendon so a minimum of 0.5 inches of grout cover is provided and shall permit free flow of grout.

Centralizers are not required on encapsulated, pressure-injected ground anchor tendons if the ground anchor is installed in coarse grained soils (more than 50 percent of the soil larger than the number 200 sieve) using grouting pressures greater than 150 psi.

Centralizers are not required on encapsulated, hollow-stem-augered ground anchor tendons if the ground anchor is grouted through and the hole is maintained full of a stiff grout (eight-inch slump or less) during extraction of the auger.

The minimum unbonded length of the tendon shall be the greater of 15 feet or that indicated in the Plans.

Corrosion protection of the unbonded length shall be provided by a sheath completely filled with corrosion inhibiting grease or grout. If grease is used under the sheath, provisions shall be made to prevent the grease from escaping at the ends of the sheath. The grease shall completely coat the tendon and fill the voids between the tendon and the sheath. The working drawings shall show how the Contractor will provide a transition between the tendon bond length and the unbonded tendon length corrosion protection.

If the sheath is not fabricated from a smooth tube, a separate bondbreaker shall be provided. The bondbreaker shall prevent the tendon from bonding to the anchor grout surrounding the tendon unbonded length.

The total anchor length shall not be less than that indicated in the Plans or the approved working drawings.

Anchorage devices shall be capable of developing 95 percent of the minimum guaranteed ultimate tensile strength of the prestressing steel tendon. The anchorage devices shall conform to the static strength requirements of Section 3.1 of the Post Tensioning Institute "Specification for Unbonded Single Strand Tendons, First Edition - 1993".

Non-restressable anchorage devices may be used except where indicated in the Plans.

Restressable anchorages shall be provided on those ground anchors that require reloading. The post-tensioning supplier shall provide a restressable anchorage compatible with the post-tensioning system provided.

The bearing plates shall be sized so the bending stresses in the plate do not exceed the yield strength of the steel when a load equal to 95 percent of the minimum guaranteed ultimate tensile strength of the tendon is applied, and the average bearing stress on the concrete does not exceed that recommended in Section 3.1.3 of the Post Tensioning Institute, "Specification For Unbonded Single Strand Tendons, First Edition - 1993".

The trumpet shall have an inside diameter equal to or larger than the hole in the bearing plate. The trumpet shall be long enough to accommodate movements of the structure during testing and stressing. For strand tendons with encapsulation over the unbonded length, the trumpet shall be long enough to enable the tendon to make a transition from the diameter or the tendon in the unbonded length to the diameter of the tendon at the anchorhead without damaging the encapsulation. Trumpets filled with corrosion-inhibiting grease shall have a permanent rubber seal, as approved by the Engineer, provided between the trumpet and the tendon unbonded length corrosion protection. Trumpets filled with grout shall have a temporary seal provided between the trumpet and the tendon unbonded length corrosion protection or the trumpet shall overlap the tendon unbonded length corrosion protection.

6-17.3(6) Tendon Storage And Handling

Tendons shall be handled and stored in such a manner as to avoid damage or corrosion. Damage to the prestressing steel as a result of abrasions, cut, nicks, welds and weld splatter will be cause for rejection by the Engineer. The prestressing steel shall be protected if welding is to be performed in the vicinity. Grounding of welding leads to the prestressing steel is forbidden. Prestressing steel shall be protected from dirt, rust, and

deleterious substances. A light coating of rust on the steel is acceptable. If heavy corrosion or pitting is noted, the Engineer will reject the affected tendons.

The Contractor shall use care in handling and storing the tendons at the site. Prior to inserting a tendon in the drill hole, the Contractor and the Engineer will examine the tendon for damage to the encapsulation and the sheathing. If, in the opinion of the Engineer, the encapsulation is damaged, the Contractor shall repair the encapsulation in accordance with the tendon supplier's recommendations and as approved by the Engineer. If, in the opinion of the Engineer, the smooth sheathing has been damaged, the Contractor shall repair it with ultra high molecular weight polyethylene (PE) tape. The tape shall be spiral wound around the tendon so as to completely seal the damaged area. The pitch of the spiral shall ensure a double thickness at all points.

6-17.3(7) Installing Permanent Ground Anchors

The Contractor shall select the drilling method, the grouting procedure, and the grouting pressure used for the installation of the ground anchor.

When caving conditions are encountered, no further drilling will be allowed until the Contractor selects a method to prevent ground movement. The Contractor may use a temporary casing. The Contractor's method to prevent ground movement shall be approved by the Engineer. The casings for the anchor holes, if used, shall be removed. The drill hole shall be located so the longitudinal axis of the drill hole and the longitudinal axis of the tendon are parallel. The ground anchor shall not be drilled in a location that requires the tendon to be bent in order to enable the bearing plate to be connected to the supported structure. At the point of entry the ground anchor shall be installed within plus or minus three degrees of the inclination from horizontal shown in the Plans or the approved working drawings. The ground anchors shall not extend beyond the right of way limits.

The tendon shall be inserted into the drill hole to the desired depth. When the tendon cannot be completely inserted without difficulty, the Contractor shall remove the tendon from the drill hole and clean or redrill the hole to permit insertion. Partially inserted tendons shall not be driven or forced into the hole.

The Contractor shall use a grout conforming to Section 6-17.2 as supplemented in the Special Provisions.

The grout equipment shall produce a grout free of lumps and undispersed cement. A positive displacement grout pump shall be used. The pump shall be equipped with a pressure gauge near the discharge end to monitor grout pressures. The pressure gauge shall be capable of measuring pressures of at least 150 psi or twice the actual grout pressures used by the Contractor, whichever is greater. The grouting equipment shall be sized to enable the grout to be pumped in one continuous operation. The mixer shall be capable of continuously agitating the grout.

The grout shall be injected from the lowest point of the drill hole. The grout may be pumped through grout tubes, casing, or drill rods. The grout can be placed before or after insertion of the tendon. The quantity of the grout and the grout pressures shall be recorded. The grout pressures and grout takes shall be controlled to prevent excessive heave in soils or fracturing of rock formations.

After grouting, the tendon shall not be loaded for a minimum of 3 days.

No grout shall be placed above the top of the bond length during the time the bond length grout is placed. The grout at the top of the drill hole shall not contact the back of the structure or the bottom of the trumpet. Except as otherwise noted, only nonstructural filler shall be placed above the bond length grout prior to testing and acceptance of the anchor. The Contractor may place structural grout above the bond length grout prior to testing and acceptance of the anchor subject to the following conditions:

1. The anchor unbonded length shall be increased by eight feet minimum.

2. The grout in the unbonded zone shall not be placed by pressure grouting methods.

The corrosion protection surrounding the unbonded length of the tendon shall extend up beyond the bottom seal of the trumpet or one foot into the trumpet if no trumpet seal is provided. If the protection does not extend beyond the seal or sufficiently far enough into the trumpet, the Contractor shall extend the corrosion protection or lengthen the trumpet.

The corrosion protection surrounding the no load zone length of the tendon shown in the Plans shall not contact the bearing plate or the anchorhead during testing and stressing. If the protection is too long, the Contractor shall trim the corrosion protection to prevent contact.

The bearing plate and anchorhead shall be placed so the axis of the tendon and the drill hole are both perpendicular to the bearing plate within plus or minus three degrees and the axis of the tendon passes through the center of the bearing plate.

The trumpet shall be completely filled with corrosion inhibiting grease or grout. Trumpet grease can be placed anytime during construction. Trumpet grout shall be placed after the ground anchor has been tested. The Contractor shall demonstrate to the Engineer that the procedure selected by the Contractor for placement of either grease or grout produces a completely filled trumpet.

All anchorages permanently exposed to the atmosphere shall be covered with a corrosion inhibiting grease-filled or grout-filled cover. The Contractor shall demonstrate to the Engineer that the procedures selected by the Contractor for placement of either grease or grout produces a completely filled cover. If the Plans require restressable anchorages, corrosion inhibiting grease shall be used to fill the anchorage cover and trumpet.

6-17.3(8) Testing And Stressing

Each ground anchor shall be tested. The test load shall be simultaneously applied to the entire tendon. Stressing of single elements of multi-element tendons will not be permitted. Test data will be recorded by the Engineer.

The testing equipment shall consist of a dial gauge or vernier scale capable of measuring to 0.001 inches shall be used to measure the ground anchor movement. The movement-measuring device shall have a minimum travel equal to the theoretical elastic elongation of the total anchor length plus 1 inch. The dial gauge or vernier scale shall be aligned so that its axis is within 5 degrees from the axis of the tieback. A hydraulic jack and pump shall be used to apply the test load. The jack and pressure gauge shall be calibrated by an independent testing laboratory as a unit. Each load cell, test jack and pressure gauge, and master pressure gauge, shall be calibrated as specified in Section 6-17.3(3). Additionally, the Contractor shall not use load cells, test jacks and pressure gauges, and master pressure

gauges, greater than 60 calendar days past their most recent calibration date, until such items are re-calibrated by an independent testing laboratory.

The pressure gauge shall be graduated in 100-psi increments or less. The pressure gauge will be used to measure the applied load. The pressure gauge shall be selected to place the maximum test load within the middle two-thirds of the range of the gauge. The ram travel of the jack shall not be less than the theoretical elastic elongation of the total anchor length at the maximum test load plus one inch. The jack shall be independently supported and centered over the tendon so that the tendon does not carry the weight of the jack. The Contractor shall have a second calibrated jack pressure gauge at the site. Calibration data shall provide a specific reference to the jack and the pressure gauge.

The loads on the tiebacks during the performance and verification tests shall be monitored to verify consistency of load as defined in Section 6-17.3(1). Test loads less than 20,000 pounds shall be monitored by the jack pressure gauge. Test loads equal to or greater than 20,000 pounds shall be monitored with an electric or hydraulic load cell. The Contractor shall provide the load cell and a readout device. The load cell shall be selected to place the maximum test load within the middle two-thirds of the range of the load cell. The stressing equipment shall be placed over the ground anchor tendon in such a manner that the jack, bearing plates, load cell and stressing anchorage are in alignment.

6-17.3(8)A Verification Testing

Verification tests shall be performed to verify the design of the anchor system. These ground anchor test results shall verify the Contractor's design and be approved by the Engineer prior to ordering anchor material for the tieback retaining walls. The tests shall be performed on sacrificial test anchors. A minimum of two successful verification tests shall be conducted. The locations shall be close to the anchor location of the production anchors. The test locations shall be selected by the Contractor and approved by the Engineer.

The drilling method, anchor diameter, and depth of anchorage for the test anchor shall be identical as for the production anchors. The no-load zone shall be backfilled prior to withdrawing the casing.

The anchor tested shall be loaded to 200 percent of the design load (DL). The prestressing tendon shall be proportioned such that the maximum stress does not exceed 80 percent of the ultimate strength of the steel. The jack shall be positioned at the beginning of the test such that unloading and repositioning of the jack during the test will not be required.

The verification tests shall be made by incrementally loading the anchors in accordance with the following schedule.

AL - Anchor Alignment Load
DL - Anchor Design Load

Load	Hold Time
AL	1 Min.
0.25DL	10 Min.
0.50DL	10 Min.
0.75DL	10 Min.
1.00DL	10 Min.
1.25DL	10 Min.

1.50DL	60 Min.
1.75DL	10 Min.
2.00DL	10 Min.
AL	1 Min.

The test load shall be applied in increments of 25 percent of the design load. Each load increment shall be held for at least 10 minutes. Measurement of anchor movement shall be obtained at each load increment. The load-hold period shall start as soon as the test load is applied and the anchor movement, with respect to a fixed reference, shall be measured and recorded at 1 minute, 2, 3, 4, 5, 6, 10, 15, 20, 25, 30, 45, and 60 minutes.

The verification test will be considered successful if the anchor meets the criteria for a performance tested ground anchor in Section 6-17.3(9), and in addition, a pull-out failure does not occur at the 2.0DL maximum load.

The Engineer will give the Contractor a written order concerning ground anchor construction within seven working days after completion of the verification tests. This written order will either confirm the bond lengths as shown in the Contractor's plans for ground anchors or reject the anchors based upon the result of the verification tests.

6-17.3(8)B Performance Testing

Performance tests shall be done in accordance with the following procedures. Five percent of the ground anchors or a minimum of three ground anchors, whichever is greater, shall be performance tested. The Engineer shall select the ground anchors to be performance tested. The first production anchor shall be performance tested.

The performance test shall be made by incrementally loading and unloading the ground anchor in accordance with the following schedule. The load shall be raised from one increment to another immediately after a deflection reading.

Performance Test Schedule

Load	Load
AL	AL
0.25DL	0.25DL
AL	0.50DL
0.25DL	0.75DL
0.50DL	1.00DL
AL	1.25DL
0.25DL	AL
0.50DL	0.25DL
0.75DL	0.50DL
AL	0.75DL
0.25DL	1.00DL
0.50DL	1.25DL
0.75DL	1.50DL
1.00DL	AL
	Jack to lock-off load

Where: AL - is the alignment load DL - is the anchor design load.

The maximum test load in a performance test shall be held for ten minutes. The load-hold period shall start as soon as the maximum test load is applied and the anchor movement, with respect to a fixed reference, shall be measured and recorded at 1 minute, 2, 3, 4, 5, 6, and 10 minutes. If the anchor movement between one minute and ten minutes exceeds 0.04 inches, the maximum test load shall be held for an additional 50 minutes. If the load hold is extended, the anchor movement shall be recorded at 15 minutes, 20, 25, 30, 45, and 60 minutes. If an anchor fails in creep, retesting will not be allowed. All anchors not performance tested shall be proof tested.

6-17.3(8)C Proof Testing

Proof tests shall be performed by incrementally loading the ground anchor in accordance with the following schedule. The load shall be raised from one increment to another immediately after a deflection reading. The anchor movement shall be measured and recorded to the nearest 0.001 inches with respect to an independent fixed reference point at the alignment load and at each increment of load. The load shall be monitored with a pressure gauge. At load increments other than the maximum test load, the load shall be held just long enough to obtain the movement reading.

Proof Test Schedule

Load	Load
AL	1.00DL
0.25DL	1.25DL
0.50DL	1.50DL
0.75DL	Jack to lock-off load

Where: AL - is the alignment load
DL - is the anchor design load

The maximum test load in a proof test shall be held for ten minutes. The load-hold period shall start as soon as the maximum test load is applied and the anchor movement with respect to a fixed reference shall be measured and recorded at 1 minute, 2, 3, 4, 5, 6, and 10 minutes. If the anchor movement between one minute and ten minutes exceeds 0.04 inches, the maximum test load shall be held of an additional 50 minutes. If the load hold is extended, the anchor movements shall be recorded at 15 minutes, 20, 25, 30, 45, and 60 minutes. If an anchor fails in creep, retesting will not be allowed.

6-17.3(9) Permanent Ground Anchor Acceptance Criteria

A performance or proof tested ground anchor with a ten minute load hold is acceptable if the:

1. Ground anchor carries the maximum test load with less than 0.04 inches of movement between one minute and ten minutes; and

2. Total movement at the maximum test load exceeds 80 percent of the theoretical elastic elongation of the tendon unbonded length.

A verification, performance or proof tested ground anchor with a 60-minute load hold is acceptable if the:

1. Ground anchor carries the maximum test load with a creep rate that does not exceed 0.08 inches/log cycle of time and is a linear or decreasing creep rate.

2. Total movement at the maximum test load exceeds 80 percent of the theoretical elastic elongation of the tendon unbonded length.

If the total movement of the ground anchors at the maximum test load does not exceed 80 percent of the theoretical elastic elongation of the tendon unbonded length, the Contractor shall replace the ground anchor at no additional cost to the Contracting Agency. Retesting of a ground anchor will not be allowed.

Ground anchors which have a creep rate greater than 0.08 inches/log cycle of time can be incorporated in the finished work at a load equal to one-half its failure load. The failure load is the load carried by the anchor after the load has been allowed to stabilize for ten minutes.

When a ground anchor fails, the Contractor shall modify the design, the construction procedures, or both. These modifications may include, but are not limited to, installing replacement ground anchors, modifying the installation methods, increasing the bond length or changing the ground anchor type. Any modification which requires changes to the structure shall have prior approval of the Engineer. Any modifications of design or construction procedures shall be at the Contractor's expense.

Upon completion of the test, the load shall be adjusted to the lock-off load indicated in the Plans and transferred to the anchorage device. The ground anchor may be completely unloaded prior to lock-off. After transferring the load and prior to removing the jack a lift-off reading shall be made. The lift-off reading shall be within ten percent of the specified lock-off load.

If the load is not within ten percent of the specified lock-off load, the anchorage shall be reset and another lift-off reading shall be made. This process shall be repeated until the desired lock-off load is obtained.

6-17.4 Measurement

Permanent ground anchors will be measured per each for each permanent ground anchor installed and accepted.

Permanent ground anchor performance tests will be measured per each for each anchor performance tested.

The permanent ground anchor verification testing program will not be measured but will be paid for on a lump sum basis.

6-17.5 Payment

Payment will be made in accordance with Section 1-04.1 for each of the following bid items when they are included in the proposal:

"Permanent Ground Anchor", per each.
All costs in connection with furnishing and installing permanent ground anchors shall be included in the unit contract price per each for "Permanent Ground Anchor", including proof testing of the installed anchor as specified.

"Permanent Ground Anchor Performance Test", per each.

"Permanent Ground Anchor Verification Test", lump sum.

SECTION 6-18, SHOTCRETE FACING
April 5, 2004

6-18.1 Description

This work consists of constructing shotcrete facing as shown in the Plans. Shotcrete constructed as concrete slope protection shall be constructed in accordance with Section 8-16.

6-18.2 Materials

Materials shall meet the requirements of the following sections:

Cement	9-01
Aggregates for Portland Cement Concrete	9-03.1
Premolded Joint Filler	9-04.1(2)
Steel Reinforcing Bar	9-07.2
Epoxy-Coated Steel Reinforcing Bar	9-07.3
Concrete Curing Materials and Admixtures	9-23
Fly Ash	9-23.9
Water	9-25

Other materials required, including materials for shotcrete, shall be as specified in the Special Provisions.

6-18.3 Construction Requirements

6-18.3(1) Submittals

The Contractor shall submit the following information to the Engineer at least 14 calendar days prior to beginning construction of the shotcrete facing:

1. The shotcrete mix design with compressive strength test results.
2. Method and equipment used to finish and cure the shotcrete facing.
3. Documentation of the experience of the nozzle operators in applying shotcrete.

The Contractor shall not begin construction of the shotcrete facing until receiving the Engineer's approval of the above submittals.

6-18.3(2) Mix Design

Shotcrete shall be proportioned to produce a 4,000 psi compressive strength at 28 days. The Contractor shall submit the shotcrete mix design, proposed method of placement, and evidence that the proposed design and placement method will produce the desired compressive strength at 28 days, to the Engineer at least 14 calendar days prior to the anticipated beginning of shotcrete placement. Shotcrete placement will not be allowed until the Engineer has approved the mix design and method of placement.

Admixture shall be used only after receiving permission from the Engineer. If admixtures are used to entrain air, to reduce water-cement ratio, to retard or accelerate setting time, or to accelerate the development of strength, the admixtures shall be used at the rate specified by the manufacturer and approved by the Engineer.

6-18.3(3) Testing

The Contractor shall make shotcrete test panels for evaluation of shotcrete quality, strength, and aesthetics. Both preproduction and production test panels, shall be prepared. All cores obtained for the purpose of shotcrete strength testing shall have the following minimum dimensions:

a. The core diameter shall be at least 3 times the maximum aggregate size, but not less than 2 inches.

b. The core height shall be a minimum of 1.5 times the core diameter.

The Contractor shall remove at least three cores from each 36-inch by 36-inch shotcrete test panel in accordance with AASHTO T 24. Cores removed from the panel shall be immediately wrapped in wet burlap and sealed in a plastic bag. Cores shall be clearly marked to identify from where they were taken and whether they are for pre-production or production testing. If for production testing, the section of the wall represented by the cores shall be clearly marked on the cores. Cores shall be delivered to the Engineer within 2 hours of coring. The remainder of the panels shall remain the property of the Contractor.

6-18.3(3)A Pre-production Testing

At least one 36-inch by 36-inch panel for each mix design shall be prepared for evaluation and testing of the shotcrete quality and strength. One 48-inch by 48-inch qualification panel shall be prepared for evaluation and approval of the proposed method for shotcrete installation, finishing, and curing. Both the 36-inch and the 48-inch panels shall be constructed using the same methods and initial curing proposed to construct the shotcrete facing, except that the 36-inch panel shall not include wire reinforcement. The 36-inch panel shall be constructed to the minimum thickness necessary to obtain the required core samples. The 48-inch panel shall be constructed to the same thickness as proposed for the production facing. Production shotcrete work shall not begin until satisfactory test results are obtained and the panels are approved by the Engineer.

6-18.3(3)B Production Testing

The Contractor shall make at least one 36-inch by 36-inch panel for each section of facing shot, or as many as directed by the Engineer. A section is defined as one day's placement. The production panels shall be constructed using the same methods and initial curing used to construct the shotcrete wall, but without wire reinforcement. The panels shall be constructed to the minimum thickness necessary to obtain the required core samples. If the production shotcrete is found to be unsuitable based on the results of the test panels, the section(s) of the wall represented by the test panel(s) shall be repaired or replaced to the satisfaction of the Engineer at no cost to the Contracting Agency.

6-18.3(4) Qualifications of Contractor's Personnel

All nozzle operators shall have had at least one year of experience in the application of shotcrete. Each nozzle operator will be qualified, by the Engineer, to place shotcrete, after successfully completing one test panel for each shooting position and surface type which will be encountered.

Qualification will be based on a visual inspection of the shotcrete density, void structure, and finished appearance along with a minimum 7-day compressive strength of 2,500 psi determined from the average test results from two cores taken from each test panel.

The Contractor shall notify the Engineer not less than 2 days prior to the shooting of a qualification panel. The mix design for the shotcrete shall be the same as that slated for the wall being shot.

Shotcrete shall be placed only by personnel qualified by the Engineer.

If shotcrete finish Alternative B or C is specified, evidence shall be provided that all shotcrete crew members have completed at least three projects in the last five years where such finishing, or sculpturing and texturing of shotcrete was performed.

6-18.3(5) Placing Wire Reinforcement

Reinforcement of the shotcrete shall be placed as shown in the Plans. The wire reinforcement shall be securely fastened to the steel reinforcing bars so that it will be 1 to 1.5 inches from the face of the shotcrete at all locations, unless otherwise shown in the Plans. Wire reinforcement shall be lapped 1.5 squares in all directions, unless otherwise shown in the Plans.

6-18.3(6) Alignment Control

The Contractor shall install non-corroding alignment wires and thickness control pins to establish thickness and plane surface. The Contractor shall install alignment wires at corners and offsets not established by formwork. The Contractor shall ensure that the alignment wires are tight, true to line, and placed to allow further tightening. The Contractor shall remove the alignment wires after facing construction is complete.

6-18.3(7) Shotcrete Application

A clean, dry supply of compressed air sufficient for maintaining adequate nozzle velocity for all parts for the work and for simultaneous operation of a blow pipe for cleaning away rebound shall be maintained at all times. Thickness, method of support, air pressure, and rate of placement of shotcrete shall be controlled to prevent sagging or sloughing of freshly-applied shotcrete.

The shotcrete shall be applied from the lower part of the area upwards. Surfaces to be shot shall be damp, but free of standing water.

The nozzles shall be held at an angle approximately perpendicular to the working face and at a distance that will keep rebound at a minimum and compaction will be maximized. Shotcrete shall emerge from the nozzle in a steady uninterrupted flow. If, for any reason, the flow becomes intermittent, the nozzle shall be diverted from the work until a steady flow resumes.

Surface defects shall be repaired as soon as possible after initial placement of the shotcrete. All shotcrete which lacks uniformity; which exhibits segregation, honeycombing, or lamination; or which contains any dry patches, slugs, voids, or sand pockets, shall be removed and replaced with fresh shotcrete by the Contractor, to the satisfaction of the Engineer at no cost to the Contracting Agency.

Construction joints in the shotcrete shall be uniformly tapered over a minimum distance of twice the thickness of the shotcrete layer. The surface of the joints shall be cleaned and thoroughly wetted before adjacent shotcreting is performed. Shotcrete shall be placed in a manner which provides a finish with uniform texture and color across the construction joint.

The shotcrete shall be cured by applying a clear curing compound in accordance with Section 9-23.2. The curing compound shall be applied immediately after final gunning. The air in contact with shotcrete surfaces shall be maintained at temperatures above 50F for a minimum of 7 days. Curing compounds shall not be used on any surfaces against which additional shotcrete or other cementitious finishing materials are to be bonded unless positive measures such as sandblasting, are taken to completely remove the curing compounds prior to the application of such additional materials.

If field inspection or testing, by the Engineer, indicates that any shotcrete produced, fails to meet the requirements, the Contractor shall immediately modify procedures, equipment, or system, as necessary, and as approved by the Engineer to produce specification material. All substandard shotcrete already placed shall be repaired by the Contractor, to the satisfaction of the Engineer, at no additional cost to the Contracting Agency. Such repairs may include removal and replacement of all affected materials.

6-18.3(8) Shotcrete Finishing

When the shotcrete facing is an interim coating to be covered by a subsequent shotcrete coating or a cast-in-place concrete fascia later under the same contract, the Contractor shall strike off the surface of the shotcrete facing with a roughened surface as specified in Section 6-02.3(12). The grooves of the roughened surface shall be either vertical or horizontal.

When the shocrete facing provides the finished exposed final surface, the shotcrete face shall be finished using the alternative aesthetic treatment shown in the Plans. The alternatives are as follows:

Alternative A

After the surface has taken its initial set (crumbling slightly when cut), the surface shall be broom finished to secure a uniform surface texture.

Alternative B

Shotcrete shall be applied in a thickness a fraction beyond the alignment wires and forms. The shotcrete shall stiffen to the point where the surface does not pull or crack when screeded with a rod or trowel. Excess material shall be trimmed, sliced, or scraped to true lines and grade. Alignment wires shall be removed and the surface shall receive a steel trowel finish, leaving a smooth uniform texture and color. Once the shotcrete has cured, pigmented sealer shall be applied to the shotcrete face. The shotcrete surface shall be completed to within a tolerance of ½ inch of true line and grade.

Alternative C

Shotcrete shall be hand-sculptured, colored, and textured to simulate the relief, jointing, and texture of the natural backdrop surrounding the facing. The ends and base of the facing shall transition in appearance as appropriate to more nearly match the color and texture of the adjoining roadway fill slopes. This may be achieved by broadcasting fine and coarse aggregates, rocks, and other native materials into the final surface of the shotcrete while it is still wet, allowing sufficient embedment into the shotcrete to become a permanent part of the surface.

6-18.4 Measurement

Shotcrete facing will be measured by the square foot surface area of the completed facing measured to the neat lines of the facing as shown in the Plans.

6-18.5 Payment

Payment will be made in accordance with Section 1-04.1 for each of the following bid items when they are included in the proposal:

"Shotcrete Facing", per square foot.

All costs in connection with constructing shotcrete facing as specified shall be included in the unit contract price per square foot for "Shotcrete Facing" including all steel reinforcing bars, premolded joint filler, polyethylene bond breaker strip, joint sealant, pvc pipe for weep holes, exterior surface finish, and pigmented sealer (when specified).

SECTION 7-05, MANHOLES, INLETS, CATCH BASINS, AND DRYWELLS
August 2, 2004

7-05.5 Payment

The sentence following "Catch Basin Type 2___ In. Diam.", per each" is deleted.

The following is inserted after "Concrete Inlet", per each":

All costs associated with furnishing and installing gravel backfill for bedding manholes, inlets and catch basins shall be included in the unit contract price for the item installed.

The following is inserted after "Precast Concrete Drywell", per each.

"Combination Inlet", per each.
All costs associated with furnishing and installing gravel backfill for bedding manholes, inlets, and catch basins shall be in the unit contract price for the item installed.

SECTION 7-12, VALVES FOR WATER MAINS
April 5, 2004

7-12.3 Construction Requirements

In the third paragraph the reference to Section 7-10 is revised to Section 7-09.

In the fourth paragraph the reference to Section 7-11 is revised to Section 7-09.

SECTION 7-14, HYDRANTS
April 5, 2004

7-14.3(1) Setting Hydrants

In the third paragraph the reference to Section 7-11 is revised to Section 7-09.

7-14.3(6) Hydrant Extensions

The reference to Section 7-11 is revised to Section 7-09.

SECTION 7-15, SERVICE CONNECTIONS
April 5, 2004

7-15.3 Construction Requirements

In the second paragraph the reference to Section 7-10 is revised to Section 7-09.

SECTION 7-17, SANITARY SEWERS
April 5, 2004

7-17.3(2)B Exfiltration Test

In the third paragraph, "Maximum leakage (in gallons per hour)" = $0.28 \times \frac{\sqrt{H}}{\sqrt{6}} \times D \times \frac{L}{100}$.

7-17.3(2)C Infiltration Test

In the second paragraph, "Maximum leakage (in gallons per hour)" = $0.16 \times \frac{\sqrt{H}}{\sqrt{2}} \times D \times \frac{L}{100}$.

7-17.3(2)E Low Pressure Air Test for Sanitary Sewers Constructed of Air-Permeable Materials

In the seventh paragraph, the statement "If C_T –1, then time = K_T" is revised to "If $C_T \leq 1$, then time = K_T."

In the seventh paragraph, the statement "If $C_T \bullet 1.75$, then time = $K_T/1.75$" is revised to "If $C_T \geq 1.75$, then time = $K_T/1.75$."

SECTION 8-01, EROSION CONTROL
August 2, 2004

8-01.3(1)B Erosion and Sediment Control (ESC) Lead

This section is revised to read:

> The Contractor shall identify the ESC Lead at the preconstruction discussions. The ESC Lead shall have, for the life of the contract, a current Certificate of Training in Construction Site Erosion and Sediment Control from a course approved by WSDOT's Statewide Erosion Control Coordinator.
>
> The ESC Lead shall implement the Temporary Erosion and Sediment Control (TESC) plan. Implementation shall include, but is not limited to:
>
> 1. Installing and maintaining all temporary erosion and sediment control Best Management Practices (BMPs) included in the TESC plan to assure continued performance of their intended function. Damaged or inadequate TESC BMPs shall be corrected immediately.
>
> 2. Inspecting all on-site erosion and sediment control BMPs at least once every five working days and each working day there is a runoff event. Inspections shall occur within 24 hours of the runoff event. A TESC Inspection Report shall be prepared for each inspection and shall be included in the TESC file. A copy of each TESC Inspection Report shall be submitted to the Engineer no later than the end of the next working day following the inspection. The report shall include, but not be limited to:

a. When, where and how BMPs were installed, maintained, modified, and removed;
b. Observations of BMP effectiveness and proper placement;
c. Recommendations for improving future BMP performance with upgraded or replacement BMPs when inspections reveal TESC plan inadequacies.

3. Updating and maintaining a TESC file on site that includes, but is not limited to:

a. TESC Inspection Reports.
b. Temporary Erosion and Sediment Control (TESC) plan narrative.
c. National Pollutant Discharge Elimination System construction permit (Notice of Intent).
d. Other applicable permits.

Upon request, the file shall be provided to the Engineer for review.

SECTION 8-04, CURBS, GUTTERS, AND SPILLWAYS
December 6, 2004

8-04.3(1)A Extruded Cement Concrete Curb

The second and third paragraphs are revised to read:

The pavement shall be dry and cleaned of loose and deleterious material prior to curb placement. Cement concrete curbs shall be anchored to the existing pavement by placing steel tie bars 1 foot on each side of every joint.

Tie bars shall meet the dimensions shown in the Standard Plans.

SECTION 8-07, PRECAST TRAFFIC CURB AND BLOCK TRAFFIC CURB
August 2, 2004

8-07.1 Description

This section is revised to read:

This work shall consist of furnishing and installing precast traffic curb, block traffic curb, sloped mountable curb, or dual faced sloped mountable curb of the design and type specified in the plans in accordance with these Specifications and in conformity to the Standard Plans and the locations indicated in the plans or as directed by the Engineer.

8-07.3(1) Installing Curbs

This section is supplemented with the following:

For sloped mountable curb installed in curves, the units shall be either curved blocks precast to the radii shown in the plans or tangent blocks sawn to the dimensions shown in the Standard Plans to conform to the specified radii.

8-07.3(2) Painting of Curbs

The first sentence is revised to read:

Concrete curbing shall be painted with two full coats of paint conforming to Section 9-34.2, as shown in the Plans or as designated by the Engineer.

8-07.4 Measurement

This section is supplemented with the following:

Sloped mountable curb will be measured by the linear foot along the front face of the curb. Dual faced sloped mountable curb will be measured by the linear foot of tapered block and nosing block installed. Measurement of both faces shall not be allowed.

8-07.5 Payment

This section is supplemented with the following:

"Precast Sloped Mountable Curb", per linear foot.
"Precast Dual Faced Sloped Mountable Curb", per linear foot.

SECTION 8-12, CHAIN LINK FENCE AND WIRE FENCE
August 2, 2004

8-12.3(1)A Posts

The seventh paragraph is revised to read:

Pullposts shall be spaced at 1,000-foot maximum intervals for Type 1, 3, and 6 fence, and at 500-foot maximum intervals for Type 4 fence.

SECTION 8-14, CEMENT CONCRETE SIDEWALKS
August 2, 2004

8-14.3(3) Placing and Finishing Concrete

The second sentence in the fourth paragraph is revised to read:

The detectable warning pattern shall have the truncated dome shape shown in the Standard Plans and may be formed by either embossing the wet concrete, adding a manufactured material before or after the concrete has cured, or installing masonry or ceramic tiles.

8-14.3(5) Ramp Detectable Warning Retrofit

This section is supplemented with the following:

Where shown in the plans, the Contractor shall retrofit existing cement concrete sidewalk ramps by installing a detectable warning pattern having the truncated dome shape shown in the Standard Plans. The warning pattern shall be the width of the ramp and cover the bottom two feet of the ramp. The truncated dome pattern shall be perpendicular to the long axis of the ramp.

The Contractor shall use one of the detectable warning pattern products listed in the Qualified Products List or submit another manufacturer's product for approval by the Engineer. The warning pattern shall be capable of being bonded to an existing cement concrete surface. The surface of the warning pattern, excluding the domes, shall not be more than 3/8 inch above the surface of the concrete after installation.

8-14.4 Measurement

This section is supplemented with the following:

In a sidewalk ramp detectable warning retrofit, the warning pattern will be measured by the square foot of truncated dome material installed on the existing ramp.

8-14.5 Payment

The following new bid item is inserted after "Cement Conc. Sidewalk Ramp Type ___", per each.

"Ramp Detectable Warning Retrofit", per square foot.

SECTION 8-15, RIPRAP
April 5, 2004

8-15.3(6) Quarry Spalls

The second sentence is revised to read:

After placement, the quarry spalls shall be compacted to be uniformly dense and unyielding.

8-15.5 Payment

In the second paragraph, the first sentence is revised to read:

The unit contract price per ton or per cubic yard for the class or kind of riprap specified above shall be full pay for furnishing all labor, tools, equipment, and materials required to construct the riprap protection, except for excavation.

SECTION 8-17, IMPACT ATTENUATOR SYSTEMS
April 5, 2004

This section is revised to read:

8-17.1 Description

This work shall consist of furnishing, constructing, repairing, and removing permanent and temporary impact attenuator systems selected from the approved list shown in the Plans.

8-17.2 Materials

Sand for inertial barrier systems shall not contain more than 5% water by weight. Commercial grade urea shall be thoroughly mixed with the sand in an amount equal to 5 percent, by weight, of the sand.

Undamaged sand barrel impact attenuators that have been previously utilized may be utilized in a temporary impact attenuator array only, if inspected and approved by the Engineer prior to use.

8-17.3 Construction Requirements

The assembly and installation of all attenuator systems, except those utilizing sand barrels, shall be supervised at all times by either a manufacturer's representative or an

installer who has been trained and certified by the manufacturer of the system. If the supervision is provided by a trained installer, a copy of the installer certification shall be provided to the Engineer prior to installation.

Assembly and installation shall be in accordance with the manufacturer's recommendations. This work shall include the connection to a concrete barrier, bridge abutment or a transition section identified in the Plans, construction of a steel reinforced concrete pad or concrete backup, and anchorage to the pavement, if required by the manufacturer's assembly and installation procedures.

The Contractor shall have a complete set of replacement parts on the jobsite for each type of temporary impact attenuator in use on the project and shall repair all damaged impact attenuators immediately.

When the Engineer determines that a temporary impact attenuator is no longer needed, then the Contractor shall remove that attenuator from the project. The removed equipment shall remain the property of the Contractor.

8-17.4 Measurement

Temporary and permanent impact attenuators will be measured per each for each installation.

Resetting impact attenuators will be measured per each for each installation that is adjusted or reset to a new location on the project. The Contracting Agency will not measure resetting impact attenuators when it is for the benefit of the Contractor's operations.

8-17.5 Payment

Payment will be made in accordance with Section 1-04.1, for the following bid items when they are included in the proposal:

"Temporary Impact Attenuator", per each.
The unit contract price for "Temporary Impact Attenuator" shall be full pay for all work associated with the installation, maintenance, and the final removal of the temporary impact attenuator.

"Permanent Impact Attenuator", per each.
The unit contract price for "Permanent Impact Attenuator" shall be full pay for all work associated with furnishing, installing and all other costs involved with installing the impact attenuator in accordance with the manufacturer's recommendations.

"Resetting Impact Attenuator", per each.
The unit contract price for "Resetting Impact Attenuator" shall be full pay for all work associated with the removing, transporting, and resetting an impact attenuator.

If an impact attenuator is damaged, it will be repaired in accordance with Section 1-07.13(4) under the bid item "Reimbursement For Third Party Damage". No payment will be made for repair of impact attenuators damaged by the Contractor's operations.

SECTION 8-18, MAILBOX SUPPORT
August 2, 2004

8-18.2 Materials

This section is revised to read:

Materials shall meet the requirements of the following sections:

Steel Posts	9-32.1
Bracket, Platform, and Anti-Twist Plate	9-32.2
Type 2 Mailbox Support	9-32.7
Timber Sign Posts	9-28.14(1)
Fasteners	9-32.5
Snow Guard	9-32.6
Concrete Base	9-32.8
Steel pipe	9-32.9
U-Channel Post	9-32.10

Mailboxes will be furnished by others.

8-18.3 Construction Requirements

This section is supplemented with the following:

8-18.3(1) Type 3 Mailbox Support

The concrete base shall be constructed using commercial concrete, with the pipe set to the dimensions shown in the Standard Plans. The base shall be crowned so as to shed water. The concrete may be mixed on the jobsite as specified in Section 6-02.3(4)B.

The U-channel post may be driven in place provided the method of driving does not damage the post.

With the Engineer's consent, a Type 3 Mailbox Support design, made of steel or other durable material, that meets the NCHRP 350 crash test criteria may be used in place of the design shown in the Standard Plans. In which case, the manufacturer's recommendations concerning installation shall be followed; however, the mailbox itself shall be positioned on the roadway according to the dimensions shown in the Standard Plans.

SECTION 8-19, REDIRECTIONAL LAND FORM
April 5, 2004

This section is deleted, and the section title is revised to **VACANT**.

SECTION 8-20,ILLUMINATION, TRAFFIC SIGNAL SYSTEMS, AND ELECTRICAL
April 5, 2004

8-20.3(5) Conduit

The third sentence in the seventeenth paragraph is revised to read:

Grout shall obtain a minimum of 4000 psi compressive strength at 7 days.

8-20.3(6) Junction Boxes, Cable Vaults, and Pull boxes

This section is supplemented with the following:

Where conduit and junction boxes are placed in barrier, the Prime Contractor shall coordinate the work of the Contractor constructing the barrier and the electrical Contractor so that each junction box placed in the barrier is placed in correct alignment with respect to the barrier, with the face of the box flush or uniformly chamfered within ½ inch of the barrier surface. If any point on the surface of the junction box placed in barrier is recessed more than 1/2 inch from the surface of the barrier, the Contractor shall install a box extension meeting the Engineer's approval and grout around the extension or remove and replace the entire section of barrier.

8-20.3(9) Bonding, Grounding

The first paragraph is revised to read:

All metallic appurtenances containing electrical conductors (luminaires, light standards, cabinets, metallic conduit, non-metallic conduit, etc.) shall be made mechanically and electrically secure to form a continuous systems which shall be effectively grounded. Where metallic conduit systems are employed, the conduit system constitutes the equipment grounding conductor. Where nonmetallic conduit is installed, the installation shall include an equipment ground conductor, in addition to the conductors noted in the contract. Bonding jumpers and equipment grounding conductors shall be installed in accordance with Section 9-29.3. The equipment ground conductor between the isolation switch and the sign lighter fixtures may be No. 14 AWG stranded copper conductor. Where parallel circuits are enclosed in a common conduit, the equipment grounding conductor shall be sized by the rating of the largest overcurrent device serving any circuit contained within the conduit.

8-20.3(11) Testing

The fourth paragraph is revised to read:

When the project includes a traffic signal system, the Contractor shall conduct tests noted in Section 8-20.3(14)D. The Contractor shall provide the Engineer a minimum of five days advance written notice of the proposed traffic signal turn-on date and time. The traffic signal turn-on procedure shall not begin until all required channelization, pavement markings, illumination, signs, and sign lights are substantially complete and operational unless otherwise allowed by the Engineer. The Contractor shall provide traffic control to stop all traffic from entering the intersection. The Contracting Agency electronics technician will program the controller and enter the timing data, then turn the traffic signal system to its flash mode to verify proper flash indications. The Contracting Agency electronics technician will then conduct functional tests to demonstrate that each part of the traffic signal system functions as specified. The Contractor shall conduct functional tests to demonstrate that each part of the illumination system, or other electrical system, functions as specified. These demonstration shall be conducted in the presence of a Contracting Agency electronic technician, the Contracting Agency electrical inspector, and Regional Traffic Engineer or his/her designee. The Contracting Agency electronics technician will then turn the traffic signal to stop-and-go operation for no less than one full cycle. Based on the results of the turn-on, the Engineer will direct the Contracting Agency electronics technician to either turn the traffic signal on to normal stop-and-go operation, to turn the signal to flash mode for a period not to exceed five calendar days, or to turn the

signal off and require the Contractor to cover all signal displays and correct all deficiencies.

SECTION 8-22, PAVEMENT MARKING
December 6, 2004

8-22.3(2) Preparation of Roadway Surfaces

This section is revised to read:

For the application of paint the pavement surface temperature and ambient temperature shall be 50° F and rising. New and existing HMA pavement shall be dry, clean and free of contaminants such as surface oils. Portland cement concrete pavement shall have a minimum compressive strength of 2500 psi and shall be dry, clean and free of contaminants. Contaminants shall be removed by approved mechanical means.

For the application of plastic pavement marking material surface temperature and ambient temperature shall be 50° F and rising. New and existing HMA pavement shall be dry, clean, and free of contaminants such as surface oils and existing pavement marking materials. Portland cement concrete pavement shall also be free of contaminants including curing agents. Contaminants shall be removed by approved mechanical means.

Pavement surfaces shall be prepared for plastic marking application in accordance with the previous paragraph and the pavement marking material manufacturer's recommendations. Manufacturers of Type D material also require a pavement cure period prior to application. Typically, Type D material applied on hot mix asphalt pavement requires a pavement cure period of 21 days. Typically, Type D material applied on portland cement concrete pavement requires a pavement cure period of 28 days. These cure periods may be reduced if the manufacturer performs a successful bond test.

Existing pavement marking material shall be removed, measured, and paid for in accordance with the provisions in this section of the Standard Specifications.

8-22.3(3) Marking Application

The first paragraph is revised to read:

Lane line and right edge line shall be white in color. Center line and left edge line shall be yellow in color. All temporary pavement markings shall be retroreflective. Paint and sprayed or extruded plastic material shall be applied with a top dressing of glass breads. Two applications of paint will be required to complete all paint markings. The time period between paint applications will vary depending on the type of pavement and paint (low VOC waterborne, high VOC solvent, or low VOC solvent) as follows:

Pavement Type	Paint Type	Time Period
Bituminous Surface Treatment	Low VOC Waterborne	4 hours min., 48 hours max.
Hot Mix Asphalt Pavement	Low VOC Waterborne	4 hours min., 30 days max.
Cement Concrete Pavement	Low VOC Waterborne	4 hours min., 30 days max.

Bituminous Surface Treatment	High and Low VOC Solvent	40 min. min., 48 hrs. max.
Hot Mix Asphalt Pavement	High and Low VOC Solvent	40 min. min., 30 days max.
Cement Concrete Pavement	High and Low VOC Solvent	40 min. min., 30 days max.

The ninth and tenth paragraphs are revised to read:

Profiles are defined as that portion of the plastic line that is applied at a greater thickness than the base line thickness. Profiles shall be applied using the extruded method in the same application as the base line. See the Standard Plans for details.

Embossed plastic lines are defined as a plastic line applied with a transverse groove. Embossed plastic lines may be applied with profiles. See the Standard Plans for details.

The last paragraph is revised to read:

When two or more spray applications are required to meet thickness requirements for Type A and Type D materials, top dressing with glass beads is only allowed on the last application. Any loose beads, dirt or other debris shall be swept or blown off the line prior to application of each successive application. Successive applications shall be applied squarely on top of the preceding application.

8-22.4 Measurement

The seventh paragraph is revised to read:

Traffic arrows, traffic letters, access parking space symbols, HOV symbols, railroad crossing symbols, drainage markings, bicycle lane symbols, aerial surveillance full, and 1/2 markers will be measured per each. Type 1 through 6 traffic arrows will be measured as one unit each, regardless of the number of arrow heads.

The ninth paragraph is revised to read:

Removal of traffic arrows, traffic letters, access parking space symbol, HOV lane symbol, railroad crossing symbol, bicycle lane symbols, drainage markings, aerial surveillance full and 1/2 markers will be measured per each. Removal of crosswalk lines will be measured by the square foot of lines removed.

SECTION 9-01, PORTLAND CEMENT
December 6, 2004

9-01.2(1) Portland Cement

This section is revised to read:

Portland cement shall conform to the requirements for Types I, II, or III cement of the Standard Specifications for Portland Cement, AASHTO M 85 or ASTM C 150, except that the content of alkalis shall not exceed 0.75 percent by weight calculated as Na_20 plus 0.658 $K_20$and except that the content of Tricalcium aluminate (C_3A) shall not exceed 8 percent by weight calculated as $2.650A1_20_3$ minus $1.692Fe_20_3$. The total

amount of processing additions used shall not exceed 1% of the weight of portland cement clinker. The type and amount of processing additions used shall be shown on mill test reports.

The time of setting shall be determined by the Vicat Test method, AASHTO T 131 or ASTM C 191.

9-01.2(4) Blended Hydraulic Cement

This section is revised to read:

Blended hydraulic cement shall be either Type IP (MS), Type I (SM) (MS) or Type I (PM) (MS) cement conforming to AASHTO M 240 and meet the following additional requirements:

1. Type IP(MS) Portland - Pozzolan Cement with moderate sulfate resistance.

   This product shall be limited to Portland Cement and Pozzolan. Pozzolan shall be limited to fly ash or ground granulated blast furnace slag. Fly ash is limited between 15 percent and 35 percent by weight of the cementitious material. Ground granulated blast furnace slag is limited between 15 percent and 25 percent by weight of the cementitious material.

2. Type I(SM) (MS) Slag Modified Portland Cement with moderate sulfate resistance.

   This product shall be limited to Portland Cement and ground granulated blast furnace slag. The addition of ground granulated blast furnace slag shall be limited to a maximum of 25 percent by weight of the cementitious material.

3. Type I(PM)(MS) Pozzolan – Modified Portland Cement with moderate sulfate resistance.

   The product shall be limited to Portland Cement and pozzolan. The pozzolan shall be limited to fly ash or ground granulated blast furnace slag at a maximum of 15 percent by weight of the cementitious material.

The source and weight of the fly ash or ground granulated blast furnace slag shall be certified on the cement mill test certificate and shall be reported as a percent by weight of the total cementitious material. The fly ash or ground granulated blast furnace slag constituent content in the finished cement will not vary morethan plus or minus 5 percent by weight of the finished cement from the certified value.

Fly ash shall meet the requirements of Section 9-23.9 of these Standard Specifications.

Ground granulated blast furnace slag shall meet the requirements of Section 9-23.10 of these Standard Specifications.

SECTION 9-02, BITUMINOUS MATERIALS
August 2, 2004

9-02.1(3) Rapid-Curing (RC) Liquid Asphalt

The column headings MC-70, MC-250, MC-800, and MC-3000 are revised to RC-70, RC-250, RC-800, and RC-3000 respectively.

The RC-250 requirement for "Residue of 680°F distillation % volumn by difference" is revised from 67 to 65.

9-02.1(4)A Performance Grade (PG) Asphalt Cement

This section including title is revised to read:

9-02.1(4)A Performance Graded Asphalt Binder

Performance Grade	PG58			PG64			PG70			PG76	
	-22	-28	-34	-22	-28	-34	-22	-28	-34	-22	-28
Original Binder											
Flash point temp, AASHTO T48 Minimum °C	230										
Viscosity, AASHTO T316 Maximum 3 Pa·s, test temp, °C	135										
Dynamic shear, AASHTO T315 G*/sinδ, minimum 1.00 kPa Test temp. @ 10 rad/s, °C	58			64			70			76	
Rolling Thin Film Oven Residue (AASHTO T240)											
Mass Change, Maximum, percent	1.00										
Dynamic shear, AASHTO T315 G*/sinδ, minimum 2.20 kPa Test temp. @ 10 rad/s, °C	58			64			70			76	
Pressure Aging Vessel Residue (AASHTO R28)											
PAV aging temperature, °C	100										
Dynamic shear, AASHTO T315 G*sinδ, maximum 5000 kPa Test temp. @ 10 rad/s, °C	22	19	16	25	22	19	28	25	22	31	28
Creep stiffness, AASHTO T313 S, maximum 300 MPa, *m* - value, minimum 0.300 Test temp. @ 60 s, °C	-12	-18	-24	-12	-18	-24	-12	-18	-24	-12	-18

All Performance Grade asphalt binders not included in this chart shall be determined by Table 1-Performance Graded Asphalt Binder Specification in AASHTO M320.

SECTION 9-03, AGGREGATES
December 6, 2004

9-03.12(4) Gravel Backfill for Drains
The percent Passing for Sieve size 3/8" square is revised from "10 - 40" to "0 - 40".

9-03.12(5) Gravel Backfill for Drywells
The percent passing for sieve size 1" square is revised to "50-100".

9-03.14 Borrow
This section is supplemented with the following:

9-03.14(1) Gravel Borrow
Ballast may be substituted for gravel borrow for embankment construction.

9-03.14(4) Gravel Borrow for Geosynthetic Retaining Wall
All backfill material used in the reinforced soil zone of the geosynthetic retaining wall shall conform to requirements of Section 9-03.14(1) and shall be free draining, free from organic or otherwise deleterious material. The material shall be substantially free of shale or other soft, poor durability particles, and shall not contain recycled materials, such as glass, shredded tires, portland cement concrete rubble, or asphaltic concrete rubble. The backfill material shall meet the following requirements:

Property	Test Method	Allowable Test Value
Los Angeles Wear, 500 rev.	AASHTO T 96	35 percent max.
Degradation	WSDOT Test Method 113	15 min.
pH	AASHTO T 289-91	**

** 4.5 to 9 for permanent walls and 3 to 10 for temporary walls

Wall backfill material satisfying these gradation, durability and chemical requirements shall be classified as nonaggressive.

9-03.21(2) Recycled Hot Mix Asphalt
The Maximum Bitumen Content (Percent) for Gravel Borrow is revised from "0" to "1.2".

SECTION 9-04, JOINT AND CRACK SEALING MATERIALS
April 5, 2004

9-04.2(2) Two Component Poured Rubber Joint Sealer

The section title is revised to read:

9-04.2(2) Poured Rubber Joint Sealer

9-05.4(3) Protective Treatment

Treatments 3, 4, and 6 are revised to read:

This treatment is no longer available.

9-05.4(4) Asphalt Coatings and Paved Inverts

The second paragraph under item 2 is revised to read:

The paved invert for Treatment 2 shall consist of bituminous material applied in such a manner that one or more smooth pavements will be formed in the invert filling the corrugations for at least 40 percent of the circumference. The pavement shall have a minimum thickness of 1/8 inch above the crest of the corrugations except where the upper edges intercept the corrugation. The pavements shall be applied following the coating with asphalt . Treatment 5 may be substituted for Treatment 2, at the option of the Contractor.

9-05.10 Steel Storm Sewer Pipe

The first sentence is revised to read:

Steel storm sewer pipe shall conform to the requirements of Section 9-05.4 for steel culvert pipe, except that protective coating shall be Treatment 1 or 5, and be constructed of either helically corrugated lock seam or helically corrugated continuous welded steel pipe.

9-05.11 Aluminum Storm Sewer Pipe

The first sentence is revised to read:

Aluminum storm sewer pipe shall conform to the requirements of Section 9-05.5 for aluminum culvert pipe, except that the protective coating shall be Treatment 1 or 5, and the pipe shall be constructed of helically corrugated lock seam aluminum pipe.

9-05.16 Grate Inlets and Drop Inlets

The first and second paragraphs are revised to read:

Steel in grates, angles, and anchors for grate inlets shall conform to ASTM A 36, except structural tube shall conform to ASTM A 500, Grade B, and structural shapes may conform to ASTM A 992. After fabrication, the steel shall be galvanized in accordance with AASHTO M 111, or galvanized with a hot-sprayed (plasma flame applied) 6 mil minimum thickness plasma coating.

Steel grating shall be fabricated by weld connections. Welds, welding procedures, and welding materials shall conform with the AWS D1.1/D1.1M, latest edition, Structural Welding Code.

SECTION 9-06, STRUCTURAL STEEL AND RELATED MATERIALS
January 5, 2004

9-06.16 Roadside Sign Structures

The third paragraph is revised to read:

Posts for multiple post sign structures shall conform to either ASTM A 36 or ASTM A 992. Posts conforming to either ASTM A 588 or ASTM A 572 Grade 50 may be used as an acceptable alternate to the ASTM A 36 and ASTM A 992 posts. All steel not otherwise specified shall conform to either ASTM A 36 or ASTM A 992.

9-06.18 Metal Railings

The first paragraph is revised to read:

Metal bridge railing shall conform to the type and material specifications set forth in the Plans and Special Provisions. Steel used for metal railings, when galvanized after fabrication in accordance with AASHTO M 111, shall have a controlled silicon content of either 0.00 to 0.04 percent or 0.15 to 0.25 percent. Mill test certificates verifying the silicon content of the steel shall be submitted to both the galvanizer and the Engineer prior to beginning galvanizing operations.

SECTION 9-07, REINFORCING STEEL
December 6, 2004

9-07.3 Epoxy Coated Steel Reinforcing Bars

This section is revised to read:

Epoxy coated rebar shall be coated according to AASHTO M 284 with the additional following modifications:

1. The list of steel reinforcing bars acceptable for coating shall include ASTM A 706.

2. The Contractor shall furnish a written certification that properly identifies the material, the number of each batch of coating material used, quantity represented, date of manufacture, name and address of manufacturer, and a statement that the supplied coating material meets the requirements of AASHTO M 284.

3. Prior to coating the bars, the Contractor shall submit to the Engineer for review, the coating material manufacturer's recommendation on the proper use and application requirements of the coating material. For Pre Approved Epoxy Coating Facilities this information will be available to the Fabrication Inspector upon request.

4. A certification stating that all bars have been coated in accordance with the coating material manufacturer's recommendations and these Specifications shall be furnished with each shipment. This certification shall include for each bar size the preheat temperatures, cure times, thickness checks, holidays detected, and test results. Two copies of these certifications shall be furnished to the Engineer.

5. The Contractor shall give advance notice to the Engineer of the coating schedule in the coating plant so that Contracting Agency inspection may be provided. The Engineer may inspect the coated bars at the coating plant for approval.

6. The patching material, compatible with the coating material and inert in concrete, shall be supplied with each shipment.

7. For projects where epoxy coated steel reinforcing bars are used in the top mat of bridge decks only, the maximum amount of damage to the coating shall not exceed 0.25 percent of the surface area of each bar.

8. The thickness of epoxy coating shall be 10 mils plus or minus 2 mils.

9. Samples, when required, shall be shipped to the Washington State Department of -Transportation, Materials Laboratory, 1655 South 2nd Ave, Tumwater, Washington 98504.

SECTION 9-08, PAINTS
April 5, 2004

9-08.2 Paint Formulas – General

The following paint formulas and associate specifications are deleted:

Formula A-6-86 Zinc Dust Zinc Oxide Primer
Formula H-2-83-White Masonry Paint for Precast Curbs
Formula H-3-83 Yellow Masonry Paint for Precast Curbs

SECTION 9-09, TIMBER AND LUMBER
January 5, 2004

9-09.2 Grade Requirements

Under "Structures", the last sentence is revised to read:

Timber lagging for soldier pile walls shall be Douglas Fir-Larch, grade No. 2 or better or Hem-Fir No. 1.

SECTION 9-10, PILING
April 5, 2004

9-10.5 Steel Piling

This section is revised to read:

The material for steel piling and pile splices shall conform to ASTM A 36 or ASTM A 992, except the material for steel pipe piling and splices shall conform to the requirements of ASTM A 252, Grade 2. Steel soldier piles, and associated steel bars and plates, shall conform to ASTM A 36 or ASTM A 992, except as otherwise noted in the Plans. All steel piling may be accepted by the Engineer based on the Manufacturer's Certification of Compliance.

SECTION 9-14, EROSION CONTROL AND ROADSIDE PLANTING
August 2, 2004

9-14.4(1) Straw

The first sentence is revised to read:

All straw material shall be in an air dried condition free of noxious weeds and other materials detrimental to plant life.

9-14.4(8) Compost

The fourth paragraph is revised to read:

Compost production and quality shall comply with the Chapter 173-305 Section 220 WAC.

Under the fifth paragraph, item 1 is revised to read:

1. Compost material shall be tested in accordance with AASHTO Test Method T87 and Section 7 of AASHTO T88.

   Compost Type 1 shall meet the following:

   100% shall pass through a 2" sieve
   90% to 100% shall pass through a 1" sieve.
   70% to 100% shall pass through a ¾" sieve.
   40% to 75% shall pass through a ¼" sieve.
   Maximum particle length of 6 inches.

   Compost Type 2 shall meet the following:

   100% shall pass through a 3" sieve
   90% to 100% shall pass through a 1" sieve.
   70% to 100% shall pass through a ¾" sieve.
   40% to 60% shall pass through a ¼" sieve.
   Maximum particle length of 6 inches.

In the seventh paragraph, the first sentence is revised to read:

Approval of sources for composted products shall be based on the following submittals by the Contractor:

This section is supplemented with the following:

Acceptance will be based upon a satisfactory Test Report from the State Materials Lab indicating that the lot (or lots) of compost meets the specification requirements.

SECTION 9-15, IRRIGATION SYSTEM
January 5, 2004

9-15.2 Drip Tubing

The second sentence is revised to read:

Drip tubing shall have a minimum wall thickness of 0.045 inch.

SECTION 9-16, FENCE AND GUARDRAIL
August 2, 2004

9-16.1 Chain Link Fence and Gates

All sub-sections under Section 9-16.1 are deleted and replaced with the following:

9-16.1(1) General

All material used in the construction of chain link fence and gates shall be new. Iron or steel material shall be galvanized unless specified otherwise. Material upon which serious abrasions of galvanizing occur shall not be acceptable.

9-16.1(1)A Post Material for Chain Link Fence

Except as noted otherwise, post material shall conform to the requirements of AASHTO M 181, Type I (zinc-coated steel), Grade 1 or 2, and shall be understood to include all round and roll-formed material (brace rails, top rails, line posts, brace posts, end posts, corner posts and pull posts).

Grade 1 post material shall conform to the weight per linear foot, minimum wall thickness and detail requirements of Standard Plan L-2. Grade 1 post material that exceeds the maximum wall thickness requirement of Standard Plan L-2 may be accepted, provided it does not interfere with the proper construction of the fence.

Grade 2 post material shall meet the organic exterior coatings requirements of AASHTO M 181 (Section 33) and the additional requirement that the interior coated surface shall be capable of resisting 300 hours of exposure to salt fog with a maximum of 5% red rust when tested in accordance with ASTM B 117.

- **Round Post Material**
  Round post material shall be Grade 1 or 2.

- **Roll Form Material**
  Roll-formed post material shall be Grade 1. Roll-formed end, corner, and pull posts shall have integral fastening loops to connect to the fabric for the full length of each post. Top rails and brace rails shall be open rectangular sections with internal flanges as shown in Standard Plan L-2.

9-16.1(1)B Chain Link Fence Fabric

Chain link fabric shall consist of 11 gage wire for Types 3, 4, and 6 fence, and 9 gage wire for Type 1 fence. The fabric shall be zinc-coated steel wire conforming to AASHTO M 181, Class C.

The wire shall be woven into approximately 2-inch diamond mesh. The width and top and bottom finish of the fabric shall be as specified in AASHTO M 181.

9-16.1(1)C Tension Wire

Tension wire shall meet the requirements of AASHTO M 181. Tension wire galvanizing shall be Class 1.

9-16.1(1)D Fittings and Hardware

Except where indicated, fittings shall be malleable cast iron or pressed steel and shall conform to the requirements of ASTM F626 or AASHTO M232, whichever is applicable. Fittings for any particular fence shall be those furnished by the manufacturer of the fence.

Tension truss rods shall be 3/8 inch round galvanized rods with drop forged turnbuckles or other approved type of adjustment. Couplings for tubular sections shall be outside sleeve type and shall be at least 6 inches long.

Eye bolts for attaching tension wire shall be 3/8 inch diameter and of sufficient length to fasten to the type of post being used.

Tension bars shall be 3/16 inch by 3/4 inch nominal and cross sectional area shall be 0.141 in^2 +/- 5%.

Hog rings shall be 12 gage galvanized steel wire. Tie wire shall be 9 gage galvanized steel wire or 9 gage aluminum wire meeting the requirements of ASTM F626.

9-16.1(E) Chain Link Gates

Gate frames shall be constructed of not less that 11/2 inch (I.D.) hot-dipped galvanized pipe conforming to AASHTO M 181 Type I, Grade 1 or 2 as specified in Section 9-16.1(1)A. The corners of the gate frame shall be fastened together and reinforced with a malleable iron or pressed steel fitting designed for the purpose, or they may be welded. Welding shall conform to the requirements of Section 6-03.3(25). All welds shall be ground smooth and painted with an A-9-73 or A-11-99 primer meeting the requirements of Section 9-08.2. The paint shall be applied in one or more coats to provide a minimum dry film thickness of 3.5 mils.

Chain link fence fabric for filling the gate frame shall meet the requirements of Section 9-16.1(1)B for the fence type being furnished.

Cross trussing shall be 5/16 inch steel adjustable rods galvanized in accordance with Section 9-16.1(1)D.

Each gate shall be furnished complete with necessary hinges, latch, and drop bar locking device designed for the type of gate posts and gate used on the project. Gates shall have positive type latching devices with provisions for padlocking. Hinges, latches, and locking devices shall be galvanized in accordance with Section 9-16.1(1)D.

Gate frames constructed of steel sections, other than pipe, that are fabricated in such a manner as to form a gate of equal or better rigidity may be used provided they are approved by the Engineer.

9-16.1(1)F Concrete

All concrete for chain link fence shall be as specified in Section 6-02.3(2)B.

9-16.1(2) Approval

Approval of materials for chain link fence shall be by evaluation of independent test results from a certified testing laboratory or by QPL. Independent test results for evaluation shall be submitted to the State Materials Engineer in Tumwater WA.

9-16.2 Wire Fence and Gates

All sub-sections under Section 9-16.2 are deleted and replaced with the following:

9-16.2(1) General

All materials used in the construction of the wire fence shall be new. All iron or steel material shall be galvanized. Material upon which serious abrasions of galvanizing occur will not be acceptable.

9-16.2(1)A Steel Post Material

- **Round Post Material**
  Round post material shall conform to AASHTO M 181, Type I, Grade 1.

- Angle Post Material (Channel, T, U, Y, or Other Approved Style)
  All angle post material shall be hot-dipped galvanized in accordance with the requirements of AASHTO M 111 grade 75. Galvanizing shall be 1.7 oz/ft^2 of surface area. Angle post used for end, corner, gate and pull post and brace shall have a minimum weight of 3.1 lb/ft.

Posts shall be not less than 7 feet in length. A tolerance of -5% on the weight of individual posts, braces or anchor plates will be permitted. One type of line post shall be used throughout the project. Line posts shall be studded, slotted, or properly adapted for attaching either wire or mesh in a manner that will not damage the galvanizing of posts, wire or mesh during the fastening. Line posts shall have a minimum weight of 1.33 lbs/ft and shall be provided with a tapered galvanized steel anchor plate. The anchor plate shall be securely attached and have a surface area of 20 +/-2 in^2, a minimum weight of 0.67 pounds and 1.7 oz/ft^2 galvanizing.

9-16.2(1)B Wood Fence Posts and Braces

Douglas fir, Western red cedar, hemlock, or larch shall be used in the construction of wood fence posts and braces. The material shall be of good quality and approved by the Engineer before use. Peeler cores shall not be used for round posts. Wood fencing materials shall have sufficient sapwood in the outer periphery to obtain the specified penetration of preservative. Western red cedar will not require preservative treatment. Fencing materials shall be cut to the correct length before pressure treatment.

Line posts shall be 3 inch minimum diameter round posts or nominal 3 inch by 3 inch square sawed posts. If the posts are to be pointed for driving, they shall be pointed before treatment. Line posts shall be at least 7 feet in length.

Pull posts and brace posts shall be 6 inch diameter round posts or nominal 6 inch by 6 inch material not less than 7 feet in length.

End, gate, and corner posts, and posts at an intersecting fence shall be 6 inch diameter round posts or nominal 6 inch by 6 inch material not less than 7 feet 10 inches in length.

All sawed posts and timbers shall meet the requirements in the table under Section 9-09.2.

The preservatives used to pressuretreat wood fencing materials shall meet the requirements of Section 9-09.3.

The retention and penetration of the preservative shall be as follows:

Minimum Retention in Pounds Per Cubic Foot		
Preservative	**Sawed Posts**	**Round Posts**
Creosote	10.00	8.00
Pentachlorophenol	0.50	0.40
ACA	0.40	0.40
ACZA	0.40	0.40
ACQ	0.40	0.40
CCA	0.40	0.40

Minimum Penetration

for material 5" or less - 0.40 inches penetration and 90% of sapwood
for material 5" or greater - 0.50 inches penetration and 90% of sapwood

9-16.2(1)C Brace Wire

Brace wire shall be 9 gage wire galvanized to meet the requirements of AASHTO M 279, Type Z, Class 1.

9-16.2(1)D Staples and Wire Clamps

The staples used to attach the wire fencing to wood posts shall be 9 gage wire, 1 1/2 inches long, galvanized to meet the requirements of AASHTO M 279, Type Z, Class 1.

The wire clamps used to attach the wire fencing to steel posts shall be 11 gage wire, galvanized to meet the requirements of AASHTO M 279, Type Z, Class 1.

9-16.2(1)E Barbed Wire

Barbed wire shall conform to the requirements of AASHTO M 280, Type Z and shall consist of two strands of 12 1/2 gage wire, twisted with four point 14 gage barbs with barbs spaced 5 inches apart (Design 12-4-5-14R). Galvanizing shall be Class 3.

9-16.2(1)F Wire Mesh

Wire mesh shall conform to the requirements of AASHTO M 279, Type Z and shall consist of eight horizontal wires with vertical stays spaced 6 inches apart. The top and bottom wires shall be 10 gage, and the intermediate wires and vertical stays shall be 12 1/2 gage. The mesh shall have a total width of 32 inches (Design 832-6-12 1/2). Galvanizing shall be Class 3.

The zinc coated wire as represented by the test specimens shall be capable of being wrapped in a close helix at a rate not exceeding 15 turns/minute around a cylindrical steel mandrel having a diameter the same as the specimen being tested, without cracking or flaking the zinc coating to such an extent that any zinc can be removed by rubbing with the bare fingers.

9-16.2(1)G Vertical Cinch Stays

Vertical cinch stays shall be 10 gage galvanized wire meeting the requirements of AASHTO M 279, Type Z, Class 1.

9-16.2(1)H Miscellaneous Hardware

Bolts, nuts, hinges, latches and other miscellaneous hardware shall be galvanized in accordance with AASHTO M 232.

9-16.2(1)I Wire Gates

Gate frames shall be constructed of galvanized pipe with a nominal diameter of not less than 1 inch. The pipe shall conform to the requirements of AASHTO M 181 Type I, Grade 1. Wire gates shall be not less than 48 inches in height and shall be designed to fit openings of the width called for in the Plans or as indicated by the bid items. Each gate shall be provided with two upright braces of the same material as the frame, spaced at 1/3 points in the gate. All gates shall be provided with adjustable 5/16 inch diameter galvanized diagonal truss rods from corner to corner. Galvanizing shall be in accordance with Section 9-16.2(1)H.

The gate frame shall be provided with wire mesh conforming to the requirements specified in Section 9-16.2(1)F, except that it shall consist of 10 horizontal wires and have a total width of 47 inches.

Each gate shall be furnished complete with necessary galvanized hinges and latch designed for use with the type of gate posts used on the project. The hinges shall be so designed as to be securely attached to the gate post and to enable the gate to be swing back against the fence. Double gates shall be hinged in the same manner as single gates and shall be provided with an approved galvanized drop bar locking device. Galvanizing for hinges, latches, and locking devices shall be in accordance with Section 9-16.2(1)H.

9-16.2(1)J Concrete

All concrete for wire fence shall be as specified in Section 6-02.3(2)B.

9-16.2(2) Approval

Approval of materials for wire fence shall be by evaluation of independent test results from a certified testing laboratory or by QPL. Independent test results for evaluation shall be submitted to the State Materials Engineer in Tumwater WA.

9-16.3(1) Rail Element

The third paragraph is revised to read:

The 6-inch channel rails and splice plates shall conform to ASTM A 36, except that the channel rails may conform to ASTM A 992. All fabrication shall be complete before galvanizing.

9-16.3(2) Posts and Blocks

In the second paragraph, the treatment for Pentachlorophenol is revised from 060 lbs. pcf to 0.60 lbs. pcf.

The fourth paragraph is revised to read:

Steel posts, blocks, and base plates, where used, shall conform to either ASTM A 36 or ASTM A 992, and shall be galvanized in accordance with AASHTO M 111. Welding shall conform to Section 6-03.3(25). All fabrication shall be completed prior to galvanizing.

9-16.3(4) Hardware

This section is revised to read:

Bolts, unless otherwise specified, shall comply with ASTM A 307 Grade A - specifications. High strength bolts shall conform to the requirements of AASHTO M 164. Nuts, unless otherwise specified, shall comply with ASTM A 563 Grade A specifications. Washers, unless otherwise specified, shall meet ASTM F 844 specifications. The Contractor shall submit a manufacturer's certificate of compliance for high strength bolts, nuts, and washers prior to installing any of the hardware. A307 Bolts will be accepted by field verification and documentation that bolt heads are stamped 307A.

9-16.3(5) Anchors

The sixth paragraph is revised to read:

The anchor plate, W200 x 27 and metal plates shall be fabricated of steel conforming to the specifications of ASTM A 36, except that the W200 x 27 may conform to ASTM A 992.

SECTION 9-17, FLEXIBLE GUIDE POSTS
December 6, 2004

9-17.1 General

The first paragraph is revised to read:

Flexible guide posts shall be made of a flexible, nonwarping, nonmetallic, durable plastic material; shall be resistant to damage due to impact, ultraviolet light, ozone, hydrocarbons, and other effects of atmospheric weathering; shall resist stiffening with age; and shall exhibit good workmanship and be free of burns, discoloration, contamination and other objectionable marks or defects that affect appearance or serviceability. The portion of ground mounted guide post installed below ground may be the same material as the portion above ground or other durable material suitable for firmly anchoring the post in the ground. When iron or steel are used for the in ground portion, galvanize in accordance with AASHTO M 111. The top of tubular posts shall be closed to prevent moisture or debris from entering. Surface mounted guide posts shall be mounted on a base made of a rigid high impact resistant material and be resistant to ultraviolet light, ozone, and hydrocarbons. The post shall mount directly into or onto the base in a tamper proof manner and shall allow for easy replacement. Guardrail mounted guide posts shall be the same as ground mounted guide posts except the length shall be adjusted to meet the mounting height requirements in the Standard Plans. Appropriate holes shall be provided for fastening the guide post to the guard rail post.

The second sentence in the second paragraph is revised to read:

If analysis by the Materials Laboratory determines there is a change in material composition, such change shall constitute grounds for rejection and/or removal from the Qualified Products List.

The second sentence in the fifth paragraph is deleted.

Section 9-17.1 is supplemented with the following new sub-sections:

9-17.1(1) Dimensions

1. Flat Type – The post has a minimum width of 3 inches of continuous flat surface with no curvature for the entire length of the post. This will allow for ridges on the outer edges and back of post intended for structural support.

2. Tubular Type – The post is tubular or round/circular in shape. This allows for a tubular post with a minimum diameter of 3 inches or a tubular post with a minimum diameter of 2 inches with a flat or flattened oval surface at least 3 inches wide and 12 inches long measured from the top for mounting reflective sheeting.

3. Non-flat and Non-tubular Type – This includes all post that do not fit into the two types indicated above. This would include convex, w-shape, oval, and other post designs. The post shall be wide enough to accept a 3 inch wide reflective sheeting. Any curvature or rounding shall not significantly reduce the brightness value of the reflective sheeting.

4. Surface Mount Guide Post Base – The base for surface mount guide posts shall be approximately 8 inches in diameter with a maximum height of 2 inches.

5. Guide posts shall be of such length to provide the required mounting height above the pavement surface in accordance with the Standard Plans.

9-17.1(2) Reflective Sheeting

Reflective sheeting for guide posts shall be Type III, IV, V, or VII conforming to Section 9-28.12. The reflective panel on a flat or elliptical guidepost shall have a minimum width of 3 inches facing traffic. The reflective sheeting shall have a minimum area of 24 square inches (3 inches by 8 inches). The reflective panel on a round guidepost shall have an 8-inch minimum band of reflective sheeting visible for 360 degrees. Mount the reflective sheeting on the guide post as detailed in the Standard Plans. Sheeting shall remain in place during the life of the post.

9-17.2 Laboratory Tests

This section including title is revised to read:

9-17.2 Ultraviolet Resistance Test Procedure (Laboratory Test)

Two posts will be tested initially for tensile strength and elongation according to ASTM D-638 and again after 1,000 hours QUV weatherometer exposure (ASTM G53).

Six bow tie specimens shall be prepared from the delineator post samples submitted for the purpose of ultraviolet (UV) exposure. The specimens shall be cycled at 1,000 hours in a weatherometer in accordance with ASTM G 53 (3 hr. 60C UV, 3 hr. 50C CON). Three of each type shall be used for control purposes. The remaining three shall be

subjected to 1000 hours of UV exposure in the QUV weatherometer. Specimen dimensions conform to those outlined below.

The laboratory test data shall summarize the tensile strength of each, and the average tensile strength for both control and weathered samples. The data shall also summarize the elongation of each, and the average elongation for both control and weathered samples. The average values shall be used to show the percent change in tensile and elongation.

Section 9-17.2 is supplemented with the following new sub-section:

9-17.2 (1) Acceptance

The specimens shall show no signs of delamination, distress, or discoloration. Physical properties of tensile strength and rigidity shall be maintained within 80 percent of the unconditioned values.

9.17.3 Field Tests

This section including title is revised to read:

9-17.3 Field Impact Test Procedure

Sample size of eight units will be tested the following way:

Flexible Ground Mounted Posts

Eight flexible ground mounted posts installed by the manufacturer (four installed manually and four installed mechanically). The delineators will be hit ten times (four posts for glancing bumper hits and four posts for wheel hits). A standard sedan with a bumper height of approximately 18" while traveling at a speed of 55 ± 2 mph will be used for impact testing. Five of the impacts will be at an ambient temperature of 32 ± 5°F and the remaining five impacts at an ambient temperature of 85 ±_5°F. The test vehicle shall impact four of the posts at an angle perpendicular to the front of the post and shall impact the remaining posts at an angle of 25° clockwise from the angle perpendicular to the front of the posts. The same test samples will be used for the ten hits. Two flexible posts will be used for weatherometer testing. A glancing hit is defined as one on the bumper near the vehicle headlight. The delineators shall be installed a minimum of eight hours prior to being hit.

Flexible Surface Mounted Posts

Eight flexible surface mounted posts installed by the manufacturer will be hit ten times (four posts for glancing bumper hits and four posts for wheel hits). A standard sedan with a bumper height of approximately 18" while traveling at a speed of 55 ± 2 mph will be used for impact testing. Five of the impacts will be at an ambient temperature of 32 ± 5°F and the remaining five impacts at an ambient temperature of 85 ± 5°F. The test vehicle shall impact four of the posts at an angle perpendicular to the front of the post and shall impact the remaining posts at an angle of 25° clockwise from the angle perpendicular to the front of the posts. The same test samples will be used for the ten hits. Two flexible posts will be used for weatherometer testing. A glancing hit is defined as one on the bumper near the vehicle headlight. The delineators shall be installed a minimum of eight hours prior to being hit.

Section 9-17.3 is supplemented with the following new sub-sections:

9-17.3 (1) Test Observations

Inspect each post after each impact and document the following:

1. Any splits, cracks, breaks or other forms of deformation or distress;

2. The percent list to vertical two minutes after each impact;

3. The approximate percentage of the reflective area that is damaged after each impact to an extent it no longer performs as intended;

4. Any problems or comments associated with the installation and removal of the posts and bases. The testing agent will document any special equipment or techniques required for installing or removing the posts and bases.

5. Any problems or comments associated with the performance of each ground mounted flexible delineator post that would be of interest to the states;

6. Type of soil and impact surface.

9-17.3 (2) Acceptance

A failure is defined as any of the following:

1. A minimum of 50 percent of the reflective sheeting shall be retained undamaged. An area of damage greater than 50 percent is considered a failure.

2. If the guide post leans more than 10 degrees from vertical it is considered a failure.

3. Any cracking, other than surface cracking evident on only one face of the post, is considered a failure.

4. Pullout in excess of 3 inches is considered a failure.

At least six of the guide posts must pass each criteria in the 55 + 2 miles per hour series of impacts to be acceptable.

SECTION 9-23, CONCRETE CURING MATERIALS AND ADMIXTURES
December 6, 2004

This section is supplemented with the following new sub-section:

9-23.10 Ground Granulated Blast Furnace Slag

Ground granulated blast furnace slag shall meet the requirements of AASHTO M 302, Grade 100 or Grade 120. The grade of the ground granulated blast furnace slag, the source, and type of manufacturing facility shall be certified on the cement mill test certificate.

SECTION 9-28, SIGNING MATERIALS AND FABRICATION
December 6, 2004

9-28.1 General
The third sentence in the first paragraph is deleted.

9-28.6 Destination Sign Messages
The second paragraph is deleted.

9-28.8 Sheet Aluminum Signs
The sheet thickness chart is revised to read:

Maximum Horizontal Dimension	Sheet Aluminum Thickness
Overlay panels	0.050 inch
Up to 20 inches	0.063 inch
20 inches to 36 inches, inclusive	0.080 inch
Over 36 inches (Permanent Signs)	0.125 inch

The fourth paragraph is revised to read:

Before placing aluminum in contact with untreated steel, the steel surfaces shall be protected by proper cleaning and painting with one coat of Zinc Primer A-9-73 or A-11-99 and two coats of aluminum paint D-1-57.

9-28.10 Plywood Signs
This section is deleted.

9-28.11 Hardware
The entry for hardware item "Angle and "Z" Bar" in the table in this section is revised to read:

Angle and "Z" Bar	ASTM B 221 6061-T6 Aluminum ASTM A 36 or ASTM A 992 Steel

9-28.14(2) Steel Structures and Posts
This section is revised to read:

Truss chords, struts, and diagonals, end posts, and end post struts and diagonals for sign bridge structures and cantilever sign structures shall conform to either ASTM A 36 or ASTM A 53 Grade B Type E or S. The nominal pipe diameter and the pipe wall thickness shall be as shown in the Plans or Standard Plans. All other structural steel for sign bridge structures and cantilever sign structures shall conform to either ASTM A 36 or ASTM A 992. Truss member connection hardware shall conform to Section 9-06.5(3).

Pipe members for bridge mounted sign brackets shall conform to ASTM A 53 Grade B Type E or S, and shall be Schedule 40 unless otherwise specified. All other structural steel for bridge mounted sign brackets shall conform to either ASTM A 36 or ASTM A 992. U bolts, and associated nuts and washers, shall be stainless steel conforming to Section 9-28.11, and shall be fabricated hot.

Anchor rods for sign bridge and cantilever sign structure foundations shall conform to ASTM F 1554 Grade 105, including Supplemental Requirements S2, S3, and S5. Nuts and washers for sign bridge and cantilever sign structure foundations shall conform to AASHTO M 291 Grade DH and AASHTO M 293, respectively.

Steel sign structures and posts shall be galvanized after fabrication in accordance with AASHTO M 111, unless noted otherwise in the Plans. All bolts, nuts, and washers shall be galvanized after fabrication in accordance with AASHTO M 232. Unless otherwise specified in the Plans or Special Provisions, metal surfaces shall not be painted.

Except as otherwise noted, steel used for sign structures and posts shall have a controlled silicon content of either 0.00 to 0.04 percent or 0.15 to 0.25 percent. If the Plans or Special Provisions specify painting of the galvanized steel surfaces, then the controlled silicon content requirement does not apply for those steel members. Mill test certificates verifying the silicon content of the steel shall be submitted to both the galvanizer and the Engineer prior to beginning galvanizing operations.

Minor fabricating and modifications necessary for galvanizing will be allowed if not detrimental to the end product as determined by the Engineer. If such modifications are contemplated, the Contractor shall submit to the Engineer, for approval, six copies of the proposed modifications, prior to fabrication.

SECTION 9-29, ILLUMINATION, SIGNALS, ELECTRICAL
August 2, 2004

9-29.3 Conductors, Cable

Under the second paragraph, item 5 is revised to read:

5. Pole and bracket cable shall be a two-conductor cable rated for 600 volts. The individual conductors shall be one red and one black 19-strand No. 10 AWG copper, assembled parallel. The conductor insulation shall be 45-mil polyvinyl chloride or a 600 volt rated cross-linked polyethylene. The Jacketing shall be polyethylene or polyvinyl chloride not less than 45-mils thick. If luminaires with remote ballasts are specified in the contract, this same cable shall be used between luminaire and ballast for both timber and ornamental pole construction. If the luminaire requires fixture wire temperatures greater than 75°C, the outer jacket shall be stripped for that portion of the cable inside the luminaire. The single conductors shall then be sheathed with braided fiberglass sleeving of the temperature rating recommended by the luminaire manufacturer.

9-29.6 Light and Signal Standards

The first paragraph is supplemented with the following:

Fabrication of light and signal standards shall conform to the applicable requirements of Section 6-03.3(14).

9-29.6(1) Light and Signal Standards

This section including title is revised to read:

9-29.6(1) Steel Light and Signal Standards

Steel plates and shapes for light and signal standards shall conform to ASTM A 36, except that structural shapes may conform to ASTM A 992. Shafts for light and signal standards, except Type PPB signal standards, shall conform to ASTM A 572 Grade 50. Shafts and caps for Type PPB signal standards, slipfitters for type PS I, FB, and RM signal standards, and all pipes shall conform to ASTM A 53 Grade B. Base plates for light standards shall conform to ASTM A 572, Grade 50, except as otherwise noted in the Standard plans for fixed base light standards. Base plates for signal standards shall conform to ASTM A 36. Connecting bolts shall conform to AASHTO M 164. Fasteners for handhole covers, bands on lighting brackets, and connector attachment brackets shall conform to ASTM F 593.

Light and signal standards shall be hot-dipped galvanized in accordance with AASHTO M 111 and AASHTO M 232.

Steel used for light and signal standards shall have a controlled silicon content of either 0.00 to 0.04 percent or 0.15 to 0.25 percent. Mill test certificates verifying the silicon content of the steel shall be submitted to both the galvanizer and the Engineer prior to beginning galvanizing operations.

9-29.10 Luminaires

Under the first paragraph, the third sentence in item D is revised to read:

All internal luminaire assemblies shall be assembled on or fabricated from either stainless steel or galvanized steel.

9-29.13 Traffic Signal Controllers

This section is supplemented with the following:

All Traffic Signal Control Equipment Shall be Tested As Follows.

The supplier shall:

1. Seven days prior to shipping, arrange appointment for controller cabinet assembly, and testing at the WSDOT Materials Laboratory or the facility designated in the Special Provisions.

2. Assembly shall be defined as but not limited to tightening all screws, nuts and bolts, verifying that all wiring is clear of moving parts and properly secured, installing all pluggables, connecting all cables, Verify that all contract required documents are present, proper documentation is provided, and all equipment required by the contract is installed.

3. The assembly shall be done at the designated WSDOT facility in the presence of WSDOT personnel.

4. The supplier shall demonstrate that all of the functions required by this specification and the contract Plans and Special Provisions perform as intended. Demonstration shall include but not be limited to energizing the cabinet and verifying that all 8 phases, 4 pedestrian movements, 4 overlaps (as required by the Contract Provisions) operate per Washington State Standard Specifications Section 9-29.13. The supplier shall place

the controller in minimum recall with interval timing set at convenient value for testing purposes. Upon a satisfactory demonstration the controller assembly will then be accepted by WSDOT for testing.

5. If the assembly, and acceptance for testing is not complete within 5 working days of delivery, the Project Engineer may authorize the return of the assembly to the supplier, with collect freight charges to the supplier.

6. The Contractor will be notified when the testing is complete, and where the assembly is to be picked-up for delivery to the project.

7. The supplier has 5 working days to repair or replace any components that fail during the testing process at no cost to the Contracting Agency. A failure shall be defined as a component that no longer functions as intended under the conditions required or does not meet the requirements of the Contract Specifications and is at the soul discretion of WSDOT.

8. Any part or component of the controller assembly, including the cabinet that is rejected shall not be submitted for use by WSDOT or any City or County in the State of Washington.

9-29.13(6) Radio Interference Suppressers

In the first paragraph, the second sentence is revised to read:

Interference suppressers shall be of a design which will minimize interference in both broadcast and aircraft frequencies, and shall provide a minimum attenuation of 50 decibels over a frequency range of 200 kilohertz to 75 megahertz when used in connection with normal installations

9-29.13(7) Traffic-Actuated Controllers

In the first paragraph, item 3 is revised to read:

3. A minimum of four overlaps.

9-29.13(7)B Auxiliary Equipment for NEMA Controllers

Under the first paragraph, item 2 is supplemented with the following:

The controller cabinet shall have all cabinet wiring installed for eight vehicle phases, four pedestrian phases, four emergency pre-empts, four overlaps (OL A, B, C, D).

Under the first paragraph, item 7 is revised to read:

7. A "Display Panel" when noted in the contract. The display panel shall depict a generic eight-phase operation. The panel shall be mounted on the inside of the front cabinet door and the mounting shall be of a design that allows positioning of the panel in four orientations 90 degrees from each other. The mounting shall be removable without use of any tools. Incandescent red, yellow, green, walk and don't walk indicator lights shall be provided for each phase. The indicator lights shall be connected to the associated field terminals. The connecting cable shall be long enough to allow for any mounting orientation. No diodes will be allowed in the display panel. A means of disconnecting all wiring entering the panel shall be

provided. Switches shall be provided on the panel with labels and functions as follows:

a. Display On — Signal indicator lamps will display the operation of the intersection.

b. Test — All indicator lamps shall be energized.

c. Display Off — all signal indicator lamps shall be de-energized.

A "Detector Panel", as specified in Standard Specification Section 9-29.12(7)D, shall be installed. The panel shall be mounted on the inside of the front cabinet door. The detector panel shall be constructed as a single unit. Detector switches with separate operate, test, and off positions shall be provided for each field detector input circuit. A high intensity light emitting diode (LED) shall be provided for each switch. The lamp shall energize upon vehicle, pedestrian or test switch actuation. The test switch shall provide a spring loaded momentary contact that will place a call into the controller. When in the OFF position, respective detector circuits will be disconnected. In the operate position, each respective detector circuit shall operate normally. Switches shall be provided on the panel with labels and functions as follows:

a. Display On — Detector indicator lights shall operate consistent with their respective switches.

b. Display Off — detector indicator lights shall be de-energized.

A means of disconnecting all wiring entering the panel shall be provided. The disconnect shall include a means to jumper detection calls when the display panel is disconnected. All switches on the panel shall be marked with its associated plan detector number. All markers shall be permanent.

9-29.13(7)D NEMA Controller Cabinets

This section is revised to read:

Each traffic-actuated NEMA controller shall be housed in a weatherproof cabinet conforming to the following requirements:

1. Construction shall be of 0.073-inch minimum thickness series 300 stainless steel or 0.125 minimum thickness 5052 H32 ASTM B209 alloy aluminum. The stainless steel shall be annealed or one-quarter-hardness complying with ASTM A666 stainless steel sheet. Cabinets may be finished inside with an approved finish coat of exterior white enamel. If no other coating is specified in the Contract Provisions the exterior of all cabinets shall be bare metal. All controller cabinets shall be furnished with front and rear doors.

2. The cabinet shall contain shelving, brackets, racks, etc., to support the controller and auxiliary equipment. All equipment shall set squarely on shelves or be mounted in racks and shall be removable without turning, tilting, or rotating or relocating one device to remove another. A 24 slot rack or racks shall be installed. The rack(s) shall be wired for 2 channel loop detectors and as follows. Slots 1 & 2 phase 1 loop detectors. Slots 3, 4, & 5 phase 2 loop

detectors. Slots 6 & 7 phase 3 loop detectors. Slots 8, 9, & 10 phase 4 loop detectors. Slots 11 & 12 phase 5 loop deterctors. Slots 13, 14, & 15 phase 6 loop detectors. Slots 16 & 17 phase 7 loop detectors. Slots 18, 19 & 20 phase 8 loop detectors. Slot 21 upper phase 1 loop detector. Slot 21 lower phase 5 detector. Slot 22 wired for a 2 channel discriminator channels A, C. Slot 23 wired for a 2 channel discriminator, channels B, D. Slot 24 wired for a 4 channel discriminator, wired for channel A, B, C, D. All loop detector slots shall be wired for presence/ pulse detection/ extension. If an external power supply is required in order for the entire racks(s) to be powered it shall be installed. All rack(s) slots shall be labeled with engraved identification strips.

3. Additional detection utilizing the "D" connector shall be installed in accordance with the contract. The cabinet shall be of adequate size to properly house the controller and all required appurtenances and auxiliary equipment in an upright position with a clearance of at least 3 inches from the vent fan and filter to allow for proper air flow. In no case shall more than 70 percent of the cabinet volume be used. There shall be at least a 2-inch clearance between shelf mounted equipment and the cabinet wall or equipment mounted on the cabinet wall.

4. The cabinet shall have an air intake vent on the lower half of the front door, with a 12 inch by 16 inch by 1 inch removable throw away filter, secured in place with a spring-loaded framework.

5. The cabinet door(s) shall be provided with:

   a. Spring loaded construction core locks capable of accepting a Best type CX series six segment (core installed by others) shall be installed in each door with the exception of the police panel door. Cabinet doors shall each have a three point latch system.

   b. A police panel assembly shall be installed in the front door and shall have a stainless steel hinge pin and a police panel lock. Two police keys with shafts a minimum of 1 3/4 inches long shall be provided with each cabinet.

   c. All doors and police panel door shall have one piece closed cell, neoprene gaskets.

   d. A two position doorstop assembly. Front and rear interior light control switches.

9-29.13(7)E Type 170E, 170E-HC-11, 2070, 2070 Lite, ATC Controller Cabinets

This section is revised to read:

The above controllers shall be housed in a Models 332, **Double 332**, 336, 336S, 303 **ITS/ATC** cabinets, or as specified in the contract. Each door shall be furnished with a construction core lock conforming to Standard Specifications 9-29.13 (7)D 5a, b and c above. A police panel with door, stainless steel hinge pin and lock shall be provided. Two police keys with shafts a minimum of 1 3/4" long shall be provided with each cabinet. Each of these cabinets shall be furnished with auxiliary equipment described in Standard Specification 9-29.13(7)C. Type 334 cabinets for traffic data station

controller furnished shall meet current Caltrans 170E specifications, as stated in Standard Specification 9-29.13(7) and as follows. Camera control and DMS local control cabinets shall contain the equipment shown in the Plans. The cabinet shall have the same external physical dimensions and appearance of Model 334 cabinets.

1. The cabinet shall be fabricated of stainless steel or sheet aluminum in accordance with Section 9-29.13(7)D, Item number 1. Painted steel, painted or anodized aluminum is not allowed.

2. Cabinet doors shall have a three-point latch and two-position stop assembly with spring loaded construction core lock capable of accepting a Best lock company type, with 6-pin CX series core. The Contractor shall supply construction cores. Upon contract completion, the Contractor shall deliver two master keys to the Engineer.

3. Field wire terminals shall be labeled in accordance with the Field Wiring Chart.

4. A shatterproof fluorescent interior cabinet lights with self-starting ballast shall be furnished, one fixture mounted on the rear rack near the top and the second mounted at the top of the front rack. Door switches shall automatically turn on both lights when either door is opened.

5. One controller unit shelf, which attaches to the front rails of the EIA rack, shall be provided in lieu of the two controller unit support angles. The shelf shall be fabricated from aluminum and shall be installed such that it does not interfere with access to any terminal block. The shelf shall contain a rollout flip-top drawer for storage of wiring diagrams and manuals.

A disposable paper filter element of at least 180 square inches shall be provided in lieu of a metal filter.

All traffic data and ramp meter cabinets shall include the following accessories:

1. Each cabinet shall be equipped with a fully operable controller equipped as specified in the Contract Provisions.

2. Two input files, except on Type 303 and 336 cabinet shall be supplied, each using 133 millimeters of rack height.

3. Power Distribution Assembly shall be PDA #3 as detailed in the January 1989 Caltrans 170 specification, with all current amendments.

   The PDA #3 shall contain three Model 200 Load Switches.

   A transient voltage protection device shall be provided, which plugs into the controller unit receptacle and in turn accepts the controller plug and meets the electrical requirements of Section 9-29.13(7)B(3) item e.

   A second transfer relay, Model 430, shall be mounted on the rear of the PDA #3 and wired as shown in the Plans.

4. Police Panel shall contain only one DPDT toggle switch. The switch shall be labeled POLICE CONTROL, ON-OFF.

5. Display Panel

A. General

Each cabinet shall be furnished with a display panel. The panel shall be mounted, showing and providing detection for inputs and specified controller outputs, at the top of the front rack above the controller unit. The display panel shall be fabricated from brushed aluminum and constructed according to the detail in the Plans.

B. Text

All text on the display panel shall be black in color and silk screened directly to the panel except the Phenolic detector and cabinet nameplates. A nameplate for each loop shall be engraved with a 1/4 inch nominal text according to the ITS Field Wiring Charts. The nameplates shall be permanently affixed to the display panel.

C. LEDs

The LEDs for the display panel shall meet the following specifications:

Case size	T 1-3/4
Viewing angle	50° minimum
Brightness	8 Milli candelas

LEDs with RED, YELLOW or GREEN as part of their labels shall be red, yellow or green in color. All other LEDs shall be red. All LEDs shall have tinted diffused lenses.

D. Detector Display Control Switch

Each display panel shall be equipped with one detector display control switch on the panel with labels and functions as follows:

ON

Detector display LEDs shall operate consistent with their separate switches.

OFF

All detector indicator LEDs shall be de-energized. Detector calls shall continue to reach the controller.

TEST

All detector indicator LEDs shall illuminate and no calls shall be placed to the controller.

E. Advance Warning Sign Control Switch

Each display panel shall be equipped with one advance warning sign control switch on the panel with labels and functions as follows:

AUTOMATIC

Sign Relay shall energize upon ground true call from controller.

SIGN OFF
Sign Relay shall de-energize.

SIGN ON
Sign Relay shall energize.

F. Sign Relay
The sign relay shall be plugged into a socket installed on the rear of the display panel. The relay shall be wired as shown in the Plans. The relay coil shall draw (or sink) 50 milliamperes ± 10% from the 170E controller and have a DPDT contact rating not less than 10 amperes. A 1N4004 diode shall be placed across the relay coil to suppress voltage spikes. The anode terminal shall be connected to terminal #7 of the relay as labeled in the Plans. The relay shall energize when the METERING indicator LED is lit.

G. Detector Input Indicators
One display LED and one spring-loaded two-position SPST toggle switch shall be provided for each of the 40 detection inputs. These LEDs and switches shall function as follows:

TEST
When the switch is in the test position, a call shall be placed to the controller and energize the associated LED. The switch shall automatically return to the run position when it is released.

RUN
In the run position the LEDs shall illuminate for the duration of each call to the controller.

H. Controller Output Indicators
The display panel shall contain a series of output indicator LEDs mounted below the detection indicators. The layout shall be according to the detail in the Plans. These LEDs shall illuminate upon a ground true output from the controller via the C5 connector.

The output indicator LEDs shall have resistors in series to drop the voltage from 24 volts DC to their rated voltage and limit current below their rated current. The anode connection of each LED to +24 VDC shall be wired through the resistor.

I. Connectors
Connection to the display panel shall be made by three connectors, one pin (labeled P2) and one socket (labeled P1) and one labeled C5. The P1 and P2 connectors shall be 50-pin cannon D series, or equivalent 50 pin connectors and shall be compatible such that the two connectors can be connected directly to one another to bypass the input detection. Wiring for the P1, P2 and C5 connectors shall be as shown in the Plans.

The Contractor shall install wire connectors P1, P2, C1P, C2, C4, C5 and C6 according to the pin assignments shown in the Plans.

6. Model 204 Flasher Unit
Each Model 334 ramp meter cabinet shall be supplied with one Model 204 sign flasher unit mounted on the right rear side panel. The flasher shall be powered from T1-2. The outputs from the flasher shall be wired to T1-5 and T1-6.

7. Fiber Optic Patch Panel
The Contractor shall provide and install a rack-mounted fiber optic patch panel as identified in the Plans.

Cabinet Wiring

1. Terminal blocks TB1 through TB9 shall be installed on the Input Panel. Layout and position assignment of the terminal blocks shall be as noted in the Plans.

   Terminals for field wiring in traffic data and/or ramp metering controller cabinet shall be labeled, numbered and connected in accordance with the following:

Terminal Block Pos.	Terminal and Wire Numbers	Connection Identification
TBS	501-502	AC Power, Neutral
T1-2	641	Sign on
T1-4	643	Sign off
T1-5	644	Flasher Output NC
T1-6	645	Flasher Output NO
T4-1	631	Lane 3 - Red
T4-2	632	Lane 3 - Yellow
T4-3	633	Lane 3 - Green
T4-4	621	Lane 2 - Red
T4-5	622	Lane 2 - Yellow
T4-6	623	Lane 2 - Green
T4-7	611	Lane 1 - Red
T4-8	612	Lane 1 - Yellow
T4-9	613	Lane 1 - Green

   Loop lead-in cables shall be labeled and connected to cabinet terminals according to the ITS Field Wiring Chart. This chart will be provided by the Engineer within 20 days of the Contractor's request.

9-29.16(2)A Optical Units

Under the first paragraph, number 4 (warranty) is deleted.

9-29.19 Pedestrian Push Buttons

The third paragraph is deleted

9-29.21 Flashing Beacon

This section is revised to read:

Flashing beacons shall be installed as detailed in the Plans, as specified in the Special Provisions, and as described below:

Controllers for flashing beacons shall be as specified in Section 9-29.15.

Beacons shall consist of single section, 8-inch or 12-inch traffic signal heads, three or four-way adjustable, meeting all of the applicable requirements of Section 9-29.16. Displays (red or yellow) may be either LED type or incandescent. 12 inch yellow displays shall be dimmed 50% after dark.

Mounting brackets, mountings, and installation shall meet all applicable requirements of Section 9-29.17.

Lenses shall be either red or amber, glass or polycarbonate as noted in the Plans or as determined by the Engineer.

9-29.24 Service Cabinets

Under the first paragraph, item F is revised to read:

F. The minimum size of control circuit conductors used in service cabinets shall be No. 14 AWG stranded copper.

All electrical contactors shall have the loadside terminals toward the front (door side) of the service cabinet.

Under the first paragraph, the fourth sentence of item I is revised to read:

No electrical devices shall be connected to the dead front panel.

9-29.25 Amplifier, Transformer, and Terminal Cabinets

Under the first paragraph, the fourth sentence of item 3 is revised to read:

The Contractor shall supply construction cores with two master keys. The keys shall be delivered to the Engineer.

SECTION 9-30, WATER DISTRIBUTION MATERIALS
August 2, 2004

9-30.6(1) Saddles

The first sentence is revised to read:

Saddles shall be ductile iron, bronze, brass, or stainless steel.

9-30.6(2) Corporation Stops

The first sentence is revised to read:

Corporation stops shall be made of bronze or brass alloy.

9-30.6(4) Service Fittings

The first sentence is revised to read:

Fittings used for service connections shall be made of bronze or brass alloy.

SECTION 9-32, MAILBOX SUPPORT
August 2, 2004

9-32.2 Bracket, Platform and Anti-Twist Plate
This section is revised to read:

The bracket, platform, and anti-twist plate shall be 16 gage sheet steel, conforming to ASTM A 36.

9-32.4 Wood Posts
This section is revised to read:

Wood posts shall meet the requirements of Section 9-28.14(1) or western red cedar.

Section 9-32 is supplemented with the following:

9-32.8 Concrete Base
The concrete in the concrete base shall meet or exceed the requirements of Section 6-02.3(2)B.

9-32.9 Steel pipe
The requirements for commercially available, Schedule 40, galvanized steel pipe, elbows, and couplings shall be met for all parts not intended to be bent or welded. Welded and bent parts shall be galvanized after fabrication in accordance with AASHTO M 111.

9-32.10 U-Channel Post
U-channel posts shall meet the requirements of ASTM A 29, weigh a minimum of 3 pounds per linear foot, and shall be galvanized according to AASHTO M 111.

SECTION 9-33, CONSTRUCTION GEOTEXTILE
April 5, 2004

This section including title is revised to read:

SECTION 9-33, CONSTRUCTION GEOSYNTHETIC
April 5, 2004

9-33.1 Geosynthetic Material Requirements
The term geosynthetic shall be considered to be inclusive of geotextiles, geogrids, and prefabricated drainage mats.

Geotextiles, including geotextiles attached to prefabricated drainage core to form a prefabricated drainage mat, shall consist only of long chain polymeric fibers or yarns formed into a stable network such that the fibers or yarns retain their position relative to each other during handling, placement, and design service life. At least 95 percent by weight of the material shall be polyolefins or polyesters. The material shall be free from defects or tears. The geotextile shall also be free of any treatment or coating which might adversely alter its hydraulic or physical properties after installation.

Geogrids shall consist of a regular network of integrally connected polymer tensile elements with an aperture geometry sufficient to permit mechanical interlock with the surrounding backfill. The long chain polymers in the geogrid tensile elements, not including coatings, shall consist of at least 95 percent by mass of the material of polyolefins or polyesters. The material shall be free of defects, cuts, and tears.

Prefabricated drainage core shall consist of a three dimensional polymeric material with a structure that permits flow along the core laterally, and which provides support to the geotextiles attached to it.

The geosynthetic shall conform to the properties as indicated in Tables 1 through 8 in Section 9-33.2, and additional tables as required in the Special Provisions for each use specified in the Plans. Specifically, the geosynthetic uses included in this section and their associated tables of properties are as follows:

Geotextile Application	**Applicable Property Tables**
Underground Drainage, Low Survivability, Classes A, B, and C	Tables 1 and 2
Underground Drainage, Moderate Survivability, Classes A, B, and C	Tables 1 and 2
Separation	Table 3
Soil Stabilization	Table 3
Permanent Erosion Control, Moderate Survivability, Classes A, B, and C	Tables 4 and 5
Permanent Erosion Control, High Survivability Classes A, B, and C	Tables 4 and 5
Ditch Lining	Table 4
Temporary Silt Fence	Table 6
Permanent Geosynthetic Retaining Wall	Tables 7 and 9
Temporary Geosynthetic Retaining Wall	Tables 7 and 10
Prefabricated Drainage Mat	Table 8

Tables 9 and 10 will be included in the Special Provisions.

Geogrid and geotextile reinforcement in geosynthetic retaining walls shall conform to the properties specified in Table 9 for permanent walls, and Table 10 for temporary walls.

For geosynthetic retaining walls that use geogrid reinforcement, the geotextile material placed at the wall face to retain the backfill material as shown in the Plans shall

conform to the properties for Construction Geotextile for Underground Drainage, Moderate Survivability, Class A.

Thread used for sewing geotextiles shall consist of high strength polypropylene, polyester, or polyamide. Nylon threads will not be allowed. The thread used to sew permanent erosion control geotextiles, and to sew geotextile seams in exposed faces of temporary or permanent geosynthetic retaining walls, shall also be resistant to ultraviolet radiation. The thread shall be of contrasting color to that of the geotextile itself.

9-33.2 Geosynthetic Properties

9-33.2(1) Geotextile Properties

Table 1: Geotextile for underground drainage strength properties for survivability.

		Geotextile Property Requirements[1]	
		Low Survivability	Moderate Survivability
Geotextile Property	**Test Method [2]**	**Woven/Nonwoven**	**Woven/Nonwovan**
Grab Tensile Strength, min. in machine and x-machine direction	ASTM D4632	180 lbs./115 lbs. min.	250 lbs./160 lbs. min.
Grab Failure Strain, in machine and x-machine direction	ASTM D4632	<50%/≥50%	<50%/≥50%
Seam Breaking Strength	ASTM D4632[3]	160 lbs./100 lbs. min.	220 lbs./140 lbs. min.
Puncture Resistance	ASTM D4833	67 lbs./40 lbs. min.	80 lbs./50 lbs. min.
Tear Strength, min. in machine and x-machine direction	ASTM D4533	67 lbs/40 lbs. min.	80 lbs./50 lbs. min.
Ultraviolet (UV) Rediation stability	ASTM D4355	50% strength retained min., after 500 hrs. in weatherometer	50% strength retained min., after 500 hrs. in weatherometer

Table 2: Geotextile for underground drainage filtration properties.

		Geotextile Property Requirements[1]		
Geotextile Property	**Test Method[2]**	**Class A**	**Class B**	**Class C**
AOS	ASTM D4751	.43 mm max. (#40 sieve)	.25 mm max. (#60 sieve)	.18 mm max. (#80 sieve)
Water Permittivity	ASTM D4491	.5 sec^{-1} min.	.4 sec^{-1} min.	.3 sec^{-1} min.

Table 3: Geotextile for separation or soil stabilization.

Geotextile Property	Test Method [2]	Geotextile Property Requirements[1] Separation Woven/Nonwoven	Soil Stabilization Woven/Nonwovan
AOS	ASTM D4751	.60 mm max. (#30 sieve)	.43 mm max. (#40 sieve)
Water Permittivity	ASTM D4491	.02 sec^{-1} min.	.10 sec^{-1} min.
Grab Tensile Strength, min. in machine and x-machine direction	ASTM D4632	250 lbs./160 lbs. min.	315 lbs./200 lbs. min.
Grab Failure Strain, in machine and x-machine direction	ASTM D4632	<50%/≥50%	<50%/≥50%
Seam Breaking Strength	ASTM D4632[2]	220 lbs./140 lbs. min.	270 lbs./180 lbs. min.
Puncture Resistance	ASTM D4833	80 lbs./50 lbs. min.	112 lbs./79 lbs. min.
Tear Strength, min. in machine and x-machine direction	ASTM D4533	80 lbs/50 lbs. min.	112 lbs./79 lbs. min.
Ultraviolet (UV) Rediation stability	ASTM D4355	50% strength retained min., after 500 hrs. in weatherometer	50% strength retained min., after 500 hrs. in weatherometer

Table 4: Geotextile for permanent erosion control and ditch lining.

Geotextile Property	Test Method [2]	Geotextile Property Requirements[1] Permanent Erosion Control Moderate Servicability Woven/Nonwoven	High Servicability Woven/Nonwovan	Ditch Lining Woven/Nonwovan
AOS	ASTM D4751	See Table 5	See Table 5	.60 mm max (#30 sieve)
Water Permittivity	ASTM D4491	See Table 5	See Table 5	.02 sec^{-1} min.
Grab Tensile Strength, min. in machine and x-machine direction	ASTM D4632	250 lbs./160 lbs. min.	315 lbs./200 lbs. min.	250 lbs./160 lbs. min.
Grab Failure Strain, in machine and x-machine direction	ASTM D4632	15%-50%/≥50%	15%-50%/≥50%	<50%/≥50%
Seam Breaking Strength	ASTM D4632[2]	220 lbs./140 lbs. min.	270 lbs./180 lbs. min.	220 lbs./140 lbs. min.
Burst Strength	ASTM D3785	400 pse/190 psi min.	500 psi/320 psi min.	
Puncture Resistance	ASTM D4833	80 lbs./50 lbs. min.	112 lbs./79 lbs. min.	80 lbs./50 lbs. min.
Tear Strength, min. in machine and x-machine direction	ASTM D4533	80 lbs/50 lbs. min.	112 lbs./79 lbs. min.	80 lbs./50 lbs. min.
Ultraviolet (UV) Rediation stability	ASTM D4355	70% strength retained min.,	70% strength retained min.,	70% strength retained min.,

		after 500 hrs. in weatherometer	after 500 hrs. in weatherometer	after 500 hrs. in weatherometer

Table 5: Filtration properties for geotextile for permanent erosion control.

		Geotextile Property Requirements[1]		
Geotextile Property	**Test Method[2]**	**Class A**	**Class B**	**Class C**
AOS	ASTM D4751	.43 mm max. (#40 sieve)	.25 mm max. (#60 sieve)	.22 mm max. (#70 sieve)
Water Permittivity	ASTM D4491	.7 sec^{-1} min.	.4 sec^{-1} min.	.2 sec^{-1} min.

Table 6: Geotextile for temporary silt fence.

		Geotextile Property Requirements[1]	
Geotextile Property	**Test Method [2]**	**Unsupported Between Posts**	**Supported Between Posts with Wire or Polymeric Mesh**
AOS	ASTM D4751	.60 mm max. for slit film wovens (#30 sieve) .30 mm max. for all other geotextile types (#50 sieve) .15 mm min. (#100 sieve)	.60 mm max. for slit film wovens (#30 sieve) .30 mm max. for all other geotextile types (#50 sieve) .15 mm min. (#100 sieve)
Water Permittivity	ASTM D4491	.02 sec^{-1} min.	.02 sec^{-1} min.
Grab Tensile Strength, min. in machine and x-machine direction	ASTM D4632	180 lbs. min. in machine direction, 100 lbs. min. in x-machine direction	100 lbs. min.
Grab Failure Strain, in machine and x-machine direction	ASTM D4632	30% max. at 180 lbs. or more	
Ultraviolet (UV) Rediation stability	ASTM D4355	70% strength retained min., after 500 hrs. in weatherometer	70% strength retained min., after 500 hrs. in weatherometer

[1]All geotextile properties in Tables 1 through 6 are minimum average roll values (i.e., the test result for any sampled roll in a lot shall meet or exceed the values shown in the table).

[2]The test procedures used are essentially in conformance with the most recently approved ASTM geotextile test procedures, except for geotextile sampling and specimen conditioning, which are in accordance with WSDOT Test Methods 914 and

915, respectively. Copies of these test methods are available at the State Materials Laboratory in Tumwater.

[3]With seam located in the center of 8-inch long specimen oriented parallel to grip faces.

9-33.2(2) Geosynthetic Properties For Retaining Walls and Reinforced Slopes

All geotextile properties provided in Table 7 are minimum average roll values. The average test results for any sampled roll in a lot shall meet or exceed the values shown in the table. The test procedures specified in the Table are in conformance with the most recently approved ASTM geotextile test procedures, except for geotextile sampling and specimen conditioning, which are in accordance with WSDOT Test Methods 914 and 915, respectively.

Table 7: Minimum properties required for geotextile reinforcement used in geosynthetic reinforced slopes and retaining walls.

		Geotextile Property Requirements
Geotextile Property	**Test Method**	**Woven/Nonwoven**
Water Permittivity	ASTM D4491	.02 sec.$^{-1}$ min.
AOS	ASTM D4751	.84 mm max. (No. 20 Sieve)
Grab Tensile Strength, min. in machine and x-machine direction	ASTM D4632	200 lbs/120 lbs min.
Grab Failure Strain, in machine and x-machine direction	ASTM D4632	< 50% / ≥ 50%
Seam Breaking Strength[1]	ASTM D4632	160 lbs/100 lbs min.
Puncture Resistance	ASTM D4833	63 lbs/50 lbs min.
Tear Strength, min. in machine and x-machine direction	ASTM D4533	63 lbs/50 lbs min.
Ultraviolet (UV) Radiation Stability	ASTM D4355	70% (for polypropylene and polyethyelene) and 50% (for polyester) Strength Retained min., after 500 Hr. in weatherometer

[1]Applies only to seams perpendicular to the wall face.

The ultraviolet (UV) radiation stability, ASTM D4355, shall be a minimum of 70% strength retained after 500 hours in the weatherometer for polypropylene and polyethylene geogrids and geotextiles, and 50% strength retained after 500 hours in the weatherometer for polyester geogrids and geotextiles.

9-33.2(3) Prefabricated Drainage Mat

Prefabricated drainage mat shall have a single or double dimpled polymeric core with a geotextile attached and shall meet the following requirements:

Table 8: Minimum properties required for prefabricated drainage mats.

Property	Test Method	Prefabricated Drainage Material/Geotextile Property Requirements
Width		12 inches min.
Thickness	ASTM D 5199	0.4 inches min.
Compressive Strength at Yield	ASTM D 1621	100 psi min.
In Plan Flow Rate Gradient = 0.1, Pressure = 5.5 psi	ASTM D 4716	5.0 gal. /min./ft.
Gradient = 1.0, Pressure = 14.5 psi		15.0 gal. /min./ft.
Geotextile - AOS	ASTM D 4751	#60 US Sieve max.
Geotextile - Permittivity	ASTM D 4491	> 0.4 SEC^{-1}
Geotextile - Grab Strength	ASTM D 4632	Nonwoven - 110 lb. min.

Prefabricated drainage mats will be accepted based on the manufacturer's certificate of compliance that the material furnished conforms to these specifications. The Contractor shall submit the manufacturer's certificate of compliance to the Engineer in accordance with Section 1-06.3.

9-33.3 Aggregate Cushion of Permanent Erosion Control Geotextile

Aggregate cushion for permanent erosion control geotextile, Class A shall meet the requirements of Section 9-03.9(2). Aggregate cushion for permanent erosion control geotextile, Class B or C shall meet the requirements of Section 9-03.9(3) and 9-03.9(2).

9-33.4 Geosynthetic Approval and Acceptance

9-33.4(1) Source Approval

The Contractor shall submit to the Engineer the following information regarding each geosynthetic proposed for use:

Manufacturer's name and current address,

Full product name,
Geotextile structure, including fiber/yarn type,
Geosynthetic polymer type(s) (for temporary and permanent geosynthetic retaining walls), and
Proposed geotextile use(s).

If the geosynthetic source has not been previously evaluated, or is not listed in the current WSDOT Qualified Products List (QPL), a sample of each proposed geosynthetic shall be submitted to the State Materials Laboratory in Tumwater for evaluation. After the sample and required information for each geosynthetic type have arrived at the State Materials Laboratory in Tumwater, a maximum of 14 calendar days will be required for this testing. Source approval will be based on conformance to the applicable values from Tables 1 through 8 in Section 9-33.2 and additional tables as specified in the Special Provisions. Source approval shall not be the basis of acceptance of specific lots of material unless the lot sampled can be clearly identified and the number of samples tested and approved meet the requirements of WSDOT Test Method 914.

Geogrid and geotextile products that are qualified for use in permanent geosynthetic retaining walls and reinforced slopes (Classes 1, 2, or both) are listed in the current WSDOT QPL.

For geogrid and geotextile products proposed for use in permanent geosynthetic retaining walls or reinforced slopes that are not listed in the current QPL, the Contractor shall submit test information and the calculations used in the determination of T_{al} performed in accordance with WSDOT Standard Practice T925 to the State Materials Laboratory in Tumwater for evaluation. The Contracting Agency will require up to 30 calendar days after receipt of the information to complete the evaluation.

9-33.4(3) Acceptance Samples

Samples will be randomly taken by the Engineer at the job site to confirm that the geosynthetic meets the property values specified.

Approval will be based on testing of samples from each lot. A "lot" shall be defined for the purposes of this specification as all geosynthetic rolls within the consignment (i.e., all rolls sent the project site) that were produced by the same manufacturer during a continuous period of production at the same manufacturing plant and have the same product name. After the samples have arrived at the State Materials Laboratory in Tumwater, a maximum of 14 calendar days will be required for this testing.

If the results of the testing show that a geosynthetic lot, as defined, does not meet the properties required for the specified use as indicated in Tables 1 through 8 in Section 9-33.2, and additional tables as specified in the Special Provisions, the roll or rolls which were sampled will be rejected. Geogrids and geotextiles for temporary geosynthetic retaining walls shall meet the requirements of Table 7, and Table 10 in the Special Provisions. Geogrids and geotextiles for permanent geosynthetic retaining wall shall meet the requirements of Table 7, and Table 9 in the Special Provisions, and both geotextile and geogrid acceptance testing shall meet the required ultimate tensile strength T_{ult} as provided in the current QPL for the selected product(s). If the selected product(s) are not listed in the current QPL, the result of the testing for T_{ult} shall be greater than or equal to T_{ult} as determined from the product data submitted and approved by the State Materials Laboratory during source approval.

Two additional rolls for each roll tested which failed from the lot previously tested will then be selected at random by the Engineer for sampling and retesting. If the retesting shows that any of the additional rolls tested do not meet the required properties, the entire lot will be rejected. If the test results from all the rolls retested meet the required properties, the entire lot minus the roll(s) that failed will be accepted. All geosynthetic that has defects, deterioration, or damage, as determined by the Engineer, will also be rejected. All rejected geosynthetic shall be replaced at no additional expense to the Contracting Agency.

9-33.4(4) Acceptance by Certificate of Compliance

When the quantities of geosynthetic proposed for use in each geosynthetic application are less than or equal to the following amounts, acceptance shall be by Manufacturer's Certificate of Compliance:

Application	Geotextile Quantity
Underground Drainage	600 sq. yards
Soil Stabilization and Separation	1,800 sq. yards
Permanent Erosion Control	1,200 sq. yards
Temporary Silt Fence	All quantities
Temp. or Perm. Geosynthetic Retaining Wall	Not required
Prefabricated Drainage Mat	All quantities

The Manufacturer's Certificate of Compliance shall include the following information about each geosynthetic roll to be used:

Manufacturer's name and current address,
Full product name,
Geosynthetic structure, including fiber/yarn type,
Polymer type (for all temporary and permanent geosynthetic retaining walls only),
Geosynthetic roll number,
Proposed geosynthetic use(s), and
Certified test results.

9-33.4(5) Approval of Seams

If the geotextile seams are to be sewn in the field, the Contractor shall provide a section of sewn seam which can be sampled by the Engineer before the geotextile is installed.

The seam sewn for sampling shall be sewn using the same equipment and procedures as will be used to sew the production seams. If production seams will be sewn in both the machine and cross-machine directions, the Contractor must provide sewn seams for sampling which are oriented in both the machine and cross-machine directions. The seams sewn for sampling must be at least 2 yards in length in each geotextile direction. If the seams are sewn in the factory, the Engineer will obtain samples of the factory seam at random from any of the rolls to be used. The seam assembly description shall be submitted by the Contractor to the Engineer and will be included with the seam sample obtained for testing. This description shall include the seam type, stitch type, sewing thread type(s), and stitch density.

SECTION 9-34, PAVEMENT MARKING MATERIAL
August 2, 2004

9-34.5 Temporary Pavement Marking Tape

This section is supplemented with the following:

Pavement marking masking tape shall conform to ASTM D 4592 Type 1 (removable), except that material shall be black, non-retroreflective and non-glaring.

SECTION 9-35, TEMPORARY TRAFFIC CONTROL MATERIALS
December 6, 2004

Temporary traffic control materials in this section consist of various traffic communication, channelization and protection items described in Section 1-10 and listed below:

Stop/Slow Paddles
Construction Signs
Wood Sign Posts
Sequential Arrow Signs
Portable Changeable Message Signs
Barricades
Traffic Safety Drums
Barrier Drums
Traffic Cones
Tubular Markers
Warning Lights and Flashers
Truck-Mounted Attenuator

The basis for acceptance of temporary traffic control devices and materials shall be visual inspection by the Engineer's representative. No sampling or testing will be done except that deemed necessary to support the visual inspection. Requests for Approval of Material and Qualified Products List submittals are not required. Certification for crashworthiness according to NCHRP 350 will be required as described in Section 1-10.2(3).

"MUTCD," as used in this section, shall refer to the latest WSDOT adopted edition of the *Manual on Uniform Traffic Control Devices for Streets and Highways*. In the event of conflicts between the MUTCD and the contract provisions, then the provisions shall govern.

9-35.1 Stop/Slow Paddles

Paddles shall conform to the requirements of the MUTCD, except that the minimum width shall be 24 inches.

9-35.2 Construction Signs

Construction signs shall conform to the requirements of the MUTCD and shall meet the requirements of NCHRP Report 350 for Category 2 devices. Except as noted below, any sign/sign stand combination that satisfies these requirements will be acceptable.

Where aluminum sheeting is used to fabricate signs, it shall have a minimum thickness of 0.080 inches and a maximum thickness of 0.125 inches.

All orange background signs shall be fabricated with Type X reflective sheeting. All post-mounted signs with Type X sheeting shall use a nylon washer between the twist fasteners (screw heads, bolts or nuts) and the reflective sheeting.

Soft, fabric, roll-up signs will not be acceptable. Any fabric sign which otherwise meets the requirements of this section and was purchased prior to July 1, 2004, may be utilized until December 31, 2007. If a fabric sign is used, it shall have been fabricated with Type VI reflective sheeting.

9-35.3 Wood Sign Posts

Use the charts below to determine post size for construction signs.

One Post Installation

Post Size	Min. Sign Sq. Ft.	Max. Sign Sq. Ft.
4x4	-	16.0
4x6	17.0	20.0
6x6	21.0	25.0
6x8	26.0	31.0

Two Post Installation

(For signs 5 feet or greater in width)

Post Size	Min. Sign Sq. Ft.	Max. Sign Sq. Ft.
4x4	-	16.0
4x6	17.0	36.0
6x6	37.0	46.0
6x8	47.0	75.0 *

* The Engineer shall determine post size for signs greater than 75 square feet.

Sign posts shall conform to the grades and usage listed below. Grades shall be determined by the current standards of the West Coast Lumber Inspection Bureau (WCLIB) or the Western Wood Products Association (WWPA).

4 x 4	Construction grade (Light Framing, Section 122-b WCLIB) or (Section 40.11 WWPA)
4 x 6	No. 1 and better, grade (Structural Joists and Planks, Section 123-b WCLIB) or (Section 62.11 WWPA)
6 x 6, 6 x 8, 8 x 10	No. 1 and better, grade (Posts and Timbers, Section 131-b WCLIB) or (Section 80.11 WWPA)
6 x 10, 6 x 12	No. 1 and better, grade (Beams and Stringers, Section 130-b WCLIB) or (Section 70.11 WWPA)

9-35.4 Sequential Arrow Signs

Sequential Arrow Signs shall meet the requirements of the MUTCD supplemented with the following:

Sequential arrow signs furnished for stationary lane closures on this project shall be Type C.
The color of the light emitted shall be yellow.
The dimming feature shall be automatic, reacting to changes in light without a requirement for manual adjustment.

9-35.5 Portable Changeable Message Signs

Portable Changeable Message Signs (PCMS) shall meet the requirements of the MUTCD and the following:

The PCMS shall employ one of the following technologies:

1. Fiber optic/shutter
2. Light emitting diode
3. Light emitting diode/shutter
4. Flip disk

Regardless of the technology, the PCMS shall meet the following general requirements:

- Be light emitting and must not rely solely on reflected light. The emitted light shall be generated using fiber optic or LED technology.

- Have a display consisting of individually controlled pixels no larger than 2 1/2 inch by 2 1/2 inch. If the display is composed of individual character modules, the space between modules must be minimized so alphanumeric characters of any size specified below can be displayed at any location within the matrix.

- When activated, the pixels shall display a yellow or orange image. When not activated, the pixels shall display a flat black image that matches the background of the sign face.

- Be capable of displaying alphanumeric characters that are a minimum of 18 inches in height. The width of alphanumeric characters shall be appropriate for the font. The PCMS shall be capable of displaying three lines of eight characters per line with a minimum of one pixel separation between each line.

- The PCMS message, using 18-inch characters, shall be legible by a person with 20/20 corrected vision from a distance of not less than 800 feet centered on an axis perpendicular to the sign face.

- The sign display shall be covered by a stable, impact resistant polycarbonate face. The sign face shall be non-glare from all angles and shall not degrade due to exposure to ultraviolet light.

- Be capable of simultaneously activating all pixels for the purpose of pixel diagnostics. Any sign that employs flip disk or shutter technology shall be programmable to activate the disks/shutters once a day to clean the electrical

components. This feature shall not occur when the sign is displaying an active message.

- The light source shall be energized only when the sign is displaying an active message.

The PCMS panels and related equipment shall be permanently mounted on a trailer with all controls and power generating equipment.

The PCMS shall be operated by a controller that provides the following functions:

1. Select any preprogrammed message by entering a code.
2. Sequence the display of at least five messages.
3. Blank the sign.
4. Program a new message, which may include animated arrows and chevrons.
5. Mirror the message currently being displayed or programmed.

9-35.6 Barricades

Barricades shall conform to the requirements of the MUTCD supplemented by the further requirements of Standard Plan H-2.

9-35.7 Traffic Safety Drums

Traffic safety drums shall conform to the requirements of the MUTCD and the following:

The drums shall have the following additional physical characteristics:

Material	Fabricated from low-density polyethylene that meets the requirements of ASTM D 4976 and is UV stabilized.
Overall Width	18-inch minimum in the direction(s)of traffic flow.
Shape	Rectangular, hexagonal, circular, or flat-sided semi-circular.
Color	The base color of the drum shall be fade resistant safety orange.

The traffic safety drums shall be designed to accommodate at least one portable light unit. The method of attachment shall ensure that the light does not separate from the drum upon impact.

Drums and light units shall meet the crashworthiness requirements of NCHRP 350 as described in Section 1-10.2(3).

When recommended by the manufacturer, drums shall be treated to ensure proper adhesion of the reflective sheeting.

9-35.8 Barrier Drums

Barrier drums shall be small traffic safety drums, manufactured specifically for traffic control purposes to straddle a concrete barrier and shall be fabricated from low-density polyethylene that meets the requirements of ASTM D 4976 and is UV stabilized.

The barrier drums shall meet the following general specifications:

Total height	22 in., ± 1 in.
Cross-section	hollow oval
	10 in. X 14 in., ± 1 in.
Formed support legs length	13 in., ± 1 in.
Space between legs	6 1/4 in. min.
(taper to fit conc. barrier)	
Weight	33 lb. ± 4 lb.
	with legs filled with sand.
Color	Fade resistant safety orange.

Barrier drums shall have three 4-inch reflective white stripes, (one complete and two partial). Stripes shall be fabricated from Type III or Type IV reflective sheeting.

When recommended by the manufacturer, barrier drums shall be treated to ensure proper adhesion of the reflective sheeting.

9-35.9 Traffic Cones

Cones shall conform to the requirements of the MUTCD, except that the minimum height shall be 28 inches.

9-35.10 Tubular Markers

Tubular markers shall conform to the requirements of the MUTCD, except that the minimum height shall be 28 inches.

Pavement-mounted tubular markers shall consist of a surface-mounted assembly which uses a separate base with a detachable tubular marker held in place by means of a locking device.

9-35.11 Warning Lights and Flashers

Warning lights and flashers shall conform to the requirements of the MUTCD.

9-35.12 Truck-Mounted Attenuator

The Truck-Mounted Attenuator (TMA) shall be selected from the approved units listed on the Qualified Products List. The TMA shall be mounted on a vehicle with a minimum weight of 15,000 pounds and a maximum weight in accordance with the manufacturer's recommendations. Ballast used to obtain the minimum weight requirement, or any other object that is placed on the vehicle shall be securely anchored such that it will be retained on the vehicle during an impact. The Contractor shall provide certification that the unit complies with NCHRP 230 or 350 requirements. Units fabricated after 1998 must comply with NCHRP 350 requirements.

The TMA shall have an adjustable height so that it can be placed at the correct elevation during usage and to a safe height for transporting. If needed, the Contractor shall install additional lights to provide fully visible brake lights at all times.

The TMA unit shall have a chevron pattern on the rear of the unit. The standard chevron pattern shall consist of 4-inch yellow stripes, alternating non-reflective black and reflective yellow sheeting, slanted at 45 degrees in an inverted "V" with the "V" at the center of the unit.

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SPECIAL PROVISIONS

The following Special Provisions are made a part of this contract and supersede any conflicting provisions of the 2004 Standard Specifications for Road, Bridge and Municipal Construction, and the foregoing Amendments to the Standard Specifications.

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

(date)	General Special Provision
(******)	Notes a revision to a General Special Provision and also notes a Project Specific Special Provision.
(Regions[1] date)	Region Special Provision
(BSP date)	Bridges and Structures Special Provision

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

Region Special Provisions are commonly applicable within the designated Region. Region designations are as follows:

Regions[1]	
ER	Eastern Region
NCR	North Central Region
NWR	Northwest Region
OR	Olympic Region
SCR	South Central Region
SWR	Southwest Region
WSF	Washington State Ferries Division

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

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

DIVISION 1
GENERAL REQUIREMENTS

DESCRIPTION OF WORK

(March 13, 1995)
This contract provides for the improvement of *** 3.82 miles of SR 16 in Pierce County, MP 0.85 to MP 4.67, Union Avenue to Jackson Avenue; by clearing and grubbing; two conc. box girder bridges; two prestressed conc. girder bridges; one steel plate girder bridge; one pedestrian tunnel; grading; surfacing; paving with cement conc. pavement and hot mix

asphalt; drainage; sign structures; noise, soil nail, structural earth and soldier pile retaining walls; illumination systems; traffic signal systems; intelligent transportation systems; ramp metering; permanent signing; pavement markings; traffic control *** and other work, all in accordance with the attached Contract Plans, these Contract Provisions, and the Standard Specifications.

DEFINITIONS AND TERMS

Abbreviations

Associations and Miscellaneous

Section 1-01.2(1) is supplemented with the following:

(******)

Bits/s	Bits Per Second of Serial Data
CAM	Camera
dB	Decibel
dBm	Decibel referenced to 1 milliwatt
DEM	Demodulator
DS-1	Digital Signal Level 1 (1.544 Mbits/s)
DS-2	Digital Signal Level 2 (6.3 Mbits/s)
DS-3	Digital Signal Level 3 (44.736 Mbits/s)
FM	Frequency Modulation
ITS	Intelligent Transportation Systems
Kbits/s	Thousands of Bits Per Second of Serial Data
LASER	Light Amplification by Stimulated Emission of Radiation
LED	Light Emitting Diode
Mbits/s	Millions of Bits Per Second of Serial Data
MDF	Main Distribution Frame
MOD	Modulator
MP	Mile Post
nm	Nanometer (10-9 meter)
OTDR	Optical Time Domain Reflectometer
PTZ	Pan, Tilt, Zoom (for camera control)
RMS	Rack Mounting Space (44 millimeters)
SM	Single-mode Fiber
STS-1	Synchronous Transport Signal Level 1 (electrical 50.84 Mbits/s)
SW	Switch
T1	See DS-1
T2	See DS-2
T3	See DS-3
TDM	Time Division Multiplex
TMC	Traffic Management Center
TWP	Twisted Pair copper wire
UPS	Uninterruptable Power Supply
VAC	Volts AC
VF	Voice Frequency

BID PROCEDURES AND CONDITIONS

(March 13, 1995)
Examination Of Plans, Specifications And Site Of Work
Section 1-02.4, is supplemented with the following:

The soils information used for study and design of this project is available for review by the bidder at the following address:

Washington State Department of Transportation
Tacoma Project Engineer's Office
1614 South Mildred, Suite M
Tacoma, WA 98465
Phone: (253) 534-3100

(November 20, 2000)
Public Opening Of Proposal
Section 1-02.12 is supplemented with the following:

Date Of Opening Bids
Sealed bids are to be received at one of the following locations prior to the time Specified:

1. At Post Office Box 47360, Olympia, Washington 98504-7360 until 11:00 A.M. of the bid opening date. The Department of Transportation will consider notification of bid receipt by the Post Office as the actual receipt of the bid.

2. In the Department of Transportation Bid Room, located at the Transportation Building, 310 Maple Park Avenue SE, Olympia WA 98501-2361, until 11:00 A.M. of the bid opening date. Bids delivered in person will be received only in the Bid Room on the bid opening date.

The bid opening date for this project is Wednesday, February 2, 2005. Bids received will be publicly opened and read after 11:00 A. M. on this date.

AWARD AND EXECUTION OF CONTRACT

(March 13, 1995)
Execution Of Contract
Section 1-03.3 is supplemented with the following:

Escrow Bid Documentation
Scope and Purpose
The purpose of this specification is to preserve the Contractor's bid documents for use by the State in any litigation between the State and Contractor arising out of this contract.

The Contractor shall submit a legible copy of all documentation used to prepare the bid for this contract to a banking institution designated by the State. Such documentation shall be placed in escrow with the banking institution and preserved by that institution as specified in the following sections of this specification.

Bid Documentation

The term "bid documentation" as used in this specification means any writings, working papers, computer printouts, charts, and any other data compilations which contain or reflect all information, data, and calculations used by the Contractor to determine the bid in bidding for this project. The term "bid documentation" includes but is not limited to Contractor equipment rates, Contractor overhead rates, labor rates, efficiency or productivity factors, arithmetic extensions, and quotations from subcontractors and materialmen to the extent that such rates and quotations were used by the Contractor in formulating and determining the amount of the bid. The term "bid documentation" also includes any manuals which are standard to the industry used by the Contractor in determining the bid for this project. Such manuals may be included in the bid documentation by reference. The term does not include bid documents provided by the State for use by the Contractor in bidding on this project.

Submittal of Bid Documentation

The Contractor shall submit the bid documentation to the banking institution. The bid documentation shall be submitted to the banking institution within seven calendar days after the contract for this project has been executed by the State. The bid documentation shall be submitted in a sealed container. The container shall be clearly marked "Bid Documentation" and shall also show on the face of the container the Contractor's name, the date of submittal, the project title, and the contract number.

Affidavit

The sealed container shall contain, in addition to the bid documentation, an affidavit signed under oath by an individual authorized by the Contractor to execute bidding proposals. The affidavit shall list each bid document with sufficient specificity so a comparison can be made between the list and the bid documentation to ensure that all of the bid documentation listed in the affidavit has been enclosed in the sealed container. The affidavit shall show that the affiant has personally examined the bid documentation and that the affidavit lists all of the documents used by the Contractor to determine the bid for this project and that all such bid documentation has been enclosed in the sealed container.

Verification

The banking institution upon receipt of the sealed container shall place the container in a safety deposit box, vault, or other secure place, and immediately notify the State in writing that the container has been received. Upon receipt of such notice, the State will promptly notify the Contractor in writing that the State will open the sealed container to verify that the affidavit has been enclosed and to compare the bid documents listed in the affidavit with the bid documents enclosed in the container to ensure that all of the bid documentation has been submitted and that the copies are legible. The notification will advise the Contractor of the date and time the container will be opened and the name of the State employee who will verify the contents of the container. The State employee verifying the contents of the escrow container will not be involved or connected with the review, evaluation, or resolution of any claim by the Contractor made to the State in connection with the contract for which the verification was made. The Contractor may have representatives present at the opening.

Supplementation

Documents listed in the affidavit but not enclosed in the sealed container through error or oversight shall be submitted in a sealed container within five calendar days after the opening of the original container. Also, any bid documentation that is illegible shall be replaced with legible copies and furnished within five calendar days after the opening of the original container. The face of the container shall show the same information as the original container except the container shall be marked "Supplemental Bid Documentation". The same procedure used in verifying the contents of the original container shall be used in verifying the contents of the supplemental submittal.

Duration and Use

The bid documentation and affidavit shall remain in escrow during the life of the contract and will be returned to the Contractor by the banking institution, provided that the Contractor has signed the final contract voucher certification and has not reserved any claims on the final contract voucher certification against the State arising out of the contract. In the event that claims against the State are reserved on the final contract voucher certification, the bid documentation and affidavit shall remain in escrow. If the claims are not resolved and litigation ensues, the State may serve a request upon the Contractor to authorize the banking institution, in writing, to release the bid documentation and affidavit in escrow to the State. The Contractor shall respond to the request within 20 days after service of the request. If the Contractor objects or does not respond to the request within 20 days after service of the request, the State may file a motion under the Civil Rules requesting the court to enter an order directing the banking institution to deliver the bid documentation and affidavit in escrow to the State. The Contractor shall respond to the request within the time required by the then applicable Civil Court Rules for the Superior Court of the State of Washington. If the Contractor objects or does not respond to the request within the time required by the then applicable Civil Rules, the State may file a motion pursuant to such rules requesting the court to enter an order directing the banking institution to deliver the bid documentation and affidavit in escrow to the State. The banking institution shall release the bid documentation and affidavit as follows:

1. To the State upon receipt of a letter from the Contractor authorizing the release;

2. To the State upon receipt of a certified copy of a court order directing the release of the documents;

3. To the court for an <u>in camera</u> examination pursuant to a certified copy of a court order;

4. The bid documentation and affidavit shall be returned to the Contractor if litigation is not commenced within the time period prescribed by law.

The Contractor agrees that the sealed container placed in escrow and any supplemental sealed container placed in escrow contain all of the bid documentation used to determine the bid and that no other bid documentation shall be utilized by the Contractor in litigation over claims brought by the Contractor arising out of this contract unless otherwise ordered by the court.

Remedies for Refusal or Failure to Provide Bid Documentation
Failure or refusal to provide bid documentation shall be deemed a material breach of this contract. The State may at its option refuse to make payment for progress estimates under Section 1-09.9 until the Contractor has submitted the bid documentation required by this specification. The State may at its option terminate the contract for default under Section 1-08.10. These remedies are not exclusive and the State may take such other action as is available to it under the law.

Confidentiality of Bid Documentation
The bid documentation and affidavit in escrow are and will remain the property of the Contractor. The State has no interest in or right to the bid documentation and affidavit other than to verify the contents and legibility of the bid documentation unless litigation ensues between the State and Contractor over claims brought by the Contractor arising out of this contract. In the event of such litigation, the bid documentation and affidavit may become the property of the State for use in the litigation as may be appropriate subject to the provisions of any court order limiting or restricting the use or dissemination of the bid documentation and affidavit as provided in the preceding section entitled Duration and Use.

Cost and Escrow Instructions
The cost of the escrow will be borne by the State. The State will provide escrow instructions to the banking institution consistent with this specification.

SCOPE OF THE WORK

(January 5, 2004)
Procedure and Protest by the Contractor
Section 1-04.5 is deleted in its entirety and replaced with the following:

The Contractor accepts all requirements of a change order by: (1) endorsing it, (2) writing a separate acceptance, or (3) not protesting in the way this section provides. A change order that is not protested as provided in this section shall be full payment and final settlement of all claims for contract time and for all costs of any kind, including costs of delays, related to any work either covered or affected by the change. By not protesting as this section provides, the Contractor also waives any additional entitlement and accepts from the Engineer any written or oral order (including directions, instructions, interpretations, and determinations).

If in disagreement with anything required in a change order, another written order, or an oral order from the Engineer, including any direction, instruction, interpretation, or determination by the Engineer, the Contractor shall:

1. Immediately give a signed written notice of protest to the Project Engineer or the Project Engineer's field inspectors before doing the work;

2. Supplement the written protest within 30 calendar days with a written statement and supporting documents providing the following:

    a. The date and nature of the protested order, direction, instruction, interpretation or determination;

b. A full discussion of the circumstances which caused the protest, including names of persons involved, time, duration and nature of the work involved, and a review of the plans and provisions referenced to support the protest;
c. The estimated dollar cost, if any, of the protested work and a detailed breakdown showing how that estimate was determined; and
d. An analysis of the progress schedule showing the schedule change or disruption if the Contractor is asserting a schedule change or disruption; and
e. If the protest is continuing, the information required above shall be supplemented monthly until the protest is resolved.

Throughout any protested work, the Contractor shall keep complete records of extra costs and time incurred. The Contractor shall permit the Engineer access to these and any other records related to the protested work as determined by the Engineer.

The Engineer will evaluate all protests provided the procedures in this section are followed. If the Engineer determines that a protest is valid, the Engineer will adjust payment for work or time by an equitable adjustment in accordance with Section 1-09.4. Extensions of time will be evaluated in accordance with Section 1-08.8. No adjustment will be made for an invalid protest.

If the Engineer determines that the protest is invalid, that determination, with an explanation, shall be provided in writing to the Contractor. The determination will be provided within seven calendar days after receipt of the Contractor's supplemental written statement described in item 2 above.

If the Contractor does not accept the Engineer's determination, either party may refer the dispute to a Disputes Review Board. If the parties mutually agree, the protest may be defaulted to Section 1-09.11(2), Claims, bypassing the Disputes Review Board process.

In spite of any protest, the Contractor shall proceed promptly with the work as the Engineer orders.

By failing to follow the procedures of this section, the Contractor completely waives any claims for protested work.

Disputes Review Board

In order to assist in the resolution of disputes arising out of the work of this project, the contract provides for the establishment of a Disputes Review Board, hereinafter called the "Board." The Board is created as part of the disputes resolution process to be utilized when normal Contracting Agency-Contractor dispute resolution is unsuccessful and prior to the filing of a Section 1-09.11(2) claim.

The Board will consider disputes referred to it and furnish recommendations to the Contracting Agency and Contractor to assist in the resolution of the differences between them. The purpose of the Board response to such issues is to provide nonbinding findings and recommendations designed to expose the disputing parties to an independent view of the dispute.

The Board members will be especially knowledgeable in the type of construction involved in the Project and shall discharge their responsibilities impartially and independently considering the facts and conditions related to the matters under consideration and the provisions of the Contract .

The Board shall consist of one member selected by the Contracting Agency and one member selected by the Contractor, with these two members to select the third member. The first two members shall be mutually acceptable to both the Contracting Agency and the Contractor. If one or both of the two members selected are not acceptable to the Contracting Agency or Contractor, another selection shall be made.

The Contracting Agency and Contractor shall each select their member and negotiate an agreement, separate and apart from this contract, with their respective Board member within the first 60 calendar days after execution of the contract. The agreements with these two Board members shall contain language imposing the "Scope of Work" and "Suggested Administrative Procedures" included in the Appendix to the Special Provisions. These negotiated agreements shall also include clauses that require the respective selected members to immediately pursue selection of a third member. The goal is to obtain a third Board member who will complement the first two by furnishing a needed expertise, which will facilitate the Board's operations. The Contracting Agency has entered into "standby" agreements with a number of potential third members. The qualifications of these potential members have been reviewed and deemed acceptable by both the State of Washington Department of Transportation and the Associated General Contractors of Washington. The names of these potential members will be provided to the first two members for consideration. If a selection can be made from the standby list, then the Board may be immediately seated with the execution of a task order under the corresponding standby agreement. Should the first two members decide to select a third member not on the list of standby candidates, then the selected person will be accepted to the Board after he or she executes a standby agreement (Third Party Member Disputes Review Board Consultant Agreement). The acceptable format for this agreement and all accompanying exhibits may be downloaded from the Internet www.wsdot.wa.gov/Consulting <http://www.wsdot.wa.gov/Consulting> or may be obtained from the Project Engineer. The fee for the third member shall be negotiated with the first two members and shall be included in a task order, issued by the Project Engineer after the third member standby agreement is fully executed.

In the event of an impasse in selection of the third member, either the Contracting Agency or the Contractor or both may appeal to the Thurston County Superior Court for selection of a third member by the court from a list or lists submitted to the court by the Contracting Agency and/or the Contractor. An impasse shall be considered to have been reached if the two members appointed by the Contracting Agency and the Contractor to the Board have been unable to appoint the third member in a period of 60 calendar days after the approval of the last of such two members.

In case a member of the Board needs to be replaced, the replacement member will be appointed in the same manner as the replaced member was appointed. The appointment of a replacement Board member will begin promptly upon determination of the need for replacement and shall be completed within 30 calendar days.

Service of a Board member may be terminated at any time with not less than 30 calendar days notice as follows:

1. The Contracting Agency may terminate service of the Contracting Agency appointed member.

2. The Contractor may terminate service of the Contractor appointed member.

3. The third member's services may be terminated by agreement of the other two members.

4. By resignation of the member.

Termination of a member will be followed by appointment of a substitute as specified above.

No member shall have a financial interest in the contract, except for payments for services on the Board. No member shall have been employed by either party within a period of two years prior to award of this contract; except that, service as a member of other Disputes Review Boards on other contracts will not preclude a member from serving on the Board for this contract.

Compensation for the Board members, and the expenses of operation of the Board, shall be shared by the Contracting Agency and Contractor in accordance with the following:

1. The Contracting Agency will compensate directly the wages and travel expense for its selected member.

2. The Contractor shall compensate directly the wages and travel expense for its selected member.

3. The Contracting Agency and Contractor shall share equally in the third member's wages and travel expense, and all of the operating expenses of the Board. These equally shared expenses shall be billed to and paid by the Contracting Agency. The Contractor's share will be deducted from monies due or coming due the Contractor.

4. The Contracting Agency, through the Engineer, will provide administrative services, such as conference facilities and secretarial services, to the Board and the Contracting Agency will bear the costs for this service.

Disputes Review Board Procedures

The Board, the Contracting Agency, and the Contractor shall develop by agreement the Board's rules of operation and procedures to be followed for the Project. The Agreement shall include the frequency of the Board's visits to the Project and its interactions with the Contracting Agency and the Contractor to keep abreast of the construction development and potential disputes.

In developing the Agreement, the parties shall take into consideration their respective duties and responsibilities set forth in the "Scope of Work" section of their agreements, the form of which is included in the Appendix of the Special Provisions.

The parties may also consider the "Suggested Administrative Procedures" for the Board's operation included in their agreements, the form of which is included in the Appendix of the Special Provisions. These Procedures express, in general terms, the policy for the creation and operation of the Board and are intended to supplement the Special Provisions to the extent that no conflict with such provisions is created.

Disputes, as used in this section, will refer only to protests properly submitted in accordance with Section 1-04.5. If the Engineer has determined the protest to be invalid and either the Contractor or the Contracting Agency has elected to refer the matter to the Board, then the Board shall consider the issue and provide recommendations concerning:

1. The interpretation of the Contract

2. Entitlement to additional compensation or time for performance

3. The amount of additional compensation or time for performance following a recommendation of entitlement by the Board provided that; (1) the parties were not able to reach a resolution as to the amount of the equitable adjustment or time; (2) the Engineer has made a unilateral determination of the amount of compensation for time; and (3) the Contractor has protested the Engineer's unilateral determination.

4. Other subjects mutually agreed by the Contracting Agency and Contractor to be a Board issue.

Procedure for Consideration of Disputes

1. Once a protest has been denied as described in Section 1-04.5, the Board members will be contacted and advised of the existence of the dispute. A hearing will be scheduled to be conducted at the next regular project visit or at such other time, as agreed to by the parties.

2. The Contractor and the Contracting Agency shall each be afforded an opportunity to be heard by the Board and to offer evidence. Either party furnishing any written evidence or documentation to the Board must furnish copies of such information to the other party a minimum of 15 calendar days prior to the date the Board sets to convene the hearing for the dispute. Either party shall produce such additional evidence as the Board may deem necessary to an understanding and determination of the dispute and furnish copies to the other party.

3. After the hearing is concluded, the Board shall meet in private and reach a conclusion supported by two or more members. Its findings and recommendations, together with its reasons shall then be submitted as a written report to both parties. The recommendations shall be based on the pertinent contract provisions and facts and circumstances involved in the dispute. The Contract shall be interpreted and construed in accordance with the laws of the State of Washington. The Board shall make every effort to reach a unanimous decision. If this proves impossible, the dissenting member may prepare a minority report.

4. Within 30 calendar days of receiving the Board recommendations, both the Contracting Agency and the Contractor shall respond to the other in writing signifying that the dispute is either resolved or remains unresolved. Although both parties should place weight upon the Board recommendations, the recommendations are not binding.

In the event the Board's recommendations do not lead to resolution of the dispute, all Board records and written recommendations, including any minority reports, will be admissible as evidence in any subsequent litigation.

Submittal of a dispute to the Board will be a condition precedent to the filing for litigation in a court of law unless the Contracting Agency and the Contractor have agreed to default the dispute to Section 1-09.11(2) Claims. If the Board's assistance does not lead to resolution of the dispute, causing the Contractor to file a Section 1-09.11(2) Claim, or if the parties default the dispute to that section, full compliance by the Contractor with the provisions of that section is a contractual condition precedent to the Contractor's right to seek judicial relief.

Disputes, claims, counterclaims and other matters in question between the Contracting Agency and the Contractor that are not resolved will be decided in the Superior Court of Thurston County, Washington, which shall have exclusive jurisdiction and venue over all matters in question between the Contracting Agency and the Contractor.

The Contract shall be interpreted and construed in accordance with the laws of the State of Washington.

(January 5, 2004)

Appendix to the Special Provisions Disputes Review Board

Scope of Work

The Scope of Work of a Board includes, but is not limited to, the following items of work:

Board Consideration of Disputes or Claims: Upon request by either the State or the Contractor to review a dispute, the Board shall convene to review and consider the issue. Both the State and the Contractor shall be given the opportunity to present their evidence at these meetings. The time and location of Board meetings shall be determined by the State, Contractor, and Board. It is expressly understood that the Board members are to act impartially and independently in the consideration of facts and conditions surrounding any written appeal presented by the State or the Contractor and that the recommendations concerning any such appeal are advisory.

Procedures: Prior to any hearing involving a contract dispute, the Board will meet with the State and the Contractor to establish the rules and procedures that will govern the Board's participation in the Project as set forth in the Special Provisions of the construction contract. In establishing the rules and procedures, the parties may consider the Suggested Administrative Procedures included in this Appendix. The Board may establish any internal rules and procedures not covered in the Agreement with the State and the Contractor. The Board's recommendations resulting from its consideration of a dispute shall be furnished in writing to the State and the Contractor. The recommendations shall be based on the construction contract provisions and the facts and circumstances involved in the dispute.

Furnishing Documents: The State shall furnish to the Board three copies of the contract and other documents, which are or may become pertinent to the activities of the Board. The Contractor shall furnish to the Board three sets of documents, which are or may become pertinent to the activities of the Board, except documents furnished by State.

Construction Site Visits: The Board members shall visit the project site to keep abreast of construction activities and to develop a familiarity of the work in progress. The frequency, exact time, and duration of these visits shall be as mutually agreed between the State, the Contractor, and the Board.

Suggested Administrative Procedures

Objective

The principal objective of the Board is to assist in the resolution of disputes, which would otherwise be likely submitted to litigation processes. If this objective is achieved, such disputes can be resolved promptly, with minimum expense, and with minimum disruption to the administration and performance of the work. It is not intended for the State or the Contractor to default on their normal responsibility to amicably and fairly settle their differences by indiscriminately assigning them to the Board. It is intended that the mere existence of the Board will encourage the State and the Contractor to resolve potential disputes without resorting to this appeal procedure. But when a dispute which is serious enough to warrant the Board's review does develop, the machinery for prompt and efficient action will already be in place.

Responsibility of the Board

Render findings and recommendations on disputes between the Contractor and the State arising from the construction contract. Primarily, the Board will consider claims and disputes involving interpretation of the Plans and Specifications, delays, acceleration of the work, scheduling, classification of extra work, changed conditions, design changes, and the like. During its regular visits to the job site, the Board will encourage the settlement of differences at the job level.

The Board will refrain from officially giving any advice or consultative services to either party. The individual members will act in a completely independent manner and will have no consultative or business connections with either party.

During routine meetings of the Board as well as during formal hearings, Board members should refrain from expressing opinions on the merits of statements on matters under dispute or potential dispute. Opinions of Board members expressed in private sessions should be kept strictly confidential.

Normally, the Board member selected by the first two will act as Chairman for all activities. However, this post may be delegated to another member from time-to-time.

Regular Construction Progress Meetings

All regular meetings will be held at or near the job site. The frequency of regular meetings will be set by agreement of the Board, the Contracting Agency and the Contractor, consistent with the construction activities and the matters under consideration and dispute. Each meeting will consist of a round table discussion

and a field inspection of the work being performed on that contract. The round table discussion will be conducted by a member of the State's staff and will be attended by selected personnel from the State and the Contractor. The agenda will generally be as follows:

- Meeting opened by Chairman of the Board.
- Remarks by the State 's representative.
- A description by the Contractor of work accomplished since the last meeting, the current status of the work, schedule-wise, and a forecast for the coming period.
- An outline, by the Contractor, of potential problems and a description.
- An outline, by the State's Project Engineer, of the status of the work as the Project Engineer views it.
- A brief description, by the Contractor or the State, of potential claims or disputes, which have surfaced since the last meeting.
- A summary, by the Contractor, the State or the Board, of the status of past disputes and claims.

The State will prepare minutes of all regular meetings and circulate them for revision and approval by all concerned.

The field inspection will cover all active segments of the work, the Board being accompanied by both State and Contractor personnel.

Handling of Written Appeals

When the Board receives a written appeal, it shall first reach agreement with the parties on a time to conduct the hearings. The decision shall be tempered by the desires and needs of the State and the Contractor. If the matter is not urgent, it may be scheduled for the time of the next regular visitation to the project. For an urgent matter, the Board should meet at its earliest convenience.

The Board may also request that written documentation concerning the dispute be sent to each individual member for study before the hearing begins. A party furnishing any written documentation to the Board must furnish copies of such information to the other party before the hearing begins.

Normally, the hearings would be conducted at the job site. However, any location, which would be more convenient and still provide all required facilities and access to the necessary documentation, would be satisfactory. Private sessions of the Board may also be held at a location other than the job site.

For hearing on disputes, the third member or one of the other members designated by the third member of the Board will act as Chairman. The State and the Contractor shall have a representative at all hearings. The claimant will discuss the dispute followed by the other party. Each party will then be allowed one or more rebuttals until all aspects are thoroughly covered. Each time a person testifies, the Board members may ask questions, seek clarification, or request further data. The Board may request from either party documents or information that would assist the Board in making its findings and recommendations, including, but not limited to, documents used by the Contractor in preparing the bid for this project. A refusal by a party to provide information requested by the Board may be

considered by the Board in making its findings and recommendations. In large or complex issues, one or more additional hearings may be necessary in order to consider all the evidence presented by both parties.

During open hearings, no Board member should express an opinion concerning the merit of any facet of the dispute. By the same token, all Board deliberations should be conducted in private, with all interim individual views kept strictly confidential.

After the hearings are concluded, the Board shall meet in private and reach a conclusion supported by two or more members. Its findings and recommendations, together with its reasons shall then be submitted as a written report to both parties. The recommendations shall be based on the pertinent contract provisions and facts and circumstances involved in the dispute.

The Board should make every effort to reach a unanimous decision. If this proves impossible, the dissenting member may prepare a minority report.

Although both parties should place weight upon the Board's recommendations, they are not binding. Either party may appeal a recommendation to the Board for reconsideration. However, if the Board's recommendations do not resolve the dispute, all records, and written recommendations, including any minority reports, may be admissible as evidence in any subsequent litigation.

Miscellaneous

It is not desirable to adopt hard and fast rules for the functioning of the Board. The entire procedure should be kept flexible so that it can adapt to changing situations. The Board should initiate, with the other parties' concurrence, new rules or modifications to old ones whenever this is deemed necessary.

CONTROL OF WORK

Conformity With And Deviations From Plans And Stakes

Section 1-05.4 is supplemented with the following:

(December 6, 2004)

Contractor Surveying - Structure

Copies of the Contracting Agency provided primary survey control data are available for the bidder's inspection at the office of the Project Engineer.

The Contractor shall be responsible for setting, maintaining, and resetting all alignment stakes, slope stakes, and grades necessary for the construction of bridges, noise walls, and retaining walls. Except for the survey control data to be furnished by the Contracting Agency, calculations, surveying, and measuring required for setting and maintaining the necessary lines and grades shall be the Contractor's responsibility.

Detailed survey records shall be maintained, including a description of the work performed on each shift, the methods utilized, and the control points used. The record shall be adequate to allow the survey to be reproduced. A copy of each day's record shall be provided to the Engineer within three working days after the end of the shift.

The meaning of words and terms used in this provision shall be as listed in "Definitions of Surveying and Associated Terms" current edition, published by the American Congress on Surveying and Mapping and the American Society of Civil Engineers.

The survey work by the Contractor shall include but not be limited to the following:

1. Verify the primary horizontal and vertical control furnished by the Contracting Agency, and expand into secondary control by adding stakes and hubs as well as additional survey control needed for the project. Provide descriptions of secondary control to the Contracting Agency. The description shall include coordinates and elevations of all secondary control points.

2. Establish, by placing hubs and/or marked stakes, the location with offsets of foundation shafts and piles.

3. Establish offsets to footing centerline of bearing for structure excavation.

4. Establish offsets to footing centerline of bearing for footing forms.

5. Establish wing wall, retaining wall, and noise wall horizontal alignment.

6. Establish retaining wall top of wall profile grade.

7. Establish elevation benchmarks for all substructure formwork.

8. Check elevations at top of footing concrete line inside footing formwork immediately prior to concrete placement.

9. Check column location and pier centerline of bearing at top of footing immediately prior to concrete placement.

10. Establish location and plumbness of column forms, and monitor column plumbness during concrete placement.

11. Establish pier cap and crossbeam top and bottom elevations and centerline of bearing.

12. Check pier cap and crossbeam top and bottom elevations and centerline of bearing prior to and during concrete placement.

13. Establish grout pad locations and elevations.

14. Establish structure bearing locations and elevations, including locations of anchor bolt assemblies.

15. Establish box girder bottom slab grades and locations.

16. Establish girder and/or web wall profiles and locations.

17. Establish diaphragm locations and centerline of bearing.

18. Establish roadway slab grades and provide dimensions from top of girder to top of roadway slab. Set elevations for deck paving machine rails.

19. Establish traffic barrier and curb profile and alignment on roadway slab.

20. Profile all girders prior to the placement of any deadload or construction live load that may affect the girder's profile.

The Contractor shall provide the Contracting Agency copies of any calculations and staking data when requested by the Engineer.

To facilitate the establishment of these lines and elevations, the Contracting Agency will provide the Contractor with the following primary survey and control information:

1. Descriptions of two primary control points used for the horizontal and vertical control. Primary control points will be described by reference to the project alignment and the coordinate system and elevation datum utilized by the project. In addition, the Contracting Agency will supply horizontal coordinates for the beginning and ending points and for each Point of Intersection (PI) on each alignment included in the project.

2. Horizontal coordinates for the centerline of each bridge pier.

3. Computed elevations at top of bridge roadway decks at one-tenth points along centerline of each girder web. All form grades and other working grades shall be calculated by the Contractor.

The Contractor shall give the Contracting Agency three weeks notification to allow adequate time to provide the data outlined in Items 2 and 3 above. The Contractor shall ensure a surveying accuracy within the following tolerances:

	Vertical	Horizontal
1. Stationing on structures		±0.02 feet
2. Alignment on structures		±0.02 feet
3. Superstructure elevations	±0.01 feet variation from plan elevation	
4. Substructure	±0.02 feet variation from Plan grades.	

The Contracting Agency may spot-check the Contractor's surveying. These spot-checks will not change the requirements for normal checking by the Contractor.

When staking the following items, the Contractor shall perform independent checks from different secondary control to ensure that the points staked for these items are within the specified survey accuracy tolerances:

Piles
Shafts
Footings
columns

The Contractor shall calculate coordinates for the points associated with piles, shafts, footings and columns. The Contracting Agency will verify these coordinates prior to issuing approval to the Contractor for commencing with the survey work. The Contracting Agency will require up to seven calendar days from the date the data is received to issuing approval.

Contract work to be performed using contractor-provided stakes shall not begin until the stakes are approved by the Contracting Agency. Such approval shall not relieve the Contractor of responsibility for the accuracy of the stakes.

Payment

Payment will be made in accordance with Section 1-04.1 for the following bid item when included in the proposal:

"Structure Surveying", lump sum.

The lump sum contract price for "Structure Surveying" shall be full pay for all labor, equipment, materials, and supervision utilized to perform the work specified, including any resurveying, checking, correction of errors, replacement of missing or damaged stakes, and coordination efforts.

(December 6, 2004)
Contractor Surveying - Roadway

Copies of the Contracting Agency provided primary survey control data are available for the bidder's inspection at the office of the Project Engineer.

The Contractor shall be responsible for setting, maintaining, and resetting all alignment stakes, slope stakes, and grades necessary for the construction of the roadbed, drainage, surfacing, paving, channelization and pavement marking, illumination and signals, guardrails and barriers, and signing. Except for the survey control data to be furnished by the Contracting Agency, calculations, surveying, and measuring required for setting and maintaining the necessary lines and grades shall be the Contractor's responsibility.

Detailed survey records shall be maintained, including a description of the work performed on each shift, the methods utilized, and the control points used. The record shall be adequate to allow the survey to be reproduced. A copy of each day's record shall be provided to the Engineer within three working days after the end of the shift.

The meaning of words and terms used in this provision shall be as listed in "Definitions of Surveying and Associated Terms" current edition, published by the American Congress on Surveying and Mapping and the American Society of Civil Engineers.

The survey work shall include but not be limited to the following:

1. Verify the primary horizontal and vertical control furnished by the Contracting Agency, and expand into secondary control by adding stakes and hubs as well as additional survey control needed for the project. Provide descriptions of secondary control to the Contracting Agency. The description shall include coordinates and elevations of all secondary control points.

2. Establish, the centerlines of all alignments, by placing hubs, stakes, or marks on centerline or on offsets to centerline at all curve points (PCs, PTs, and PIs) and at points on the alignments spaced no further than 50 feet.

3. Establish clearing limits, placing stakes at all angle points and at intermediate points not more than 50 feet apart.

4. Establish grading limits, placing slope stakes at centerline increments not more than 50 feet apart. Establish offset reference to all slope stakes.

5. Establish the horizontal and vertical location of all drainage features, placing offset stakes to all drainage structures and to pipes at a horizontal interval not greater than 25 feet.

6. Establish roadbed and surfacing elevations by placing stakes at the top of subgrade and at the top of each course of surfacing. Subgrade and surfacing stakes shall be set at horizontal intervals not greater than 50 feet in tangent sections, 25 feet in curve sections with a radius less than 300 feet, and at 10-foot intervals in intersection radii with a radius less than 10 feet. Transversely, stakes shall be placed at all locations where the roadway slope changes and at additional points such that the transverse spacing of stakes is not more than 12 feet.

7. Establish intermediate elevation benchmarks as needed to check work throughout the project.

8. Provide references for paving pins at 25-foot intervals or provide simultaneous surveying to establish location and elevation of paving pins as they are being placed.

9. For all other types of construction included in this provision, (including but not limited to channelization and pavement marking, illumination and signals, guardrails and barriers, and signing) provide staking and layout as necessary to adequately locate, construct, and check the specific construction activity.

The Contractor shall provide the Contracting Agency copies of any calculations and staking data when requested by the Engineer.

To facilitate the establishment of these lines and elevations, the Contracting Agency will provide the Contractor with primary survey control information consisting of descriptions of two primary control points used for the horizontal and vertical control, and descriptions of two additional primary control points for every additional three miles of project length. Primary control points will be described by reference to the project alignment and the coordinate system and elevation datum utilized by the project. In addition, the Contracting Agency will supply horizontal coordinates for the beginning and ending points and for each Point of Intersection (PI) on each alignment included in the project.

The Contractor shall ensure a surveying accuracy within the following tolerances:

	Vertical	Horizontal
Slope stakes	±0.10 feet	±0.10 feet
Subgrade grade stakes set 0.04 feet below grade	±0.01 feet	±0.5 feet (parallel to alignment) ±0.1 feet (normal to alignment)
Stationing on roadway	N/A	±0.1 feet
Alignment on roadway	N/A	±0.04 feet
Surfacing grade stakes	±0.01 feet	±0.5 feet (parallel to alignment) ±0.1 feet (normal to alignment)
Roadway paving pins for surfacing or paving	±0.01 feet	±0.2 feet (parallel to alignment) ±0.1 feet (normal to alignment)

The Contracting Agency may spot-check the Contractor's surveying. These spot-checks will not change the requirements for normal checking by the Contractor.

When staking roadway alignment and stationing, the Contractor shall perform independent checks from different secondary control to ensure that the points staked are within the specified survey accuracy tolerances.

The Contractor shall calculate coordinates for the alignment. The Contracting Agency will verify these coordinates prior to issuing approval to the Contractor for commencing with the work. The Contracting Agency will require up to seven calendar days from the date the data is received.

Contract work to be performed using contractor-provided stakes shall not begin until the stakes are approved by the Contracting Agency. Such approval shall not relieve the Contractor of responsibility for the accuracy of the stakes.

Stakes shall be marked in accordance with Standard Plan H-14. When stakes are needed that are not described in the Plans, then those stakes shall be marked, at no additional cost to the Contracting Agency as ordered by the Engineer.

Payment

Payment will be made in accordance with Section 1-04.1 for the following bid item when included in the proposal:

"Roadway Surveying", lump sum.

The lump sum contract price for "Roadway Surveying" shall be full pay for all labor, equipment, materials, and supervision utilized to perform the work specified, including any resurveying, checking, correction of errors, replacement of missing or damaged stakes, and coordination efforts.

(March 13, 1995)
Cooperation With Other Contractors
Section 1-05.14 is supplemented with the following:

Other Contracts Or Other Work
It is anticipated that the following work adjacent to or within the limits of this project will be performed by others during the course of this project and will require coordination of the work:

SR 16, Tacoma Narrows Bridge Project

Qwest – underground fiber optics relocation, Vic. A22 128+31 (LT & RT)

LEGAL RELATIONS AND RESPONSIBILITIES TO THE PUBLIC

Laws To Be Observed
Section 1-07.1 is supplemented with the following:

State Taxes
Section 1-07.2 is supplemented with the following:

(March 13, 1995)
The work on this contract is to be performed upon lands whose ownership obligates the Contractor to collect State sales tax from the Contracting Agency. The provisions of Section 1-07.2(2) apply.

Sanitation

(April 1, 2002)
Health Hazards
Section 1-07.4(2) is revised to read:

The requirements of this provision apply to the following:

*** In the vicinity of Pearl Street and the pedestrian walkway between Pearl Street and Jackson Avenue. ***
This project site is known for occupation by transients and is known to contain biological hazards and associated physical hazards. The worksite may include materials and wastes associated with transients, drug users or litter, that pose physical or biological safety and health hazards or both. These may include, but not be limited to, violent and dangerous individuals (physical hazard), hypodermic needles, food, garbage, clothing, bedding, broken glass, human and animal excrement, drug paraphernalia, makeshift dwellings, birds, bats, rodents and other hazards.

Health and Safety Requirements
The Contractor shall communicate with the Project Engineer to ensure a coordinated effort for providing and maintaining a safe worksite for both the Contracting Agency's and Contractor's workers.

Construction Requirements

The Contractor shall be responsible for the sanitation measures required to provide and maintain a safe and healthful jobsite for the duration of the project in accordance with all applicable laws and this Special Provision.

Site Maintenance For Biological and Physical Hazards

Cleanup of the site, including all preparatory work required to make the worksite sanitary and safe in accordance with applicable laws, shall be completed to address all biological and associated physical hazards present. Necessary worker training, on and off site preparations, and safety equipment shall be provided by the Contractor to complete the cleanup and disposal of the biological and associated physical hazards.

Periodic Site Maintenance

The Contractor may elect to take some security measures such as lighting, fencing, or security guards to ensure that the site remains safe and healthful. The costs for these security measures shall be included for payment under the lump sum price for "Site Maint. For Bio. And Physical Hazards". If the worksite becomes unsanitary or unsafe due to biological and associated physical hazards after initial maintenance work activities such that additional maintenance becomes necessary, those costs shall be included for payment under the lump sum price for "Site Maint. For Bio. And Physical Hazards".

Payment

Payment will be made in accordance with Section 1-04.1, for the following bid item:

"Site Maint. For Bio. And Physical Hazards", lump sum.

The lump sum contract price for "Site Maint. For Bio. And Physical Hazards" shall be full pay for work to perform the site maintenance for biological and physical hazards as specified, and all other related work as mentioned in this special provision or as required by law, including the work described as periodic site maintenance.

Air Quality

Section 1-07.5(4) is supplemented with the following:

(OR November 27, 2001)

Fugitive Dust

The Puget Sound Clean Air Agency and the Washington State Department of Transportation recognize that fugitive dust from construction projects can become an air pollution problem. Both organizations share a common goal of controlling fugitive dust.

Fugitive Dust control planning is a partnership between the Contracting Agency, Contractor, subcontractors and any other party whose activities during the project may lead to the generation of Fugitive Dust. This partnership extends to legal responsibilities as well in that all parties can be held liable for non-compliance and subsequent regulatory actions, including monetary penalties.

The Contractor shall incorporate as part of the Temporary Erosion and Sediment Control (TESC) Plan, a Fugitive Dust Control Plan (FDCP). This plan should

reflect conditions specific to the Contractor's operation and schedule of work. The Contractor should base the FDCP on Best Management Practices (BMP's) set forth in the Associated General Contractors of Washington Education Foundation and Fugitive Dust Task Force pamphlet, "Guide To Handling Fugitive Dust From Construction Projects".

Fish and Wildlife and Ecology Regulations

Section 1-07.5 is supplemented with the following:

(******)

Imposed Restrictions and Requirements

The following provisions summarize some of the requirements imposed upon the Contracting Agency by the various environmental permits referenced in the following section. Throughout the work, the Contractor shall comply with the following requirements:

General

The contractor shall ensure that the Project Manager representing the Prime Contractor has read and understands this Special Provision. The Contractor shall provide the Engineer with a signed statement from that employee stating that the employee understands and will abide by the conditions of this Special Provision.

Sensitive areas shall be delineated and made clearly visible to equipment operators in accordance with the Special Provision, **Vegetation Protection and Restoration.**

Wetlands and Water Quality

The following restrictions and requirements pertain to work throughout the project limits:

1. Equipment shall not be moved into or operated in wetlands that are not authorized to be filled and shall operate only within the delineated clearing limits.
2. Turbid water generated from construction activities, including turbid de-watering water, shall not be discharged directly to waters of the state. Clean de-watering water that has been tested and confirmed to meet water quality standards may be discharged directly to waters of the state. The discharge outfall method shall be designed and operated so as not to cause erosion or scour in state waters, banks or vegetation. Machinery and equipment used during construction shall be serviced, fueled, and maintained on uplands in a confined area in order to prevent contamination to waters of the state. Fueling areas shall be provided with adequate spill containment.
3. Contractor staging areas will not be allowed within 200 feet of waters of the state including wetlands.
4. Equipment used for this project shall be free of external petroleum-based products while working around any water body. Equipment shall be checked daily for leaks and any necessary repairs shall be completed prior to commencing work activities along any water body. Accumulation of soils or debris shall be removed from the drive mechanisms (wheels, tires, tracks, etc.) and undercarriage of equipment prior to its working below the ordinary high water line.

5. No petroleum products, hydraulic fluid, fresh cement, sediments, sediment-laden water, chemicals, or any other toxic or deleterious materials are allowed to enter or leach into the water. Wash water containing sediments, oils, grease, or other hazardous materials resulting from wash down of equipment or working areas shall not be discharged into state waters. The Contractor shall set up a designated area for washing down equipment with no possible discharge to waters of the state including wetlands.
6. Any wooden components used for the construction of temporary work platforms if composed of pressure treated wood, shall comply with all current best management practices as contained in the "Western Wood Preservers Institute's latest edition of Best Management Practices for Use of Treated Wood in Aquatic Environments."
7. Structures containing concrete shall cure for 7 days prior to contact with water to avoid leaching. Fresh concrete or concrete by-products shall not be allowed to come into contact with state waters at any time during this project. All forms used for concrete shall be completely sealed to prevent the possibility of fresh concrete from leaking into the water.
8. Wastewater from project activities and water removed from within the work area shall be routed to an area landward of the ordinary high water line to allow removal of fine sediment and other contaminants prior to being discharged to a water body.
9. All waste material such as silt and excess dirt or overburden resulting from this project shall be deposited above the limits of floodwater in an approved upland disposal site.
10. No petroleum products, hydraulic fluid, fresh cement, sediments, sediment-laden water, chemicals, or any other toxic or deleterious materials are allowed to enter or leach into the water.

Work at Snake Lake

In addition to the restrictions and requirements listed above, the following additional restrictions and requirements pertain specifically to work in the vicinity of Snake Lake:

1. Removal and/or modification of the existing Snake Lake structure shall be accomplished so the structure and associated material does not enter the water. Material shall be disposed of so it will not enter the water.
2. Riprap materials shall not be used within the ordinary high water line of Snake Lake.
3. Equipment used for the Snake Lake structure shall operate stationed on a barge or secured work platform.
4. The temporary work platform shall be cleaned of aggregate or earth materials prior to removal. This material shall be disposed of so it will not enter the water.
5. Removal of temporary structures shall be accomplished so the structure and associated material does not re-enter the water.
6. Aquatic vegetation shall not be removed or disturbed, except for that incidental to the physical movement of piles into the substrate.
7. Shoreline vegetation and bank vegetation shall not be removed or disturbed, except for that incidental to the physical movement of equipment for access to the work area as shown in the plans.

Payment

All costs to comply with this Special Provision for the Imposed Restrictions and Requirements are incidental to the contract and are the responsibility of the Contractor. The Contractor shall include all related costs in the associated unit bid prices of the contract.

Permits and Licenses

Section 1-07.6 is supplemented with the following:

(******)

The Contracting Agency has obtained the below-listed permit(s) for this project. A copy of each of the permit(s) is attached as an appendix and made part of this contract. All contacts with the permitting agency concerning the below-listed permit(s) shall be through the Engineer.

NAME OF PERMIT	PERMITTING AGENCY	PERMIT REFERENCE NO.
Department of the Army Section 404 Nationwide	Corps of Engineers Seattle District	2003-01129
Section 401 Water Quality Certification	Department of Ecology	OBY-4-012713
Coastal Zone Management Consistency Certification	Department of Ecology	1173
NPDES Industrial Stormwater Permit for Construction Activities	Department of Ecology	S03005672
Hydraulic Project Approval	Department of Fish & Wildlife	ST-G0105-01
Critical Area Ordinance Permit	City of Tacoma	

Load Limits

Section 1-07.7 is supplemented with the following:

(March 13, 1995)

If the sources of materials provided by the Contractor necessitates hauling over roads other than State Highways, the Contractor shall, at the Contractor's expense, make all arrangements for the use of the haul routes.

Wages

General

Section 1-07.9(1) is supplemented with the following:

(January 7, 2002)

Application of Wage Rates For The Occupation Of Landscape Construction

State prevailing wage rates for public works contracts are included in this contract and show a separate listing for the occupation:

> Landscape Construction, which includes several different occupation descriptions such as: Irrigation and Landscape Plumbers, Irrigation and Landscape Power Equipment Operators, and Landscaping or Planting Laborers.

In addition. Federal wage rates that are included in this contract may also include occupation descriptions in Federal Occupational groups for work also specifically identified with landscaping such as:

> Laborers with the occupation description, Landscaping or Planting, or
>
> Power Equipment Operators with the occupation description, Mulch Seeding Operator.

If Federal wage rates include one or more rates specified as applicable to landscaping work, then Federal wage rates for all occupation descriptions, specific or general, must be considered and compared with corresponding State wage rates. The higher wage rate, either State or Federal, becomes the minimum wage rate for the work performed in that occupation.

If Federal wage rates do not include any rates specified as applicable to landscaping work, the Contractor shall assume the Federal wage rates did not take landscaping into consideration. In these instances the minimum wage rate shall be the State wage rate for the occupations specified as applicable to landscape construction.

Requirements For Nondiscrimination

Section 1-07.11 is supplemented with the following:

(February 16, 1999)

Minority And Women's Business Enterprise (MWBE) Participation

General Statement

In accordance with the legislative findings and policies set forth in Chapter 39.19 RCW the State of Washington encourages participation in all of its contracts by MWBE firms certified by the office of Minority and Women's Business Enterprises (OMWBE). Participation may be either on a direct basis in response to a solicitation/invitation or as a subcontractor to a Bidder/Proposer. No preference will be included in the evaluation of bids/proposals, no minimum level of MWBE participation shall be required as a condition for receiving an award and bids/proposals will not be rejected or considered non-responsive on that basis.

Voluntary MWBE Goals

Voluntary numerical MWBE participation goals shall be established for all solicitation/invitations where applicable. These goals are voluntary, but achievement of the goals is encouraged. No preference will be included in the evaluation of bids/proposals, no minimum level of MWBE participation shall be

required as a condition of award or completion of the contract work, and bids/proposals will not be rejected or considered non-responsive on that basis. Bidders may contact OMWBE at 360-753-9693 to obtain information on certified firms.

Affirmative Efforts To Increase Participation By MWBE's

Voluntary Efforts

Bidders/Proposers/Contractors are encouraged to:

1. Advertise opportunities for subcontractors or suppliers in a manner reasonably designed to provide MWBEs capable of performing the work with timely notice of such opportunities and all advertisements should include a provision encouraging participation by MWBE firms. Advertising may be done through general advertisements (e.g., newspapers, journals, etc.) or by soliciting bids/proposals directly from MWBEs.

2. Provide MWBEs that express interest with adequate and timely information about plans, specifications, and requirements of the contract. Break down total requirements into smaller tasks or quantities, where economically feasible, in order to permit maximum opportunity for participation by MWBEs and other small businesses.

3. Utilize the services of available minority community organizations, minority contractor groups, local minority assistance offices and organizations that provide assistance in the recruitment and placement of MWBEs and other small businesses.

4. Establish delivery schedules, where requirements of the contract permit, that encourage participation by MWBEs and other small businesses.

The actions described in this section should supplement efforts to provide information to all qualified firms, and nothing in this section is intended to prevent or discourage the Bidders/Proposers/Contractors from inviting proposals for participation from non-MWBE firms as well as MWBE firms.

Non-discrimination

Contractors, Bidders, and Proposers shall not create barriers to open and fair opportunities for all businesses including MWBEs to participate in all State contracts and to obtain or compete for contracts and subcontracts as sources of supplies, equipment, construction and services. In considering offers from and doing business with subcontractors and suppliers, the Contractor shall not discriminate on the basis of race, color, creed, religion, national origin, sex, age, nationality, marital status, or the presence of any mental or physical disability in an otherwise qualified disabled person.

The Contractor shall make the MWBE Participation General Statement cited previously in this Special Provision a part of all subcontracts and agreements entered into as a result of this contract.

Definitions

When referred to in this contract, the terms Minority, Minority Business Enterprise (MBE), and Women's Business Enterprise (WBE) will be construed to have the following meanings:

Minority means a person who is a citizen or lawful permanent resident of the United States and who is:

(a) Black: having origins in any of the black racial groups of Africa;

(b) Hispanic: of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish or Portuguese culture or origin, regardless of race;

(c) Asian American: having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands; or

(d) American Indian or Alaskan Native: having origins in any of the original peoples of North America.

Minority Business Enterprise, Minority-owned Business Enterprise, or MBE means a business organized for profit, performing a commercially useful function, which is owned and controlled by one or more minority individuals or minority business enterprises. Owned and controlled means a business in which one or more minorities or MBE's own at least fifty-one percent (51%), or in the case of a corporation at least fifty-one percent (51%) of the voting stock, and control at least fifty-one percent (51%) of the management and daily business operations of the business.

MWBE means a minority owned business enterprise, a women-owned business enterprise, and/or a combination minority and women's business enterprise certified by the Office of Minority and Women's Business Enterprises (OMWBE) of the State of Washington.

Women's Business Enterprise, Women-owned Business Enterprise, or WBE means a business organized for profit, performing a commercially useful function, which is owned and controlled by one or more women or women's business enterprises. Owned and controlled means a business in which one or more women or WBE's own at least fifty-one percent (51%) or in the case of a corporation at least fifty-one percent (51%) of the voting stock, and control at least fifty-one percent (51%) of the management and daily business operations of the business. The women owners must be United States citizens or lawful permanent residents.

Minority/Women's Business Enterprise means a minority owned business enterprise, a women-owned business enterprise; and/or a combination minority and women's business enterprise certified by the OMWBE of the State of Washington.

MBE/WBE Status
A consolidated list of firms accepted as certified by OMWBE is available via the WSDOT Home Page, (WWW.WSDOT.WA.GOV) and a hard copy is available at nominal cost from the OMWBE.

MBE/WBE Goals
The Contracting Agency has established a voluntary goal in the amount of:

*** 10 percent (10%) of the contract total for combined MWBE goals. ***

Further Information
If further information is desired concerning Minority Business Enterprise/Women's Business Enterprise participation, inquiry may be directed to:

External Civil Rights Branch
Office of Equal Opportunity
Washington State Department of Transportation
Transportation Bldg., PO Box 47314
Olympia, WA 98504-7314
or telephone - (360) 705-7085
Fax (360) 705-6801

Contractor's Responsibility for Work

(August 6, 2001)
Repair of Damage
Section 1-07.13(4) is revised to read:

The Contractor shall promptly repair all damage to either temporary or permanent work as directed by the Engineer. For damage qualifying for relief under Sections 1-07.13(1), 1-07.13(2) or 1-07.13(3), payment will be made in accordance with Section 1-04.4. Payment will be limited to repair of damaged work only. No payment will be made for delay or disruption of work.

Protection And Restoration Of Property

Vegetation Protection and Restoration
Section 1-07.16(2) is supplemented with the following:

(******)
The Contracting Agency has identified critical environmental areas adjacent to work areas within the project limits. Wetland boundaries as well as surrounding buffer zones are shown in the plans.

A site preservation line has been established as a boundary between work zones and critical environmental areas. As described in the Special Provisions **ORDER OF WORK** and **EROSION CONTROL AND WATER POLLUTION CONTROL**, the Contractor shall install high visibility fence along the site preservation line. The preservation zones include critical environmental areas, buffer zones, and other areas of vegetation to be preserved. The Contractor shall keep the preservation

zones identified by the site preservation lines free of construction equipment, construction materials, debris, and runoff. No excavation shall be performed inside the preservation zone.

Archaeological and Historical Objects

Section 1-07.16(4) is supplemented with the following:

(******)
The Blue Star Memorial, as shown in the Park and Ride Plan, shall not be removed, damaged, or destroyed during construction.

(February 5, 2001)

Utilities And Similar Facilities

Section 1-07.17 is supplemented with the following:

Locations and dimensions shown in the Plans for existing facilities are in accordance with available information obtained without uncovering, measuring, or other verification.

Public and private utilities, or their contractors, will furnish all work necessary to adjust, relocate, replace, or construct their facilities unless otherwise provided for in the Plans or these Special Provisions. Such adjustment, relocation, replacement, or construction will be done during the prosecution of the work for this project.

The following addresses and telephone numbers of utility companies known or suspected of having facilities within the project limits are supplied for the Contractor's convenience:

Comcast
410 Valley Avenue NW
Suite 12
Puyallup, WA 98371
Attn: Aaron Cantrell
(206) 510-4222

Puget Sound Energy
3130 S. 38th St
Tacoma, WA 98409
Attn: Ralph Yerbury
(253) 377-7172

Qwest
2310 S. 84th Street, Suite 18
Lakewood, WA 98499
Attn: Brian Bujacich
(253) 597-5189

Qwest Wireless
1600 7th Avenue
Seattle, WA 98191
Attn: Frank Matranga
(206) 271-5420

Sprint
2606 70th Avenue East
Suite 102
Fife, WA 98424
Attn: Wes Carpenter
(253) 476-6655

Tacoma Fire Department
415 Tacoma Avenue S.
Tacoma, WA 98402
Attn: Nick Hartman
(253) 591-5719

Tacoma Power
3628 South 35th Street
Tacoma, WA 98409-3192
Attn: Thad Glassy
(253) 502-8704

Tacoma Power / Click Network
3628 S. 35th Street
Tacoma, WA 98409
Attn: Chris Mantle
(253) 502-8131

Tacoma Public Works
2201 Portland Avenue
Tacoma, WA 98421-2711
Attn: Steve Hoffman
(253) 502-2144

Tacoma Public Works – Street Lighting
747 Market Street, Room 520
Tacoma, WA 98402
Attn: Steve Davis
(253) 591-5278

Tacoma Water
3628 S. 35th Street
Tacoma, WA 98409-3192
Attn: Mike Dalin
(253) 502-8520

WSDOT – Olympic Region
P.O. Box 47440
Tumwater, WA 98504-7440
Attn: Don Anders
(360) 357-2616

(******)
The Contractor shall contact the WSDOT Olympic Region Signal Superintendent, Don Anders, to obtain the locations of all Contracting Agency-owned utilities within the

project limits. To request utility locates, call 360-357-2616 during normal business hours (7:30AM to 4:00PM, Monday thru Friday), or 360-704-3228 (available 7 days per week by voicemail).

(******)

Work Performed by Utilities

Utility companies will relocate utilities during the life of the contract. Until such time that the utility relocations are completed, portions of the right of way will not be available to the Contractor for the construction of the project.

Utility work will be ongoing at the locations listed below and as shown on the existing utility plan. The right of way at each location will be made available to the Contractor as indicated:

Utility & Location	Type of Work	Right of Way Available by:
Qwest		
Vic. OS 10+00.0 (LT & RT) to A22 118+00.0 (LT & RT)	Install new fiber conduit	January 31, 2005
Vic. A22 118+00.0 (RT) to A22 130+00.0 (RT)	Install new fiber conduit	January 31, 2005
Vic. A22 125+95.0 (LT) to A22 128+00.0 (LT)	Remove abandoned cable & backfill the clay ductwork	January 31, 2005

(******)

Overhead Power Lines

There are overhead high-voltage lines, owned by Tacoma Power, in the vicinity of the following:

A 22 Wall 1
MLS Wall 1
MLN Wall 1
CES Ramp Structure

The Contractor shall coordinate, through the Engineer, work in these areas with Tacoma Power to have the lines de-energized prior to beginning work in the vicinity of the power lines. The coordination shall include the following:

Written notice, indicating the desired date for de-energizing the line, shall be provided to Tacoma Power and the Engineer a minimum of 45 days in advance of the desired date.

A minimum of thirty days prior to performing work in the vicinity, a meeting shall be held with the Contractor, Tacoma Power, and the Engineer to discuss the work to be performed and the approximate timing for the de-energizing of the line.

The Contractor shall notify the Tacoma Power Transmission Coordinator at (253) 502-8379 and the Engineer seven calendar days prior to requiring the lines to be de-energized.

De-energizing of the power lines will be allowed only between March 15 and October 15 of any year.

(******)

Street Lighting

There is overhead street lighting, owned by Tacoma Power, along Mullen Street and Center Street.

Following installation of the permanent illumination in the vicinity, the Contractor shall notify Tacoma Power, Mr. Thad Glassy at (253) 502-8704 or Mr. Denny Dore at (253) 502-8284, and the Engineer, seven calendar days prior to requiring Tacoma Power to remove their street lighting. Tacoma Power will need three weeks to complete this work.

Public Convenience And Safety

Construction Under Traffic

Section 1-07.23(1) is supplemented with the following:

(******)

This contract has the following traffic restrictions:

There shall be no restrictions or interruptions to traffic the day prior to a holiday or holiday weekend through the last day of the holiday or holiday weekend unless approved by the Engineer.

Two lanes of traffic shall be maintained at all times on mainline SR 16 in both directions except when the Contractor's operations are in progress subject to the following lane restrictions:

SINGLE LANE CLOSURES EASTBOUND SR 16

Beginning of Project to Vic. 19th Street:

9:00 PM	Sunday	to	5:00 AM	Monday
9:00 PM	Monday	to	5:00 AM	Tuesday
9:00 PM	Tuesday	to	5:00 AM	Wednesday
9:00 PM	Wednesday	to	5:00 AM	Thursday
9:00 PM	Thursday	to	5:00 AM	Friday
9:00 PM	Friday	to	7:00 AM	Saturday
9:00 PM	Saturday	to	8:00 AM	Sunday

Vic. 19th Street to End of Project:

9:00 PM	Sunday	to	5:00 AM	Monday
7:00 PM	Monday	to	5:00 AM	Tuesday
7:00 PM	Tuesday	to	5:00 AM	Wednesday
7:00 PM	Wednesday	to	5:00 AM	Thursday
7:00 PM	Thursday	to	5:00 AM	Friday
8:00 PM	Friday	to	7:00 AM	Saturday
9:00 PM	Saturday	to	8:00 AM	Sunday

SINGLE LANE CLOSURES WESTBOUND SR 16

9:00 PM	Sunday	to	7:00 AM	Monday
9:00 PM	Monday	to	7:00 AM	Tuesday
9:00 PM	Tuesday	to	7:00 AM	Wednesday
9:00 PM	Wednesday	to	7:00 AM	Thursday
9:00 PM	Thursday	to	7:00 AM	Friday
10:00 PM	Friday	to	8:00 AM	Saturday
10:00 PM	Saturday	to	9:00 AM	Sunday

There shall be no weekday shoulder closures on SR 16 during the hours of 6:00 AM to 9:00 AM and 3:00 PM to 6:00 PM.

Ramp closures will be allowed during the hours of 10:00 PM to 5:00 AM for the purpose of constructing drainage crossings and ramp paving only. Consecutive on-ramps or off-ramps shall not be closed concurrently.

Short-term highway closures for sign bridge erection and girder placement will be allowed during the hours of 12:00 AM to 4:00 AM subject to the requirements shown in the Plans.

CITY STREETS

All lanes of traffic and traffic movements shall be maintained on City streets except when the Contractor's operations are in progress subject to the following lane restrictions:

4 & 5 Lane Roadways
A minimum of one lane in each direction shall be maintained on City streets during the hours of 9:00 PM to 5:00 AM nightly and 9:00 AM to 3:00 PM daily.

2 & 3 Lane Roadways and Signalized Intersections
City street lane closure operations requiring alternating one-way traffic or signalized intersections requiring flagging operations will only be allowed between the hours of 9:00 PM to 5:00 AM.

DETOURS

Detours from SR 16 onto City streets will be allowed to facilitate the planned traffic switch between phase traffic control alignments shown in the Plans. A one-time detour for Eastbound SR 16 traffic and a one-time detour for Westbound SR 16 traffic will be allowed for each planned traffic switch. Eastbound and Westbound detours for SR 16 traffic will not be allowed concurrently. These detours will be allowed during the same work hours listed above for single lane closures on SR 16.

For girder setting, City street closures and their associated detours will be allowed during the hours of 9:00 PM to 5:00 AM.

The Contractor shall be required to notify the Engineer two weeks prior to implementing a detour.

BUSINESS APPROACHES

All work on approaches accessing businesses shall be coordinated with the Engineer and the affected businesses.

Weekend closures of approaches accessing businesses will not be allowed.

Approaches accessing businesses shall be constructed one half at a time.

SPECIAL CLOSURES

Existing Tyler Street off ramp and Center Street on ramp:

The Tyler Street off ramp can be closed to traffic, but shall remain passable for emergency vehicle traffic until the start of Phase 3A.

The Center Street on ramp and off ramp can be closed to traffic, but shall remain passable for emergency vehicle traffic until the start of Phase 2A.

The Contractor shall notify the Engineer 7 days in advance of any necessary temporary closures and the final closure of the ramps to emergency vehicles.

Weekend Closures:

A weekend closure for work in each of the specific locations listed below will be allowed. Prior to opening a weekend closure, the Contractor shall at a minimum provide the same number of paved lanes and traffic movements as there were before the weekend closure and a signal system that supports that configuration. An interim striping plan shall be submitted to the Engineer two weeks in advance of a weekend closure for approval.

A one-time, weekend closure of the OSE Line ramp will be allowed between the hours of 10:00 P.M. Friday until 7:00 A.M. Monday to complete the work in the vicinity of station OSE 51+00 to OSE 57+80.

A one-time, weekend closure of the 6SN Line ramp will be allowed between the hours of 10:00 P.M. Friday until 7:00 A.M Monday to complete the work in the vicinity of station 6SN 13+00 to 6SN 24+00.

A one-time, weekend closure of the PEW Line ramp will be allowed between the hours of 10:00 P.M. Friday until 7:00 A.M. Monday to complete the work in the vicinity of station PEW 11+00 to PEW 17+00.

A one-time, weekend closure of the 19NW Line ramp will be allowed between the hours of 9:00 P.M. Friday until 5:00 A.M. Monday to complete the work in the vicinity of station 19NW 30+80 to 19NW 38+50.

A one-time, weekend closure of the OWS Line ramp will be allowed between the hours of 9:00 P.M. Friday until 5:00 A.M. Monday to complete the work in the vicinity of station OWS 10+50 to OWS 23+40.

Concurrent weekend ramp closures will not be allowed. The existing Tyler and Center Street ramps described above are exempt from this restriction.

19TH STREET TUNNEL

A single lane closure will be allowed Westbound on 19th St. only during the 60 working days allowed to complete the tunnel as described in the Special Provision **Time for Completion**.

PHASE 3B WORK

Eastbound SR 16 station A22 151+00 to A22 201+00, and the PNW and PWS Lines may be closed concurrently and one-time only for a period not to exceed 14 working days as described in the Special Provision **Time for Completion**. The Contractor shall notify the Engineer two weeks prior to the start of the Phase 3B work.

Should high volume hours differ from those specified, as determined by the Engineer, the Contractor will be required to adjust the hours of work accordingly. Exceptions to these restrictions may be considered by the Engineer on a case-by-case basis following a written request by the Contractor.

Special events that generate increased traffic volumes through the work area may occur during the life of this project. Lane restrictions may be denied if severe traffic congestion is expected. Coordination with events at Cheney Stadium and the Tacoma Dome is required.

There shall be no delay to medical, fire, police, or other emergency vehicles with flashing lights or sirens.

Hauling vehicle access to and from SR 16 barrier protected work areas shall be accomplished using an approved lane closure.

(******)
The construction safety zone will be determined as follows:

When the posted speed is 35 MPH or under, the safety zone will be 10 feet from the outside edge of traveled way or 2 feet beyond the outside edge of the sidewalk.

When the posted speed is from 40 to 55 MPH the safety zone will be 15 feet from the outside edge of traveled way.

When the posted speed is over 60 MPH the safety zone will be 30 feet from the outside edge of traveled way.

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

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

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

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

(December 6, 2004)
The Contractor shall enter the highway only through legal movements from existing roads, streets and through other access points specifically allowed by the contract documents.

(December 6, 2004)
The portion of Section 1-07.16(1) that prohibits the merging of construction vehicles with public traffic from an access gained through adjacent properties is rescinded, provided the Contractor's submittal is approved as required below.

Access for Construction

The Contractor may enter and leave the traveled way, auxiliary lanes or shoulders at approved locations other than established legal movements. To obtain approval of such an access location, the Contractor shall submit a request to the Engineer. The Contractor's request shall be submitted to the Engineer at least 30 calendar days prior to the time the use of the access will be required. This submittal shall include a vicinity map indicating the interstate stationing at the centerline of the access, distances from the end of ramp tapers of existing interchanges and a traffic control plan conforming with the requirements specified in Section 1-10.2(2). The access shall meet the following requirements:

- Access to and from the worksite adjacent to a multi-lane facility will only be allowed to and from a closed lane.

- The merging point of construction vehicles and public traffic shall provide a Decision Sight Distance for the traveling public of 1,640 ft in urban areas and 1,360 ft in rural areas.

- In urban areas the access shall not be located within 3,280 ft of the end of a ramp taper, or the centerline of a road approach. In rural areas the access shall not be located within 2,720 ft of the end of a ramp taper or the centerline of a road approach.

- Median crossings within 1.5 miles of the access point shall not be used in conjunction with the access.

- No new median crossings shall be created for use in conjunction within 1.5 miles of the access point.

- Short-duration shoulder stops in the construction zone, utilizing light vehicles properly equipped with warning flashers, will be allowed without a lane closure.

- When in use the access location shall have traffic control in place as per Section 1-10. Unauthorized use of the access from adjacent property is to be prohibited by the use of signing and/or flaggers as conditions warrant.

- The continuity of the existing drainage system shall be maintained through the access site.

- Air borne particulates created as a result of using the access shall be effectively controlled.

- The access location shall not adversely affect wetlands or other sensitive areas.

At the completion of the project, the Contractor 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 or other items caused by the access shall be repaired. All work to comply with this provision or to build, maintain, provide erosion control, control airborne particulates, ensure that drainage continues through the access site, provide traffic control when necessary, remove the temporary access and restore the surrounding area when no longer required for use are the responsibility of the Contractor. The Contractor shall include all related costs in the bid prices of the contract.

Rights Of Way

Section 1-07.24 is supplemented with the following:

(******)

As indicated on the Alignment/Right of Way Plans, there is a portion of the right of way in the vicinity of BP2 158+00 Rt. to PED2 53+00 Rt., that will not be available to the Contractor for staging or parking of construction or private vehicles. The Contractor shall install and maintain temporary chain link fencing at all times in this area following removal of the existing fence and prior to the installation of the permanent

The Contracting Agency has not completed the acquisition of title to the following described property:

Along the MLN Line, between Sta. CTR 10+98.04 (LT), CTR 10+29.59 (LT), CSE 10+23.68 (RT), CSE 10+23.76 (RT), and MLN 10+75.65 (RT) as shown on the Right-of-Way plans.

The Contractor shall not perform any work within these limits until ordered to do so by the Engineer. The Contracting Agency has estimated that the above described property will be available August 1, 2005.

PROSECUTION AND PROGRESS

Subcontracting

Section 1-08.1 is supplemented with the following:

(October 12, 1998)
Prior to any subcontractor or lower tier subcontractor beginning work, the Contractor shall submit to the Engineer a certification (WSDOT Form 420-004) that a written agreement between the Contractor and the subcontractor or between the subcontractor and any lower tier subcontractor has been executed. This certification shall also guarantee that these subcontract agreements include all the documents required by the Special Provision **Federal Agency Inspection**.

A subcontractor or lower tier subcontractor will not be permitted to perform any work under the contract until the following documents have been completed and submitted to the Engineer:

1. Request to Sublet Work (Form 421-012), and
2. Contractor and Subcontractor or Lower Tier Subcontractor Certification for Federal-aid Projects (Form 420-004).

The Contractor's records pertaining to the requirements of this Special Provision shall be open to inspection or audit by representatives of the Contracting Agency during the life of the contract and for a period of not less than three years after the date of acceptance of the contract. The Contractor shall retain these records for that period. The Contractor shall also guarantee that these records of all subcontractors and lower tier subcontractors shall be available and open to similar inspection or audit for the same time period.

Progress Schedule

Section 1-08.3 is supplemented with the following:

(OR October 7, 2003)

Weekly Meeting

The Contractor shall attend weekly meetings with the Project Engineer's office, at a mutually agreed upon time and location, to discuss changes in the proposed order of work, construction delays, or conditions that may affect the progress of work.

The attendees shall include but not be limited to Project Manager(s), Superintendents(s), key personnel, and when necessary, subcontractor personnel.

Progress Schedule

The second paragraph of Section 1-08.3 is deleted and replaced with the following:

(******)
The Contractor shall create and maintain a Critical Path Method (CPM) progress schedule. The Contractor shall submit five hard copies of the CPM schedule to the Engineer no later than 30 calendar days after the date the contract is executed. If a computer program is utilized to create the schedule, then the contractor shall furnish the Engineer with one copy of the electronic data and a description of the software utilized. If requested by the Engineer, the Contractor will assist the Contracting Agency

in acquiring a copy of the software, to be obtained at the expense of the Contracting Agency.

The CPM schedule shall show the manner in which the Contractor intends to prosecute the work from execution through physical completion within the specified contract time. The CPM schedule shall be prepared using Precedence Diagram Methodology, which clearly delineates the relationship between contract activities. Each activity must include the following:

1. The activity start and activity complete times.
2. The activity duration in contract working days.
3. The physically logical relationship(s) to all preceding and related activities, i.e., activity predecessor(s).
4. The physically logical relationship(s) to all subsequent and related activities, i.e., activity successor(s).
5. Total float for each activity.

The CPM schedule shall be of sufficient detail to evaluate the progress of individual activities on a daily basis. Activities with durations longer than 15 working days shall be shown subdivided on the CPM schedule to facilitate the evaluation of progress.

The CPM schedule shall include the following specific contractual work restrictions, constraints, activities, and milestones:

1. Project start time, completion time, and duration in contract working days for the major phases of the work and for the entire project.
2. The start time, completion time, and duration in contract working days for all work phases, restrictions, and constraints outlined in the Special Provisions titled ***Order of Work, Construction Under Traffic, and Time for Completion.***
3. Procurement of any critical materials for specific work activities.
4. Working drawings and submittals requiring review or approval of the Engineer.
5. Delivery of state-furnished materials.

The Contractor shall provide sufficient material, equipment, and labor to meet the completion times in the CPM schedule.

Prosecution of Work

Section 1-08.4 is supplemented with the following:

(******)

Order of Work

Unless otherwise approved by the Engineer, the Contractor shall complete the work in accordance with the construction phasing plans, the Special Provisions **CONSTRUCTION UNDER TRAFFIC** and **TIME FOR COMPLETION**, and the following:

The first order of work on this project shall be the installation of fencing to delineate all wetland and sensitive areas, as described in the Special Provision **Vegetation Protection and Restoration** and **EROSION CONTROL AND WATER POLLUTION CONTROL**. No other work shall be performed on the site until the Contracting Agency has accepted the installation of the wetland and sensitive area delineation. The acceptance will be evidenced in writing.

The Contractor shall complete the installation of BMPs and work as outlined in the Special Provision **EROSION CONTROL AND WATER POLLUTION CONTROL** and the Plans prior to performing earthwork.

The Contractor shall install and maintain all temporary drainage required to maintain a functioning drainage system through all phases of the work, until the new system is complete. All costs associated with temporary drainage shall be included in various drainage bid items.

Work on A22 Wall 1, MLS Wall 1, MLN Wall 1, and the Center Street Flyover structure, requiring de-energizing of the Tacoma Power overhead high voltage lines, shall be performed only between March 15 and October 15 of any year.

Throughout the project limits on SR 16, paved areas outside the existing edge lines and within the highway rights of way shall be assumed to be not of sufficient depth to support traffic. Prior to allowing any traffic shift or detour that would put public traffic on these areas, the locations shall be rebuilt with HMA in accordance with the detail in the Plans.

Phase 1A

Widening of the PNS Line, between 9th St. and the 6PL Line intersection shall be completed prior to construction of the falsework for the Pearl St. bridge.

Construct the following ponds, prior to performing any grading work in the designated area:

Pond Description	Designated Grading Area
Mullen Pond	Center Street Flyover Structure Span 2 CES Line from 22+00 to the end
Lowes Pond	A22 Line from 80+00 to 95+00 Eastbound
JJ Pond	A22 Line from 95+00 to 115+00 Eastbound OWS Line 10+00 to 23+39.91
12th Street Pond	A22 Line from 140+00 to 157+00 Westbound A22 Line from 140+00 to 154+00 Eastbound PED2 Line from 110+20 to 112+40 PED3 Line from 10+00 to 11+00 BP5 Line from 55+40 to 58+20
North Pearl Pond	A22 Line from 178+00 to 200+00 Westbound and Eastbound 6th Street Bridge 6PL Line Pearl Street Bridge

Close existing Tyler Street off-ramp and existing Center Street on and off-ramps to public traffic prior to the lane shift for the Snake Lake Bridge widening.

Phase 2A

Prior to closing the ONW Line to traffic, the 19NW ramp signing and the signal at the 19NW Line terminus shall be modified to temporarily provide for the left turning movement.

Phase 2B

Girders for Span 2 of the Center Street Flyover Structure shall be placed no more than 10 days prior to moving traffic to the new eastbound lanes of SR 16 under the span.

Phase 3A

Upon opening the ONW Line, the 19NW ramp signing and the signal at the 19NW terminus shall be modified to eliminate the left turn movement.

The Mullen Street access to and from Lowes shall remain open until 2 weeks prior to the CSE Line or CES Line is open to traffic.

Construct the following ponds, prior to performing any grading work in the designated area:

Cheney Pond
- A22 Line from 80+00 to 97+00 Westbound
- CES Line from beginning to 22+00
- PED2 Line from 48+00 to 58+00
- BP3 Line

Phase 3B

Girders for Span 1 of the Center Street Flyover Structure shall be placed after traffic has been shifted onto the Phase 3B detour alignment.

Time for Completion

Section 1-08.5 is deleted in its entirety and replaced with the following:

(******)

Work on this project will be subject to a total project completion schedule and to schedules for five intermediate Stages of work. The intermediate Stages will run concurrently with the overall project schedule.

The project shall be physically completed in its entirety within 400 working days, or as extended by the Engineer in accordance with Section 1-08.8. In addition, the following intermediate Stages of work shall be completed as follows:

1. All city street improvements to Center Street shall be completed within 70 working days. Time will begin with the start of removal or excavation work along Center Street.
2. All work on the pedestrian tunnel that requires westbound 19th Street traffic to be restricted to a single lane shall be completed within 60 working days. Time will begin the first day that the Phase 3A lane restriction on 19th Street is in place.
3. The MLN Wall 1 shall be completed within 30 working days. Time will begin on the first day of excavation work for the wall.

4. The MLN Wall 2 shall be completed within 30 working days. Time will begin on the first day of excavation work for the wall.
5. The CSE Wall 1 shall be completed within 30 working days. Time will begin on the first day of excavation work for the wall.
6. Phase 3B work on eastbound SR 16, station A22 151+00 to A22 201+00, and the PNW and PWS Lines shall be substantially complete and open to traffic within 14 working days. Time will begin on the first day following the day that traffic is shifted to the westbound lanes.
7. The Vortex Water Enhancement System shall be completed within 60 working days. Time will begin on the first day of excavation work for the system or on working day 80, whichever comes first.

Working days will be counted concurrently on the total project schedule and on whichever intermediate Stage is underway at the time. Every day will be counted as a "working day" unless it is a nonworking day or an Engineer determined unworkable day. A nonworking day is defined as a Saturday, a Sunday, a day on which the contract specifically suspends work, or one of these holidays: 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. When any of these holidays fall on a Sunday, the following Monday shall be counted a nonworking day. When the holiday falls on a Saturday, the preceding Friday shall be counted a nonworking day.

An unworkable day is defined as a partial or whole day the Engineer declares to be unworkable because of weather, conditions caused by the weather, or such other conditions beyond the control of the Contractor that prevents satisfactory and timely performance of the work, and such performance, if not hindered, would have otherwise progressed toward physical completion of the work.

Independent assessments of workable and unworkable days will be made for each working day count underway at a given time.

Contract time will begin on the first working day following the 10th calendar day after the date the Contracting Agency executes the contract.

Each working day shall be charged to the contract as it occurs, until the contract work is physically complete. Each week the Engineer will provide the Contractor a statement that shows the number of working days: (1) charged to the contract the week before; (2) specified for the physical completion of the contract and for the completion of the current intermediate Stage; and (3) remaining for the physical completion of the contract and the current intermediate Stage. The statement will also show the nonworking days and any partial or whole day the Engineer declares as unworkable. Within 10 calendar days after the date of each statement, the Contractor shall file a written protest of any alleged discrepancies in it. To be considered by the Engineer, the protest shall be in sufficient detail to enable the Engineer to ascertain the basis and amount of time disputed. By not filing such detailed protest in that period, the Contractor shall be deemed as having accepted the statement as correct.

The Engineer will give the Contractor written notice of the physical completion date for all work the contract requires. That date shall constitute the physical completion date of the contract, but shall not imply the Secretary's acceptance of the work or the contract.

The Engineer will give the Contractor written notice of the completion date of the contract after all the Contractor's obligations under the contract have been performed by the Contractor. The following events must occur before the Completion Date can be established:

1. The physical work on the project must be complete; and

2. The Contractor must furnish all documentation required by the contract and required by law, to allow the Contracting Agency to process final acceptance of the contract. The following documents must be received by the Project Engineer prior to establishing a completion date:

   a. Certified Payrolls (Federal-aid Projects)
   b. Material Acceptance Certification Documents
   c. Annual Report of Amounts Paid as MBE/WBE Participants or Quarterly Report of Amounts Credited as DBE Participation, as required by the Contract Provisions.
   d. FHWA 47 (Federal-aid Projects)
   e. Final Contract Voucher Certification

Liquidated Damages

Section 1-08.9 is revised as follows:

The second sentence of the first paragraph is deleted.

Section 1-08.9 is supplemented with the following:

(******)
The closure of SR 16 mainline, lanes, or ramps, will result in traffic impacts. Closures cause delays to the traveling public, increase fuel consumption and vehicle operating costs, pollution, and other inconveniences.

Accordingly, the Contractor agrees to authorize the Engineer to deduct from any money due or coming due the Contractor the following liquidated damages for failure to open the traveled way as specified:

SR 16

To pay $3,000 liquidated damages per 15 minutes per lane that a lane is closed on SR 16 beyond the scheduled opening time.

To pay $250 liquidated damages per 15 minutes that the NCR ramp or the 6SN ramp is closed beyond the scheduled opening time.

To pay $100 liquidated damages per 15 minutes per ramp that a ramp is closed on SR 16 beyond the scheduled opening time.

To pay $500 liquidated damages per 15 minutes SR 16 is totally closed for sign bridge placement beyond the scheduled opening time.

To pay $12,000 liquidated damages per day, or portion of a day that Phase 3B work is not open within 14 working days specified in the Special Provision **Time for Completion.**

To pay $50,000 liquidated damages per day, or portion of a day, that lane restrictions are in place on 19th Street beyond the 60 working days specified in the Special Provision **Time for Completion.**

City Streets

To pay $500 liquidated damages per 15 minutes per lane that a lane is closed on a city street beyond the scheduled opening time.

To pay $500 per day, or portion of a day, for each day beyond the 30 working days specified in the Special Provision **Time for Completion**, required to complete the Center Street improvements.

Wall Construction

To pay $500 per day, or portion of a day, per wall, for each day beyond the 30 working days specified in the Special Provision **Time for Completion**, required to complete the construction of the MLN Wall 1, the MLN Wall 2, and the CSE Wall 1.

Vortex Water Enhancement System

To pay $1000 per day, or portion of a day, for each day beyond the 60 working days specified in the Special Provision **Time for Completion**, required to complete the construction of the water enhancement system.

Detours

To pay $6,000 liquidated damages per 15 minutes that SR 16 is closed and detoured to either westbound Union Street off-ramp to Pearl Street on-ramp, or eastbound Pearl Street off-ramp to Union Street on-ramp, or eastbound Jackson Avenue off-ramp to Union Street on-ramp beyond the scheduled opening time.

To pay $1,200 liquidated damages per 15 minutes that SR 16 is closed and detoured to either westbound Orchard Street off-ramp to Pearl Street on-ramp, or westbound 6th Street off-ramp to Jackson Avenue on-ramp, or eastbound Jackson Avenue off-ramp to Pearl Street on-ramp beyond the scheduled opening time.

To pay $100 liquidated damages per 15 minutes that Tyler Street is closed and detoured for SR 16 girder placement beyond the scheduled opening time.

To pay $200 liquidated damages per 15 minutes that 12th Street is closed and detoured for SR 16 girder placement beyond the scheduled opening time.

ITS Disruption

To pay $250.00 liquidated damages per 15 minutes for each 15 minute period that the Contractor fails to restore the proper operation of an existing ITS element following an unplanned disruption as specified in the subsection **Existing System Disruption and Restoration** of the Special Provision **INTELLIGENT TRANSPORTATION SYSTEM (ITS)**.

MEASUREMENT AND PAYMENT

(April 28, 1997)
Payment For Material On Hand
The last paragraph of Section 1-09.8 is revised to read:

The Contracting Agency will not pay for any individual item on hand with a cost of less than $2,000. As materials are used in the work, credits equaling the partial payments for them will be taken on future estimates. Each month, no later than the estimate due date, the Contractor shall submit a letter to the Project Engineer that clearly states: 1) the amount originally paid on the invoice (or other record of production cost) for the items on hand, 2) the dollar amount of the material incorporated into each of the various work items for the month, and 3) the amount that should be retained in material on hand items. If work is performed on the items and the Contractor does not submit a letter, all of the previous material on hand payment will be deducted on the estimate. Partial payment for materials on hand shall not constitute acceptance. Any material will be rejected if found to be faulty even if partial payment for it has been made.

(March 13, 1995)
Payments
Section 1-09.9 is supplemented with the following:

The quantity of the following items to be paid for on this project shall be the quantity shown in the Proposal, unless changes are made in accordance with Section 1-04.4 which affect this quantity. The quantity shown in the Proposal will be adjusted by the amount of the change and will be paid for as specified in Section 1-04.4.

St. Reinf. Bar For Bridge
St. Reinf. Bar For Wall ___
St. Reinf. Bar For Traffic Barrier A22 Wall 2
Conc. Class 4000 For Bridge
Conc. Class 4000 For Wall ___
Conc. Class 4000 For Traffic Barrier A22 Wall 2

The quantities in the Proposal are listed only for the convenience of the Contractor in determining the volume of work involved and are not guaranteed to be accurate. The prospective bidders shall verify these quantities before submitting a bid. No adjustments other than for approved changes will be made in the quantity even though the actual quantities required may deviate from those listed.

The unit contract price for these items shall be full pay to construct and complete this portion of the work.

TEMPORARY TRAFFIC CONTROL

General

Section 1-10.1(2) is supplemented with the following:

(August 2, 2004)

The Contracting Agency will provide the following labor, equipment and/or materials resources to the Contractor for use on the project. The Contractor will notify the Engineer when each resource is to be utilized and will provide adequate notice that will allow any necessary arrangements to be made.

*** Washington State Patrol Officer(s), including vehicle - 100 hours.
City of Tacoma Police Officer(s), including vehicle - 850 hours. ***

(August 2, 2004)
The Contracting Agency has arranged for uniformed law enforcement personnel to participate in the Contractor's traffic control activities. As stated in the last paragraph of Section 1-10.1(2), the responsibility for all traffic control shall remain with the Contractor. Uniformed law enforcement personnel may be utilized to perform the following traffic control tasks:

*** 1. Closure point enforcement for city street detours
2. Intersection flagging for city street detours
3. Highway closures for sign bridge placement and removal ***

This resource is provided at no additional cost to the Contractor. The value of this resource is assumed to be reflected in the Contractor's bid for Traffic Control. Additional agreement or price adjustment between the Contractor and the Contracting Agency for this resource shall not be necessary.

Traffic Control Management

General

(August 2, 2004)
Section 1-10.2(1) is supplemented with the following:

The Traffic Control Supervisor shall be certified by one of the following:

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

Evergreen Safety Council
401 Pontius Ave. N.
Seattle, WA 98109
1-800-521-0778 or
(206) 382-4090

Section 1-10.2(2) is supplemented with the following:

(******)
Unless specifically shown and noted on the plans, Traffic Control Plans are designed to function without the use of flaggers or spotters.

DIVISION 2

EARTHWORK

CLEARING, GRUBBING, AND ROADSIDE CLEANUP

Construction Requirements

Roadside Cleanup

Section 2-01.3(4) is supplemented with the following:

(January 5, 1998)

6. Periodic clean up, as directed by the Engineer, of the temporary park-and-ride lot site, at the Tacoma Alliance Church, for the life of the project.

REMOVAL OF STRUCTURES AND OBSTRUCTIONS

Construction Requirements

Section 2-02.3 is supplemented with the following:

(February 17, 1998)

Removal of Obstructions

Removal and disposal of the following work items shall be included in the lump sum item "Removal of Structures and Obstructions":

Union Hall Building (including concrete slab and sewer line)	4240 sq. ft.
Union Hall Storage Building (including concrete slab)	180 sq. ft.
Snake Lake Bridge No.16/20E approach slab – vic 76+00	210 sq. yds.
Snake Lake Bridge No. 16/20W approach slab – vic 76+00	90 sq. yds.
Tubular marker bases (T Line 12+50 to 13+00 Lt)	5 each
Concrete benches at Park and Ride (CTR Line 21+60 Lt and 22+23 Lt)	2 each
Glare screen paddles	520 each
Buried fence (6PL Line 10+64 Lt to 17+62 Rt)	710 lf.
Concrete Pavement Removal (Regents Blvd. Median Island) Approximate depths - 0.30 Asphalt over 0.75 Concrete)	22 sq. yds.
Strain pole and foundation (A4 Line 13+95.00 Rt)	1 each

Pole to be removed and delivered to:
Mark Jones
City of Tacoma
3401 South Orchard Street
Phone: (253) 593-7740

(March 13, 1995)

Removing Miscellaneous Traffic Items

The following miscellaneous traffic items shall be removed and disposed of:

Plastic Crosswalks

NAR/NCR	490	sq. ft.
T1	70	sq. ft.
19th/19NW	50	sq. ft.
ON/OWS	130	sq. ft.
ON/OWS	40	sq. ft.
19NW/19th	40	sq. ft.
ON/OSE	50	sq. ft.
ON/OSE	160	sq. ft.
PWS/PNS	240	sq. ft.
PEW/PNS	120	sq. ft.
Total	1390	sq. ft.

Plastic Stop Lines

NAR/NCR	110	LF
T1	40	LF
CTR	80	LF
CTR/Mullen	110	LF
CTR/ ON	130	LF
19th/19NW	60	LF
ON/OWS	50	LF
ON/ONW	40	LF
ON/OSE	70	LF
PWS/PNS	80	LF
PEW/PNS	40	LF
Total	810	LF

(******)

Removal of Traffic Island

Traffic islands shall be removed entirely, including all curb, and surfacing and pavement materials.

(******)

Removal of Guide Posts

Guide posts shall be removed and the holes backfilled with native material and compacted.

(******)

Removal of Chain Link Fence

Chain link fence, rail and posts shall be removed and the post holes backfilled with native material and compacted.

(******)

Hazardous or Contaminated Materials

The following hazardous or contaminated material may exist at the project site:

Location	Material
Area between the A22 Line and the 6SN and 6PL Lines	Smelter Slag

The Contractor shall notify the Engineer immediately when hazardous or contaminated material is encounter.

All hazardous or contaminated material shall segregated from clean soil, and be stockpiled and managed in a manner that shall eliminate erosion and the release of contaminates through infiltration or through the air.

Samples will be taken by the Contracting Agency to determine the level of contamination. Based on the test results, the Contractor shall transport the material to an appropriate, approved disposal facility, or, if approved by the Engineer, the material may be used as backfill if placed back in the hole from which it was excavated.

Removal of Bridges, Box Culverts, and other Drainage Structures

Section 2-02.3(2) is supplemented with the following:

(June 26, 2000)
The Contractor shall remove the following portions of Bridge *** no's. 16/20W widening and 16/20E widening***, as shown in the Plans:

*** Shaded portions of existing slabs, wingwalls, crossbeams, and traffic barriers. ***

(June 26, 2000)
Plans of the existing bridge(s) are available at the Project Engineer's Office for the prospective bidder's inspection.

(June 26, 2000)
Bridge Demolition Plan
The Contractor shall submit a bridge demolition plan with working drawings and calculations to the Engineer for approval in accordance with Section 6-01.9, showing the method of removing the existing bridge(s), or portions of bridges, as specified.

The bridge demolition plan shall show support bents, bracing, guys, lifting devices, lifting attachments, the sequence of demolition and removal, the type of equipment to be used in all demolition and removal operations, the location of cranes and barges, the location of support or lifting points, and the weights of structure parts being removed. The plan shall include a crane stability analysis and crane load calculations based on the controlling crane picks of the Contractor's plan. The plan

shall detail the containment, collection, and disposal of all debris. The plan shall show all stages of demolition.

The Contractor shall not begin removal operations until receiving the Engineer's approval of the bridge demolition plan.

(June 26, 2000)
Removing Portions of Existing Concrete
Before removing the portions of the existing concrete adjacent to that which is to remain, a 3/4-inch deep saw cut, but no deeper than the existing concrete cover over the steel reinforcing bars, shall be made into the surface of the concrete to form a break line. Care shall be taken to prevent cutting the existing reinforcing steel bars which are to remain.

Care shall be taken in removing concrete to prevent overbreakage or damage to portions of the existing structure which are to remain. Concrete shall be carefully broken away from the steel reinforcing bars which extend from the existing structure. Steel reinforcing bars which extend from the existing members shall be cleaned and spliced with the steel reinforcing bars in the new members unless shown otherwise in the Plans. The Contractor shall protect traffic from falling concrete and debris, in accordance with the debris collection and containment provisions of the bridge demolition plan as approved by the Engineer.

Surfaces to which fresh concrete is to be bonded shall be rough and clean. The Contractor shall use bush-hammering and other means to roughen surfaces of the existing structure. Loose particles, dust and dirt shall be removed by vigorous brushing with wire brushes followed by a thorough washing with high pressure water jet spray. Oil or film of any sort that may reduce the bond between existing and fresh concrete shall be removed.

Use of Explosives

(June 26, 2000)
Explosives shall not be used in the demolition.

(September 8, 1997)
Removal of Pavement, Sidewalks, and Curbs
Section 2-02.3(3) is supplemented with the following:

The approximate thickness of the *** asphalt concrete *** pavement is *** 9 inches maximum ***.

(******)
Removing Drainage Structure
Existing manholes, catch basins and inlets designated for removal shall be removed in their entirety.

Measurement
Section 2-02 is supplemented with the following:

(******)

The removal of traffic island will be measured by the square yard measured at the base of the curb forming the island, with no deduction made for pedestrian cuts in the island.

Guide post removal will be measured per each for each guide post removed.

Fence removal will be measured by the linear foot for the type of fence removed.

Removing drainage structure will be measured per each for each structure removed.

(September 8, 1997)
Pavement removal will be measured by the square yard.

(October 25, 1999)
Sidewalk removal will be measured by the square yard.

(September 8, 1997)
Curb removal will be measured by the linear foot.

Payment

Section 2-02.5 is supplemented with the following:

(******)
"Removing Cement Conc. Curb and Gutter", per linear foot.

"Removing Traffic Island", per square yard.

"Removing Guide Post", per each.

"Removing Chain Link Fence", per linear foot.

"Removing Drainage Structure", per each.

"Removal of Hazardous or Contaminated Material", by force account, in accordance with Section 1-09.6.
To provide a common proposal for all bidders, the Contracting Agency has entered an amount in the proposal to become a part of the Contractor's total bid.

(September 30, 1996)
"Removing Miscellaneous Traffic Item", lump sum.

(June 26, 2000)
"Removing Portion of Existing Bridge _____", lump sum.

(September 30, 1996)
"Removing *** Asphalt Conc. *** Pavement", per square yard.

(November 3, 1999)
"Removing *** Cement Conc. *** Sidewalk", per square yard.

ROADWAY EXCAVATION AND EMBANKMENT

Construction Requirements

Disposal Of Surplus Material

Section 2-03.3(7) is supplemented with the following:

(December 6, 2004)
Contractor-Provided Disposal Site
Section 2-03.3(7)C is supplemented with the following:

All surplus excavation or other materials shall be disposed of or reused in a manner that does not degrade sensitive resources such as wellhead protection zones, surface water bodies, parks, and child-use areas. Disposing of soils of any kind directly to a topsoil manufacturer is prohibited.

(OR April 25, 2002)
Section 2-03.3 is supplemented with the following:

Earthwork Design Assumptions

The following are the Contracting Agency's roadway excavation and embankment design assumptions:

All roadway excavation material will be used to construct embankments.

Roadway excavation material may not be compactable during wet weather. If the placement of the material is critical, the Contracting Agency will consider a suspension for this item of work. The Contractor assumes all risks for placing the roadway excavation material in wet weather conditions.

A *** shrink *** factor of *** 7% *** has been applied to roadway excavation quantities to determine the available material for constructing embankments.

The conversion factor used for ***gravel *** borrow is *** 1.80 ton/c.y.***.

The earthwork quantities listed in the contract are based upon the above assumptions.

(******)

Pond Excavation

Ponds shall be excavated to the lines and grades detailed in the Plans. Excavated material shall not be used for embankment construction.

Bench Drains

If seepage is encountered during construction of cut slopes, the Engineer shall be notified immediately so a determination can be made as to whether the seepage will present a long-term problem with erosion or sloughing. If the Engineer determines that the seepage presents a problem, the Contractor shall construct bench drains in accordance with the detail in the Plans.

Measurement

The first sentence of the first paragraph of Section 2-03.4 is revised to read as follows:

(******)
"Roadway Excavation", "Roadway Excavation Incl. Haul", "Roadway Excavation - Area ____", "Roadway Excavation Incl. Haul – Area ____", "Unsuitable Foundation Excavation", "Common Borrow Incl. Haul, and "Pond Excavation Incl. Haul", will be measured by the cubic yard.

Section 2-03.4 is supplemented with the following:

(March 13, 1995)
Only one determination of the original ground elevation will be made on this project. Measurement for roadway excavation and embankment will be based on the original ground elevations recorded previous to the award of this contract.

If discrepancies are discovered in the ground elevations which will materially affect the quantities of earthwork, the original computations of earthwork quantities will be adjusted accordingly.

Earthwork quantities will be computed, either manually or by means of electronic data processing equipment, by use of the average end area method or by the finite element analysis method utilizing digital terrain modeling techniques.

Copies of the ground cross-section notes will be available for the bidder's inspection, before the opening of bids, at the Project Engineer's office and at the Region office.

Upon award of the contract, copies of the original ground cross-sections will be furnished to the successful bidder on request to the Project Engineer.

Payment

Section 2-03.5 is supplemented with the following:

(******)
"Pond Excavation Incl. Haul", per cubic yard.
The unit contract price per cubic yard for "Pond Excavation Incl. Haul" shall be full pay for excavating, shaping, and compacting the area, and disposing of the excavated material.

(******)
"Force Account Bench Drain", by force account as provided in Section 1-09.6.
To provide a common proposal for all bidders, the Contracting Agency has entered an amount in the proposal to become a part of the Contractor's total bid.

STRUCTURE EXCAVATION

Construction Requirements

General Requirements

Removal of Unstable Base Material

Section 2-09.3(1)C is supplemented with the following:

(******)

A22 Wall 6

The Contractor shall excavate below grade and replace the unstable material with lean concrete.

Lean concrete shall meet the requirements of Section 6-02.3(2)D.

Construction Requirements, Structure Excavation, Class A

Excavation Using Open Pits – Extra Excavation

Section 2-09.3(3)B is supplemented with the following:

(BSP October 13, 2003)

Extra excavation and open pit excavation, as defined in this section, will not be allowed at the following location(s):

*** <u>19th St. Pedestrian Tunnel</u>
Between Stages 1 and 2

<u>Bridge No. 16/20E and 16/20 W</u>
Between end piers of existing bridges No. 16/20E and No. 16/20W.

<u>Bridge No. 16/24E</u>
Between end piers of bridge No. 16/24E and existing bridge No. 16/24W.

<u>Bridge No. 16/30E</u>
Between end piers of bridge No. 16/30E and existing bridge No. 16/30W.

<u>Bridge No. 16/31E</u>
Between end piers of bridge No. 16/31E and existing bridge No. 16/30W.

Along both of the long sides of Piers 2 and 3 footings.

<u>Center Street Flyover Ramp</u>
Pier 2 footing.

<u>A22 Wall 6</u>
At the location detailed in the Plans.

<u>MLN Wall 2</u>
At the location detailed in the Plans

<u>Vortex Water Enhancement System</u>
At the location detailed in the Plans***

The Contractor shall shore excavations at the locations specified above in accordance with Section 2-09.3(3)D. The Contractor shall submit shoring plans to the Engineer for approval in accordance with Section 2-09.3(3)D.

(March 13, 1995)

If unsatisfactory foundation material, as determined by the Engineer, is encountered for placing bridge footings, the foundation material shall be excavated

below the footing, and the unsatisfactory material replaced with gravel backfill for foundation Class A, or lean concrete, except, when the maximum design soil pressure is greater than five tons per square foot, lean concrete only shall be used for replacing the unsatisfactory material.

Lean concrete is defined as an approved aggregate and cement mixture which possesses a minimum compressive strength of 2,000 pounds per square inch at 28 days.

The unsatisfactory material shall be removed to a maximum of 3 feet below the bottom of the footing elevation, unless the Engineer directs the Contractor to excavate deeper. Excavations greater than 3 feet below the bottom of the footing may require redesign of the footings and columns, for which the Engineer will furnish revised plans.

Shoring And Cofferdams

Section 2-09.3(3)D is supplemented with the following:

(March 13, 1995)
The Contractor shall protect the existing pavement from damage due to the Contractor's operations and shall shore all excavation adjacent to the existing pavement.

DIVISION 5
SURFACE TREATMENTS AND PAVEMENTS

HOT MIX ASPHALT

Materials

Construction Requirements

Hot Mix Asphalt Pavers

Section 5-04.3(3) is supplemented with the following:

Material Transfer Device/Vehicle
For any course of hot mix asphalt (HMA) used in traffic lanes with a depth of 0.08 feet or greater the direct transfer of the HMA from the hauling equipment to the paving machine will not be allowed. A material transfer device or vehicle (MTD/V) shall be used to deliver the HMA from the hauling equipment to the paving machine.

The MTD/V shall mix the HMA after delivery by the hauling equipment but prior to laydown by the paving machine. Mixing of the HMA shall be sufficient to obtain a uniform temperature throughout the mixture. If a windrow elevator is used, the length of the windrow may be limited in urban areas or through intersections, at the discretion of the Engineer.

Acceptance Sampling and Testing - HMA Mixture

(April 5, 2004)
Section 5-04.3(8)A is revised as follows:

The first paragraph of item 3 subsection C is revised to read:

The Engineer will furnish the Contractor with a copy of the results of all acceptance testing performed in the field within either 24 hours of sampling or four hours after the beginning of the next paving shift, whichever is later. The Engineer will also provide the Composite Pay Factor (CPF) of the completed sublots after three sublots have been produced. The CPF will be provided by the end of the workday in which the results of the acceptance testing are provided.

The first sentence in the second paragraph of item 3 subsection C is revised to read:

Sublot sample test results (gradation, asphalt binder content, VMA and Va) may be challenged by the Contractor.

The third paragraph of item 3 subsection C is revised to read:

The results of the challenge sample will be compared to the original results of the acceptance sample test and evaluated according to the following criteria:

	Deviation
U.S. No. 4 sieve and larger	Percent passing ±4.0
U.S. No. 8 sieve	Percent passing ±2.0
U.S. No. 200 sieve	Percent passing ±0.4
Asphalt binder %	Percent binder content ±0.3
VMA %	Percent VMA ±1.5
Va %	Percent Va ±0.7

The last sentence of item 3 subsection E is revised to read:

The calculation of the CPF in a test section with a mix design that did not verify will include gradation, asphalt binder content, VMA and Va.

Pavement Repair

Section 5-04.3(5)E is supplemented with the following:

(OR January 1, 1999)
The minimum excavation depth for pavement repair is *** 0.50 *** feet.

Planing Bituminous Pavement

Section 5-04.3(14) is revised as follows:

(******)
Prior to beginning the planing operations, the Contractor shall submit a method of operation to the Engineer for approval.

The completed surface after planning and prior to paving shall not vary more than ¼ inch from the lower edge of a 10 foot straightedge placed on the surface parallel or transverse to the centerline. The planed surface shall have a matted surface and the difference between the high and low of the matted surface shall not exceed ¼ inch.

If at any time during the planing operation the Engineer determines that the required surface tolerance is not being achieved, the Contractor will be required to stop planing. Planing shall not resume until the Engineer is satisfied that specification planing can be produced.

Pavement outside the horizontal and vertical limits shown in the plans damaged by the Contractor's operations, shall be repaired to the satisfaction of the Engineer, at the Contractor's expense. Delamination or raveling of the underlying pavement shall not be construed as damage due to the Contractor's operations.

The planings shall become the property of the Contractor and shall be removed from the project. The Contractor may utilize the planings in the asphalt concrete pavement as specified in Section 5-04.2. All debris resulting from the planning operations shall be completely removed from the roadway and disposed of by the Contractor to the satisfaction of the Engineer. Unless otherwise provided, the Contractor shall provide a waste site for the disposal of these materials.

Pavement repair operations, when required, shall be accomplished prior to planing.

Crack sealing operations, where required, shall be accomplished following planing, and prior to paving.

(January 5, 2004)
Transverse Joints
The full depth end of each lane of planing shall be squared off to form a uniform transverse joint. The Contractor shall construct and maintain a temporary HMA wedge in accordance with Section 5-04.3(11) across the entire width of the transverse edge when traffic is allowed on the planed surface prior to paving. The wedge shall be constructed before opening the lane to traffic. The Contractor shall remove the wedge immediately prior to paving.

(March 13, 1995)
Vertical Edge Planing
During planing of bituminous pavement in the travelled lanes, the Contractor shall coordinate the planing and paving operations such that the planed roadway surface shall not remain unpaved at the end of the work day. The Contractor shall have a contingency plan to ensure that no planed areas remain unpaved due to equipment breakdown or other emergency.

CEMENT CONCRETE PAVEMENT

Construction Requirements

Concrete Mix Design for Paving

When combined aggregate concrete gradation is used, item 3 in Section 5-05.3(1) is revised to read as follows:

(August 5, 2002)

3. Mix Design Modifications. The Contractor may initiate minor adjustments to the approved mix proportions. The combined aggregate gradation may be adjusted provided it remains with the specifications limits detailed above. The mix design will not be required to be resubmitted as long as the water cementitious ratio does not change.

   Only non-chloride accelerating admixtures that meet the requirements of Section 9-23.6 Admixture for Concrete, shall be used.

   The Contractor shall notify the Engineer in writing of any proposed modification. A new mix design will designate a new lot.

Reinforced Concrete Bridge Approach Slabs

Section 5-05.3(19) is supplemented with the following:

(March 13, 1995)

The pavement end of the approach slab shall be constructed parallel to the pavement seat for bridge(s) No. *** Center Street Flyover Ramp ***.

The pavement end of the approach slab shall be constructed normal to the roadway center line for bridge(s) No. *** 16/20W Widening, 16/20E Widening, 16/24E, 16/30E, and 16/31E ***.

(February 5, 2001)

The compression seal shall be D.S. Brown, CV-2502; Watson Bowman Acme, WA-250; ESCO, X-2500; Structural Accessories Inc., SA-2500, or approved equal.

(******)

Construction staging requires that traffic be shifted to the 16/20E structure prior to constructing the bridge approach slabs. Crushed surfacing base course and HMA shall be placed to establish grade for the temporary connection at the structure.

(******)

Joints

Section 5-05.3(8) is supplemented with the following:

Transverse joints in the cement concrete pavement median sections on the A22 Line between the Cedar Street Bridge and Union Avenue, and Union Avenue and the Snake Lake Bridges, shall be constructed to match the transverse joints in the existing roadway pavements on each side of the new pavement.

Payment

The paragraph following the item "Bridge Approach Slab", per square yard, in Section 5-05.5 is revised to read as follows:

(******)

The unit contract price per square yard for "Bridge Approach Slab" shall be full pay for providing, placing, and compacting the crushed surfacing base course, furnishing and placing Class 4000 concrete, furnishing and installing compression seal, anchors, and

reinforcing steel, removal of the temporary approach, and reshaping and compacting the base course.

DIVISION 6
STRUCTURES

GENERAL REQUIREMENTS FOR STRUCTURES

Foundation Data

Section 6-01.2 is supplemented with the following:

(June 26, 2000)
The attached log of test boring pages are reproductions of the original Log of Test Boring for the test holes shown in the Plans.

The Contractor should review the geotechnical recommendations report prepared for this project. Copies of the geotechnical recommendations report are available for review by prospective bidders at the location specified in Section 1-02.4 as supplemented in these Special Provisions.

(August 6, 2001)
The Contractor should also review the Summary of Geotechnical Conditions in the Appendix to the Special Provisions.

(BSP July 12, 2000)

Work Access

Section 6-01.5 is re-titled, and revised to read as follows:

The Contractor shall construct work access to accommodate all work within the wetted perimeter, or above the environmentally sensitive area, of *** bridge no. 16/20W widening and bridge no. 16/20E widening ***, as staked by the Engineer. The Contractor shall construct and remove the work access in accordance with all environmental regulations and permits, including those specified in Sections 1-07.5 and 1-07.6.

Submittals

The Contractor shall submit working drawings of the work access to the Engineer for review and comment.

If the Contractor chooses an access alternative using a work trestle structure, the work access submittal shall include six sets of working drawings and two sets of design calculations prepared in accordance with Section 6-01.9. The Contractor shall design the work access structure to withstand all applicable loads in accordance with accepted design codes. The Contractor shall specify the design code(s) in the design calculations and working drawings.

The Contractor shall include information with the work access submittal on the construction equipment that will use the work access. The Contractor shall specify the type and model of construction equipment to be used, and shall include equipment catalogue cuts with capacities and geometry. The Contractor shall

include anticipated wheel or track loads, axle spacings, outrigger geometry and reactions, crane pick angles and reach, and other equipment details.

(BSP July 12, 2000)
Payment
Payment will be made in accordance with Section 1-04.1 for the following bid item:

"Work Access - _____", lump sum.

SHAFTS

Description

1.01 Shafts

A. This item of work shall consist of furnishing all materials, labor, tools, equipment, services and incidentals necessary to construct the shafts in accordance with the Plans, the Standard Specifications, and the Special Provisions.

Materials

2.01 Casing

A. All permanent casing shall be of steel base metal conforming to ASTM A 36. All permanent casing shall be of ample strength to resist damage and deformation from transportation and handling, installation stresses, and all pressures and forces acting on the casing.

All temporary casing shall be a smooth wall structure of steel base metal, except where corrugated metal pipe is shown in the Plans as an acceptable alternative material. All temporary casing shall be of ample strength to resist damage and deformation from transportation and handling, installation and extraction stresses, and all pressures and forces acting on the casing. The casing shall be capable of being removed without deforming and causing damage to the completed shaft, and without disturbing the surrounding soil.

B. Permanent casing is defined as casing designed as part of the shaft structure and installed to remain in place after construction is complete. Temporary casing is defined as casing installed to facilitate shaft construction only, which is not designed as part of the shaft structure, and which shall be completely removed after shaft construction is complete, unless otherwise shown in the Plans.

C. The casing shall be watertight and clean prior to placement in the excavation.

D. The outside diameter of the casing shall not be less than the specified diameter of the shaft. The inside diameter of the casing shall not be greater than the specified diameter of the shaft plus six inches, except as otherwise noted in subsection 3.03.C for temporary telescoping casing.

E. Where the minimum thickness of the casing is specified in the Plans, it is specified to satisfy structural design requirements only. The Contractor shall increase the casing thickness as necessary to satisfy the requirements of item A of this section.

2.02 Reinforcing Steel

A. Reinforcing steel used in the construction of shafts shall conform to Section 9-07.

2.03 Concrete

A. Concrete used in the construction of shafts shall be Class 4000P conforming to Section 6-02.

B. When shafts are constructed in water, the concrete used for the casing shoring seal shall be Class 4000W conforming to Section 6-02.

2.04 Slurry

Slurry, if used, shall conform to one of the following:

A. Mineral Slurry

1. Mineral slurry shall conform to the following requirements:

Property	Test	Requirement
Density (pcf)	Mud Weight (Density) API 13B-1, Section 1	64.3* to 75*
Viscosity (seconds/quart)	Marsh Funnel and Cup API 13b-1, Section 2.2	26 to 50
PH	Glass Electrode, pH Meter, or pH Paper	8 to 11
Sand Content (percent)	Sand API 13B-1, Section 5	
-prior to final cleaning		4.0 max.
-immediately prior to placing concrete		4.0 max.

*When approved by the Engineer, slurry may be used in salt water, and the allowable densities may be increased up to 2 pcf.

Slurry temperature shall be at least 40F when tested.

B. Synthetic Slurries

1. Synthetic slurries shall be used in conformance with the manufacturer's recommendations, the quality control plan specified in subsection 3.02.B.5, and these Special Provisions. The following synthetic slurries may be used:

Product	Manufacturer
ShorePac GCV	CETCO 1500 West Shure Drive Arlington Heights, IL 60004
SlurryPro CDP	KB International, LLC Suite 216, 735 Broad Street Chattanooga, TN 37402
Super Mud*	PDS Company 8140 East Rosecrans Ave. Paramount, CA 90723

*Approval as a product applies to the liquid product only.

Other synthetic slurry products may be approved for use provided the product meets the acceptance criteria established by WSDOT, including status as an approved synthetic slurry with the California Department of Transportation (Caltrans).

2. The sand content of synthetic slurry prior to final cleaning and immediately prior to placing concrete shall be less than 2.0 percent, in accordance with API 13B-1, Section 5.

C. Water Slurry (with or without site soils)

1. Water with or without site soils may be used as slurry when casing is used for the entire length of the drilled hole. Use of water slurry without full length casing may only be used with the approval of the Engineer.

2. Water slurry shall conform to the following requirements:

Property	Test	Requirement
Density (pcf)	Mud Weight (Density) API 13B-1, Section 1	70* max.
Sand Content (percent)	Sand API 13B-1, Section 5	4.0 max.

*When approved by the Engineer, slurry may be used in salt water, and the allowable densities may be increased up to 2 pcf.

Slurry temperature shall be at least 40F when tested.

2.05 Access Tubes for Crosshole Sonic Log Testing

A. Access tubes for crosshole sonic log testing shall be steel pipe of 0.145 inches minimum wall thickness and at least 1-1/2 inch inside diameter.

B. The access tubes shall have a round, regular inside diameter free of defects and obstructions, including all pipe joints, in order to permit the free, unobstructed

passage of 1.3 inch maximum diameter source and receiver probes used for the crosshole sonic log tests. The access tubes shall be watertight, free from corrosion with clean internal and external faces to ensure good bond between the concrete and the access tubes. The access tubes shall be fitted with watertight caps on the bottom and the top.

2.06 Grout

A. Grout for filling the access tubes at the completion of the crosshole sonic log tests shall be a neat cement grout with a maximum water/cement ratio of 0.45.

Construction Requirements

3.01 Quality Assurance

A. Shaft Construction Tolerances

1. Shafts shall be constructed so that the center at the top of the shaft is within the following horizontal tolerances:

Shaft Diameter	Tolerance
Less than or equal to 2'-0"	3"
Greater than 2'-0" and less than 5'-0"	4"
5'-0" or larger	6"

2. Shafts shall be within 1.5 percent of plumb. For rock excavation, allowable tolerance can be increased to 2 percent max.

3. During drilling or excavation of the shaft, the Contractor shall make frequent checks on the plumbness, alignment, and dimensions of the shaft. Any deviation exceeding the allowable tolerances shall be corrected with a procedure approved by the Engineer.

4. Shaft steel reinforcing bar placement tolerances shall conform to Section 6-02.3(24)C.

B. Nondestructive Testing of Shafts

1. Unless otherwise specified in this Special Provision, the Contracting Agency will perform crosshole sonic log testing of specific shafts, except for those constructed completely in the dry, selected in accordance with subsection 3.09.A of this Special Provision. The Contractor shall accommodate the crosshole sonic log testing by furnishing and installing access tubes in accordance with subsection 3.06.A of this Special Provision.

C. Shaft Preconstruction Conference

1. A shaft preconstruction conference shall be held at least five working days prior to the Contractor beginning any shaft construction work at the site to discuss construction procedures, personnel, and equipment to be used, and other elements of the approved shaft installation plan as specified in subsection 3.02.B of this Special Provision. The list of materials specified in

the Record of Materials (ROM) form for this item of work will also be discussed. Those attending shall include:

a. (representing the Contractor) The superintendent, on site supervisors, and all foremen in charge of excavating the shaft, placing the casing and slurry as applicable, placing the steel reinforcing bars, and placing the concrete. If synthetic slurry is used to construct the shafts, either a slurry manufacturer's representative or a Contractor's employee trained in the use of the synthetic slurry, as approved by the Engineer in accordance with subsection 3.02.C of this Special Provision, shall also attend.

b. (representing the Contracting Agency) The Project Engineer, key inspection personnel, and representatives from the WSDOT Construction Office and Materials Laboratory Geotechnical Branch.

2. If the Contractor's key personnel change, or if the Contractor proposes a significant revision of the approved shaft installation plan, an additional conference shall be held before any additional shaft construction operations are performed.

3.02 Submittals

A. Construction Experience

1. Prior to the start of drilled shaft construction, the Contractor shall submit four copies of a project reference list to the Engineer for approval verifying the successful completion by the Contractor of at least three separate foundation projects with drilled shafts of diameters, depths, and ground conditions equal to or larger than those shown in the Plans. A brief description of each project and the owner's contact person's name and current phone number shall be included for each project listed.

2. Prior to the start of drilled shaft construction, the Contractor shall submit four copies of a list identifying the on-site supervisors, and drill rig operators assigned to the project to the Engineer for approval. The list shall contain a detailed summary of each individual's experience in shaft excavation operations, and placement of assembled steel reinforcing bar cages and concrete in shafts.

a. On-site supervisors shall have a minimum two years experience in supervising construction of drilled shaft foundations of similar size (diameter and depth) and scope to those shown in the Plans, and similar geotechnical conditions to those described in the geotechnical report and the summary of geotechnical conditions. The work experience shall be direct supervisory responsibility for the on-site shaft construction operations. Project management level positions indirectly supervising on-site shaft construction operations is not acceptable for this experience requirement.

b. Drill rig operators shall have a minimum one year experience in construction of drilled shaft foundations.

3. The Engineer will approve or reject the Contractor's qualifications and field personnel within 10 working days after receipt of the submission. Work shall not be started on any drilled shaft until the Contractor's qualifications and field personnel are approved by the Engineer. The Engineer may suspend the drilled shaft construction if the Contractor substitutes unqualified personnel. The Contractor shall be fully liable for the additional costs resulting from the suspension of work and no adjustments in contract time resulting from the suspension of work will be allowed.

B. Shaft Installation Plan

The Contractor shall submit four copies of a shaft installation narrative for approval by the Engineer. In preparing the narrative, the Contractor shall reference the available subsurface data provided in the contract test hole boring logs, the Summary of Geotechnical Conditions provided in the Appendix to the Special Provisions, and the geotechnical report(s) prepared for this project. This narrative shall provide at least the following information:

1. An overall construction operation sequence and the sequence of drilled shaft construction.

2. List, description and capacities of proposed equipment, including but not limited to cranes, drills, auger, bailing buckets, final cleaning equipment and drilling unit. The narrative shall describe why the equipment was selected, and describe equipment suitability to the anticipated site and subsurface conditions. The narrative shall include a project history of the drilling equipment demonstrating the successful use of the equipment on shafts of equal or greater size in similar soil/rock conditions.

3. Details of shaft excavation methods, including proposed drilling methods, methods for cleanout of the shafts and a disposal plan for excavated material and drilling slurry (if applicable). This shall include a review of method suitability to the anticipated site and subsurface conditions.

4. Details of the method(s) to be used to ensure shaft stability (i.e., prevention of caving, bottom heave, etc. using temporary casing, slurry, or other means) during excavation and concrete placement. This shall include a review of method suitability to the anticipated site and subsurface conditions. If casings are proposed or required, casing dimensions and detailed procedures for permanent casing installation, temporary casing installation and removal, and methods of advancing temporary and permanent casing with the excavation in accordance with subsection 3.03.B of this Special Provision, shall be provided.

5. Detailed procedures for mixing, using, maintaining, and disposing of the slurry shall be provided. A detailed mix design (including all additives and their specific purpose in the slurry mix), and a discussion of its suitability to the anticipated subsurface conditions, shall also be provided for the proposed slurry.

The submittal shall include a detailed plan for quality control of the selected slurry, including tests to be performed, test methods to be used, and minimum and/or maximum property requirements which must be met to ensure that the slurry functions as intended, considering the anticipated subsurface conditions and shaft construction methods, in accordance with the slurry manufacturer's recommendations and these Special Provisions. As a minimum, the slurry quality control plan shall include the following tests:

Property	Test Method
Density	Mud Weight (Density), API 13B-1, Section 1
Viscosity	Marsh Funnel and Cup, API 13B-1, Section 2.2
pH	Glass Electrode, pH Meter, or pH Paper
Sand Content	Sand, API 13B-1, Section 5

6. The method used to fill or eliminate all voids below the top of shaft between the plan shaft diameter and excavated shaft diameter, or between the shaft casing and surrounding soil, if permanent casing is specified.

7. Reinforcing steel shop drawings, details of reinforcement placement, including bracing, centering, and lifting methods, and the method to assure the reinforcing cage position is maintained during construction.

8. Details of the methods used to construct the column, and the portion of the shaft above the upper construction joint and below existing ground.

9. Details of concrete placement, including proposed operational procedures for pumping and/or tremie methods.

10. The method to be used to form an emergency horizontal construction joint during concrete placement.

11. Details of the device used to prevent unauthorized entry into a shaft excavation.

12. Description of the material used to temporarily backfill a shaft excavation during a stoppage of the excavation operation, as well as the method used to place and remove the material.

13. When shafts are constructed in water, the submittal shall include seal thickness calculations, seal placement procedure, and descriptions of provisions for casing shoring dewatering and flooding.

The Engineer will evaluate the shaft installation plan for conformance with the Plans, Specifications and Special Provisions, within the review time specified in Section 6-01.9. At the option of the Contracting Agency, a Shaft Installation Plan Submittal Meeting may be scheduled following review of the Contractor's initial submittal of the plan. Those attending the Shaft Installation Plan Submittal Meeting, if held, shall include the following:

a. (representing the Contractor) The superintendent, on-site supervisors, and other Contractor personnel involved in the preparation of the shaft installation plan.

b. (representing the Contracting Agency) The Project Engineer, and Contracting Agency personnel involved with the structural, geotechnical, and construction review of the shaft installation plan. For WSDOT administered projects, this includes representatives of the Bridge and Structures Office, Materials Laboratory Geotechnical Services Branch, and Construction Office.

C. Synthetic Slurry Technical Assistance

1. If synthetic slurry is used to construct the shafts, the Contractor shall provide or arrange for technical assistance in the use of the synthetic slurry as specified in subsection 3.04.A.1 of this Special Provision. The Contractor shall submit four copies of one of the following to the Engineer for approval:

a. The name and current phone number of the synthetic slurry manufacturer's technical representative assigned to the project.

b. The name(s) of the Contractor's personnel assigned to the project and trained by the synthetic slurry manufacturer in the proper use of the synthetic slurry. The submittal shall include a signed training certification letter from the synthetic slurry manufacturer for each trained Contractor's employee listed, including the date of the training.

D. Work shall not begin until all the required submittals have been approved in writing by the Engineer. All procedural approvals given by the Engineer will be subject to trial in the field and shall not relieve the Contractor of the responsibility to satisfactorily complete the work.

3.03 Shaft Excavation

A. Shafts shall be excavated to the required depth as shown in the Plans or as directed by the Engineer. Once the excavation operation has been started, the excavation shall be conducted in a continuous operation until the excavation of the shaft is completed, except for pauses and stops as noted, using approved equipment capable of excavating through the type of material expected. Pauses during this excavation operation, except for casing splicing and removal of obstructions, are not allowed. The Contractor shall provide temporary casing at the site in sufficient quantities to meet the needs of the anticipated construction method.

Pauses, defined as momentary interruptions of the excavation operation, will be allowed only for casing splicing and removal of obstructions. Shaft excavation operation interruptions not conforming to this definition shall be considered stops.

If the shaft excavation is not complete at the end of the shift or series of continuous shifts, the shaft excavation operation may be stopped, provided the following conditions are met. The Contractor shall, before the end of the work day, either install casing in the hole to the depth of the excavation and either the Plan diameter of the shaft or the actual excavated diameter of the hole, whichever is greater, or backfill the hole with material approved by the Engineer in accordance with subsection 3.02.B.12 of this Special Provision. The Contractor shall backfill the hole to the ground surface, if the excavation is not cased, or to a minimum of five feet above the bottom of casing, if the excavation is cased. Backfilling of shafts with casing fully seated into rock, as determined by the Engineer, will not be required. If slurry is present in the shaft excavation, the Contractor shall conform to the requirements of subsection 3.04.B of this Special Provision regarding the maintenance of the minimum level of drilling slurry throughout the stoppage of the shaft excavation operation, and shall recondition the slurry to the required slurry properties in accordance with subsection 3.04 prior to recommencing shaft excavation operations.

B. The Contractor shall furnish and install casings as follows:

Wall Name or Bridge No.	Wall Station or Bridge Pier Number	Casing Type	Elev. Of Bottom of Required Casing (ft)	Upper And Lower Elevation Limits for Concurrent Casing Placement with Excavation
***16/20W	Piers 2, 3	Permanent	290.85	
	Pier 4	Permanent	292.95	
	Pier 2	Temporary	273.00	
	Pier 3	Temporary	285.00	
16/20E	Piers 2, 3	Permanent	290.85	
	Pier 4	Permanent	292.95	
	Pier 2	Temporary	279.00	
	Pier 3	Temporary	285.00	
16/30E	Piers 1, 4	Temporary	320.00	
	Piers 2, 3	Permanent	320.00	***

When installing required temporary or required permanent casings between the upper and lower elevation limits specified above, the casing shall be advanced prior to or concurrently with the excavation. Excavation in advance of the casing tip shall not exceed ***2*** feet.

C. Where the acceleration coefficient used for seismic design of the structure, as specified in the General Notes of the structure Plans, is less than or equal to 0.10, the Contractor may use temporary telescoping casing for the shafts, subject to the following conditions:

1. The Contractor shall submit the request to use temporary telescoping casing to the Engineer for approval. The request shall specify the diameters of the temporary telescoping casing, and shall specify the shafts where use is requested. The Contractor shall not proceed with the use of temporary telescoping casing until receiving the Engineer's approval.

2. The minimum diameter of the shaft shall be as shown in the Plans.

3. The temporary telescoping casing shall conform to subsections 2.01.A, 2.01.B, 2.01.C, and 2.01.E of this Special Provision.

D. The Contractor shall conduct casing installation and removal operations and shaft excavation operations such that the adjacent soil outside the casing and shaft excavation for the full height of the shaft is not disturbed. Disturbed soil is defined as soil whose geotechnical properties have been changed from those of the original in-situ soil, and whose altered condition adversely affects the structural integrity of the shaft foundation.

E. Shaft excavations shall not be left open overnight unless cased full depth. An open shaft excavation is defined as a shaft excavation that has not been filled with concrete, or temporarily backfilled with a material approved by the Engineer in accordance with subsection 3.02.B.12 of this Special Provision.

F. The Contractor shall use appropriate means such as a cleanout bucket or air lift to clean the bottom of the excavation of all shafts. No more than 2 inches of loose or disturbed material shall be present at the bottom of the shaft just prior to placing concrete for end bearing shafts. No more than 6 inches of loose or disturbed material shall be present for side friction shafts. End bearing shafts shall be assumed unless otherwise noted in the Contract. Shafts specified as both side friction and end bearing shall conform to the sloughing criteria specified for end bearing shafts.

G. The excavated shaft shall be inspected and approved by the Engineer prior to proceeding with construction. The bottom of the excavated shaft shall be sounded with an airlift pipe, a tape with a heavy weight attached to the end of the tape, or other means acceptable to the Engineer to determine that the shaft bottom meets the requirements in the Contract.

H. When obstructions are encountered, the Contractor shall notify the Engineer promptly. An obstruction is defined as a specific object (including, but not limited to, boulders, logs, and man made objects) encountered during the shaft excavation operation which prevents or hinders the advance of the shaft excavation. When efforts to advance past the obstruction to the design shaft tip elevation result in the rate of advance of the shaft drilling equipment being significantly reduced relative to the rate of advance for the rest of the shaft excavation, then the Contractor shall remove the obstruction under the provisions of subsection 5.01.B of this Special Provision. The method of removal of such obstructions, and the continuation of excavation shall be as proposed by the Contractor and approved by the Engineer.

I. When permanent casing is specified, excavation shall conform to the specified outside diameter of the shaft. After the casing has been filled with concrete, all

void space occurring between the casing and shaft excavation shall be filled with a material which approximates the geotechnical properties of the in-situ soils, in accordance with the shaft installation plan specified in subsection 3.02.B.6 of this Special Provision and as approved by the Engineer.

J. Drilling equipment shall not be operated from an existing bridge, except as otherwise noted. If necessary and safe to do so, and if the Contractor submits a written request to the Engineer in accordance with Section 6-01.6, the Engineer may approve the operation of drilling equipment on a bridge.

K. When shafts are constructed in water, the Contractor shall construct a seal between the casing shoring and the upper portion of the permanent casing for the shaft as shown in the Plans, in accordance with the shaft installation plan specified in subsection 3.02.B.13 of this Special Provision, and as approved by the Engineer.

The seal thickness shown in the Plans is designed to resist the hydrostatic uplift force with the corresponding seal weight and adhesion of the seal to the permanent casing and the casing shoring of 20 psi, based on the casing shoring dimension and the seal vent water surface elevation specified in the Plans. If the Contractor uses a casing shoring diameter other than that specified in the Plans, the Contractor shall submit a revised seal design to the Engineer for approval in accordance with subsection 3.02.B.13 of this Special Provision.

If, in the opinion of the Engineer, water conditions at the time of construction allow the seal vent water surface elevation to be lowered, the Contractor may revise the casing shoring seal by submitting a revised seal design to the Engineer for approval in accordance with subsection 3.02.B.13 of this Special Provision.

3.04 Slurry Installation Requirements

A. Synthetic Slurry Technical Assistance

1. If synthetic slurry is used, either a manufacturer's representative or a Contractor's employee trained in the use of the synthetic slurry, as approved by the Engineer in accordance with subsection 3.02.C of this Special Provision, shall provide technical assistance for the use of the synthetic slurry, shall be at the site prior to introduction of the synthetic slurry into a drilled hole, and shall remain at the site during the construction and completion of a minimum of one shaft to adjust the slurry mix to the specific site conditions.

B. Minimum Level of Slurry in the Excavation

1. If the Contractor uses slurry in shafts installed below groundwater and in caving or sloughing soils, the slurry level in the excavation shall be maintained above the groundwater level the greater of the following dimensions, except as otherwise noted in subsection 3.04.B.3:

a. not less than five feet for mineral slurries, and not less than ten feet for synthetic and water slurries,

b. one shaft diameter,

c. dimension as required to provide and maintain a stable hole.

The Contractor shall provide casing, or other means, as necessary to meet these requirements.

2. The slurry level shall be maintained above all unstable zones a sufficient distance to prevent bottom heave, caving or sloughing of those zones.

3. Throughout all stops in shaft excavation operations, as specified in subsection 3.03.A, the Contractor shall monitor and maintain the slurry level in the excavation the greater of the following elevations:

a. no lower than the water level elevation outside the shaft,

b. elevation as required to provide and maintain a stable hole.

C. Slurry Sampling and Testing

1. Mineral slurry and synthetic slurry shall be mixed and thoroughly hydrated in slurry tanks, ponds, or storage areas. The Contractor shall draw sample sets from the slurry storage facility and test the samples for conformance with the appropriate specified material properties before beginning slurry placement in the drilled hole. Mineral slurry shall conform to the material specifications in subsection 2.04.A of this Special Provision. Synthetic slurry shall conform to the quality control plan included in the shaft installation plan in accordance with subsection 3.02.B.5 of this Special Provision and as approved by the Engineer. A sample set shall be composed of samples taken at mid-height and within two feet of the bottom of the storage area.

2. The Contractor shall sample and test all slurry in the presence of the Engineer, unless otherwise directed. The date, time, names of the persons sampling and testing the slurry, and the results of the tests shall be recorded. A copy of the recorded slurry test results shall be submitted to the Engineer at the completion of each shaft, and during construction of each shaft when requested by the Engineer.

3. Sample sets of all slurry, composed of samples taken at mid-height and within two feet of the bottom of the shaft, shall be taken and tested during drilling as necessary to verify the control of the properties of the slurry. As a minimum, sample sets of synthetic slurry shall be taken and tested at least once every four hours after beginning its use during each shift. Sample sets of all slurry shall be taken and tested at least once every two hours if the slurry is not recirculated in the drilled hole or if the previous sample set did not have consistent specified properties. All slurry shall be recirculated, or agitated with the drilling equipment, when tests show that the sample sets do not have consistent specified properties.

4. Sample sets of all slurry, as specified, shall be taken and tested prior to final cleaning of the bottom of the hole and again just prior to placing concrete. Cleaning of the bottom of the hole and placement of the concrete shall not start until tests show that the samples taken at mid-height and within two feet of the bottom of the hole have consistent specified properties.

D. The Contractor shall clean, recirculate, de-sand, or replace the slurry to maintain the required slurry properties.

E. The Contractor shall demonstrate to the satisfaction of the Engineer that stable conditions are being maintained. If the Engineer determines that stable conditions are not being maintained, the Contractor shall immediately take action to stabilize the shaft. The Contractor shall submit a revised shaft installation plan which addresses the problem and prevents future instability. The Contractor shall not continue with shaft construction until the damage which has already occurred is repaired in accordance with the specifications, and until receiving the Engineer's approval of the revised shaft installation plan.

3.05 Assembly And Placement Of Reinforcing Steel

A. The reinforcing cage shall be rigidly braced to retain its configuration during handling and construction. Individual or loose bars will not be permitted. The Contractor shall show bracing and any extra reinforcing steel required for fabrication of the cage on the shop drawings.

B. The reinforcement shall be carefully positioned and securely fastened to provide the minimum clearances listed below, and to ensure that no displacement of the reinforcing steel bars occurs during placement of the concrete. The steel reinforcing bars shall be securely held in position throughout the concrete placement operation. The Contractor shall submit details of the proposed reinforcing cage spacers along with the shop drawings. The reinforcing steel spacers at each longitudinal placement plane shall be placed at least at the quarter points around the circumference of the steel reinforcing bar cage, and at a maximum longitudinal spacing of either 2.5 times the shaft diameter or 20'-0", whichever is less.

C. Place bars as shown in the contract plans with minimum concrete cover as shown in the table below.

Shaft Diameter	Minimum Concrete Cover
Less than or equal to 3'-0"	3"
Greater than 3'-0" and less than 5'-0"	4"
5'-0" or larger	6"

D. Shaft excavation shall not be started until the Contractor has received approval from the Engineer for the reinforcing steel spacers required when the casing is to be pulled during concrete placement.

3.06 Access Tubes for Crosshole Sonic Log Testing

A. The Contractor shall install access tubes for crosshole sonic log testing in all drilled shafts, except as otherwise noted, to permit access for the crosshole sonic log test probes. If, in the opinion of the Engineer, the condition of the shaft excavations permit shaft construction in the dry, the Engineer may specify that the access tubes be omitted.

B. The Contractor shall securely attach the access tubes to the interior of the reinforcement cage of the shaft. One access tube shall be furnished and installed for each foot of shaft diameter, rounded to the nearest whole number, as shown in the Plans. The number of access tubes for shaft diameters specified as "X feet 6 inches" shall be rounded up to the next higher whole number. The access tubes shall be placed around the shaft, inside the spiral or hoop reinforcement and three inches clear of the vertical reinforcement, at a uniform spacing measured along the circle passing through the centers of the access tubes. If the vertical reinforcement is not bundled and each bar is not more than one inch in diameter, the access tubes shall be placed two inches clear of the vertical reinforcement. If these minimums cannot be met due to close spacing of the vertical reinforcement, then the access tubes shall be bundled with the vertical reinforcement.

C. The access tubes shall be installed in straight alignment and as near to parallel to the vertical axis of the reinforcement cage as possible. The access tubes shall extend from the bottom of the reinforcement cage to at least two feet above the top of the shaft. Splice joints in the access tubes, if required to achieve full length access tubes, shall be watertight. The Contractor shall clear the access tubes of all debris and extraneous materials before installing the access tubes. Care shall be taken to prevent damaging the access tubes during reinforcement cage installation and concrete placement operations in the shaft excavation.

D. The access tubes shall be filled with potable water as soon as possible after concrete placement (but no later than one day after concrete placement), and the top watertight caps shall be reinstalled.

3.07 Placing Concrete

A. Concrete placement shall commence immediately after completion of excavation by the Contractor and inspection by the Engineer. Immediately prior to commencing concrete placement, the shaft excavation and the properties of the slurry (if used) shall conform to subsections 3.03.F and 3.04, respectively, of this Special Provision. Concrete placement shall continue in one operation to the top of the shaft, or as shown in the Plans. The Contractor shall place concrete between the upper construction joint of the shaft and the top of the shaft in the dry.

B. When placing concrete in the dry, only the top five feet of concrete shall be vibrated. If a temporary casing is used it shall be removed before vibration. This requirement may be waived if a temporary casing is used and removed with a vibratory hammer during the concrete placement operation. Vibration of the top five feet of concrete does not affect the maximum slump allowed for the concrete class specified.

C. If water is not present, the concrete shall be deposited through the center of the reinforcement cage by a method which prevents segregation of aggregates and splashing of concrete on the reinforcement cage. The concrete shall be placed such that the free-fall is vertical down the center of the shaft without hitting the sides, the steel reinforcing bars, or the steel reinforcing bar cage bracing.

D. When placing concrete underwater, the Contractor shall use a concrete pump or tremie. A tremie shall have a hopper at the top that empties into watertight tube at least 8 inches in diameter. If a pump is used, a watertight tube shall be used with a

minimum diameter of 4 inches. The discharge end of the tube on the tremie or concrete pump shall include a device to seal out water while the tube is first filled with concrete.

E. Throughout the underwater concrete placement operation, the discharge end of the tube shall remain submerged in the concrete at least 5 feet and the tube shall always contain enough concrete to prevent water from entering. The concrete placement shall be continuous until the work is completed, resulting in a seamless, uniform shaft. If the concrete placement operation is interrupted, the Engineer may require the Contractor to prove by core drilling or other tests that the shaft contains no voids or horizontal joints. If testing reveals voids or joints, the Contractor shall repair them or replace the shaft at no expense to the Contracting Agency. Responsibility for coring costs, and calculation of time extension, shall be in accordance with subsection 3.09.H.

F. Before placing any fresh concrete against concrete deposited in water or slurry, the Contractor shall remove all scum, laitance, loose gravel and sediment on the upper surface of the concrete deposited in water or slurry and chip off any high spots on the upper surface of the existing concrete that would prevent the steel reinforcing bar cage from being placed in the position required by the Plans.

G. The Contractor's construction operation in the vicinity of a drilled shaft excavation with freshly placed concrete and curing concrete are subject to the following restrictions:

1. The Contractor shall not drive piling within the distance specified and calculated in accordance with Section 6-05.3(11)H.

2. The Contractor shall not advance a casing, or perform rock drilling, within four shaft diameters or 30 feet of the centerline of the concreted shaft, whichever is greater, during the time period between six hours after beginning concrete placement operations and eight days after completing concrete placement operations, except after satisfying one of the following conditions:

a. The compressive strength of the concrete in the concreted shaft shall have reached 3,000 psi. The Contractor shall obtain and test concrete test cylinders for this early concrete strength measurement in accordance with Section 6-02.3(17)O.

b. The Contractor shall implement a shaft vibration monitoring plan as follows:

1. The Contractor shall submit a shaft vibration monitoring plan to the Engineer for approval, including a description of the monitoring equipment, and the installation and monitoring procedure.

2. The Contractor shall furnish and install monitoring equipment in accordance with the shaft vibration monitoring plan as approved by the Engineer. The Contractor shall locate the monitoring sensor at the

concreted shaft and on a line between the concreted shaft and the construction operation within the specified boundary causing the vibration. The monitoring equipment shall be sensitive enough to detect a Peak Particle velocity of 1/4 inch per second.

3. The Contractor shall cease all construction operations within the specified boundary when monitoring equipment detects Peak Particle velocities exceeding the following values:

Concrete Age	Peak Particle Velocity
6 hours to 72 hours	1/4 inches per second
72 hours to 8 days	2 inches per second

4. The Contractor shall furnish, install, and operate the monitoring equipment at no additional expense to the Contracting Agency.

3.08 Casing Removal

A. As the temporary casing is withdrawn, a minimum 5 foot head of concrete shall be maintained to balance the foundation material and water pressure at the bottom of the casing.

B. Tops of permanent casings for the shafts shall be removed to the top of the shaft or finished groundline, whichever is lower, unless directed otherwise by the Engineer. For those shafts constructed within a permanent body of water, tops of permanent casings for shafts shall be removed to the low water elevation, unless directed otherwise by the Engineer.

C. The Contractor shall completely remove all temporary casings, except as noted. The Contractor may leave some or all of the temporary casing in place provided all the following conditions are satisfied:

1. The Contractor shall submit the following information in writing to the Engineer:

a. The Contractor shall completely describe the portion of the temporary casing to remain.

b. The Contractor shall specify the reason(s) for leaving the portion of the temporary casing in place.

c. The Contractor shall submit structural calculations, using the design specifications and design criteria specified in the General Notes of the structure Plans, in accordance with Section 6-01.9, indicating that leaving the temporary casing in place is compatible with the structure as designed in the Plans.

2. The Contractor shall have received the Engineer's written approval of the submitted request to leave the temporary casing in place.

3.09 Nondestructive Testing of Shafts (Crosshole Sonic Log Testing)

A. The Contracting Agency will perform crosshole sonic log testing and analysis on all completed shafts designated for testing by the Engineer. The Contracting Agency will require advance notice from the Contractor to schedule all crosshole sonic log testing. The Contractor shall give at least 48 hours notice to the Engineer of the time the concrete in each shaft will be sufficiently cured to allow for crosshole sonic log testing.

The testing will be performed after the shaft concrete has cured at least 96 hours. Additional curing time prior to testing may be required if the shaft concrete contains admixtures, such as set retarding admixture or water reducing admixture, added in accordance with Section 6-02.3(3). The additional curing time prior to testing required under these circumstances shall not be grounds for additional compensation or extension of time to the Contractor in accordance with Section 1-08.8.

Crosshole sonic log testing will be conducted at all shafts in which access tubes for test probe access have been installed (see subsection 3.06.A of this Special Provision).

B. After placing the shaft concrete and before beginning the crosshole sonic log testing of a shaft, the Contractor shall inspect the access tubes. Each access tube that the test probe cannot pass through shall be replaced, at the Contractor's expense, with a two inch diameter hole cored through the concrete for the entire length of the shaft. Unless directed otherwise by the Engineer, cored holes shall be located approximately six inches inside the reinforcement and shall not damage the shaft reinforcement. Descriptions of inclusions and voids in cored holes shall be logged and a copy of the log shall be submitted to the Engineer. Findings from cored holes shall be preserved, identified as to location, and made available for inspection by the Engineer.

C. The Engineer will determine final acceptance of each shaft, based on the crosshole sonic log test results and analysis for the tested shafts, and will provide a response to the Contractor within three working days after receiving the test results and analysis submittal.

D. Except as otherwise noted, the Contractor shall not commence subsequent shaft excavations until receiving the Engineer's approval and acceptance of the first shaft, based on the results and analysis of the crosshole sonic log testing for the first shaft. The Contractor may commence subsequent shaft excavations prior to receiving the Engineer's approval and acceptance of the first shaft, provided the following condition is satisfied:

1. The Engineer approves continuing with shaft construction based on the Engineer's observations of the construction of the first shaft, including, but not limited to, conformance to the shaft installation plan as approved by the Engineer, and the Engineer's review of the Contractor's daily reports

and Inspector's daily logs concerning excavation, steel reinforcing bar placement, and concrete placement.

E. If the Contractor requests, the Engineer may direct that additional testing be performed at a shaft. If subsequent testing at a shaft indicates the presence of a defect(s) in the shaft, the testing costs and the delay costs resulting from the additional testing shall be borne by the Contractor in accordance with Section 1-05.6. If this additional testing indicates that the shaft has no defect, the testing costs and the delay costs resulting from the additional testing will be paid by the Contracting Agency in accordance with Section 1-05.6, and, if the shaft construction is on the critical path of the Contractor's schedule, a time extension equal to the delay created by the additional testing will be granted in accordance with Section 1-08.8.

F. For all shafts determined to be unacceptable, the Contractor shall submit a plan for remedial action to the Engineer for approval. All modifications to the dimensions of the shafts, as shown in the Plans, required by the remedial action plan shall be supported by calculations and working drawings as specified in Section 6-01.9. All remedial correction procedures and designs shall be submitted to the Engineer for approval. The Contractor shall not begin repair operations until receiving the Engineer's approval of the remedial action plan.

G. If the Engineer determines that the concrete placed under slurry for a given shaft is structurally inadequate, that shaft will be rejected. The placement of concrete under slurry shall be suspended until the Contractor submits to the Engineer written changes to the methods of shaft construction needed to prevent future structurally inadequate shafts, and receives the Engineer's written approval of the submittal.

H. At the Engineer's direction, a corehole shall be drilled in any questionable quality shaft (as determined from crosshole sonic log testing and analysis or by observation of the Engineer) to explore the shaft condition.

Prior to beginning coring, the Contractor shall submit the method and equipment used to drill and remove cores from shaft concrete to the Engineer and receives the Engineer's written approval. The coring method and equipment shall provide for complete core recovery and shall minimize abrasion and erosion of the core.

If a defect is confirmed, the Contractor shall pay for all coring costs in accordance with Section 1-05.6. If no defect is encountered, the Contracting Agency will pay for all coring costs in accordance with Section 1-05.6, and, if the shaft construction is on the critical path of the Contractor's schedule, compensation for the delay will be granted by an appropriate time extension in accordance with Section 1-08.8. Materials and work necessary, including engineering analysis and redesign, to effect corrections for shaft defects shall be furnished to the Engineer's satisfaction at no additional cost to the Contracting Agency.

I. All access tubes and cored holes shall be dewatered and filled with grout after tests are completed. The access tubes and cored holes shall be filled using grout tubes that extend to the bottom of the tube or hole or into the grout already placed.

Measurement

4.01 Measurement

A. Measurement will be made as follows:

1. Soil excavation for shaft including haul will be measured by the cubic yards of shaft excavated. The cubic yards will be computed using the shaft diameter shown in the Plans, the top of shaft soil excavation, as defined below, and the bottom elevation shown in the Plans, unless adjusted by the Engineer.

   Except as otherwise specified, the top of shaft soil excavation shall be defined as the highest existing ground point within the shaft diameter. For shafts where the top of shaft is above the existing ground line and where the Plans show embankment fill placed above the existing ground line to the top of shaft and above, the top of shaft soil excavation shall be defined as the top of shaft. Excavation through embankment fill placed above the top of shaft will not be included in the measurement.

2. Furnishing and placing temporary casing will be measured by the number of linear feet of required temporary casing, as specified in subsection 3.03.B of this Special Provision, installed within the limits shown in the Plans, plus additional length approved by the Engineer for temporary casing required to address field conditions as encountered.

3. Furnishing permanent casing will be measured by the number of linear feet of required permanent casing, as specified in subsection 3.03.B of this Special Provision, installed below the cutoff elevation.

4. Placing permanent casing will be measured by the number of permanent casings placed.

5. Casing shoring will be measured by the number of linear feet of casing shoring installed. The linear feet dimension will be computed using either the top of ground line, defined as the highest ground line elevation within the casing shoring, or the specified shaft seal vent elevation as shown in the Plans, whichever is higher, and the bottom elevation as shown in the Plans.

6. Concrete Class 4000P for shaft will be measured by the cubic yards of concrete in place. The cubic yards will be computed using the shaft diameter shown in the Plans, and the top and bottom elevations shown in the Plans, unless adjusted by the Engineer.

7. Steel reinforcing bar for shaft will be measured by the computed weight of all reinforcing steel in place, as shown in the Plans. Bracing for steel reinforcing bar cages shall be considered incidental to this item of work.

8. CSL access tube will be measured by the linear foot of tube furnished and installed.

Payment

5.01 Payment

A. Payment will be made, in accordance with Section 1-04.1, for the following bid items when they are included in the proposal:

1. "Soil Excavation For Shaft Including Haul", per cubic yard, including all costs in connection with furnishing, mixing, placing, maintaining, containing, collecting, and disposing of all mineral, synthetic, and water slurry.

2. "Furnishing & Placing Temp. Casing For _____ Diam. Shaft", per linear foot, including all costs in connection with completely removing the casing after completing shaft construction.

3. "Furnishing Permanent Casing For ____ Diam. Shaft", per linear foot.

4. "Placing Permanent Casing For _____ Diam. Shaft", per each.

5. "Casing Shoring", per linear foot, including all costs in connection with placing seals when required.

6. "Shoring Or Extra Excavation Cl. A - _____", lump sum, including all costs in connection with all excavation outside the limits specified for items 1 and 2, all temporary telescoping casings, and all optional temporary casings.

7. "Conc. Class 4000P For Shaft", per cubic yard.

8. "St. Reinf. Bar For Shaft", per pound.

9. "CSL Access Tube", per linear foot.

10. "Removing Obstructions", estimated.

B. Payment for Removing Obstructions

1. Payment for removing obstructions, as defined in subsection 3.03.H of this Special Provision, will be made for the changes in shaft construction methods necessary to remove the obstruction. The Contractor and the Engineer shall evaluate the effort made and reach agreement on the equipment and employees utilized, and the number of hours involved for each. Once these cost items and their duration have been agreed upon, the payment amount will be determined using the rate and markup methods specified in Section 1-09.6. For the purpose of providing a common proposal for all bidders, the Contracting Agency has entered an amount for the item "Removing Obstructions" in the bid proposal to become a part of the total bid by the Contractor.

2. If shaft construction equipment is idled as a result of the obstruction removal work and cannot be reasonably reassigned within the project, then standby payment for the idled equipment will be added to the payment calculations. If labor is idled as a result of the obstruction removal work and cannot be reasonably reassigned within the project, than all labor costs resulting from

Contractor labor agreements and established Contractor policies will be added to the payment calculations.

3. The Contractor shall perform the amount of obstruction work estimated by the Contracting Agency within the original time of the contract. The Engineer will consider a time adjustment and additional compensation for costs related to the extended duration of the shaft construction operations, provided:

   a. the dollar amount estimated by the Contracting Agency has been exceeded, and

   b. the Contractor shows that the obstruction removal work represents a delay to the completion of the project based on the current progress schedule provided in accordance with Section 1-08.3.

(******)

TRAIL MARKER

Description

This work shall consist of furnishing and installing a trail map stand, post caps, and trail markers.

Materials

Materials for the trail map stand shall be in accordance with the detail in the Plans.

The trail marker shall be fabricated from 1/4 inch copper plate. The trail markers shall be fabricated accurately to match the image shown on the Plans.

Construction Requirements

Trail Map Stand

The trail map stand shall be constructed in accordance with the details in the Plans.

Trail Markers

The silhouette and the accent line within the silhouette of the trail marker shall either be water jet or laser cut. The drawing shown on the plans is a free hand drawing and an electronic CADD file is available for use with the fabrication of the trail marker if requested by the Contractor.

The letterings "SCOTT PIERSON TRAIL" are sample only. The final lettering shall have clean corners and straight lines. The lettering font is New Roman bold.

The Contractor shall submit drawings showing the layout of the trail marker. Upon approval of the drawings, the contractor shall fabricate two samples of the trail marker for approval. The trail markers shall not have the mounting flange and shall be tapped on the backside with two 1/8-inch diameter x 1 inch threaded rods. The two samples will become the property of the State. Upon written approval from the State, the Contractor shall fabricate the trail markers with the mounting flange as shown on the Plans.

The trail marker shall be mounted to the cap on top of the posts with two 1/4 inch anti-theft fasteners. The color of the fasteners shall match the color of the post.

Measurement

The trail map stand and trail marker will be measured per each, for each marker fabricated and installed.

Payment

Payment will be made in accordance with Section 1-04.1, for the following bid item:

"Trail Map Stand", per each

"Trail Marker", per each

Post caps shall be considered incidentals to these items of work.

SILHOUETTE IMAGES

General

This item of work includes fabricating and furnishing the forms for the silhouette images as shown in Plans and these Special Provisions.

The silhouette images shall match the silhouettes shown in the Plans. The 4"x4" grid shown in the Plans are intended to show the positioning of the silhouette images on the wall, and to aid in the transfer of the images onto the formwork. The silhouettes shown in the Plans are free hand drawings, and electronic CADD files are available for use with the fabrication of the forms if requested by the Contractor.

Materials

The formliners used shall be selected from the approved manufacturers listed in the Special Provision **CONCRETE TEXTURE FINISH**.

Construction Requirements

The edge of the forms and formliners for the silhouette shall have clean and sharp edges. To facilitate the removal of forms, a 1/8-inch bevel is required on all the edges for 3/4 inch and 1-inch recesses, and a 1/4 inch bevel is required on all the edges for 1-1/2 inch recess. All cracks, holes, slits, gaps, and apertures in the forms shall be plugged and caulked with molding plaster to remain watertight and withstand the pressure of concrete placement. Forms and form ties shall be designed to permit removal without damaging the finish. Prying against the face of the concrete will not be allowed. The formwork shall be approved for use by the Engineer prior to the erection of the formwork.

Payment

All costs in connection with producing silhouette images on concrete surfaces as specified shall be included in the unit contract price per square foot for "Concrete Fascia Panel".

CONCRETE TEXTURE FINISH

Materials

All concrete texture finish shall be applied to those areas designated in the plans. The concrete texture finish effect is accomplished by the use of a formliner. Formliners that will produce the required texture shall be one of the following:

Medium Sand Blast Finish
Fitzgerald Pattern 16991 (Vac-U-Form)
1341 East Pomona Street
Santa Ana, CA 92705
Phone: (714) 547-6710

Round Stone Finish
Symons Corporation's Pattern 99374 (ABS)
Mason Supply Company
6018-234th Street SE
Woodinville, WA 98072
Phone: (425) 487-6161

Fitzgerald Pattern 16983 (Vac-U-Form)
1341 East Pomona Street
Santa Ana, CA 92705
Phone: (714) 547-6710

Heavy Sand Blast Finish
Fitzgerald Pattern 16992 (Vac-U-Form)
1341 East Pomona Street
Santa Ana, CA 92705
Phone: (714) 547-6710

Stone Finish
Fitzgerald Pattern 17931 (GrayLastic)
1341 East Pomona Street
Santa Ana, CA 92705
Phone: (714) 547-6710

Ripple Finish
Symons' P/C 30711 (SPS) or P/C 30477 (ABS), 3/16" long ripple rib
Mason Supply company
6018-234th Street SE
Woodinville, WA 98072
Phone: (425) 487-6161

The Scott System #154, ½" sine wave
10777 East 45th Avenue
Denver, CO 80239
Phone: 303-373-2500

Fitzgerald No. 14415, sine wave
1341 East Pomona Street
Santa Ana, CA 92705
Phone: (714) 547-6710

Fractured Fin Finish
ABS or plastic formliner. It shall be selected from the approved products listed in the WSDOT Qualified Products List, latest Edition.

Construction Requirements

Formliners shall be placed vertically as shown in the Plans.

If ABS formliners are used, horizontal joints will not be allowed.

If plastic formliners are used, they shall be full height of the wall face (no splices) for wall face heights of 8 feet and less. Plastic formliners may be spliced horizontally for wall face heights greater than 8 feet, provided that the minimum formliner height shall be 8'-0".

Payment

All costs in connection with producing concrete texture finish on concrete surfaces as specified, shall be included in the unit contract price per cubic yard for "Concrete Fascia Panel".

CERAMIC TILE TUNNEL LINING

General

This item of work includes the ceramic tile, installation systems and accessories as needed for complete and proper installation of the ceramic tile design as shown on Plans and these special provisions.

Materials

Ceramic Tile

The design shown on plans is a guide for the layout of the ceramic tile design and colors. A larger size layout, 22" x 34" can be provided by the State for the clarity of the tile layout at the request of the Contractor. The tile pattern shown on plans is 3x3 size tile, however, 4x4 size tile is acceptable. The design shall be accomplished with whole tile with minimum cutting. The Contractor shall submit a layout of the design, showing the colors of tile, and expansion joints for approval prior to fabrication and installation.

The ceramic tile shall be porcelain tile. The manufacturer of the ceramic tile and the respective colors shall be one of the following:

Manufacturer	Color
Ceramic Expressions,	Green - Basil
Series: Northern Lights	Brown - Leather
	Blue -Cornflower
	Background- Polar White
Crossville	Green - A481 Forest Green (cross sheen)
Series: Cross Colors	Brown - A130 Adobe (cross sheen)
	Blue - A583 Windsurf (cross sheen)
	Background - A215 Empress White (cross sheen)
Buchtal	Green - 541 Distinct Green (Glazed)
Series: Chroma 2	Brown - 558 Deep Sahara (Glazed)
	Blue - 724 Distinct Azure (Glazed)
	Background - 700 Glossy White (glazed)

Mortar

Latex-Portland Cement Mortar complying with ANSI A118.4. Crete Filler Powder gauged with Latex Thin Set Mortar Additive to meet the following physical requirements:

1.	Shear Bond Porcelain Tile, 28 day cure	500 psi Minimum
2.	Water absorption	4% Maximum
3.	Compressive Strength	5,000 psi Minimum

Epoxy Grout

Grout shall be chemically and stain resistant, non-toxic, non-flammable, non-hazardous, water cleanable complying with ANSI A118. When cured meeting following minimum physical requirements:

1.	Compressive Strength	6,600 psi, Minimum
2.	Shear Bond Strength	100 psi, Minimum
3.	Water Absorption	½% Maximum
4.	Service Temperature	up to 230° F

The installation system shall include mortar, grout, adhesive shall be by one of the following manufacturer or approved:

A. Laticrete International,
B. Southern Grouts and Mortar,
C. Hydromat/Upco.

All Mortar Additives, powders, Grouts shall be compatible and from one manufacturer providing single source responsibility.

All Materials shall be delivered to the job site in the original containers with the manufacturer's identification on each package. The addition of water or other materials to dilute the Mortar Additive will not be permitted.

Construction Requirements

Temperature Control

The Contractor shall maintain ambient temperatures between 50-100° F during installation of the tiles and for minimum seven (7) days after completion. Verify substrate, ambient and material at least 37° F for installation of Latex Portland cement mortars. Protect Portland cement based mortars until cured to prevent premature evaporation of moisture.

Substrate Examination

Prior to the installation of the ceramic tile, the wall surfaces shall be verified for the following:

1. The concrete has cured a minimum of 28 days at 70° F.
2. Level and true to within 1/8 inch in 8 ft.
3. Verify wall to receive the tile to be sound, solid, well bonded, stripped clean and free of form oil, dust, grease, sealers, curing compounds, scales, wax, and all other contamination which may reduce or prevent adhesion.

Mixing

Comply with mixing requirements of referenced standards and manufacturers. Accurately proportion materials, water or additive. Use recommended mixing equipment, speeds, containers, mixing time and pot life to produce mortars and grouts of uniform quality with optimum performance characteristics.

Ceramic Tile Installation

Install in accordance with ANSI A108 Standard for Ceramic Tile Installation and TCA Handbook. Make joints even, straight, plumb and of uniform width to tolerance +/- 1/16th inch over 8 ft.

Work mortar with trowel into good contact with concrete wall. Spread mortar onto back of sheet mounted mosaics in addition to troweling materials over concrete wall surface. Fully bed tile by beating with block or rubber mallet to insure full bedding and flatness.

Verify grout joints are free of dirt, debris or tile spacers. Follow manufacturer recommendations for minimum cure time prior to grouting. Sponge or wipe dust/dirt off tile faces.

Provide control and expansion joints in accordance with Tile Council of America's detail "EJ-171 Expansion Joints".

Protection

Protect finished installation until tile being installed has set firmly.

Measurement

Ceramic tile tunnel lining will be measured by the square yard of tile furnished and set in place.

Payment

"Ceramic Tile Tunnel Lining", per square yard.

CONCRETE STRUCTURES

Materials

Section 6-02.2 is supplemented with the following:

(******)

Tunnel Ceiling Coating

The concrete surface primer shall be paint Formula K-1-83, conforming to Section 9-08.2.

The tunnel ceiling coating shall be a two-component solvent base polyester-epoxy coating. Component A shall be high solids white gloss polyester, and component B shall be high solids white gloss epoxy.

The percentage of solids by mass (mixed) shall be between 75.3 and 79.3 percent. The percentage of solids by volume (mixed) shall be between 63.6 and 67.6 percent. The viscosity shall be between 77 and 84 K.U., blended. The finish shall have a gloss sheen of 85 minimum (60 degree gloss meter).

The Contractor shall submit to the Engineer a Manufacturers Certificate of Compliance, a Product Data Sheet, and a Material Safety Data Sheet for the tunnel ceiling coating in accordance with Sections 1-06.3, 6-07.3(1), and 6-07.3(2)E.

(August 5, 2002)

Resin Bonded Anchors

The resin bonded anchor system shall include the nut, washer, and threaded anchor rod which is installed into hardened concrete with a resin bonding material. The resin bonded anchor system shall conform to the following requirements:

1. Threaded Anchor Rod and Nuts

   Threaded anchor rods shall conform to ASTM A 193 Grade B7 or ASTM A 449, except as otherwise noted, and be fully threaded. Threaded anchor rods for stainless steel resin bonded anchor systems shall conform to ASTM F 593 and shall be Type 304 unless otherwise specified.

   Nuts shall conform to AASHTO M 291, Grade DH, except as otherwise noted. Nuts for stainless steel resin bonded anchor systems shall conform to ASTM F 594 and shall be Type 304 unless otherwise specified.

   Washers shall conform to AASHTO M 293, except as otherwise noted. Washers for stainless steel resin bonded anchor systems shall conform to ANSI B18.22.1 and shall be Type 304 Stainless Steel unless otherwise specified.

   Nuts and threaded anchor rods, except those manufactured of stainless steel, shall be galvanized in accordance with AASHTO M 232. Galvanized threaded anchor rods shall be tested for embrittlement after galvanizing, in accordance with Section 9-06.5(4).

   Threaded anchor rods used with resin capsules shall have the tip of the rod chiseled in accordance with the resin capsule manufacturer's recommendations. Galvanized threaded rods shall have the tip chiseled prior to galvanizing.

2. Resin Bonding Material

   Resin bonding material shall be one of the following:

   a. Vinylester resin.

   b. Polyester resin.

   c. Methacrylate resin.

   d. A two component epoxy resin which meets the requirements of ASTM C 881, Type IV. The grade and class of the epoxy resin shall be as recommended by the epoxy resin manufacturer and as approved by the Engineer.

3. Ultimate Anchor Tensile Capacity

   Resin bonded anchors shall each have the following minimum ultimate tensile load capacity when installed in concrete having a maximum compressive

strength of 6000 pounds per square inch (psi) at the embedment specified below:

Anchor Diameter (inch)	Tensile Capacity (lbs.)	Embedment (inch)
3/8	7,800	3-3/8
1/2	12,400	4-1/2
5/8	19,000	5-5/8
3/4	27,200	6-3/4
7/8	32,000	7-7/8
1	41,000	9
1-1/4	70,000	11-1/4

(December 2, 2002)
Epoxy Bonding Agent For Surfaces And For Steel Reinforcing Bar Dowels
Epoxy bonding agent for surfaces shall be Type II, as specified in Section 9-26.1. Epoxy bonding agent for steel reinforcing bar dowels shall be either Type I or Type IV, as specified in Section 9-26.1. The grade and class of epoxy bonding agent shall be as recommended by the resin manufacturer and approved by the Engineer.

(August 5, 2002)
Fractured Fin Finish
The fractured fin finish shall be accomplished by the use of a form liner selected from the approved products listed in the WSDOT Qualified Products List (QPL), latest edition.

The height of the form liner shall be equal to or greater than the height of the formed surface. Only elastomeric form liners are allowed to have horizontal splices.

(August 5, 2002)
Random Board Finish
The random board finish shall be accomplished by the use of a form liner selected from the approved products listed in the WSDOT Qualified Products List (QPL), latest edition.

The variable depth finish shall utilize an elastomeric form liner, while the ¾ inch depth finish shall use either an elastomeric or a plastic form liner.

The height of the form liner shall be equal to or greater than the height of the formed surface. Only elastomeric form liners are allowed to have horizontal splices.

(April 7, 2003)
Pigmented Sealer
The pigmented sealer shall be a semi-opaque colored toner containing only methyl methacrylate-ethyl acrylate copolymer resins, toning pigments suspended in solution at all times by a chemical suspension agent, and solvent. Toning pigments shall be laminar silicates, titanium dioxide and inorganic oxides only. There shall be no settling or color variation. Use of vegetable or marine oils, paraffin materials, stearates or organic pigments in any part of coating formulation will not be permitted.

The color shall match the color chip Washington Gray. Pigmented sealer color chips are available from the State Bridge and Structures Architect, WSDOT Bridge and Structures Office, P. O. Box 47340, Olympia, WA 98504-7340.

The pigmented sealer shall be selected from the approved products listed in the WSDOT Qualified Products List, latest edition.

(December 6, 2004)

Fabric Pad Bearing

Unless other materials are specified in the Plans, fabric pad bearing assembly components shall conform to the following requirements for those components shown and specified in the Plans:

Steel Plates and Bars

Steel plates and bars (keeper bars, sole plates, backing plates, and masonry plates) shall conform to ASTM A 36 and the dimensions shall conform to the details shown in the Plans. The backing plate and masonry plate surfaces in contact with the pre-formed fabric pad, and the surface within the recess of the backing plate, shall have an average surface roughness of 250 microinches or less. The surface of the sole plate in contact with the stainless steel sheet shall have an average surface roughness of 125 microinches or less. All other steel plate and bar surfaces in contact with other fabric pad bearing components shall have an average surface roughness of 500 microinches or less.

Pre-formed Fabric Pad

Pre-formed fabric pads shall be composed of multiple layers of duck, impregnated and bound with high quality oil resistant synthetic rubber, compressed into resilient pads of uniform thickness. The duck shall be of highest quality cotton or cotton-polyester 50-50 blend, and shall weigh a minimum of eight ounces per square yard. The cotton warp and the filling yarn shall be 2-ply. The cotton-polyester warp and fill shall be single yarn, with a minimum breaking strength by grab method of 150 pounds per inch per width (piw) warp, and 140 piw fill. The filling count of the duck shall be 40± 2 threads per inch and the warp count shall be 50 ± 1 threads per inch. The number of plies shall be sufficient to produce the specified thickness, after compression and vulcanization.

The finished pads shall withstand compression loads perpendicular to the plane of the laminations of not less than 10,000 psi without any sign of failure after the load is removed. Failure is defined as any breakdown of the component materials or laminations.

The pre-formed fabric pad shall have a shore A hardness of 90±5.

Polytetraflouroethylene (PTFE) Sheet

PTFE shall be 100 percent virgin (unfilled) PTFE, fiberglass fiber filled PTFE, or dimpled PTFE conforming to Section 18.8.2 of the AASHTO LRFD Bridge Construction Specifications, 1st Edition and latest interims, and the following requirements:

1. PTFE sheet shall be composed of 100 percent virgin (unfilled) polytetrafluoroethylene resin, except where filled PTFE is specified in the Plans.

2. Filled PTFE, when specified in the Plans, shall be composed of PTFE resin uniformly blended with 15 percent maximum fiberglass fiber.

3. The substrate shall limit the flow (elongation) of the confined PTFE to not more than 0.009 inch under a pressure of 2,000 psi for 15 minutes at 78F for a two inch by three inch test sample.

4. Unfilled PTFE shall have a hardness of 50 to 65 Durometer D, at 78F, in accordance with ASTM D 2240.

Stainless Steel Sheet
Stainless steel sheet shall be no less than 14 gage meeting ASTM A 240 Type 304L specifications. Stainless steel in contact with the PTFE shall be polished to a Number 8 mirror finish.

Welded Shear Connectors
Welded shear connectors shall conform to Section 9-06.15.

Bolts, Nuts and Washers
Bolts, nuts and washers shall conform to Section 9-06.5(3), and shall be galvanized after fabrication in accordance with AASHTO M 232.

Anchor Bolts, Nuts and Washers
Anchor bolts, nuts and washers shall conform to Section 9-06.5(4). The top 1'-0", minimum, of the exposed end of the anchor bolts, and the associated nuts and washers, shall be galvanized after fabrication in accordance with AASHTO M 232.

Concrete Inserts
Concrete inserts shall be as specified in the Plans.

Silicone Grease and Epoxy Gel
Silicone grease shall conform to Military Specification MIL-S-8660.

Epoxy gel shall be Type I, Grade 3, Class A, B, or C, conforming to Section 9-26.1.

Submittals of Test Reports, Certifications, and Samples
The Contractor shall submit to the Engineer the following test reports, certifications, and samples for review, testing, and approval, prior to installing the fabric pad bearings:

1. Manufacturer's certificate of compliance for the PTFE, pre-formed fabric pad duck, silicone grease, and epoxy gel.

2. Certified mill test reports for all steel and stainless steel in the bearing assemblies.

3. Certified test reports confirming that the pre-formed fabric pads meet the specified requirements of proof load.

4. Samples of the pre-formed fabric pads, size six inches by six inches by one inch, and PTFE sheet, size two inches by three inches by 1/8 inch, from the production material.

The Engineer will require 15 calendar days to review and test the submitted certificates, test reports, and samples. If all or a portion of the submittal fail to meet the specified requirements, the Contractor shall correct the deficiencies and resubmit to the Engineer. An additional 15 calendar days may be required by the Engineer for review of each resubmittal.

Bridge Supported Utilities

(June 26, 2000)
Inserts shall be of the type and model specified in the Plans. Inserts shall be galvanized in accordance with AASHTO M 111.

(April 30, 2001)
Hanger rods, and associated nuts and washers, shall conform to Section 9-06.5(1), and shall be galvanized in accordance with AASHTO M 232.

Steel bars and plates shall conform to ASTM A 36 and shall be galvanized in accordance with AASHTO M 111.

(June 26, 2000)
Bridge Deck Repair Concrete

Bridge deck repair concrete shall be a pre-packaged concrete mix capable of achieving a cube compressive strength of 3,000 psi in six hour or less. The maximum chloride ion (Cl-) content, expressed as a percent by dry weight of the pre-packaged concrete, or of the extended mix if the use of aggregate extenders is approved by the Engineer, shall be 0.015. The Contractor may use aggregate extenders up to two-thirds of that recommended by the pre-packaged concrete manufacturer, if approved by the Engineer.

The Contractor shall submit samples from the lot or lots of pre-packaged concrete and aggregate extenders to the WSDOT Materials Laboratory for approval. The Contracting Agency will require fourteen calendar days to test and evaluate the pre-packaged concrete mix for compressive strength and chloride ion content. If the Contractor submits independent laboratory verification of the corrosion deterrent performance of the pre-packaged concrete, the Engineer may waive the testing requirements for chloride ion content.

Construction Requirements

Section 6-02.3 is supplemented with the following:

(******)
Cement Concrete Slurry

The Contractor shall prepare a plan for the collection and disposal of concrete residue/slurry for the approval by the Engineer.

Residue and slurry generated form concrete grinding, sawing, or any other method of concrete scarifying shall not be allowed to enter any drainage conveyance or waterway, nor be discharged to the ground. Disposal of concrete residue/slurry will not be allowed within the State right-of-way.

Bridge Supported Utilities

(June 26, 2000)
The Contractor shall furnish and install inserts for the bridge utility supports as shown in the Plans. The Contractor shall verify that the hanger rods freely hang plumb in their inserts, and shall make adjustments to the inserts as necessary and as approved by the Engineer prior to utility installation.

(June 26, 2000)
The Contractor shall furnish and install the bridge utility supports, and the utility pipe or conduit pipe, as shown in the Plans.

Proportioning Materials

Contractor Mix Design

Section 6-02.3(2)A is supplemented with the following:

(April 30, 2001)
When combined aggregate gradation is used for structural concrete, the Contractor's mix design shall include a plot of the combined gradation on the 0.45 power curve showing that the proposed gradation conforms to Section 9-03.1(5). The requirement for the fine aggregate to conform to Section 9-03.1(2) Class 1 or Class 2 gradation is eliminated when using a combined gradation.

(******)
The nominal maximum size of aggregate for Class 4000 concrete used in columns shall be ½ inch.

Acceptance of Concrete

Certification of Compliance

Section 6-02.3(5)B is supplemented with the following:

(April 30, 2001)
When combined aggregate gradation is used for structural concrete, the Certificate of Compliance shall include:

Manufacturer plant (batching facility)
Contracting Agency contract number
Date
Time batched
Truck No.
Initial revolution counter reading
Quantity (quantity batched this load)
Type of concrete by class and producer design mix number

Cement producer, type, and Mill Certification No. (The mill test number as required by Section 9-01.3)
Fly ash (if used) brand and type
Mix design weight per cubic yard and actual batched weights for:
- Cement
- Fly ash (if used)
- Aggregate components and moisture contents (each size)
- Water (including free moisture in aggregates)
- Admixtures brand and total quantity batched
- Air-entraining admixture
- Water reducing admixture
- Other admixtures

Conformance to Mix Design
Section 6-02.3(5)C is supplemented with the following:

(January 5, 2004)
When combined aggregate gradation is used for structural concrete, the specified fine and course aggregate weight tolerance shall not apply.

Roadway Slabs
Section 6-02.3(10) is supplemented with the following:

(August 2, 2004)
Bridge Deck Repair
The Contractor shall have the services of a qualified technical representative of the pre-packaged concrete manufacturer available at the job site to assist in assuring the proper preparation and use of the pre-packaged concrete in the bridge deck repair. The qualified technical representative shall be present at the site at all times while the Contractor is preparing and placing the pre-packaged concrete mix. The qualified technical representative shall be an employee of the pre-packaged concrete manufacturer. Recommendations made by the qualified technical representative and approved by the Engineer, shall be followed by the Contractor.

All loose and unsound concrete within the repair area shall be removed with jackhammers or chipping hammers no more forceful than the nominal 30 pounds class, or other mechanical means approved by the Engineer, and operated at angles less than 45 degrees as measured from the surface of the deck to the tool. If unsound concrete exists around the existing steel reinforcing bars, or if the bond between concrete and steel reinforcing bar is broken, the Contractor shall remove the concrete to provide a 3/4 inch minimum clearance to the bar. The Contractor shall take care to prevent damage to the existing steel reinforcing bars and concrete to remain.

After removing sufficient concrete to establish the limits of the repair area, the Contractor shall make neat vertical saw cuts and maintain square edges at the boundaries of the repair area. The saw cut depth shall not exceed 3/4 inch or the concrete cover over the top steel reinforcing bars, whichever is less.

The pre-packaged concrete shall be thoroughly mixed in a batch mixer which mixes materials uniformly throughout the batch, and is of the type and size approved by the Engineer. The mixer shall have a minimum rated capacity of four

cubic feet. The batches shall be charged into the mixer such that some water enters before the pre-packaged material. The Contractor shall place all water required for the mix in the drum by the end of the first quarter of the required mixing time of one minute minimum. The Contractor may propose shorter mixing times with special mixing equipment by submitting mixing test results to the Engineer for approval. If the Contractor uses heated water, the Engineer may require revising the order of charging to prevent flash setting of the concrete mix.

The exposed steel reinforcing bars and concrete in the repair area shall be sandblasted and blown clean just prior to placing concrete.

All bridge deck repair areas shall be cured in accordance with the pre-packaged concrete manufacturer's recommendations as approved by the Engineer, or in accordance with Section 6-02.3(11) for Class 4000D concrete, until the concrete has attained the specified strength. During concrete curing, all vehicular and foot traffic shall be prohibited on the repaired area.

For those bridge decks receiving a waterproofing membrane and HMA overlay, all deck repair shall be completed prior to placement of the waterproofing membrane.

Finishing Concrete Surfaces

Section 6-02.3(14) is supplemented with the following:

(June 26, 2000)
Fractured Fin Finish
Form liners shall be placed with fins and joints normal to grade for barrier applications and vertical (or as shown in the Plans) for other applications. Horizontal joints in the elastomeric form liners are permitted on surfaces greater than 8 feet in height provided that the minimum form liner panel dimension is 8 feet.

(June 26, 2000)
Random Board Finish
Form liners shall be placed with board lines and joints normal to grade for barrier applications and vertical (or as shown in the Plans) for other applications. Horizontal joints in the elastomeric form liners are permitted on surfaces greater than 12 feet in height provided that the minimum form liner panel dimension is 12 feet.

(August 2, 2004)
Pigmented Sealer
The Contractor shall submit four draw down color samples of the pigmented sealer selected for use to the Engineer for approval. The Contractor shall submit spectrophotometer or colorimeter readings, taken in accordance with either ASTM D 2244 or Color Matching Conference (CMC) standards, for each batch. The calculated Delta E (DIELAB or CMC) shall not exceed 1.0 deviation from the color chip specified and available from the Contracting Agency. The Contractor shall label each wet sample and draw down color sample with the batch number. The Contractor shall not begin applying pigmented sealer until receiving the Engineer's written approval of the pigmented sealer color samples.

All surfaces to be sealed shall receive a Class 2 finish and shall receive a light brush sandblasting in order that complete neutralization of the surface and subsequent penetration of the pigmented sealer is achieved. All curing agents and form release agents shall be removed. The surface shall be dry, clean and prepared in accordance with manufacturer's written instructions. The Contractor shall submit four copies of the manufacturer's written instructions.

The pigmented sealer shall be spray applied in accordance with the manufacturer's written instructions for application, qualification of applicator, rate of application, and number of coats to apply. Sealer shall be applied only when the air temperature is at or above 50F. Sealer shall not be applied until the concrete has cured for at least 28 days. It shall not be applied upon damp surfaces, nor shall it be applied when the air is misty, or otherwise unsatisfactory for the work, in the opinion of the manufacturer or the Engineer. The final appearance shall have an even and uniform color acceptable to the Engineer.

For concrete surfaces such as columns, retaining walls and abutments, the pigmented sealer shall extend to 1 foot below the finish ground line, unless otherwise shown in the Plans.

(August 5, 2002)

Placing Anchor Bolts

Section 6-02.3(18) is supplemented with the following:

Resin Bonded Anchors

The Contractor shall submit item 1 and 2 to the Engineer for all resin bonded anchor systems. If the resin bonded anchor system and anchor diameter are not listed in the current WSDOT Qualified Products List, the Contractor shall also submit item 3 to the Engineer.

1. The resin manufacturer's written installation procedure for the anchors. Resin bonding material used in overhead and horizontal application shall be specifically recommended by the resin manufacturer for those applications.

2. The manufacturer's certificate of compliance for the threaded anchor rod certifying that the anchor rod meets the requirements of this Special Provision.

3. Test results by an independent laboratory certifying that the threaded anchor rod system meets the ultimate anchor tensile load capacity specified in Section 6-02.2 as supplemented in these Special Provisions. The tests shall be performed in accordance with ASTM E 488.

The embedment depth of the anchors shall be as specified in the Plans. If the embedment depth of the anchor is not specified in the Plans then the embedment depth shall be as specified in the table of minimum and maximum torque below.

The anchors shall be installed in accordance with the resin manufacturer's written procedure.

Holes shall be drilled as specified in the Plans. Holes may be drilled with a rotary hammer drill when core drilling is not specified in the Plans. If holes are core drilled, the sides of the holes shall be roughened with a rotary hammer drill after core drilling.

Holes shall be prepared in accordance with the resin manufacturer's recommendations and shall meet the minimum requirements as specified herein. Holes drilled into concrete shall be thoroughly cleaned of debris, dust, and laitance prior to installing the threaded rod and resin bonding material. Holes shall not have any standing liquid at the time of installation of the threaded anchor rod.

Threaded anchors shall not be installed in submerged liquid environments unless specifically recommended by the resin manufacturer. The Contractor shall submit tests performed by an independent laboratory which certifies that anchors installed in a submerged environment meet the strength requirements specified in Section 6-02.2 as supplemented in these Special Provisions.

The anchor nuts shall be tightened to the following torques when the embedment equals or exceeds the minimum embedment specified.

Anchor Diameter (inch)	Minimum Torque (ft-lbs)	Maximum Torque (ft-lbs)	Minimum Embedment (Inch)
3/8	12	18	3-3/8
1/2	22	35	4-1/2
5/8	55	80	5-5/8
3/4	106	140	6-3/4
7/8	165	190	7-7/8
1	195	225	9
1-1/4	370	525	11-1/4

When the anchor embedment depth is less than the minimum values specified, the anchor nuts shall be tightened to the torque values specified in the Plans, or as recommended by the resin bonded anchor system manufacturer and approved by the Engineer.

Bridge Bearings

Bridge Bearing Assemblies

Section 6-02.3(19)B is supplemented with the following:

(December 6, 2004)

Fabric Pad Bearing

The fabric pad bearing consists of an upper unit and a lower unit. The upper unit consists of a stainless steel sheet and either a single sole plate or upper and lower sole plates, as shown in the Plans. The lower unit consists of a polytetrafluoroethylene (PTFE) sheet, a backing plate, and a pre-formed fabric pad, and may also include keeper bars and a masonry plate, as shown in the Plans. Lower unit components of transverse restrainer bearings and transverse stop bearings shall be as shown in the Plans. The upper and lower units shall be supplied by a single bearing manufacturer.

Shop Drawings

The Contractor shall submit shop drawings to the Engineer for approval in accordance with Section 6-03.3(7). These drawings shall include but not be limited to the following information:

1. Plan and elevation of the assembled bearing and each of the components showing dimensions and tolerances.

2. Complete details of all components and sections showing all materials incorporated into the bearing.

3. All AASHTO, ASTM or other material designations.

4. Bearing manufacturer's recommendations and procedures for bearing assembly shipment and storage.

The Contractor shall not begin fabricating the fabric pad bearings until receiving the Engineer's approval of the shop drawings.

Flatness and Manufacturing Tolerances

Flatness of bearing surfaces shall be determined by the following method:

1. A precision straightedge, longer than the nominal dimension to be measured shall be placed in contact with the surface to be measured as parallel to it as possible.

2. A feeler gauge having an accuracy equal to the tolerance allowed ± .001 inch, shall be selected and inserted under the straightedge.

3. Surfaces are acceptable for flatness if the feeler gauge does not pass under the straightedge.

4. In determining the flatness, the straightedge may be located in any position on the surface being measured.

Flatness tolerances shall be defined as follows:

1. Class A tolerance = 0.001 x nominal dimension

2. Class B tolerance = 0.002 x nominal dimension

3. Class C tolerance = 0.005 x nominal dimension

(Nominal dimension shall be taken as the actual dimension of the plate or sheet under the straightedge, in inches.)

Manufacturing tolerances for the bearings are as follows:

PTFE Sheet

Plan dimensions: Total nominal design area -0, +1/8"

Thickness:	-0", + 1/64"
Flatness:	Class A tolerance, both surfaces

Pre-formed Fabric Pad

Plan dimension:	-0", +3/16"
Thickness:	-1/16", +3/16"
Surface finish:	For pre-formed fabric pads fabricated from multiple layers, all pad edges shall be free of visible horizontal displacement between the individual layers.

Stainless Steel Sheet

Plan dimensions:	-0", +3/16"
Flatness:	Class A tolerance, both surfaces

Sole Plate

Plan dimensions:	-0", +3/16"
Thickness:	-1/16", +3/16"
Flatness:	Class A tolerance, side in contact with the stainless steel sheet or sole plate Class C tolerance, side in contact with epoxy gel, grout, or concrete

Backing Plate

Plan dimensions:	-0", +3/16"
Thickness:	-0", +3/16"
Width and length of recess:	-0", +1/16", of PTFE sheet size
Flatness:	Class A tolerance, both surfaces

Masonry Plate

Plan dimension:	-0", +3/16"
Thickness:	-0", +3/16"
Flatness:	Class A Tolerance, side in contact with pre-formed fabric pad. Class C tolerance, free side or side in contact with grout.

Keeper Bar

Length:	±1/8"
Section dimensions:	±1/16"
Flatness:	Class A Tolerance, side in contact with masonry plate.
Bar to bar tolerance:	±1/32"

Bars shall be not more than 1/32" out of parallel

Overall Height

Total thickness:	-0, +10 percent

Special Fabrication Requirements

When the following components are shown in the Plans as part of the fabric pad bearing assembly, the following special fabrication requirements shall apply:

PTFE

PTFE shall be 1/8 inch thick unless otherwise noted in the Plans. PTFE shall be recessed and bonded to a depth of one half the PTFE sheet thickness into the backing plate. The exposed height of the PTFE shall not be less than 3/64 inch.

Dimpled PTFE, if shown in the Plans, shall be unfilled and have a minimum thickness of 3/16 inch. Dimples shall be placed in a 1/2 inch grid and shall have a depth of 1/16 inch.

The PTFE sheet shall be recessed and chemically bonded to the supporting steel plate or bar. Bonding shall be performed under controlled conditions and in accordance with the written instructions of the PTFE manufacturer.

Following the bonding operation, the PTFE surface shall be smooth and free from bubbles. Filled PTFE shall be polished after the bonding operation is complete, in accordance with AASHTO LRFD Bridge Construction Specification Section 18.8.3.2.2.

Stainless Steel

The stainless steel sheet shall be seal welded all around to the supporting steel plate or bar by the gas tungsten-arc welding (GTAW) process in accordance with current AWS specifications. The stainless steel sheet shall be clamped down to have full contact with the sole plate during welding. The welds shall not protrude beyond the sliding surface of the stainless steel sheet.

Keeper Bars

Each keeper bar shall be fabricated from a single steel plate. The keeper bars shall be connected to the masonry plate either by welding or by bolting, as shown in the Plans.

Corrosion Protection

Steel surfaces, except as otherwise specified, shall be painted in accordance with Section 6-07.3(1), and Section 6-03.3(30) as supplemented in these Special Provisions. The surfaces of all welds fastening stainless steel to structural steel shall be painted as specified for structural steel. Stainless steel shall not be painted. The second and third coats of paint shall be applied after the fabric pad bearing assembly has been erected in its final position with the anchor bolt nuts installed.

Bearing Component Assembly, Shipping, and Storage

Each bearing, except for upper sole plate components embedded into cast-in-place concrete superstructures, shall be fully assembled at the manufacturing plant and delivered to the construction site as a complete

unit, ready for installation. The units shall be held together with removable restraints so that the sliding surfaces are not damaged.

All bearing assemblies shall be marked with the following information prior to shipping:

1. Location of the bearing, including the pier and the specific location along the pier.

2. Direction arrow pointing in the ahead on station direction.

The above information shall be marked on the top plate of the upper unit of the bearing assembly. The marks shall be permanent and shall be visible after bearing installation.

The bearing assemblies shall have centerlines marked on both upper and lower units for checking alignment in the field.

The bearing assemblies shall be shipped in light-proof, moisture-proof and dust-proof containers.

Bearing Assembly Field Inspection

Field inspection of a representative number of bearing assemblies will be performed by the Engineer. The Contractor shall provide a clean, dry and enclosed area at the site, spacious enough for the field inspection activities. The Contractor shall disassemble and reassemble the bearings for inspection by the Engineer. The disassembly and reassembly of the bearings shall be in accordance with the bearing manufacturer's written procedure and in the presence of the Engineer.

Bearings that fail the inspection shall be replaced or repaired by the Contractor, as approved by the Engineer, at no additional expense to the Contracting Agency. All proposed corrective procedures shall be submitted by the Contractor to the Engineer for approval before beginning corrective work.

Bearing Assembly Installation

The sliding surfaces shall be finished true, lubricated and installed level, or installed as shown in the Plans for transverse restrainer bearings and transverse stop bearings.

PTFE sheet shall not be greased, except as otherwise noted. A thin uniform film of silicone grease shall be applied to the entire dimpled PTFE sheet before installation (all dimples shall be filled with grease).

For cast-in-place concrete superstructures, the fabric pad bearing upper unit shall be anchored to the structure as shown in the Plans. For precast concrete superstructures with fabric pad bearing upper units consisting of upper and lower sole plates, the upper sole plate shall be cast into and anchored to the precast concrete member as shown in the Plans.

The upper unit of fabric pad bearings for steel superstructures, and the lower sole plate assemblies for precast concrete superstructures shall be set with epoxy gel as specified below just before setting the superstructure in place.

The sole plate top surface in contact with the epoxy gel shall receive a thin uniform film of silicone grease, to prevent bonding to the epoxy gel. The anchor bolts and insert threads shall be greased to prevent bonding and allow future removal. The Contractor shall apply the epoxy gel by troweling it into the concrete recess, or onto the bottom of the steel superstructure or upper sole plate surface, and immediately bolt the upper unit of the bearing in place to obtain a level surface.

Before the epoxy gel has cured, the superstructure shall be set in place, squeezing out excess epoxy gel while filling the entire recess. Excess epoxy and grease shall be removed immediately. Special care shall be exercised at all times to ensure protection of the stainless steel and PTFE surfaces from coming in contact with concrete, epoxy gel, or any other foreign matter. After the epoxy gel has cured, the anchor bolts shall be tightened to snug tight.

The grout pad, and masonry plate when shown in the Plans, shall be installed level. When shown with a masonry plate, the grout pad shall be pressure installed starting at the middle of the masonry plate.

All forms and debris that tend to interfere with the free action of the bearing assemblies shall be removed at the time falsework and forms are removed.

Grout for Anchor Bolts and Bridge Bearings

Section 6-02.3(20) is supplemented with the following:

(June 26, 2000)
Grout placed at the following locations shall conform to the requirements of this section.

*** Where shown in the Plans. ***

Prestressed Concrete Girders

Contractors Control Strength

Section 6-02.3(25)E is supplemented with the following:

(BSP June 26, 2000)
If too few concrete test cylinders were molded to carry out all required tests on a precast prestressed member, four cores measuring four inches in diameter by five inches in height shall be taken from the precast prestressed member, two from each side of the member and on each side of the member midpoint, as approved by the Engineer.

The core locations for precast prestressed slabs shall be near mid depth of the slab, within the middle third of the span length, and shall avoid all prestressing strands and steel reinforcing bars.

The core locations for precast prestressed ribbed sections shall be immediately beneath the top flange, within the middle third of the span length, and shall avoid all prestressing strands and steel reinforcing bars.

The Engineer may accept the precast prestressed member if the average compressive strength of four cores is at least 85 percent of the specified compressive strength with no one core less than 75 percent of specified compressive strength.

Shipping

(BSP June 26, 2000)
The fourth paragraph of Section 6-02.3(25)M is revised to read as follows:

Girder support during shipping shall be located as follows unless otherwise shown in the Plans:

Type of Girder	Centerline Support This Distance From Both Ends
Series W42G and W50G and all bulb tee girders	3 feet
Series W58G	4 feet
Series W74G	5 feet
Series W83G and W95G	8 feet
Precast prestressed members	1 foot

Prestress Concrete Girder Erection
Section 6-02.3(25)N is supplemented with the following:

(BSP June 26, 2000)
Dowel Bars for Precast Prestressed Slabs
The Contractor shall place 1-1/4 inch diameter vertical dowel bars at the top of the pier walls as shown in the Plans. The Contractor shall either form the hole or core drill the hole following the alternatives shown in the Plans. The portion of the dowel bar in the top of the pier walls shall be set with grout following placement of each prestressed precast slab. The remaining portion of the dowel bar shall be grouted after the weld-ties are connected and the keyways are grouted.

Reinforcement

Placing and Fastening
Section 6-02.3(24)C is supplemented with the following:

(June 26, 2000)

Drilling Holes for, and Setting, Steel Reinforcing Bar Dowels

Where called for in the Plans, holes shall be drilled into existing concrete to the size and dimension shown in the Plans. The Contractor may use any method for drilling the holes provided the method selected does not damage the concrete and the steel reinforcing bar that is to remain. Core drilling will be required when specifically noted in the Plans.

The Contractor shall exercise care in locating and drilling the holes to avoid damage to existing steel reinforcing bars and concrete. Location of the holes may be shifted slightly with the approval of the Engineer in order to avoid damaging the existing steel reinforcing bars. All damage caused by the Contractor's operations shall be repaired by the Contractor at no cost to the Contracting Agency and the repair shall be as approved by the Engineer.

Steel reinforcing bars shall be set into the holes noted in the Plans with epoxy resin. The holes shall be blown clean with dry compressed air before placing the resin.

The Contractor shall demonstrate, to the satisfaction of the Engineer, that the method used for setting the steel reinforcing bars completely fills the void between the steel reinforcing bar and the concrete with epoxy resin. Dams shall be placed at the front of the holes to confine the epoxy and shall not be removed until the epoxy has cured in the hole.

Measurement

Section 6-02.4 is supplemented with the following:

(June 26, 2000)

*** The "Superstructure - Bridge No. 16/20W Widening", "Superstructure - Bridge No. 16/20E Widening", "Superstructure - 19th St. Pedestrian Tunnel", "Superstructure - Bridge No. 16/24E", "Superstructure - Bridge No. 16/30E", "Superstructure - Bridge No. 16/31E" and "Roadway Deck - Center Street Flyover Ramp" *** contains the following approximate quantities of materials and work:

*** <u>Superstructure - Bridge No. 16/20W Widening</u>

Epoxy-Coated St. Reinf. Bar	56,700	LBS
St. Reinf. Bar	56,600	LBS
Conc. Class 4000D	496	C.Y.
Conc. Class 4000	96	C.Y.
Elastomeric Bearing Pad	8	Each
Prestressed Conc. Girder (W74G)	2,009	L.F.
2 Foot High Chain Link Fence (Coated)	550	L.F.

All costs in connection with widening the existing pavement seats as shown in the Plans, shall be included in this item of work.

<u>Superstructure - Bridge No. 16/20E Widening</u>

Epoxy-Coated St. Reinf. Bar	68,000	LBS
St. Reinf. Bar	84,000	LBS
Conc. Class 4000D	504	C.Y.
Conc. Class 4000	91	C.Y.

Elastomeric Bearing Pad	8	Each
Prestressed Conc. Girder (W74G)	1,871	L.F.
2 Foot High Chain Link Fence (Coated)	551	L.F.
4 Foot High Chain Link Fence (Coated)	551	L.F.

All costs in connection with widening the existing pavement seats as shown in the Plans, shall be included in this item of work.

<u>Superstructure - 19th St. Pedestrian Tunnel</u>

St. Reinf. Bar	1,050	LBS
Tunnel Ceiling Coating	1,092	S.F.
Bridge Railing Type BP	40	L.F.
Conc. Class 4000	12	C.Y.
Elastomeric Bearing Strip	152	L.F.
Precast Prestressed Slab Members	382	L.F.
Portal Head Wall/Barrier	29	S.Y.
Membrane Waterproofing (Deck Seal)	144	S.Y.

<u>Superstructure - Bridge No. 16/24E</u>

Epoxy-Coated St. Reinf. Bar	30,000	LBS
St. Reinf. Bar	39,200	LBS
Conc. Class 4000D	321	C.Y.
Conc. Class 4000	110	C.Y.
Elastomeric Bearing Pad	32	Each
Prestressed Conc. Girder (W58G)	2,119	L.F.
2 Foot High Chain Link Fence (Coated)	230	L.F.
4 Foot High Chain Link Fence (Coated)	230	L.F.
Traffic Barrier Modification	16.5	L.F.

<u>Superstructure - Bridge No. 16/30E</u>

Epoxy-Coated St. Reinf. Bar	68,800	LBS
St. Reinf. Bar	158,700	LBS
Conc. Class 4000D	436	C.Y.
Conc. Class 4000	540	C.Y.
Prestressing Steel	47,500	LBS
Access Hatch	3	Each
Transverse Stop Bearings	4	Each
2 Foot High Chain Link Fence (Coated) (Ex. Br. No. 16/30W)	211	L.F.
Remove and Replace Existing Traffic Barrier	14'-6"	L.F.
Remove and Replace Existing Chain Link Fabric	211	L.F.

Cleaning and repainting existing chain link posts for reuse is considered incidental to this item of work.

<u>Superstructure - Bridge No. 16/31E</u>

Epoxy-Coated St. Reinf. Bar	80,000	LBS
St. Reinf. Bar	231,000	LBS
Conc. Class 4000D	559	C.Y.
Conc. Class 4000	837	C.Y.
Prestressing Steel	76,000	LBS

Access Hatch	3	Each
Transverse Stop Bearings	4	Each
2 Foot High Chain Link Fence (Coated) (Ex Br. No. 16/31W)	264	L.F.
Remove and Replace Existing Traffic Barrier	27'-6"	L.F.
Remove and Replace Existing Chain Link Fabric	257	L.F.

Cleaning and repainting existing chain link posts for reuse is considered incidental to this item of work.

<u>Roadway Deck - Center Street Flyover Ramp</u>

Epoxy-Coated St. Reinf. Bar	54,755	LBS
St. Reinf. Bar	57,800	LBS
Conc. Class 4000D	249	C.Y.
Conc. Class 4000	48	C.Y.
Elastomeric Bearing Pad	6	Each
Structural Steel	2,700	LBS
Prestressing Steel	3,100	LBS
Transverse Stop Bearings	4	Each

The quantities are listed only for the convenience of the Contractor in determining the volume of work involved and are not guaranteed to be accurate. The prospective bidders shall verify these quantities before submitting a bid. No adjustments other than for approved changes will be made in the lump sum contract price for *** "Superstructure - Bridge No. 16/20W Widening", "Superstructure - Bridge No. 16/20E Widening", "Superstructure - 19th St. Pedestrian Tunnel", "Superstructure - Bridge No. 16/24E", "Superstructure - Bridge No. 16/30E", "Superstructure - Bridge No. 16/31E" and "Roadway Deck - Center Street Flyover Ramp" *** even though the actual quantities required may deviate from those listed.

(June 26, 2000)
*** Fabric pad *** bearing - superstr. will be measured per each for each bearing assembly furnished and installed.

Payment

The first bid item under Section 6-02.5 is supplemented with the following:

(June 26, 2000)
All costs in connection with producing *** fractured fin and random board *** finish on concrete surfaces as specified shall be included in the unit contract price per cubic yard for "Conc. Class _____". If the concrete is to be paid for other than by class of concrete then the costs shall be included in the applicable adjacent item of work.

(June 26, 2000)
All costs in connection with furnishing and applying pigmented sealer on concrete surfaces as specified shall be included in the unit contract price per cubic yard for "Conc. Class _____". If the concrete is to be paid for other than by class of concrete then the costs shall be included in the applicable adjacent item of work.

The third bid item under Section 6-02.5 is supplemented with the following:

(June 26, 2000)
All costs in connection with *** S_1 and S_2 St. Reinf. Bar *** shall be included in the lump sum contract price for "Superstructure - _____" and "Roadway Deck ___".

The fifth and sixth bid items under Section 6-02.5 are supplemented with the following:

(June 26, 2000)
All costs in connection with drilling holes in concrete and setting steel reinforcing bar dowels with epoxy resin as specified shall be included in the unit contract price per pound for "St. Reinf. Bar _____" or "Epoxy-Coated St. Reinf. Bar _____" as applicable. If the steel reinforcing bars are to be paid for other than by type of bar then the costs shall be included in the applicable adjacent item of work.

Section 6-02.5 is supplemented with the following:

(June 26, 2000)
"Roadway Deck - Center Street Flyover Ramp", lump sum.
The lump sum contract price for "Roadway Deck - Center Street Flyover Ramp" shall be full pay for constructing the reinforced concrete portions of the steel bridge superstructure, including *** Pier 2 crossbeam ***.

(June 26, 2000)
"_____ Bearing - Superstr.", per each.

(June 26, 2000)
Payment for "Bridge Deck Repair" will be by force account as provided in Section 1-09.6.

For the purpose of providing a common proposal for all bidders, the Contracting Agency has entered an amount for the item "Bridge Deck Repair" in the bid proposal to become a part of the total bid by the Contractor.

(June 26, 2000)
Bridge and Structures Minor Items
For the purpose of payment, such bridge and structures items as *** concrete inserts, adhesives, epoxy resin, premolded joint filler, grout, conduit expansion joint fittings, conduit deflection fittings, expanded polyethylene, copper pipe drains, junction boxes, close cell polyethylene backer rods, PVC pipes, expanded rubber, sealants, bottom slab drain holes, air vents, luminaires bracket anchorages in traffic barriers, butyl rubber sheeting and assembly, elastomeric girder stops, anchors, pour strips, *** etc., for which there is no pay item included in the proposal, are considered as bridge and structures minor items. All costs in connection with furnishing and installing these bridge and structures minor items as shown and noted in the Plans and as outlined in these specifications and in the Standard Specifications shall be included in the *** applicable adjacent item of work. ***

(June 26, 2000)
Bridge Supported Utilities
All costs in connection with placing *** ITS innerduct and galvanized rigid steel conduit *** through the superstructure of *** the bridges constructed in this project *** as

shown in the Plans, including all *** bridge utility support rods and bars ***, shall be included in the *** lump sum contract price for "Communication Conduit System" . ***

(June 26, 2000)
No additional compensation will be made by reason of any delay or other expense to the Contractor caused by coordination with the utility company or by installing utility company furnished items. However, any unavoidable delays to the Contractor caused by coordination with the utility company or resulting from installing utility company furnished items will be adjusted in accordance with Section 1-08.8.

ACCESS HATCH

Description

This work shall consist of furnishing and installing hatches.

Materials

All steel bars, plates, and shapes shall conform to ASTM A36, AASHTO M 222, or AASHTO M 223 Grade 50.

All bolts shall conform to AASHTO M 164, all nuts shall be heavy hex conforming to AASHTO M 291, Grade DH, and all washers shall conform to AASHTO M 293.

All steel bars, plates, and shapes shall be galvanized in accordance with AASHTO M 111.

All bolts, nuts, and washers shall be galvanized in accordance with AASHTO M 232.

Construction Requirements

The hatches shall meet the following design criteria:

a. The hatch opening shall be spring loaded for one person operation.

b. The bottom surface of the hatch shall be flush with the surface of the surrounding concrete.

The Contractor shall submit shop plans to the Engineer for approval in accordance with Section 6-03.3(7). These plans shall include but not be limited to the following:

a. Plan, elevation, and sections of the hatch assembly, and all components, with dimensions and tolerances.

b. All material designations.

c. Corrosion protection system used on all components.

Payment

All costs in connection with furnishing and installing the hatch as specified shall be included in the lump sum contract price for "Superstructure - Bridge No. 16/30E" and "Superstructure - Bridge No. 16/31E".

STEEL STRUCTURES

Construction Requirements

Planing of Bearing Surfaces

Section 6-03.3(15) is supplemented with the following:

(June 26, 2000)
Where mill to bear is specified in the Plans, the bearing end of the stiffener shall be flush and square with the flange and shall have at least 75 percent of this area in contact with the flange.

Shop Assembly

Method of Shop Assembly

Section 6-03.3(28)A is supplemented with the following:

(August 4, 2003)
The girders shall also be shop assembled either completely or progressively in the transverse direction. The transverse shop assembly shall consist of a minimum of two adjacent girders, with pier diaphragms, intermediate diaphragms and cross bracing, and temporary bracing between girders at the end of the shop assembly (longitudinally). Staging of the transverse shop assembly shall proceed along with the longitudinal shop assembly. Each next stage of the transverse shop assembly shall be assembled to one of the previous transverse shop assemblies, repositioned if necessary, and pinned to ensure accurate alignment. Unless otherwise specified, the girders shall be blocked or supported in the no-load position.

Check of Shop Assembly

Section 6-03.3(28)B is supplemented with the following:

(June 26, 2000)
If an assembly or stage of assembly is not approved by the Engineer, deficiencies shall be corrected and the assembly or stage of assembly shall be resubmitted to the Engineer for approval.

Painting

Section 6-03.3(30) is supplemented with the following:

(March 6, 2000)
Paint for the new steel shall be applied in accordance with Section 6-07.3(1). The color of the third coat, when dry, shall match *** Washington Gray ***. Color chips are available from the source specified in Section 9-08.4(7).

Bolted Connections

Section 6-03.3(33) is supplemented with the following:

(June 26, 2000)
All bolted connections for bridge structures shall use Type 3 bolts.

Swinging the Span

Section 6-03.3(39) is supplemented with the following:

(June 26, 2000)
The Contractor shall measure and submit to the Engineer camber values at the points indicated in the Plans at each of the following times:

1. After the spans are swung.

2. After roadway slab placement.

Measurement

Section 6-03.4 is supplemented with the following:

(June 26, 2000)
Structural low alloy steel contains the following approximate steel quantities:

Bridge	Quantity
*** Center Street Flyover Ramp ***	*** 400,000 lbs ***

Payment

PILING

Construction Requirements

Test Piles

Section 6-05.3(10) is supplemented with the following:

(******)
Piling holes shall be permanently sealed with Bentonite immediately following the removal of the temporary pilings for Snake Lake Bridges No. 16/20E and No. 16/20W.

WATERPROOFING

Description

Section 6-08.1 is supplemented with the following:

(August 2, 2004)
This work consists of furnishing and placing an approved waterproofing membrane over a properly prepared concrete bridge deck prior to placing the HMA overlay.

The waterproofing membrane for this project shall be selected by the Contractor from one of the following systems:

System A
A factory laminated sheet composed of either suitably plasticized coal tar or rubberized asphalt reinforced with a polypropylene fabric or added polyester fibers, and primed in accordance with the manufacturer's recommendations.

System B
A hot-applied, rubberized elastomeric membrane with primer if required by the manufacturer.

System C

A hot-applied reclaimed asphalt/rubber membrane together with a membrane protective fabric. The asphalt/rubber membrane shall be produced by one of the two known proprietary processes combining granulated tire rubber with asphalt cement. Method 1 uses a ground, vulcanized rubber and an extender oil. Method 2 uses ground vulcanized rubber and a kerosene diluent. Either method is acceptable based on proper compliance with the specification and certification of materials.

Materials

Asphalt for Waterproofing

Section 9-11.1 is supplemented with the following:

(******)

Membrane Waterproofing System A Primer

The primer used to bond membrane to the deck and to seal seams and patches shall be a water resistant adhesive compatible with the System A membrane. The primer shall be of suitable consistency for application by brush, roller, or spray without further dilution.

Membrane Waterproofing System B Primer

The primer, if required by the membrane manufacturer, shall be compatible with the System B membrane.

Membrane Waterproofing System C Materials

Asphalt Cement

The asphalt shall be either PG-58-22 or PG-64-22 conforming to Section 9-02.1(14).

Rubber Extender Oil (Method 1)

The extender oil shall be a resinous, aromatic hydrocarbon meeting the following requirements when tested as indicated:

Test	ASTM Test Method	Requirement
Viscosity, SSU at 100F	D 88	2,500 min.
Flash Point, COC Open Cup	D 92	392F min.
Molecular Analysis:	D 2007	
Asphaltenes, percent by Weight	0.1 max.	
Aromatics, percent by Weight	55.0 min.	

Kerosene Type Diluent (Method 2)

The kerosene type diluent used shall be compatible with all materials used and shall have a flash point (ASTM D 92) of not less than 80F. The initial boiling point shall be not less than 300F with a total distillation (dry point) before 450F (ASTM D 850). The Contractor is cautioned that a normal kerosene or range oil cut may not be suitable.

Ground Rubber Components (Method 1)

The rubber shall meet the following physical and chemical requirements:

The granulated crumb rubber shall contain 22 ± 5 percent by weight natural rubber and shall meet the following requirements:

Sieve Size	Percent Passing
U.S. No. 8	100
U.S. No. 30	40-75
U.S. No. 50	10-35
U.S. No. 100	0-15

The sieves shall comply with AASHTO M 92. All percentages are by weight.

The specific gravity of the rubber shall be 1.15 ±0.05 and shall be free of fabric, wire, or other contaminating materials, except that up to four percent of calcium carbonate may be included in the rubber to prevent particles from sticking together.

Ground Rubber Components (Method 2)

The combined granulated rubber shall consist of a minimum of 80 percent by weight of vulcanized rubber produced by the processing of tires. The rubber shall consist of one type or a blend of types as indicated below. The type or blend selected shall be based on laboratory testing by the asphalt/rubber supplier.

The granulated rubber types shall meet the following gradation:

Sieve Sizes	Percent Passing		
	Type 1	Type 2	Type 3
U.S. No. 8	100	---	---
U.S. No. 10	95-100	---	---
U.S. No. 16	---	100	100
U.S. No. 30	0-10	60-90	95-100
U.S. No. 50	0-5	0-20	30-60
U.S. No. 80	---	0-5	15-35
U.S. No. 200	---	---	0-10

The sieves shall comply with the requirements of AASHTO M 92. All percentages are by weight.

The individual granulated rubber particles, regardless of diameter, shall not be greater in length than 0.250 inch for Type 1 or 0.125 inch for Type 2 and Type 3.

The combined granulated rubber shall have a specific gravity of 1.15 ±0.05 and shall be free of loose fabric, wire and other contaminants except that up to four percent (by weight of rubber) calcium carbonate or talc may be added to prevent rubber particles from sticking together. The rubber shall be sufficiently

dry to be free flowing and not produce foaming when blended with the hot asphalt cement.

Certification of Quality Assurance

The asphalt/rubber supplier shall furnish the Engineer the asphalt/rubber mix formulation which shall contain the following information, a minimum of seven calendar days prior to starting placement of the membrane:

Asphalt Cement	Granulated Rubber
Grade of asphalt	Total rubber content, weight
Source of asphalt	Percent of asphalt/rubber mixture

Rubber type(s) and content of each type (if blend), weight, and percent of combined rubber:

<u>Asphalt Modifier</u>

Type of Modifier
Quantity of modifier, weight
Percent of asphalt cement

The Contractor shall submit certifications that the asphalt cement is compatible with the rubber. New certifications will be required if the asphalt cement is changed. The supplier shall furnish a certificate of compliance with these specifications, in accordance with Section 1-06.3, for each shipment.

The granulated rubber will be accepted on receipt of a certificate of compliance with these specifications, in accordance with Section 1-06.3, from the rubber supplier.

Waterproofing Fabric

Section 9-11.2 is supplemented with the following:

(August 4, 2003)

Membrane Waterproofing System A Membrane

The membrane shall be factory-laminated sheet composed of either suitably plasticized coal tar or rubberized asphalt reinforced with polypropylene fabric or added polyester fibers. It shall be manufactured free from blemishes, discontinuities, and other defects. The membrane shall be supplied in rolls, having a minimum width of 36 inches, and shall conform to the following requirements:

Thickness:	65 mils minimum
Pliability (1):	No cracks

(1) Place a 4 inch by 1 inch membrane specimen in a -10F cold chamber for two hours. While still in the cold chamber, bend the specimen 180 degrees over a 1 inch radius mandrel. Remove specimen from cold chamber and inspect for cracks.

Membrane Waterproofing System B Membrane

The membrane shall meet the following requirements:

Viscosity, SSF at 350F	ASTM E 102	950-1350
Softening Point, F	ASTM D 36	165 Min.
Adhesion, psi	ASTM D 429(1)	15 Min.
Cold Bend Test, at -10F		(2) No cracks
Compatibility with Asphalt		Complete

(1) Adhesion ASTM D 429, Method A(Modified). The Contractor shall perform the following tension test of vulcanized rubber bonded to steel:

Coat the surfaces of the 2 metal plates described in the procedure with an epoxy resin of at least 2000 psi tensile strength. Stand the coated ends on Ottawa sand (ASTM C 109). Apply a force of 10 pounds for a minimum of eight hours to ensure adequate bedding of the sand in the resin. Brush all loose particles from the treated metal surface and coat each with 0.0106 ounces of primer.

Cover the bottom of a cylindrical thin film oven test pan (ASTM D 1754) with a release paper such as Technipeel No. 985 made by the Brown Paper Company of Kalamazoo, Michigan. Any release paper that retains its release properties after use is satisfactory.

Pour 1.75 ounces of membrane (at 350 to 375F) into the release-treated pan. Allow the membrane to cool to ambient temperature. Remove it from the pan and cut circular sections to fit the metal plates or discs coated as above.

Fit the circular section of membrane on one metal disc and place the other metal disc over it. Put this sandwich in a 140F oven. Place a 2.205 pound weight on it and leave in the oven for two hours.

Test in accordance with ASTM D 429, Method A, and calculate adhesion as total load at failure divided by area of adhered surface, whether failure occurred at bonded surface or within the membrane material.

(2) Cold Bend Test. The Contractor shall perform the following test:

Pour 1.75 ounces of membrane into a container, as described for the adhesion test. Allow it to cool to ambient temperature and remove from the pan.

Dust both sides lightly with talc to prevent stickiness.

Place the specimen in a -10F cold chamber for two hours. While still in the cold chamber, bend the specimen 180 degrees over a radius not to exceed 1 inch.

Remove the membrane from the cold chamber and check for cracks. Only material which shows no cracks will be considered satisfactory.

Membrane Waterproofing System C Fabric For Membrane Protection
The fabric shall be a polypropylene material having the following properties:

Tensile strength, either direction, min. 47 lbs. (WSDOT Test Method 916)

Weight, oz./sq. yd.	3-6
Width, inches	36 min.

Construction Requirements

Preparation of Surface

Section 6-08.3(2) is supplemented with the following:

(August 2, 2004)
Preparation of Concrete Deck
The entire deck and the sides of the curb to the height of the HMA overlay shall be essentially free of all foreign material such as dirt, grease, etc. Prior to applying the primer or liquid membrane, all dust and loose material shall be removed from the deck with compressed air. Any surface defects such as spalled areas, cracks, protrusions, etc., that will decrease the effectiveness of the membrane by puncturing, stretching, etc., shall be corrected prior to application of the membrane.

Weather and Moisture Limitations
Work shall not be done during wet weather conditions, nor when the deck and ambient air temperatures are below 50F. The deck shall be surface-dry at the time of the application of the primer or liquid membrane.

The Engineer may order work to be suspended in accordance with Section 1-08.6 because of the above weather and moisture limitations.

New Concrete Areas
All areas of the deck that have less than 28 day old concrete shall be allowed to cure for a period of time recommended by the membrane manufacturer or as ordered by the Engineer before application of the membrane.

Concrete Protection
The Contractor shall use care to protect all concrete surfaces from damage. Any damage to exposed surfaces shall be repaired at the Contractor's expense.

Application of Waterproofing

Section 6-08.3(3) is supplemented with the following:

(August 2, 2004)
General Requirements for All Membrane Waterproofing Systems
The primer and membrane waterproofing shall extend from the roadway deck up onto the curb face the thickness of the HMA overlay. Special care shall be used at the curb face to see that the membrane adheres to the concrete.

The Contractor shall not begin application of membrane waterproofing deck seal to the bridge until demonstrating, to the satisfaction of the Engineer, that all labor,

equipment, and materials necessary to apply the membrane and HMA overlay are either on hand or readily available to complete the work in a timely manner.

Evaluating Membrane Waterproofing Effectiveness:
The waterproofing membrane will be visually inspected by the Engineer for uniformity of application, tears, punctures, and bonding. All such deficiencies shall be repaired as approved by the Engineer prior to placement of the membrane protection.

Membrane Waterproofing System A
The primer shall be applied to the cleaned concrete surfaces at the rate and according to the procedure recommended by the membrane manufacturer. All surfaces to be covered by the membrane shall be thoroughly and uniformly coated with primer. Precautionary measures shall be taken to ensure that pools and thick layers of primer are not left on the deck surface to scum over. Drying time prior to applying the membrane shall normally be as recommended by the manufacturer, however, the membrane shall not be applied until substantially all volatile material has dissipated from the primer.

The prefabricated membrane shall be applied to the primed curb and bridge deck surfaces by either hand methods or mechanical applicators. The membrane shall be placed in such manner that a shingling effect will be achieved and that any water which accumulates will drain toward the curb and the drain pipes. Each strip shall be overlapped a minimum of 4 inches or as recommended by the manufacturer. An adhesive or a wide tipped torch to cause tackiness shall be used, if necessary, to assure a good seal of the joints. Hand rollers or other satisfactory pressure apparatus shall be used on the applied membrane to assure firm and uniform contact with the primed concrete surfaces.

Any torn or cut areas, or narrow overlaps, shall be patched using a satisfactory adhesive and by placing sections of the membrane over the defective area in such a manner that the patch extends at least 6 inches beyond the defect. The patch shall be rolled or firmly pressed onto the surface.

The fabric shall be neatly cut and contoured at all joints as directed by the Engineer.

After the membrane waterproofing has been completed, the membrane shall be cut with two right angle cuts at all deck drain pipes. The cuts shall be made to the inside diameter of the drain pipes, after which the corners of the membrane waterproofing shall be turned down into the drains and laid in a coating of asphalt binder.

Membrane Waterproofing System B
The primer, if required, shall be applied to the pavement as specified by membrane manufacturer.

If the primer has become contaminated, the pavement shall be cleaned and a new primer applied and allowed to cure before the membrane is applied.

The membrane material shall be heated in accordance with the manufacturer's recommendations. To ensure against overheating, a double-boiler type heater

shall be used and the membrane material shall be circulated or agitated during the heating process.

The membrane shall be applied to the clean, dry (primed) surface at a nominal rate of 0.5 gallon per square yard and in accordance with the manufacturer's recommendations as to application temperatures.

Placement of the HMA wearing surface shall be done in accordance with the recommendations of the coating manufacturer.

Membrane Waterproofing System C

Preparation of Asphalt/Rubber:

Both Methods

The method and equipment for combining the rubber and asphalt shall be so designed and accessible that the Engineer can readily determine the percentages, by weight, of each of the two materials being incorporated into the mixture.

Method 1

The rubber and modified asphalt shall be combined in a ratio of 20 ± 2 percent rubber to 80 ± 2 percent asphalt by weight and reacted for a sufficient time at 400F ±25F to produce a product with the following properties:

Viscosity at 400	1700 cps max.
Softening Point (R & B)	120F min.
Flex Temperature (90° Bend Test)	20F max.

In the event a delay occurs when the product is ready to be applied, the heat shall be turned off until the job resumes.

Method 2

The percent of combined rubber shall be as indicated by the mixture design for specific project requirements by weight of total mixture, that is, by total weight of asphalt cement plus asphalt modified (if used) plus granulated rubber.

The temperature of the asphalt shall be between 350 and 425F at the addition of the vulcanized rubber. The asphalt and rubber shall be combined and mixed together in a blender unit then reacted in the distributor for a period of time as required by the Engineer and, based on laboratory testing, by the asphalt/rubber supplier. The temperature of the asphalt/rubber mixture shall be above 325F during the reaction period.

After the reaction between asphalt and rubber has occurred, the viscosity of the hot asphalt/rubber mixture may be adjusted for spraying or better wetting of the cover material by the addition of a diluent. The diluent shall comply with the requirements for kerosene type diluent (Method 2) and shall not exceed 7.5 percent by volume of the hot asphalt/rubber mixture.

When a job delay occurs after full reaction, the asphalt/rubber may be allowed to cool. The asphalt/rubber shall be reheated slowly just prior to

application but not to a temperature exceeding 325F. An additional quantity of diluent not exceeding three percent by volume of the hot asphalt/rubber mixture may be added after reheating.

Construction of Membrane:

Equipment

The equipment used for mixing and spreading the asphalt and rubber shall be a self-powered pressure distributor equipped with a separate power unit, a distributing pump capable of pumping the specified material at the specified rate through the distributor tips, and equipment for heating the bituminous material. The distribution bar on the distributor shall be fully circulating with nipples and valves so constructed that they are bathed in the circulating asphalt to the extent that the nipples will not become partially plugged with congealing asphalt. Distributor equipment shall include a tachometer, pressure gauges, volume measuring devices, and a thermometer for reading temperatures of tank contents. The spray bars on the distributor shall be controlled by a bootman riding at the rear of the distributor in such a position that operation of all sprays is in full view and accessible to him for controlling spread widths.

Application

The application rate of the hot asphalt/rubber mixture shall be 0.55 ± 0.10 gallon per square yard uniformly applied.

All transverse joints shall be made by placing building paper over the ends of the previous applications, and the joining application shall start on the building paper used. Once the application process has progressed beyond the paper used, the paper shall be removed and disposed of to the satisfaction of the Engineer. If the Contractor can demonstrate the ability to produce satisfactory transverse joints without paper, no paper will be required as long as the joints remain satisfactory. Any unsatisfactory joint shall be repaired at the Contractor's expense.

Protection Course

Section 6-08.3(4) is supplemented with the following:

(August 2, 2004)

General Membrane Protection for All Membrane Waterproofing Systems

The membrane material shall be protected from damage due to the paving operations. The method of membrane protection for Membrane Systems A and B shall be as recommended by the manufacturer of the membrane system and approved by the Engineer. The method of membrane protection for Membrane System C shall be as specified below.

No traffic or equipment except that required for the actual waterproofing and paving operations will be permitted to travel or rest on the membrane waterproofing until it is covered by the HMA overlay.

Membrane Protection for Membrane Waterproofing System C

Prior to overlaying with HMA, the asphalt/rubber mixture shall be covered with membrane protection fabric. The fabric shall be aligned and carefully rolled or

broomed into the asphalt/rubber mixture. Rolling or brooming the fabric into the asphalt should be accomplished in such a way that any air bubbles which form under the fabric will be removed. This can best be accomplished by brooming from the center of the fabric toward the outer edges. Initial alignment is very important since the fabric direction cannot be changed appreciably without causing wrinkles. If the alignment of the fabric must be changed, the fabric shall be cut and realigned overlapping the previous material and proceeding as before. All joints shall be overlapped a minimum of 1 inch.

After the membrane waterproofing has been completed, the fabric shall be cut around the top inside of the frame of inlets and laid in a coating of asphalt binder.

HMA Overlay

The membrane manufacturer's recommendations shall be thoroughly considered in the application of the HMA overlay particularly as to the type of paving machine, laydown temperature of the HMA, protection of membrane while paving, rolling temperature and technique, and other items unique to each membrane. Differences in application procedure shall be resolved by the Engineer and the Engineer's decision shall be final. Vibratory rollers shall not be used on bridge decks.

Measurement

Section 6-08.4 is supplemented with the following:

(March 6, 2000)
Membrane waterproofing will be measured by the square yard of the bridge deck and curb which is satisfactorily sealed and accepted.

Payment

Section 6-08.5 is supplemented with the following:

(August 2, 2004)
"Membrane Waterproofing (Deck Seal)", per square yard.

The unit contract price per square yard for "Membrane Waterproofing (Deck Seal)" shall be full pay for performing the work as specified, including repairing any damaged or defective waterproofing membrane and damaged HMA overlay.

MODIFIED CONCRETE OVERLAYS

Construction Requirements

Equipment

Rotary Milling Machines

Section 6-09.3(1)B is supplemented with the following:

(December 2, 2002)
Rotary milling machines known to have the specified capacity conforming to Standard Specification 6-09.3(1)B are: the CMI Roto-Mill PR-225, the CMI Roto-Mill PR-275RT, and the Caterpillar PR-275.

Hydro-Demolition Machines
Section 6-09.3(1)C is supplemented with the following:

(August 4, 2003)
Possible sources of hydro-demolition machines include:

1. FLOW International, Inc.
   23500 64th Avenue S
   Kent, WA 98032
   (253) 850-3500

2. IVS Hydro-Demolition Services
   5460 Green Palms Street
   Las Vegas, NV 89103
   (800) 532-6790

3. Hydro-Technologies, Inc.
   6200 E Highway 62
   Jeffersonville, IN 47130
   (812) 284-9376

4. National Hydro, Inc.
   5643 Warner Road
   Flowlerville, MI 48836
   (517) 223-0915

The Contractor may choose to use a machine from a source not listed above, provided the machine is manufactured specifically for concrete removal and meets the performance criteria specified in Section 6-09.3(1)C.

Shot Blasting Machines
Section 6-09.3(1)D is supplemented with the following:

(August 2, 2004)
Possible sources of shot blasting machines include:

1. Humble Equipment Company
   1720 Industrial Drive
   P. O. Box 1606
   Ruston, LA 71273-1606
   (318) 251-1935

2. US Filter Blasttrac
   6215 Aluma Valley Drive
   Oklahoma City, OK 73121
   (405) 478-3440

3. Texas Shot Blast
   4040 Beckwood
   San Antonio, TX 78259
   (210) 497-5594

4. Shot Surfaces, Inc.
   2630 SW Patton Road
   Portland, OR 97201
   (503) 796-9823

5. American Concrete Cutting
   4600 Main Street
   Springfield, OR 97478
   (541) 726-8597

The Contractor may choose to use a machine from a source not listed above, provided the machine is manufactured specifically for concrete removal and meets the performance criteria specified in Section 6-09.3(1)D.

Concrete Overlay Mixes

Section 6-09.3(3) is supplemented with the following:

(January 7, 2002)
The Contractor may use either fly ash modified concrete (FMC), latex modified concrete (LMC), or microsilica modified concrete (MMC) for the concrete overlay. The Contractor shall select one type of concrete for the overlay, provide a mix for the selected concrete to the Engineer in accordance with Item 5 of Section 6-09.3(2), and use that type for the total concrete overlay operation. Use of a combination of types will not be allowed.

Scarifying Concrete Surface

Section 6-09.3(5) is supplemented with the following:

(January 7, 2002)
The Contractor may use either a rotary milling machine, hydro-demolition machine, or shot blasting machine for scarifying concrete surfaces. The Contractor shall inform the Engineer of the type of machine selected in accordance with Item 1 of Section 6-09.3(2).

CONCRETE BARRIER

Materials

Section 6-10.2 is supplemented with the following:

The cement concrete caps and end walls for barriers shall be air entrained concrete Class 3000 in accordance with the requirements of Section 6-02.

Material requirements for temporary barrier connections shall be as detailed on the Plans.

Construction Requirements

Cast-In-Place Concrete Barrier

Section 6-10.3(2) is supplemented with the following:

(******)
Variable height single slope concrete barrier shall be barrier greater than four feet six inches in height and shall be constructed in accordance with the details in the Plans.

Cast-in-place single slope concrete barrier sections for light standards and ramp meter signal standards shall be constructed in accordance with the details in the Plans.

(March 6, 2000)
*** Traffic and SEW Traffic *** barrier shall be constructed in accordance with the requirements for cast-in-place concrete barrier, and shall be cured and finished in accordance with Sections 6-02.3(11)A and 6-02.3(14) respectively.

Temporary Concrete Barrier

Section 6-10.3(5) is supplemented with the following:

(March 13, 1995)
Delineators shall be placed on the traffic face of the barrier 6 inches from the top and spaced a maximum of 40 feet on tangents and 20 feet through curves.

Reflector color shall be white on the right of traffic and yellow on the left of traffic.

The Contractor shall maintain, replace, and clean the delineators when ordered by the Engineer.

(******)
At locations where temporary barrier terminations are adjacent to a fixed barrier, a temporary barrier connection shall be constructed as detailed in the Plans.

Section 6-10.3 is supplemented with the following:

(******)

Cement Concrete Cap and End Wall for Barrier

The cement concrete cap and end wall between barriers shall be constructed in accordance with the details in the Plans.

Measurement

Section 6-10.4 is supplemented with the following:

(August 6, 2001)
*** Traffic *** barrier will be measured by the linear foot along the completed line and slope.

(******)
Cast-in-place single slope transition sections for light standards and ramp meter standards will be measured per each for each completed section.

(******)
Temporary barrier connections to fixed barrier will be measured per each for each connection installed.

(******)
Cement concrete cap and barrier walls will be measured by the square yard of cap and wall constructed.

Payment

Section 6-10.5 is supplemented with the following:

(April 28, 1997)
The following paragraph is added immediately following the bid item, "Temporary Conc. Barrier":

> The unit contract price per linear foot for "Temporary Conc. Barrier" shall include all costs for furnishing, placing, maintaining, replacing, and cleaning barrier delineation.

(March 6, 2000)
"*** Traffic *** Barrier", per linear foot.

The unit contract price per linear foot for "*** traffic barrier, traffic/pedestrian barrier and pedestrian barrier as shown in the Plans shall be considered as traffic barrier for the purposes of measurement and payment. All Traffic *** Barrier" shall be full pay for performing the work as specified, excluding the steel reinforcing bars that extend from the *** deck slabs and walls ***.

(******)
"SEW Traffic Barrier", per linear foot.

(******)
"Variable Height Single Slope Conc. Barrier", per linear foot.
The unit contract price per linear foot for "Variable Height Single Slope Conc. Barrier" shall be full pay for cast-in-place variable height single slope concrete barrier.

(******)
"Single Slope Conc. Barrier _____ Section", per each.

(******)
"Temporary Barrier Connection", per each.

"Cement Conc. Cap", per square yard.
The unit contract price per square yard for "Cement Conc. Cap" shall be full pay to construct the cap and end wall.

NOISE BARRIER WALLS

Materials

Section 6-12.2 is supplemented with the following:

(April 5, 2004)
Precast Concrete Noise Barrier Walls
Grout for encapsulating dowel bars shall conform to Section 6-02.3(26)H.

Grout pads at the bases of precast concrete panels shall conform to Section 6-02.3(20).

Base plates and anchor bolt templates shall conform to ASTM A 36. Base plates shall be corrosion protected by one of the following methods:

1. One coat of Formula A-11-99 paint as specified in Sections 9-08.2 and 6-07.3(5).

2. Galvanized after fabrication in accordance with AASHTO M 111.

3. Galvanized after fabrication in accordance with AASHTO M 298, Class 5, Type 1.

Anchor rods, nuts, and washers shall conform to Section 9-06.5(1), except that plate washers conforming to ASTM A 36 may be used. Nuts and washers, and a minimum of 1'-0" of the exposed end of the anchor rod, shall be corrosion protected by one of the following methods:

1. One coat of Formula A-11-99 paint as specified in Sections 9-08.2 and 6-07.3(5).

2. Galvanized after fabrication in accordance with AASHTO M 232.

3. Galvanized after fabrication in accordance with AASHTO M 298, Class 5, Type 1.

The button head end, 1'-0" minimum, of steel reinforcing Bar B, as identified in the Standard Plans, shall be painted with one coat of Formula A-11-99, as specified in Sections 9-08.2 and 6-07.3(5).

The sealant system for the vertical joint between precast concrete panels shall consist of a single component, gun grade, polyurethane sealant, with a closed cell polyurethane foam backer rod.

(April 5, 2004)

Noise Barrier Wall Access Door

Access door frames shall be formed of 16 gauge steel to size and dimensions shown in the Plans. The access door frame head and jamb members shall be mitered, securely welded, and ground smooth. Each head shall have two anchors and each jamb shall have three anchors. The hinges shall be reinforced with 1/4 inch by 12 inch plate, width equal to the full inside width of the frame.

Access doors shall be full flush 1-3/4 inch thick seamless doors with a honeycomb core. Door faces shall be constructed with smooth seamless 18 gauge roller-levered, cold-rolled steel sheet. The vertical edges shall be neat interlocked hemmed edge seam. The top and bottom of the door shall be enclosed with 16 gauge channels. Mortise and reinforcement for locks and hinges shall be 10 gauge steel.

Each access door shall have three hinges. Access door hinges shall be stainless steel, 4-1/2 inches square, with stainless steel ball bearing and non-removable pins.

Each access door shall have two pull plates. The pull plates shall be stainless steel, with a grip handle of one inch diameter and 8 to 10 inches in length.

Access door deadbolt locks shall be capable of accepting a Best CX series core. The Contractor shall furnish and install a spring loaded construction core lock with each lock. The Engineer will furnish the permanent Best CX series core for the Contractor to install at the conclusion of the project.

Paint for exposed metal surfaces of access doors and frames, except for stainless steel surfaces, shall be Exterior Acrylic water base paint conforming to Federal Standard No. TT-P-19. The paint color, when dry, shall match *** Washington Gray ***. Color chips are available from the source specified in Section 9-08.4(7).

Construction Requirements

Submittals

Section 6-12.3(1) is supplemented with the following:

(April 5, 2004)
The Contractor shall submit a field survey of the existing groundline along each noise barrier wall alignment. The Contractor shall obtain field topographical information for the existing ground within ten feet of the noise barrier wall alignment, except as further limited by the Contracting Agency Right of Way and construction easements for this project. The Contractor shall ensure a vertical survey accuracy of 0.1 foot. The Contractor shall establish horizontal survey control at ten foot intervals, or at six inches differential vertical elevation from the adjacent point on the alignment, whichever is less.

The Contractor shall submit the field survey, including all field notes, to the Engineer. If the Engineer confirms that the groundline condition along the noise barrier wall alignment at the time of construction requires revisions to the noise barrier wall details shown in the Plans, the Engineer will provide revised noise barrier wall Plan details to the Contractor within 14 calendar days.

The Contractor shall complete the field survey as a first item of noise barrier wall work, and shall not begin any other noise barrier wall work, including preparation of precast concrete wall panel shop drawings, until receiving the Engineer's response to the field survey submittal.

Precast Concrete Panel Fabrication and Erection

Section 6-12.3(6) is supplemented with the following:

(April 5, 2004)
The Contractor shall form a *** Class 2 *** finish, as specified in the Plans and Section 6-02.3(14) as supplemented in these Special Provisions, on the surface of the precast concrete panel facing the traffic side.

The Contractor shall form a *** Class 2 *** finish, as specified in the Plans and Section 6-02.3(14) as supplemented in these Special Provisions, on the surface of the precast concrete panel facing the residential area, except as otherwise noted. The surfaces of the pilaster shall receive either a Class 2 surface finish in accordance with Section 6-02.3(14)B, if pigmented sealer is being applied, or a

Class 1 surface finish in accordance with Section 6-02.3(14)A, if pigmented sealer is not being applied.

Payment

Section 6-12.5 is supplemented with the following:

(April 5, 2004)
All costs in connection with performing the field survey of the existing groundline of the noise barrier wall alignment, and submitting the field survey to the Engineer, shall be included in the lump sum contract price for "Structure Surveying".

(April 5, 2004)
"Removing Noise Barrier Wall Shaft Obstructions", estimated.
Payment for removing obstructions, as defined in Sections 6-12.3(3), will be made for the changes in shaft construction methods necessary to remove the obstruction. The Contractor and the Engineer shall evaluate the effort made and reach agreement on the equipment and employees utilized, and the number of hours involved for each. Once these cost items and their duration have been agreed upon, the payment amount will be determined using the rate and markup methods specified in Section 1-09.6. For the purpose of providing a common proposal for all bidders, the Contracting Agency has entered an amount for the item "Removing Noise Barrier Wall Shaft Obstructions" in the bid proposal to become a part of the total bid by the Contractor.

If the shaft construction equipment is idled as a result of the obstruction removal work and cannot be reasonably reassigned within the project, then standby payment for the idled equipment will be added to the payment calculations. If labor is idled as a result of the obstruction removal work and cannot be reasonably reassigned within the project, then all labor costs resulting from Contractor labor agreements and established Contractor policies will be added to the payment calculations.

The Contractor shall perform the amount of obstruction work estimated by the Contracting Agency within the original time of the contract. The Engineer will consider a time adjustment and additional compensation for costs related to the extended duration of the shaft construction operations, provided:

1. the dollar amount estimated by the Contracting Agency has been exceeded, and

2. the Contractor shows that the obstruction removal work represents a delay to the completion of the project based on the current progress schedule provided in accordance with Section 1-08.3.

STRUCTURAL EARTH WALLS

(October 4, 2004)

Precast Concrete Panel Faced Structural Earth Wall Materials

General Materials

Concrete Leveling Pad

Leveling pad concrete shall be commercial concrete in accordance with Section 6-02.3(2)B.

Backfill for Precast Concrete Panel Faced Structural Earth Wall

All backfill material within the structural earth wall reinforced zone shall be free draining, free from organic or otherwise deleterious material.

Backfill material within the reinforced zone shall conform to Section 9-03.14(1), except that the maximum particle size for walls with geogrid reinforcement shall not exceed 1-1/4 inches.

All material within the structural earth wall reinforced zone shall be substantially free of shale or other soft, poor durability particles, and shall not contain recycled materials, such as glass, shredded tires, portland cement concrete rubble, or asphaltic concrete rubble. The material shall meet the following aggregate durability requirements:

Property	Test Method	Allowable Test Value
Los Angeles Wear, 500 rev.	AASHTO T 96	35 percent max.
Degradation	WSDOT Test Method 113	15 percent min.

For walls with metallic soil reinforcement, all material within the structural earth wall reinforced zone shall meet the following chemical requirements:

Property	Test Method	Allowable Test Value
Resistivity	AASHTO T 288	3,000 ohm-cm, min.
pH	AASHTO T 289	5 to 10
Chlorides	AASHTO T 291	100 ppm max.
Sulfates	AASHTO T 290	200 ppm max.

If the resistivity of the backfill material equals or exceeds 5,000 ohm-cm, the specified chloride and sulfate limits may be waived.

For walls with geogrid soil reinforcement, all material within the structural earth wall reinforced zone shall meet the following chemical requirements:

Property	Test Method	Allowable Test Value
pH	AASHTO T 289	4.5 to 9

Wall backfill material satisfying these gradation, durability, and chemical requirements shall be classified as nonagressive.

Proprietary Materials

ARES Modular Panel Wall System

Geogrid reinforcement shall conform to Section 9-33.1 and shall be the following products conforming to the specified material properties:

Geogrid Product Name	Wide Width Tensile Strength	[1,2]Long Term Tensile Strength, T_{al}
Tensar UX1600HS	8,980 lb./ft. min.	2,640 lb./ft.
Tensar UX1700HS	10,830 lb./ft. min.	3,280 lb./ft.

[1]These long term tensile strength requirements apply only in the geogrid direction perpendicular to the wall face.

[2] T_{al} shall be determined in accordance with WSDOT Standard Practice T 925, "Determination of Long-Term Strength for Geosynthetic Reinforcement".

The wide width tensile strength of the geogrid shall be a minimum average roll value (the average test results for any sampled roll in a lot shall meet or exceed the values shown in the table). The strength shall be determined in accordance with ASTM D 6637 for multi-rib specimens.

The ultraviolet (UV) radiation stability, ASTM D 4355, shall be a minimum of 70 percent strength retained after 400 hours in the weatherometer.

The longitudinal (i.e., in the direction of loading) and transverse (i.e., parallel to the wall or slope face) ribs that make up the geogrid shall be perpendicular to one another. The maximum deviation of the cross-rib from being perpendicular to the longitudinal rib (skew) shall be no more than 1 inch in 5 feet of geogrid width. The maximum deviation of the cross-rib at any point from a line perpendicular to the longitudinal ribs located at the cross-rib (bow) shall be 0.5 inches.

The geogrid shall not exhibit brittle fracture (snapping, or rapid crack development), when tested in accordance with Test Method WSDOT T 926.

The Engineer will take random samples of the geogrid materials at the job site. Approval of the geogrid materials will be based on testing of samples from each lot. A "lot" shall be defined as all geogrid rolls sent to the project site produced by the same manufacturer during a continuous period of production at the same manufacturing plant having the same product name. The Contracting Agency will require 14 calendar days maximum for testing the samples after their arrival at the WSDOT Materials Laboratory in Tumwater, WA.

The geogrid samples will be tested for conformance to the specified material properties. If the test results indicate that the geogrid lot does not meet the specified properties, the roll or rolls which were samples will be rejected. Two additional rolls for each roll tested which failed from the lot previously tested will then be selected at random by the Engineer for sampling and retesting. If the retesting shows that any of the additional rolls tested do not meet the specified properties, the entire lot will be rejected. If the test results from all the rolls retested meet the specified properties, the entire lot minus the roll(s) which failed will be accepted.

All geogrid materials which have defects, deterioration, or damage, as determined by the Engineer, will be rejected. All rejected geogrid materials shall be replaced at no expense to the Contracting Agency.

Except as otherwise noted, geogrid identification, storage and handling shall conform to the requirements specified in Section 2-12.2. The geogrid materials shall not be exposed to temperatures less than –20F and greater than 122F.

Rubber bearing pads shall be a type and grade as recommended by Tensar Earth Technologies, Inc.

Geosynthetic joint cover for all horizontal and vertical joints shall be a non-woven geosynthetic as recommended by Tensar Earth Technologies, Inc. Adhesive used to attach the geosynthetic to the rear of the precast concrete facing panel shall be as recommended by Tensar Earth Technologies, Inc.

MSE Plus Wall

Pins connecting the reinforcing mesh to the precast concrete panels shall conform to AASHTO M 32 and shall be galvanized in accordance with AASHTO M 111. Damage to the galvanizing shall be repaired with one coat of Formula A-9-73 paint conforming to Section 9-08.2.

Bearing pads shall be serrated high-density polyethylene (HDPE) copolymer pads with a Shore Hardness between 55 and 65.

Filter fabric joint cover for all horizontal and vertical joints shall be non-woven geosynthetic conforming to AASTHO M 288. Adhesive used to attach the geosynthetic to the rear of the precast concrete facing panel shall be as recommended by SSL, LLC.

Reinforced Earth Wall

Reinforcing strips shall be shop fabricated from hot rolled steel conforming to ASTM A 572 Grade 65 or approved equal, and shall be galvanized after fabrication in accordance with AASHTO M 111. Damage to the galvanizing shall be repaired with one coat of Formula A-9-73 paint conforming to Section 9-08.2.

Bolts and nuts shall conform to Section 9-06.5(3), and shall be galvanized in accordance with AASHTO M 232.

Rubber bearing pads shall be a type and grade as recommended by the Reinforced Earth Company.

Vertical joint filler between panels, when specified in the structural earth wall working drawings, shall be two inch square, flexible open cell polyether foam strips, Grade UU-34, as recommended by the Reinforced Earth Company.

Filter fabric joint cover for all horizontal and vertical joints, when specified in the structural earth wall working drawings, shall be a pervious woven polypropylene filter fabric as recommended by the Reinforced Earth Company. Adhesive used to attach the fabric material to the rear of the precast concrete facing panel shall be as recommended by the Reinforced Earth Company.

Reinforced Soil Wall

Reinforcing mesh shall be shop fabricated of cold drawn steel wire conforming to AASHTO M 32, and shall be welded into finished mesh fabric conforming to AASHTO M 55. Reinforcing mesh shall be galvanized after fabrication in accordance with AASHTO M 111. Damage to the galvanizing shall be repaired with one coat of Formula A-9-73 paint conforming to Section 9-08.2.

Retained Earth Wall

Tie strips shall be shop fabricated from hot rolled steel conforming to ASTM A 570 Grade 50 or approved equal, and shall be galvanized after fabrication in accordance with AASHTO M 111. Damage to the galvanizing shall be repaired with one coat of Formula A-9-73 paint conforming to Section 9-08.2.

The embed loops and connector bars shall be fabricated of steel wire conforming to AASHTO M 32, and shall be galvanized after fabrication in accordance with AASHTO M 111.

Filter fabric joint cover for all horizontal and inclined joints shall be a monofilament filter fabric as recommended by Foster Geotechnical. Adhesive used to attach the fabric to the rear of the precast concrete facing panel shall be as recommended by Foster Geotechnical.

Construction Requirements

Section 6-13.3 is supplemented with the following:

(August 2, 2004)

Precast Concrete Panel Faced Structural Earth Wall

Precast concrete panel faced structural earth walls shall be constructed of only one of the following wall systems. The Contractor shall make arrangements to purchase the precast concrete panels, soil reinforcement, attachment devices, joint filler, and all necessary incidentals from the source identified with each wall system:

ARES Modular Panel Wall System

ARES Modular Panel Wall System is a registered trademark of Tensar Earth Technologies, Inc.

Tensar Earth Technologies, Inc.
5883 Glenridge Drive Suite 200
Atlanta, GA 30328
(800) 836-7271

MSE Plus Wall

MSE Plus is a registered trademark of SSL, LLC.

SSL, LLC
4740-E Scotts Valley Drive
Scotts Valley, CA 95066
(831) 430-9300
FAX (831) 430-9340

Reinforced Earth Wall

Reinforced Earth is a registered trademark of the Reinforced Earth Company.

The Reinforced Earth Company
20381 Lake Forest Drive Suite B-2
Lake Forest CA, 92630
(949) 587-3060

Reinforced Soil Wall

Reinforced Soil is a registered trademark of Hilfiker Retaining Walls.

Hilfiker Retaining Walls
P. O. Box 2012
Eureka, CA 95501-2012
(707) 443-5093
FAX (707) 443-2891

Retained Earth Wall

Retained Earth is a registered trademark of Foster Geotechnical.

Foster Geotechnical
1660 Hotel Circle North Suite 304
San Diego, CA 92108
(619) 688-2400
FAX (619) 688-2499

Submittals

Section 6-13.3(2) is supplemented with the following:

(April 5, 2004)

The following geotechnical design parameters shall be used for the design of the structural earth wall(s):

Wall Name or No.: *** CES Walls 1 & 2 ***

Soil Properties	Wall Backfill	Retained Soil	Foundation Soil
Unit Weight (pcf)	*** 130 ***	*** 130 ***	*** 130 ***
Friction Angle (deg)	*** 36 ***	*** 35 ***	*** 38 ***

	AASHTO Load Group I	AASHTO Load Group VII
Allowable Bearing Capacity (tsf)	*** 3 ***	*** 6 ***
Acceleration Coefficient (g)	N/A	*** 0.3 ***

Wall Name or No.: *** MLN Wall 2 ***

Soil Properties	Wall Backfill	Retained Soil	Foundation Soil
Unit Weight (pcf)	*** 125 ***	*** 125 ***	*** 120 ***
Friction Angle (deg)	*** 38 ***	*** 32 ***	*** 30 ***

	AASHTO Load Group I	AASHTO Load Group VII
Allowable Bearing Capacity (tsf)	*** 2.5 [1] ***	*** 4 [1] ***

Acceleration Coefficient (g)	N/A	*** 0.3 ***

[1]Assumes over excavation and replacement of loose soil.

Precast Concrete Facing Panel and Concrete Block Fabrication

Section 6-13.3(4) is supplemented with the following:

(August 2, 2004)

Specific Fabrication Requirements for Proprietary Precast Concrete Panel Faced Structural Earth Walls

ARES Modular Panel Wall System

The concrete mix for precast concrete facing panels shall be a Contractor mix design in accordance with Section 6-02.3(2)A, producing a minimum compressive strength at 28 days of 4,500 psi. The Contractor mix design for precast concrete facing panels shall not include Type III cement unless otherwise approved by the Engineer.

The slot opening for geogrid attachment in precast concrete facing panels shall be 1/8 inch minimum. The Contractor shall test the slot opening of each concrete panel using a feeler gauge furnished by Tensar Earth Technologies, Inc. Concrete panels with slot dimension deviations that allow the feeler gauge to be pulled out of the slot shall be rejected.

MSE Plus Wall

The concrete mix for precast concrete facing panels using soil reinforcement mesh of either 6w20 or 6w24 shall be a Contractor mix design in accordance with Section 6-02.3(2)A, producing a minimum compressive strength at 28 days of 5,000 psi. The Contractor mix design for all precast concrete facing panels shall include Type II cement only.

Rods forming the internal connection channel in precast concrete facing panels shall be turned within 20 minutes of concrete placement in each concrete panel, and removed between 3 and 24 hours after concrete placement.

Precast Concrete Facing Panel and Concrete Block Erection

Section 6-13.3(5) is supplemented with the following:

(April 5, 2004)

Specific Erection Requirements for Proprietary Precast Concrete Panel Faced Structural Earth Walls

MSE Plus Wall

The loop pockets and access pockets of the internal connection channel of the precast concrete facing panels shall be cleaned of all backfill and extraneous materials prior to inserting the pins to connect the soil reinforcing mesh to each concrete panel.

Backfill

Section 6-13.3(7) is supplemented with the following:

(April 5, 2004)
Specific Backfill Requirements for Proprietary Precast Concrete Panel Faced Structural Earth Walls

MSE Plus Wall

At each wall reinforcement level, the Contractor shall place the backfill to the level of the connection. Backfill placement and compaction methods shall ensure that no voids exist directly beneath the wall reinforcement near the precast concrete facing panels.

SOIL NAIL WALLS

Materials

Section 6-15.2 is supplemented with the following:

(April 5, 2004)
Permanent Soil Nail Materials and Components

A soil nail system is a structural system used to transfer tensile loads to soil. A soil nail system may also be specified in the Plans as a nail. A soil nail system includes all steel reinforcing bars, anchorage devices, grout, coatings, sheathings and couplers if used.

The Contractor shall either select a soil nail system from the Qualified Products List, or submit the following information to the Engineer for approval:

1. Catalogue cuts or Manufacturer's Certificates of Compliance for centralizers and grout admixtures.

2. Manufacturer's Certificate of Compliance for bearing plates, nuts, steel reinforcing bars, tendon encapsulation tubing, and welded shear studs. The Manufacturer's Certificate of Compliance for the nuts shall confirm compliance with the specified strength requirements.

If the Contractor selects a permanent soil nail system from the Qualified Products List (QPL), the Contractor shall submit, to the Engineer, a certificate from the permanent soil nail system fabricator/supplier confirming that the material specifications of the permanent soil nail system components as furnished conform to those specified in the QPL submittal as approved by WSDOT.

Component Material Specifications

Bearing plates shall conform to ASTM A 36, ASTM A 529, ASTM A 536, ASTM A 572, ASTM A 588, or AASHTO M 270.

Centralizers shall be fabricated from plastic, steel, or material which is nondetrimental to the prestressing steel. Wood shall not be used.

Grout shall be a neat cement grout or a sand-cement grout. The compressive strength for the grout shall be as required by the soil nail manufacturer and as approved by the Engineer. Grout components shall be as follows:

Admixtures shall conform to the requirements of Section 9-23.6. Expansive admixtures and accelerators will not be permitted. Admixtures shall be mixed in accordance with the manufacturer's recommendations.

Aggregates shall conform to the requirements of Section 9-03.

Cement shall conform to the requirements of Section 9-01, and shall not contain lumps or other indications of hydration.

Nuts shall conform to either AASHTO M 291, Grade B, Hexagonal, ASTM A 536 Grade 100-70-03, ASTM A 29 Grades 12L14, 1215, or C1045, AASHTO M 169 Grades 1117 or 12L14, ASTM A 513 Type 5 Grade 1026, ASTM A 521 Class CF, ASTM A 897 Grade 125/80/10M, or ASTM A 519 Grade 1026, and shall be capable of developing 100 percent of the GUTS of the soil nail. The nuts shall be fitted, where necessary, with a special wedge washer or spherical seat such that the nut bears uniformly on the bearing plate.

Washers shall conform to either AASHTO M 293, ASTM A 536 Grade 80-55-06 or ASTM A 47 Grade 32510.

Soil nails shall be deformed steel reinforcing bars conforming to AASHTO M 31, Grade 60 minimum, and Section 9-07.2. All soil nails, except those specified in the Plans to be encapsulated, shall be epoxy-coated in accordance with Sections 6-02.3(24)H and 9-07.3. The soil nails shall be of the type and size specified in the Plans. The soil nails shall not be spliced. The soil nails shall be threaded at the bearing plate end a minimum of six inches. The threading shall be continuous spiral deformed ribbing. Alternatively, threads may be cut into the soil nail if the bar size is increased to the next larger size from the size specified in the Plans at no additional cost to the Contracting Agency.

Tendon encapsulation, when specified in the Plans to provide additional corrosion protection, shall be fabricated from one of the following:

1. High density corrugated polyehtylene (PE) tubing conforming to the requirements of ASTM D 3350 Class PE335520C or Class PE335400C, ASTM D 1248, and AASHTO M 252 and having a nominal wall thickness of 40 mils.

2. Corrugated, polyvinyl chloride (PVC) tubing conforming to ASTM D 1784, Class 13464-B, and having a nominal wall thickness of 40 mils.

The soil nails shall be centralized within the sheathing with a minimum 0.2 inch grout cover over the soil nail inside the sheath. The encapsulation shall be constructed at the factory under controlled conditions. Field construction of the encapsulation will not be permitted.

Welded shear studs shall conform to Section 9-06.15, and shall be welded in accordance with Section 6-03.3(25).

Construction Requirements

Soil Nail Testing And Acceptance

Verification Testing

Section 6-15.3(8)A is supplemented with the following:

(April 5, 2004)
Soil nail verification tests shall be conducted as follows:

Verification Test Limits	Soil Nail Row	Number of Successful Verification Tests Required
***A22 Wall 3		
Between Sta. 5+40.00 and Sta. 5+60.00***	***top row***	***1***
Between Sta. 6+40.00 and Sta. 6+60.00	top row	1
A22 Wall 4		
Between Sta. 11+30.00 and Sta. 11+50.00	top row	1
Between Sta. 11+95.00 and Sta. 12+15.00	top row	1

DIVISION 7
DRAINAGE STRUCTURES, STORM SEWERS, SANITARY SEWERS, WATER MAINS, AND CONDUITS

MANHOLES, INLETS, CATCH BASINS, AND DRYWELLS

Materials

Section 7-05.2 is supplemented with the following:

(******)
Manhole 48 in. Diam. Type COT shall meet the requirements of the details in the Plans.

Grate Inlets And Drop Inlets
Section 9-05.16 is supplemented with the following:

(March 13, 1995)
The Contractor shall furnish and install Grate B, as shown on Standard Plan B-4b, on all grate inlets.

Construction Requirements

Adjusting Manholes and Catch Basins to Grade
Section 7-05.3(1) is supplemented with the following:

(OR February 28, 2002)
The existing manholes, catch basins, and inlets shall be lowered prior to planing, and adjusted to the finished grade after the asphalt overlay is complete.

Manholes, catch basins, and inlets shall be lowered sufficiently to allow the planer to maintain a continuous profile and grade.

Manholes, catch basins, and inlets to be adjusted, shall have their frames and grates marked as identifiable pairs.

Debris from lowering and adjusting of the manholes, catch basins, and inlets shall be removed and disposed of from the project.

To minimize pavement damage, the Contractor shall reference the location of each manhole, catch basin, and inlet to be adjusted. The Contractor may use location devices, offsets, or any locating method approved by the Engineer.

(******)
Manholes, catch basins, and inlets installed by the Contractor that are in the traveled way or shoulder where traffic is present, shall be adjusted to maintain the roadway or shoulder grade at that time.

(******)
Locking Solid Metal Covers and Frames
Locking solid cover lids shall be furnished and install in accordance with the Standard Plans.

Measurement

Section 7-05.4 is supplemented with the following:

(******)
Adjusting drainage structure will be measured per each for each existing manhole, catch basin, or inlet adjusted to finish grade. No measurement will be made for lowering manholes, catch basins, or inlets prior to paving.

(******)
Solid metal locking covers and frames for catch basins will be measured, as a single unit, per each, for each unit installed.

Payment

The paragraph following "Catch Basin Type 2 ___ In. Diam.", per each, in Section 7-05.5 is revised to read as follows:

(******)
All costs associated with furnishing and installing gravel backfill for bedding manholes and catch basins, and adjusting the drainage structure to grade, including restoration of the areas in a manner acceptable to the Engineer, shall be included in the unit contract price for the item installed.

Section 7-05.5 is supplemented with the following:

(******)
"Manhole 48 In. Diam. Type COT", per each.

(******)
"Locking Solid Metal Cover and Frame for Catch Basin", per each.

(******)
"Adjust Drainage Structure", per each.

The unit contract price per each for "Adjust Drainage Structure" shall be full pay for all costs necessary to make the adjustment to existing structures, including temporary lowering, adjusting to grade, and restoration of adjacent areas in a manner acceptable to the Engineer. All costs associated with adjusting drainage structures installed by the Contractor shall be included in the cost of the specific drainage structure.

GENERAL PIPE INSTALLATION REQUIREMENTS

Construction Requirements

Backfilling

Section 7-08.3(3) is supplemented with the following:

(******)
When pipe is being placed under existing paved areas, or roadways, backfill above the pipe zone shall be controlled density fill.

Excavation, installation, and backfilling for each of the following drainage codes shall be completed within one work shift:

D8-8
D8-9
D8-10
D8-11
D8-12
D8-27
D11-6
D11-7

Section 7-08.3 is supplemented with the following:

(******)
The Contractor shall provide written notification 30 days prior to performing any work on City of Tacoma storm or sanitary sewer systems.

ECOLOGY DRAIN

Description

This work shall consist of furnishing and installing materials to construct ecology drains in ditches and ponds.

Materials

Materials shall meet the requirements of the following sections:

Gravel Backfill for Drains	9-03.12(4)
Underdrain Pipe	9-05.2
Compost Type 1	9-14.4(8)
Construction Geotextile	9-33

Sand Backfill

Sand backfill shall conform to the following grading:

Sieve Size	Percent Passing
U.S. No. 4	95-100
U.S. No. 8	70-100
U.S. No. 16	40-90
U.S. No. 30	25-75
U.S. No. 50	2-25
U.S. No. 100	0-4
U.S. No. 200	0-2

All percentages are by weight.

Prior to use, the Contractor shall provide the Engineer with a grain analysis from the sand supplier certifying that the sieve requirements are met.

Construction Requirements

Ecology drains shall be constructed in accordance with the details in the Plans.

Measurement

Ecology drain will be measured by the linear foot along the completed line and slope of the installation.

Payment

Payment will be made in accordance with Section 1-04.1, for the following bid item:

"Ecology Drain", per linear foot.

OPEN FLOW RESTRICTOR

Description

This work shall consist of furnishing and installing materials to construct the open flow restrictor.

Materials

Materials requirements for the open flow restrictor shall be as detailed in the Plans.

Construction Requirements

The open flow restrictor and concrete pad shall be constructed in accordance with the details in the Plans.

Measurement

Open flow restrictor will be measured per each for each open flow restrictor constructed.

Payment

Payment will be made in accordance with Section 1-04.1, for the following bid item:

"Open Flow Restrictor", per each.

The unit contract price per each for "Open Flow Restrictor" shall be full pay to perform the work as specified including all costs associated with constructing the concrete pad.

WATER ENHANCEMENT SYSTEM

Description

This work shall consist of furnishing and installing a vortex-enhanced water treatment settling system.

Construction Requirements

The design and installation of the enhancement system shall be in accordance with the Dept. of Ecology Stormwater Management Manual For Western Washington and the manufacturer's requirements.

The system shall be designed to:

1. Treat 50 CFS from a 585-acre basin.
2. Provide 80% total suspended solid removal.
3. Remove oil and debris.
4. Prevent re-suspension of solids during high flows.
5. Prevent re-suspension of solids during surcharge from high lake levels.

The Contractor shall provide shop drawings to the Engineer for review and comment prior to fabrication of the system components. The drawings shall show all components to the system and the proposed method of connection to the existing stormwater system.

The gravel parking area shall only be used as a staging area for the installation of the "Vortex Water Enhancement System" and shall not prohibit access to the Snake Lake Nature Center.

Upon completion of the system, the Contractor shall provide maintenance and operational manuals for system components and a complete set of as-built plans for the system.

Payment

Payment will be made in accordance with Section 1-04.1 for the following bid item:

"Vortex Water Enhancement System", lump sum.
The lump sum contract price for "Vortex Water Enhancement System" shall be full compensation for all costs associated with installing a complete and operating system, in accordance with the system manufacturer's requirements, including excavation and connection to the existing stormwater system.

VALVES FOR WATER MAINS

Construction Requirements

Section 7-12.3 is supplemented with the following:

(OR March 26, 2001)

Adjusting Valve Box to Grade

Where shown in the Plans or designated by the Engineer, the existing valve boxes shall be lowered prior to planing and adjusted to the finish grade after the asphalt overlay is complete.

The existing valve box shall be removed and thoroughly cleaned for reinstallation at the new elevation. The Contractor shall exercise care in removing the existing valve boxes so as not to disturb the valve or damage the box. Any part damaged due to the Contractor's operations shall be replaced by the Contractor at no expense to the Contracting Agency.

Valve boxes shall be lowered sufficiently to allow the planer to maintain a continuous profile and grade.

The Contractor shall backfill and compact all voids resulting from lowering and adjusting the valve boxes. Backfill material shall be approved by the Engineer.

Debris from lowering and adjusting the valve boxes shall be removed and disposed from the project.

To minimize pavement damage, the Contractor shall reference the location of each valve box to be adjusted. The Contractor may use location devices, offsets, or any locating method approved by the Engineer

Measurement

Section 7-12.4 is supplemented with the following:

(OR March 26, 2001)
Adjusting valve boxes will be measured per each.

Payment

Section 7-12.5 is supplemented with the following:

(OR March 26, 2001)
"Adjust Valve Box", per each

The unit contract price per each for "Adjust Valve Box" shall be full pay for all costs necessary to make adjustments including temporary lowering and final adjustments, removal of debris, locating, backfilling and restoration of adjacent areas in a manner acceptable to the Engineer.

DIVISION 8
MISCELLANEOUS CONSTRUCTION

EROSION CONTROL AND WATER POLLUTION CONTROL

Description

Section 8-01.1 is supplemented with the following:

(OR November 27, 2001)

This work shall consist of preparing a Fugitive Dust Control Plan (FDCP) in conjunction with the Temporary Erosion and Sediment Control (TESC) Plan and preparing for implementation of the plan.

(OR September 9, 2004)

High Visibility Fence

This work shall consist of delineating all wetland and sensitive areas by furnishing, installing, maintaining, and removing high visibility construction fence in accordance with these specifications and as shown in the Plans or as designated by the Engineer.

Materials

Section 8-01.2 is supplemented with the following:

(OR September 9, 2004)
High visibility fence shall be UV stabilized, orange or yellow high-density polyethylene or polypropylene mesh, and shall be at least four feet in height. Mesh openings shall be 1.5 inches by 2.5 inches nominal. The fence shall weigh approximately 0.5 pounds per linear foot.

Either wood or steel support posts shall be used. Wood posts shall have minimum dimensions of 1.5 inch by 1.5 inch, and shall be free of defects such as knots, splits, or gouges. Steel posts shall consist of either size No. 6 rebar or larger, ASTM A 120 steel pipe with a minimum weight of 1.3 pounds per foot or other steel posts having equivalent strength and bending resistance to the posts listed.

Construction Requirements

Section 8-01.3 is supplemented with the following:

(******)

Compost

All erodible soil, when at final grade, shall be covered with a 3-inch thickness of compost Type 1. Prior to seeding, fertilizing and mulching, all areas that have not yet received a 3-inch thickness of compost, shall receive a 3-inch thickness of compost Type 1.

(******)

Parking Lot Sweeping

The temporary park-and-ride lot, located in the Tacoma Alliance Church parking lot, shall be swept every other Saturday night during the time that the lot is used as a park-and-ride.

Submittals

Section 8-01.3(1)A is supplemented with the following:

(OR May 27, 2004)
The Contractor shall incorporate as part of the Temporary Erosion and Sediment Control (TESC) Plan, a Fugitive Dust Control Plan (FDCP). This plan shall reflect conditions specific to the Contractor's operation and schedule of work. The Contractor shall base the FDCP on Best Management Practices (BMP's) set forth in the Associated General Contractors of Washington Education Foundation and

Fugitive Dust Task Force Pamphlet, "Guide To Handling Fugitive Dust From Construction Projects".

(OR September 13, 2002)

Erosion and Sediment Control (ESC) Lead

Section 8-01.3(1)B is supplemented with the following:

In addition to those outlined in Section 8-01.3(1)B duties of the Erosion and Sediment Control Lead shall also include, but are not limited to:

1. Being responsible for the preparation of a Temporary Erosion and Sediment Control (TESC) Plan, to be used for the duration of the project, when a TESC Plan is not included in the contract plans.

2. Making Contracting Agency initiated revisions to the approved Temporary Erosion and Sediment Control (TESC) Plan and Fugitive Dust Control Plan (FDCP), maintaining both in a TESC file.

3. Implementing the FDCP and inspecting the Best Management Practices (BMPs) for proper location and installation.

4. Preparing a FDCP Inspection Report for each inspection. The inspection reports shall be included in the TESC Plan/FDCP File maintained by the Contractor's Erosion and Sediment Control Lead. The inspection reports shall be made available to the Engineer upon request and shall include, but not be limited to the following:

    a. The date and time BMPs are installed, removed, or changed;
    b. The date and time maintenance is needed and performed;
    c. The date, time, and person who performs inspection and maintenance, and what, if any maintenance is done;
    d. Observations of BMP effectiveness and proper placement;
    e. Recommendations for improving performance of BMPs.

Section 8-01.3 is supplemented with the following:

(OR September 9, 2004)***High Visibility Fence***

As described in the Special Provision **ORDER OF WORK**, the Contractor shall, as the first order of work, install a high visibility fence along the site preservation lines shown in the Plans. Support posts for the fence shall be placed at six-foot centers or as needed to provide rigidity. The fence shall be attached to the posts every six inches with a polyethylene tie. The fence shall not be fastened to trees.

Upon completion of this work, the Contractor shall request the Engineer to inspect the fence. Contracting Agency acceptance of the material and installation will be based on visual inspection, and acceptance will be evidenced in writing.

Throughout the life of the project, the Contractor shall preserve and protect the delineated area, acting immediately to repair or restore any fencing damaged or removed.

Measurement

Section 8-01.4 is supplemented with the following:

(******)
Sweeping of the temporary park-and-ride will be measured by the hour for the actual time spent sweeping the pavement, as authorized by the Engineer. Time to move equipment to or from the area on which the sweeping is required will not be measured.

(OR September 9, 2004)
High visibility fence will be measured by the linear foot along the groundline of the completed fence.

Payment

Section 8-01.5 is supplemented with the following:

(OR November 27, 2001)
"Temporary Erosion and Sediment Control (TESC) Plan", per lump sum.
The lump sum contract price for the "Temporary Erosion and Sediment Control (TESC) Plan", which includes the "Fugitive Dust Control Plan (FDCP)", shall be full pay for all labor, equipment, material and overhead costs associated with the preparation of the TESC Plan and FDCP and any coordination and preparation needed prior to implementation.

There shall be no other payment for Dust Control Measures other than what is provided for in Section 2-07.

(OR September 9, 2004)
"High Visibility Fence", per linear foot.
The unit contract price per linear foot for "High Visibility Fence" shall be full pay for all costs to obtain, install, maintain, and remove the fence as specified. Once removed, the fencing shall remain the property of the Contractor.

(******)
"Parking Lot Sweeping", per hour.

ROADSIDE RESTORATION

Description

(January 7, 2002)
The first paragraph of Section 8-02.1 is revised to read:

This work shall consist of furnishing and placing topsoil and soil amendments, and furnishing and planting trees, whips, shrubs, ground covers, cuttings, live stakes, live poles, rhizomes, tubers, and seedling, and applying compost in accordance with these Specifications and as shown in the Plans or as directed by the Engineer.

Construction Requirements

Planting Area Preparation

Section 8-02.3(5) is supplemented with the following:

(******)

After the initial planting area weed control, soil placement, grading, and the installation of irrigation lines are completed, and prior to planting, all designated planting areas shall be covered with compost.

Prior to placement of compost, the application methods shall be approved by the Engineer.

Compost shall not be placed when a condition exists, such as frozen or water saturated soil, that may be detrimental to successful application or soil structure.

Type 1 Compost shall be used on entire site.

The Contractor shall notify the Engineer a minimum of five working days prior to the start of compost work.

In the revegetation area, compost shall be uniformly and evenly placed in all designated areas at the rate of *** 400 *** cubic yards per acre.

Erosion Control Seeding, Fertilizing and Mulching

Seeding and Fertilizing

Section 8-02.3(15)B is supplemented with the following:

(December 23, 2002)

Grass seed, of the following composition, proportion, and quality shall be applied at the rate of *** 80 *** pounds per acre on all areas requiring roadside seeding within the project:

Kind and Variety of Seed in Mixture	% By Weight	Minimum % Pure Seed	Minimum % Germination
Non-Clover Mix	45	44.1	80
Perennial Ryegrass	45	44.1	90
Colonial Bentgrass	10	9.8	85
Weed Seed		0.5 (max)	
Inert and Other Crop		1.5 (max)	
TOTAL		100.00	

(December 23, 2002)

Grass seed shall be a commercially prepared mix, made up of low growing species which will grow without irrigation at the project location, and approved by the Engineer. The application rate shall be two pounds per 1000 square feet.

(December 23, 2002)

Sufficient quantities of fertilizer shall be applied to supply the following amounts of nutrients:

Total Nitrogen as N - *** 135 *** pounds per acre.

Available Phosphoric Acid as P_2O_5 - *** 60 *** pounds per acre.

Soluble Potash as K_2O - *** 60 *** pounds per acre.

*** 90 *** pounds of nitrogen applied per acre shall be derived from isobutylidene diurea (IBDU), cyclo-di-urea (CDU), or a time release, polyurethane coated source with a minimum release time of 6 months. The remainder may be derived from any source.

The fertilizer formulation and application rate shall be approved by the Engineer before use.

Mulching

Section 8-02.3(15)D is supplemented with the following:

(December 23, 2002)
*** Wood cellulose fiber *** mulch shall be applied at a rate of *** 2,000 *** pounds per acre.

Payment

Section 8-02.5 is supplemented with the following:

(August 2, 2004)
"Compost ___", per cubic yard.

The unit contract price per cubic yard for "Compost ___" shall be full pay for furnishing, and spreading, compost onto the soil.

IRRIGATION SYSTEMS

Construction Requirements

Section 8-03.3 is supplemented with the following:

Irrigation System Restoration

The Contractor shall extend the irrigation water line, and the electrical conduit and conductors from the existing median island, being removed, to the median island being constructed in the vicinity of RGS 12+50.

Water line pipe shall match the existing in size and type. The end shall be capped inside the island 2 feet from the back of curb. A stake shall be placed to indicate the location of the capped end.

Payment

Section 8-03.5 is supplemented with the following:

"Force Account Irrigation System", by force account as provided in Section 1-09.6.

To provide a common proposal for all bidders, the Contracting Agency has entered an amount in the proposal to become a part of the Contractor's total bid.

GUIDE POSTS

Description

Section 8-10.1 is supplemented with the following:

(******)
This work shall consist of furnishing and installing barrier delineators on permanent concrete barrier when delineators are used in lieu of guide post.

Materials

Section 8-10.2 is supplemented with the following:

(April 1, 2002)
Barrier delineators shall consist of a flat plastic reflector lens or reflective sheeting attached to a housing or bracket to facilitate the mounting of the delineator on concrete traffic barrier. The reflective surface shall be rectangular or trapezoidal shape with a minimum area of 9 square inches for reflectors and 12 square inches for reflective sheeting. The housing or bracket can be flexible or rigid, molded from a durable plastic or other durable material approved by the engineer. Barrier delineators shall be one sided for single direction or two sided for bi-directional.

Reflectors shall be acrylic or polycarbonate and shall conform to AASHTO M 290. Reflectors shall equal or exceed the following minimum values of specific intensity:

Observation Angle (Degrees)	Entrance Angle (Degrees)	Specific Intensity cd/ft-c	
		White	Yellow
0.1	0	126	75
0.1	20	50	30

Reflective sheeting for barrier delineators shall be type III, IV, V or VII and selected from approved materials listed in the Qualified Products List.

Construction Requirements

Section 8-10.3 is supplemented with the following:

(April 1, 2002)
Barrier delineators shall be placed on the traffic face of the barrier six inches down from the top. Spacing shall be as shown in the plans. Delineator color shall be white on the right of traffic and yellow on the left of traffic. The surface of the barrier where the delineator is applied shall be free of dirt, curing compound, moisture, paint, or any other material that would adversely affect the bond of the adhesive. Install delineators with an adhesive recommended by the manufacturer.

Measurement

Section 8-10.4 is supplemented with the following:

(******)

Barrier delineators will be measured by the unit for each delineator furnished and installed on permanent barrier.

Payment

Section 8-10.5 is supplemented with the following:

(April 1, 2002)
"Barrier Delineator", per each

CHAIN LINK FENCE AND WIRE FENCE

Materials

Section 8-12.2 is supplemented with the following:

(******)

Bracket For Barrier Mounted Fence

The material requirements for the bracket assembly for fence mounted on barrier shall be as detailed in the Plans.

(******)

Coated Chain Link Fence and Cable Safety Rail

Chain link fence fabric shall be hot-dip galvanized with a minimum of 0.8 ounce per square foot of surface area.

All fencing and cable safety rail materials, except for the safety cables, turnbuckles and spelter sockets, shall be coated with an ultraviolet-insensitive plastic or other inert material at least 2 mils in thickness.

Any pretreatment or coating shall be applied in accordance with the manufacturer's written instructions. The Contractor shall provide the Engineer with the manufacturer's written specifications detailing the product and method of fabrication. The color shall match color number 37056 Federal Standard 595B latest edition, or be as approved by the Engineer.

Samples of the coated materials shall be approved by the Engineer prior to installation on the project.

The Contractor shall supply the Engineer with 10 aerosol spray cans containing a minimum of 14 ounces each of paint of the color specified above. The touch-up paint shall be compatible with the coating system used.

(******)

Temporary Fence

Temporary fence shall be self-supported chain link panels that can be fastened together to form a continuous fence.

Construction Requirements

Section 8-12.3 is supplemented with the following:

(******)

Barrier and Wall Mounted Fencing

Chain link fence shall be constructed on top of barrier and walls in accordance with the details in the Plans.

Safety Cable Rail

Safety cable rail shall be constructed on top of walls in accordance with the details in the Plans.

Temporary Fence

The Contractor shall install and maintain temporary chain link fencing at locations indicated in the Plans.

The temporary chain link fence shall be securely attached to the right of way fence at each end.

Measurement

Section 8-12.4 is supplemented with the following:

(******)

Safety cable rail will be measured by the linear foot along the line of the completed rail.

Temporary fencing will be measured by the linear foot of completed fence, measured along the ground line.

Payment

Section 8-12.5 is supplemented with the following:

(******)

"Coated Chain Link Fence Type ___", per linear foot.

"Coated Chain Link Fence Type ___ On Single Slope Barrier", per linear foot.

"Coated Chain Link Fence On Wall", per linear foot.

The unit contract price per linear foot for "Coated Chain Link Fence Type ___ On Single Slope Barrier" and "Coated Chain Link Fence On Wall" shall include all costs associated with furnishing and installing the brackets.

"Coated End, Gate, Corner, PullPost for Chain Link Fence", per each.

"Double 20 Ft. Coated Chain Link Gate", per each.

"Coated Cable Safety Rail", per linear foot.

The unit contract price per linear foot for "Coated Cable Safety Rail" shall include all costs associated with furnishing and installing the brackets.

"Temporary Chain Link Fence", per linear foot.

The unit contract price per linear foot of "Temporary Chain Link Fence" shall include all costs to furnish, install, maintain, and remove the temporary fencing.

MONUMENT CASES

Description

Section 8-13.1 is supplemented with the following:

(******)
This work shall consist of furnishing and placing monument cases, covers, and pipes in accordance with the Standard Plans and these Specifications, in conformity with the lines and locations shown in the Plans or as staked by the Engineer.

Materials

Section 8-13.2 is supplemented with the following:

(March 13, 1995)
The pipe shall be Schedule 40 galvanized pipe.

Construction Requirements

(March 13, 1995)
The last paragraph of Section 8-13.3 is revised to read:

The Engineer will be responsible for placing the concrete core and tack or wire inside the pipe.

Section 8-13.3 is supplemented with the following:

Adjusting Monument Case and Cover
Existing monument cases and covers shall be lowered prior to planning to allow the planer to maintain a continuous profile and grade. Following completion of the paving, the monument and covers shall be adjusted to finished grade.

The existing case and cover shall be removed, without disturbing the monument, and cleaned prior to lowering.

The case and cover may be adjusted to finished grade by either removing and resetting the case and cover or by the use of riser rings. If the case and cover is reset, backfill material, approved by the Engineer, shall be placed and compacted without disturbing the monument, to provide a solid base for the case.

Cases or covers damaged due to the Contractors operation shall be replaced by the Contractor at no cost to the Contracting Agency.

Measurement

Section 8-13.4 is supplemented with the following:

(******)
Measurement of monument case, cover, and pipe will be by the unit for each monument case, cover, and pipe set.

Adjusting monument case and covers will be by the unit for each monument case and cover adjusted to finished grade.

Payment

Section 8-13.5 is supplemented with the following:

(******)
"Monument Case, Cover, and Pipe", per each.

"Adjusting Monument Case and Cover", per each.
The unit contract price per each for "Adjusting Monument Case and Cover" shall be full pay to perform the work as specified including all costs associated with referencing the monument, temporary lowering of the case and cover, and adjusting the case and cover to final grade.

CEMENT CONCRETE SIDEWALKS

Construction Requirements

Section 8-14.3 is supplemented with the following:

(******)
Detectable Warning Pattern For Traffic Islands
Detectable warning pattern for traffic islands shall be either a manufactured material designed for use on asphalt concrete pavement, or masonry or ceramic tiles. When masonry or ceramic tiles are used, the Contractor shall block out the detectable warning pattern area to the depth required for installation of the tiles. After the asphalt concrete has cooled, the Contractor shall install the tiles using standard masonry practices.

Measurement

Section 8-14.4 is supplemented with the following:

(******)
Detectable warning pattern installed in conjunction with a traffic island pass-through will be measured per each for each installation.

Payment

Section 8-14.5 is supplemented with the following:

(******)
"Detectable Warning Pattern for Traffic Island", per each.

RIPRAP

(February 5, 2001)
The last paragraph in Section 8-15.4 is deleted.

Payment

(March 13, 1995)
The first sentence of the second paragraph of Section 8-15.5 is revised to read as follows:

The unit contract price per ton or cubic yard for the class or kind of riprap specified shall be full pay for furnishing all labor, tools, equipment, and materials required to construct the riprap, including excavation.

CONCRETE SLOPE PROTECTION

Construction Requirements

Footing and Preparation of Slope

Section 8-16.3(1) is supplemented with the following:

Preparation of Existing Slope Protection

When existing slope protection is present, the Contractor may either remove the existing or construct the new slope protection over the top of the existing.

If the Contractor elects to construct over the existing, all vegetation, debris, and broken pieces of the existing slope protection shall be removed. The bottom 3 rows shall be removed to allow for a smooth transition to the existing foundation curb.

Poured in Place Cement Concrete

The third paragraph of Section 8-16.3(3) is revised to read as follows:

The newly constructed concrete shall be finished by means of a wood float and shall be striated with a rustication join as shown in the Standard Plans.

Pneumatically Placed Concrete

The eighth paragraph of Section 8-16.3(4) is revised to read as follows:

Finishing. The newly constructed concrete shall be finished by means of a wood float and shall be striated with a rustication join as shown in the Standard Plans.

IMPACT ATTENUATOR SYSTEMS

Materials

The first sentence of Section 8-17.2 is revised to read as follows:

All permanent impact attenuator systems shall be the React 350, manufactured by Energy Absorption Systems.

ILLUMINATION, TRAFFIC SIGNAL SYSTEMS, AND ELECTRICAL

Description

Section 8-20.1 is supplemented with the following:

(******)

Intelligent Transportation Systems (ITS)

This work shall include ITS as identified in the Plans and these Special Provisions.

Traffic Data Accumulation And Ramp Metering System

This work shall consist of furnishing, installing and testing five new ramp meter stations, cabinets, controllers and associated equipment, foundations, induction loop vehicle detectors, loop lead-in cables, signal head cable, ramp metered ahead beacons and wire, ramp meter signal standards, conduit, junction boxes, trenching, and backfilling. This work shall also include the addition of detector loops and loop lead-in cables to two existing data stations. This work shall also consist of furnishing, installing and testing induction loop vehicle detectors, loop lead-in cables, signal head cable, ramp metered ahead beacons and wire, ramp meter signal standards, foundations, conduit, junction boxes, trenching, and backfilling for two existing ramp meter sites.

Closed Circuit Television System (CCTV)

This work shall consist of furnishing and installing two closed circuit television cameras, including camera assembly (camera, lens, and housing), pan and tilt drive, camera control receiver, camera pole, camera cabinet, foundations, cables, and other equipment necessary to provide two complete and operable closed circuit television (CCTV) systems. This work shall also include the removal of one existing CCTV system and re-using this equipment except for the camera pole that shall be provided by the Contractor, for a third new CCTV site. This work shall also include reusing this equipment for a temporary CCTV site on a Contractor provided wood utility pole.

Communication Conduit System

This work shall consist of furnishing and installing the facilities used to mechanically accommodate the communication components of the ITS System. This includes 4-inch mainline conduit with inner ducts and their associated construction, mainline trenching and backfilling, directional boring, location wire, warning tape, controlled density fill, cable vaults, pull boxes, crushed surfacing top course, and other required equipment. Conduit shall be supplied as a system from a single manufacturer providing all of the steel and PVC conduit, all required fittings, terminations, and other installation accessories; all in accordance with the Plans, the Standard Specifications and these Special Provisions.

Communication System Cables And Interfaces

This work shall consist of furnishing and installing communication system cables, interfaces, and associated equipment including but not limited to the following:

a. fiber optic cable
b. lateral cable
c. fiber optic connectors
d. fiber optic patch panels
e. fiber optic patch cords and pigtails
f. fiber optic splice enclosures
g. fiber optic fusion splicer

This work shall provide and install a 48-count fiber optic cable from existing cable vault number one to cable vault number four. This work shall include a 12-count fiber optic connection to the CCTV sites and traffic data accumulation and ramp meter system built as a part of this project. This work shall also include a 12-count fiber connection to the existing data station site west of the Union Ave. / SR16 interchange. This work shall also include a 12-count fiber link to the existing data station / variable message sign east of the Jackson Ave. interchange. This work shall also include the

maintenance of an existing fiber system serving the City of Tacoma Fire Department and CCTV site 016-TV-0038 during construction and with the installation of a 36-count fiber optic link to replace this system. The Contractor shall provide a fiber optic fusion splicer to the Contracting Agency as a part of this work.

Data Distribution And Transmission System

This work shall consist of the provision of voice and data distribution and transmission equipment including fiber optic data transceivers and receivers, receiver shelf, Telco Systems channel banks and associated cards, and all cabling and connectors required between the termination blocks and data transceivers, or control receivers, between channel bank multiplexer, data receivers and distribution panels (EIA 232 and TWP distribution panels).

Video Distribution And Video Transmission System

This work shall consist of providing and installing a video system to equip the camera control cabinets with a fiber optic FM video transmitter for conversion of the video and PTZ signals to an optical signal and transmission over single mode fiber optic cable. The signals shall be multiplexed at the existing CCTV cabinet at Union Ave. and shall be de-multiplexed at the WSDOT Traffic Management Center with a corresponding fiber optic FM video receiver to receive and convert the optical signals back to video and PTZ signals. This work shall include the installation of a fiber optic multiplex transceiver in the existing CCTV site at Union Ave and the purchase of a de-multiplex receiver. This work shall also include the purchase of a multiplex transceiver and a multiplex receiver to provide the video images from this project to the City of Tacoma Fire Department.

Industry Codes and Standards

Section 8-20.1(2) is supplemented with the following:

(******)

BELLCORE	Bell Company Research and Evaluation
CCITT	Consultative Committee on International Telephony and Telegraphy
EIA	Electronic Industries Association
FCC	Federal Communications Commission
NTSC	National Television Standards Committee
RUS	Rural Utilities Service
NTCIP	National Transportation Communications for ITS Protocol

Materials

Section 8-20.2 is supplemented with the following:

Temporary Illumination System

Equipment and Materials

With the exception of lamps and wiring, the equipment and materials used in the temporary illumination system does not have to be new. Equipment and materials shall however, be of the type and grade specified within these Special Provisions, the Plans and the Standard Specifications.

Timber Pole
Timber poles for high mast illumination shall be of sufficient length to provide a minimum 100 feet mounting height over any roadway, as shown in the plans, and Standard Plan J-1f. The Contractor shall locate high mast poles within a 50-foot radius of the location indicated in the Plans to facilitate the Contractor's construction operations.

Intermediate timber poles shall be of sufficient length to maintain a minimum 25-foot ground clearance at all times, and shall be located allow for Contractor operations.

Lamps
The luminaire lamps shall be 1000 watt, mercury vapor or metal halide area highway lightning.

Luminaires
The luminaires shall be equipped with 180 degree house side shield to minimize spill light.

Contracting Agency Supplied Materials

(******)
The Type V signal standard for traffic signal system no. 5 will be Contracting Agency supplied. The Contractor with 3 working days advance notice shall make arrangements for pickup of materials with the State's Mottman Shed, 2120 R.W. Johnson Rd. SW, Tumwater, WA. Contact Olympic Region Signal Superintendent, Don Anders at (360) 357-2616 during normal business hours.

Light And Signal Standards

(December 6, 2004)
Light Standards with Type 1 Luminaire Arms
Lighting standards shall be fabricated in conformance with the methods and materials specified on the pre-approved Plans listed below, provided the following requirements have been satisfied:

(a) Light source to pole base distance (H1) shall be as noted in the Plans. Verification of H1 distances by the Engineer, prior to fabrication, is not required. Fabrication tolerance shall be ±6 inches.

(b) All other requirements of the Special Provisions have been satisfied.

Pre-Approved Plan	Fabricator	Mounting Hgt.
Drawing No. DB00654 Rev. A Sheets 1, 2 & 3	Valmont Ind. Inc.	30', 40' & 50'
Drawing No. W3721-1 Rev. D & W3721-2 Rev. A	Ameron Pole Prod. Div.	40' & 50'
Drawing No. NWS 3510 Rev.	Northwest Signal	25', 30', 35',

4-6-04 or NWS 3510B Rev. 4-6-04	Supply Inc.	40', 45' & 50'
Drawing WS-SL-01	American Pole Structures, Inc.	25', 30', 35', 40', 45', 50'
Drawing 71035-B39 Rev. 2 Sheets 1 & 2	Union Metal Corp.	40'
Drawing 71035-B38 Rev. 2 Sheets 1 & 2	Union Metal Corp.	50'
Drawing No. WSDOT-LP-01 Rev. 0 Sheets 1 and 2	West Coast Engineering Group	25', 30', 35', 40', 45', and 50'

(December 6, 2004)
Traffic Signal Standards
Traffic signal standards shall be furnished and installed in accordance with the methods and materials noted in the applicable Standard Plans, pre-approved plans, or special design plans.

All welds shall comply with the latest AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals. Welding inspection shall comply with Section 6-03.3(25)A Welding Inspection.

Hardened washers shall be used with all signal arm connecting bolts instead of lockwashers. All signal arm AASHTO M 164 connecting bolts shall be tightened to 40 percent of proof load.

Traffic signal standard types and applicable characteristics are as follows:

Type PPB Pedestrian push button posts shall conform to Standard Plan J-7a or to one of the following pre-approved plans:

Fabricator	Drawing No.
Northwest Signal Supply Inc.	NWS 3530 or NWS 3530B
Valmont Ind. Inc.	DB00655 Rev. B
Ameron Pole Prod. Div.	M3723 Rev. D
Union Metal Corp.	TA-10035 Rev. 3
West Coast Engineering Group	WSDOT-PP-01 Rev. 0

Type PS Pedestrian signal standards shall conform to Standard Plan J-7a or to one of the following pre-approved plans:

Fabricator	Drawing No.
Northwest Signal Supply Inc.	NWS 3530 or NWS 3530B
Valmont Ind. Inc.	DB00655 Rev. B
Ameron Pole Prod. Div.	M3723 Rev. D or W3539
Union Metal Corp.	TA-10025 Rev. 13
West Coast Engineering Group	WSDOT-PP-02 Rev. 0

Type I

Type I vehicle signal standards shall conform to Standard Plan J-7a or to one of the following pre-approved plans:

Fabricator	Drawing No.
Northwest Signal Supply Inc.	NWS 3530 or NWS 3530B
Valmont Ind. Inc.	DB00655 Rev. B
Ameron Pole Prod. Div	M3723 Rev. D or W3539
Union Metal Corp.	TA-10025 Rev. 11
West Coast Engineering Group	WSDOT-PP-02 Rev. 0

Type FB

Type FB flashing beacon standard shall conform to Standard Plan J-7a or the following pre-approved plan:

Fabricator	Drawing No.
Union Metal Corp	50200-B58 Rev. 3
Valmont Ind. Inc.	DB00655 Rev. B
Ameron Pole Prod. Div.	W3539 Rev. B
Northwest Signal Supply, Inc.	NWS 3535 or NWS 3535B

Type RM

Type RM ramp meter standard shall conform to Standard Plan J-7a or the following pre-approved plan:

Fabricator	Drawing No.
Union Metal Corp	50200-B58 Rev. 3

Valmont Ind. Inc.	DB00655 Rev. B
Ameron Pole Prod. Div.	W3539
Northwest Signal Supply, Inc.	NWS 3535 or NWS 3535B

Type II Characteristics:

Luminaire mounting height	N.A.
Luminaire arms	N.A.
Luminaire arm length	N.A.
Signal arms	One Only

Type II standards shall conform to one of the following pre-approved plans, provided all other requirements noted herein have been satisfied. Maximum (x) (y) (z) signal arm loadings in cubic feet are noted after fabricator.

Signal Arm Length (max)	Fabricator-(x) (y) (z)	Drawing No.
65 ft.	Valmont Ind. Inc.-(2894)	DB00625-Rev. E, Shts. 1, 2 & 3
65 ft.	Union Metal Corp. (2900)	71026-B86 Rev. 4 shts. 1, 2, & 3
65 ft.	Ameron Pole-(2900) Prod. Div.	W3724-1 Rev. B & W3724-2 Rev. C
65 ft.	Northwest Signal-(2802) Supply Inc.	NWS 3500 Rev. 10/14/03 or NWS 3500B Rev. 10/14/03
45 ft.	American Pole(1875) Structures, Inc.	WS-T2-L Rev. 1
65 ft.	American Pole (2913) Structures, Inc.	WS-T2-H Rev. 1

Type III Characteristics:

Luminaire mounting height	30 ft., 35 ft., 40 ft., or 50 ft.
Luminaire arms	One Only
Luminaire arm type	Type 1
Luminaire arm length (max.)	16 ft.
Signal arms	One Only

Type III standards shall conform to one of the following pre-approved plans, provided all other requirements noted herein have been satisfied. Maximum (x) (y) (z) signal arm loadings in cubic feet are noted after fabricator.

Signal Arm Length (max)	Fabricator-(x) (y) (z)	Drawing No.
65 ft.	Valmont Ind. Inc.-(2947)	DB00625-Rev. E, Shts. 1, 2 & 3 and "J" luminaire arm
65 ft.	Union Metal Corp. (2900)	71026-B87 Rev. 4 Shts. 1, 2 & 3
65 ft.	Ameron Pole-(2900) Prod. Div.	W3724-1 Rev. B & W3724-2 Rev. C and "J" luminaire arm
65 ft.	Northwest Signal-(2802) Supply Inc.	NWS 3500 Rev. 10/14/03 or NWS 3500B Rev. 10/14/03
45 ft.	American Pole (1875) Structures, Inc.	WS-T3J-L, Rev. 1, Shts. 1 & 2
65 ft.	American Pole (2913) Structures, Inc.	WS-T3J-H Rev. 1, Shts. 1 & 2

Type IV

Type IV strain pole standards shall be consistent with details in the plans and Standard Plan J-7c or one of the following pre-approved plans:

Fabricator	Drawing No.
Northwest Signal Supply Inc.	NWS 3520 or NWS 3520B,
Valmont Ind. Inc.	5000-4
Ameron Pole Prod. Div.	M3650 Rev. A
Union Metal Corp.	EA-10224 Rev. 8
American Pole Structures, Inc.	9000-12-037 Rev. A
West Coast Engineering Group	WSDOT-TS-01 Rev. 0 Sheets 1, 2, and 3

Type V

Type V combination strain pole and lighting standards shall be consistent with details in the plans and Standard Plan J-7c or one of the following pre-approved plans:

Fabricator	Drawing No.
Northwest Signal Supply Inc.	NWS 3520 or NWS 3520B
Valmont Ind. Inc.	5000-4
Ameron Pole Prod. Div.	M3650 Rev. A
Union Metal Corp.	EA-10225, Rev. 8 Shts. 1 & 2
American Pole Structures, Inc.	9020-12-007 Rev. B
West Coast Engineering Group	WSDOT-TS-01 Rev. 0 Sheets 1, 2, and 3

The luminaire arm shall be Type 1, 16 foot maximum and the luminaire mounting height shall be 40 feet or 50 feet as noted in the plans.

Type SD

Type SD standards require special design. All special design shall be based on the latest AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals and pre-approved plans and as follows:

1. A 90 mph wind loading shall be used.

2. The Design Life and Recurrence Interval shall be 50 years for luminaire support structures exceeding 50 feet in height, and 25 years for all other luminaire support structures.

3. Fatigue design shall conform to AASHTO Section 11, Table 11-1 using fatigue category III.

Complete calculations for structural design, including anchor bolt details, shall be prepared by a Professional Engineer, licensed under Title 18 RCW, State of Washington, in the branch of Civil or Structural Engineering or by an individual holding valid registration in another state as a civil or structural Engineer.

All shop drawings and the cover page of all calculation submittals shall carry the Professional Engineer's original signature, date of signature, original seal, registration number, and date of expiration. The cover page shall include the contract number, contract title, and sequential index to calculation page

numbers. Two copies of the associated design calculations shall be submitted for approval along with shop drawings.

Details for handholes and luminaire arm connections are available from the Bridges and Structures Office.

Foundations for various types of standards shall be as follows:

Type PPB	As noted on Standard Plan J-7a.
Type PS	As noted on Standard Plan J-7a.
Type I	As noted on Standard Plan J-7a.
Type FB	As noted on Standard Plan J-7a
Type RM	As noted on Standard Plan J-7a
Type II	As noted in the Plans.
Type III	As noted in the Plans.
Type IV	As noted in the Plans and Standard Plan J-7c.
Type V	As noted in the Plans and Standard Plan J-7c.
Type SD	As noted in the Plans.

Equipment List And Drawings

Section 8-20.2(1) is supplemented with the following:

(March 13, 1995)
Pole base to light source distances (H1) for lighting standards with pre-approved plans shall be as noted in the Plans.

Pole base to light source distances (H1) for lighting standards without pre-approved plans will be furnished by the Engineer as part of the final approved shop drawings, prior to fabrication.

(March 13, 1995)
If traffic signal standards, strain pole standards, or combination traffic signal and lighting standards are required, final verified dimensions including pole base to signal mast arm connection point, pole base to light source distances (H1), mast arm length, offset distances to mast arm mounted appurtenances, and orientations of pole mounted appurtenances will be furnished by the Engineer as part of the final approved shop drawings prior to fabrication.

Construction Requirements

General

Section 8-20.3(1) is supplemented with the following:

(******)
The existing light standards with Type 1 mast arms to be removed shall remain the property of WSDOT. The contractor shall deliver this equipment with 3 working days advance notice to the State's Mottman Shed, 2120 R.W. Johnson Rd. SW, Tumwater, WA during normal business hours. Contact Olympic Region Signal Superintendent, Don Anders (360)-357-2616.

The existing signal standards, signal cabinet and controllers to be removed shall remain the property of the City of Tacoma. The contractor shall deliver this

equipment with 1 working day advance notice to the City's Signal Shop, 3401-A South Orchard St., Tacoma, WA during normal business hours. Contact City Signal Superintendent, Mark Jones (253)-593-7740.

All other existing electrical equipment and materials designated to be removed shall become the property of the Contractor and be removed from the project.

(******)

Labeling ITS Equipment

The Contractor shall mark each ITS device cabinet and transformer cabinet by affixing black vinyl lettering which matches the alphanumeric device number as shown in the Plans to the outside of the cabinet. The lettering shall be a minimum of 4inch C. The lettering shall be on the side of the cabinet most visible from the roadway.

The Contractor shall install an engraved nameplate identifying the power source for each cabinet. The nameplate shall consist of white letters on a red background and be permanently affixed to the inside of the cabinet door. The nameplate text shall read "Cabinet Power Source" in ½ inch nominal letters followed by "SCA###" or "016-CC-####", as appropriate, in 1 inch nominal letters.

All junction boxes, cable vaults, and pull boxes used as part of the ITS System shall be labeled per section 9-29.2(4).

Foundations

Section 8-20.3(4) is supplemented with the following:

(******)

All existing light standard foundations to be removed shall be removed to 3 ft. below finished grade. The remaining hole shall be backfilled with granular material and compacted in accordance with Section 8-20.3(2).

Conduit

Section 8-20.3(5) is supplemented with the following:

(******)

If the Contractor elects to use PVC conduit, the minimum size shall be 1 ¼".

Wiring

Section 8-20.3(8) is supplemented with the following:

(March 13, 1995)

Field Wiring Chart

501	AC+ Input	516-520 Railroad Pre-empt
502	AC- Input	5A1-5D5 Emergency Pre-empt
503-510	Control-Display	541-580 Coordination
511-515	Sign Lights	581-599 Spare

Movement Number	1	2	3	4	5	6	7	8	9

Vehicle Head									
Red	611	621	631	641	651	661	671	681	691
Yellow	612	622	632	642	652	662	672	682	692
Green	613	623	633	643	653	663	673	683	693
Spare	614	624	634	644	654	664	674	684	694
Spare	615	625	635	645	655	665	675	685	695
AC-	616	626	636	646	656	666	676	686	696
Red Auxiliary	617	627	637	647	657	667	677	687	697
Yellow Auxiliary	618	628	638	648	658	668	678	688	698
Green Auxiliary	619	629	639	649	659	669	679	689	699
Pedestrian Heads & Dets.									
Hand	711	721	731	741	751	761	771	781	791
Man	712	722	732	742	752	762	772	782	792
AC-	713	723	733	743	753	763	773	783	793
Detection	714	724	734	744	754	764	774	784	794
Common-Detection	715	725	735	745	755	765	775	785	795
Spare	716	726	736	746	756	766	776	786	796
Spare	717	727	737	747	757	767	777	787	797
Spare	718	728	738	748	758	768	778	788	798
Spare	719	729	739	749	759	769	779	789	799
Detection									
AC+	811	821	831	841	851	861	871	881	891
AC-	812	822	832	842	852	862	872	882	892
Common-Detection	813	823	833	843	853	863	873	883	893
Detection A	814	824	834	844	854	864	874	884	894
Detection B	815	825	835	845	855	865	875	885	895
Loop 1 Out	816	826	836	846	856	866	876	886	896
Loop 1 In	817	827	837	847	857	867	877	887	897
Loop 2 Out	818	828	838	848	858	868	878	888	898
Loop 2 In	819	829	839	849	859	869	879	889	899
Supplemental Detection									
Loop 3 Out	911	921	931	941	951	961	971	981	991
Loop 3 In	912	922	932	942	952	962	972	982	992
Loop 4 Out	913	923	933	943	953	963	973	983	993
Loop 4 In	914	924	934	944	954	964	974	984	994
Loop 5 Out	915	925	935	945	955	965	975	985	995
Loop 5 In	916	926	936	946	956	966	976	986	996
Loop 6 Out	917	927	937	947	957	967	977	987	997
Loop 6 In	918	928	938	948	958	968	978	988	998
Spare	919	929	939	949	959	969	979	989	999

Services, Transformer, Intelligent Transportation System Cabinet

The second sentence of the fourth paragraph of Section 8-20.3(10) is revised to read as follows:

> All costs for service connections and electrical energy used during the life of the contract will be borne by the Contracting Agency.

Testing

Section 8-20.3(11) is supplemented with the following:

(******)

Prior to scheduling a Turn-On date, the Contractor shall verify with the Engineer that:

1. Field tests 1, 2, and 3 as specified in Section 8-20.3(11) have been completed; and

2. All other field tests specified in Section 8-20.3(14)D have been completed.

3. For each signal the Contractor shall provide and install a 48" x 48" W20-903 (SIGNAL REVISION AHEAD) sign on a 4 x 6 wood posts for each approach at locations staked by the Engineer. The Contractor shall remove these sign assemblies two weeks after normal cycling operation has begun.

4. Give notice of the Turn-On and time to the Engineer five working days in advance of said date.

A qualified representative from the Contractor's signal controller supplier shall be present during Turn-On.

Traffic signal Turn-On procedures shall not commence until:

1. All required channelization - crosswalks, stop bars and pavement markings have been installed; and,

2. All required signs have been installed.

Prior to Turn-On, the Contractor shall perform Field Test 4 in the presence of Agency electronics technicians and electrical inspectors.

Field Test 4 shall proceed as follows:

1. Turn-On the signal system to its flash mode to verify proper flash indications;

2. Stop all traffic from entering the intersection; and,

3. Allow the signal system to cycle through no less than one full signal cycle to verify proper signal operation.

Based on the outcome of Field Test 4, the Engineer will order the Contractor to take one of the following actions:

1. Turn-On the signal system to normal cycling operation:

2. Set the signal system to its flash mode for a period not exceeding five calendar days: or,

3. Turn-Off power to the signal system and cover all signal displays with black opaque material.

If action 3 is taken, the Contractor shall schedule a new Turn-On date with the Engineer following the procedures given herein.

Following Turn-On, all conflicting signs shall be removed as ordered by the Engineer.

Turn-On to normal cycling operation shall be completed prior to 2:00 p.m., however, no Turn-On will be allowed on Fridays, weekends, holidays, or the day preceding a holiday.

Illumination Systems

Section 8-20.3(13) is supplemented with the following:

(******)

City Street Illumination System

All city street luminaires shall have its own photocell. The photoelectric control shall be the twistlock type and the light sensitive element shall be solid-state photo diode or hermetically sealed cadmium sulfide cell. The control shall be designed to turn on at 2.6 foot-candles (+/-20%) and turn off at 2.6 foot-candles (+/-20%). The lighting control shall not drift by more than 1 percent over a 10-year period. The output control relay shall be electro-mechanical. The time delay for both turn on and turn off shall be a minimum of one second and a maximum of 5 seconds. The output relay shall be rated 1000 watts incandescent or 15 amps inductive load. The contacts shall be normally closed.

The lighting control shall have a built in metal oxide varistor (MOV) rated a minimum of 160 joules for lightning and transient protection. The control shall also have a secondary zenar diode and transient filter. The relay shall be suitable for operation on 240 volt, 60-hertz electrical circuits.

Dimensions shall conform to ANSI specifications for twistlock photocells.

Approved Manufacturers for Photoelectric Control:

Area Lighting Research (ALR 2190-MP3)

Dark to Light (DTL DP 124)

or approved equal meeting specifications.

Signal Controllers

Section 8-20.3(14)A is supplemented with the following:

(March 13, 1995)

Testing

All signal control equipment shall be tested at the Washington State Department of Transportation Materials Laboratory located in Tumwater, Washington, prior to final delivery. The tests shall check the operation of each individual component as well as the overall operation of the system.

The Contractor shall designate a qualified representative for these tests. Notification of this representative shall be submitted for approval, in writing, to the State Materials Laboratory, 14 calendar days prior to any equipment deliveries. The Engineer shall also receive a copy of this notification, which includes the

representative's name, address, and telephone number. All communications and actions regarding testing of all equipment submitted to the State Materials Laboratory shall be made through this representative. These communications and actions shall include, but not be limited to, the following:

All notifications of failure or rejection, demonstration of the equipment, and the return of rejected equipment.

The State Materials Laboratory testing process will consist of the following four separate stages:

a. Delivery and Assembly
b. Demonstration and Documentation
c. Performance Test
d. Operational Test

Testing will follow in the correct order with no time gaps between stages unless mutually agreed upon by the Contractor and State Materials Laboratory.

Stage 1 Delivery Assembly

All components for the complete traffic control systems, including the necessary test equipment, shall be assembled and ready for demonstration within ten working days of delivery to the Materials Laboratory. The systems shall simulate the operations as installed in the field.

Equipment and prerequisites necessary to complete this stage shall include:

a. Detection Simulator:
The detection simulator shall provide at least one detector per phase and variable traffic volumes. One simulator shall be required for every two controllers tested.

b. Communications Network:
Locations, specified for coordinating communications equipment and cable, shall be completely wired to provide an operational communications system between all local and master controllers.

The Contractor shall provide labor, equipment, and materials necessary to assemble all control equipment complete and ready for demonstration. Materials and equipment used for this stage that are not required for field installation shall remain the property of the Contractor. Failure to complete this stage within ten working days will result in rejection of the entire system.

Stage 2 Demonstration and Documentation

This stage shall be completed within seven working days following the completion of Stage 1. Failure to do so shall result in rejection of the entire shipment.

All documentation shall be furnished with the control equipment prior to the start of testing. If corrections to any document are deemed necessary by the State, the Contractor shall submit this updated version prior to the final

approval by the State Materials Laboratory. The documents to be supplied shall consist of or provide the following:

a. A Complete accounting of all the control and test equipment required.

b. A complete set of documents which shall include:

1. Serial numbers when applicable.

2. Written certification that equipment of the same make and model has been tested according to NEMA Environmental Standards and Test Procedures, and has met or exceeded these standards. The certificate shall include equipment model number and where, when, and by whom the tests were conducted. This certificate shall accompany each shipment of controllers.

3. Reproducible mylar wiring diagrams and two blue-tone prints for each controller and cabinet supplied. The sheet size shall be 24 inches by 36 inches.

4. Wiring diagrams for all auxiliary equipment furnished. One set per cabinet.

5. Complete operations and maintenance manuals including complete and correct software listing and flow charts. One set of operations and maintenance manuals per cabinet; at least four but no more than ten. Five sets of software listings and flow charts.

6. Complete operations and maintenance manuals for all auxiliary equipment. One set per cabinet.

c. A description of the functions and the capabilities of individual components and of the overall control system.

d. A presentation on how to operate the system.

e. A complete and thorough demonstration to show that all components of the control system are in good condition and operating properly, and proof that the controller and cabinet are functioning correctly.

f. Detailed instructions for installing and operating the controller(s), including explanations on the use of all features of the controller(s).

g. The operational and maintenance manuals for each traffic signal controller supplied including as a minimum, but not to be limited to the following:

1. Detailed instructions for maintaining all hardware components, controller, and auxiliary equipment.

2. A complete parts list detailing all manufacturer's identification codes.

3. Detailed wiring diagrams and schematics indicating voltage levels and pictorial description, part name, and location for all hardware components, controller, and auxiliary equipment.

The demonstration shall include the following:

a. Phasing per plans and all phase timing.

b. Detection including any special detector functions.

c. Conflict Monitor and Load Switches.

d. Special Coordination including communication equipment.

This demonstration shall be performed by the Contractor in the presence of State Materials personnel. The Contractor shall supply any item not accounted for within five working days of the accounting. Controllers and cabinets that remain incomplete five working days after notification shall be rejected and returned freight collect to the Contractor.

Stage 3 Unit Performance Test

A minimum of ten working days shall be allowed for one or two cabinet assemblies and five working days for each additional assembly.

The unit performance test will be conducted by State Personnel to determine if each and every controller cabinet assembly complies with NEMA Environmental Standards as stated in NEMA publication No. TS 1-1976, Part 2.

Any unit submitted, whose failure has been corrected, shall be retested from the beginning of this stage.

Stage 4 Operational Test

All control and auxiliary equipment shall operate without failure for a minimum of ten consecutive days. If an isolated controller is specified, it shall operate as an isolated controller. If a coordinated system is specified, it shall operate as a total coordinated system with the master and all local controllers operating in all coordinated modes.

If any failure occurs during this stage, all equipment for this stage shall be restarted following completion of repairs.

Equipment Failure Or Rejection

Equipment failures shall be defined as set forth in NEMA Publication No. TS 1-1976. Failure of load switches, detector amplifiers, and conflict monitors shall not result in rejection of the controller or cabinet. However, the Contractor shall stock, as replacements, approximately 30 percent more than the total for

these three items. All excess material shall remain the property of the Contractor following completion of all tests.

If a failure occurs during Stages 3 or 4, repairs shall be made and completed within ten working days following notification of the malfunction. The Contractor shall have the option of making onsite repairs or repair them at a site selected by the Contractor. Failure to complete repairs within the allotted time shall result in rejection of the controller or cabinet assembly under test.

A total of two failures will be allowed from the start of Stage 3 to the end of Stage 4. If three failures occur during this time period, the equipment will be rejected. New equipment of different serial numbers submitted as replacement shall be received by the Materials Laboratory for testing under Stage 3 within ten working days following notification of rejection. Failure to meet this requirement within the allotted time will result in rejection of the entire system. Software errors will be considered as failures and, if not corrected within ten working days, the entire system will be subject to rejection. Following rejection of any equipment, the Contractor shall be responsible for all costs incurred. This shall include but not be limited to all shipping costs.

When the traffic control program is supplied by the State, the Contractor shall prove that any failures are, in fact, caused by that program and not the hardware.

All component or system failures, except load switches and detector amplifiers, shall be documented. This documentation shall be submitted prior to commencing the test or stage in which the failure was found and shall provide the following information:

a. A detailed description of the failure.
b. The steps undertaken to correct the failure.
c. A list of parts that were replaced, if any.

Upon completion of the tests, the equipment will be visually inspected. If material changes are observed which adversely affect the life of the equipment, the cause and conditions shall be noted. The Contractor will immediately be given notice to correct these conditions. If not repaired within ten working days of notification, the equipment will be subject to rejection. A final accounting shall be made of all equipment prior to approval.

All failed or rejected equipment shall be removed from the Materials Laboratory within three working days following notification; otherwise, the failed or rejected equipment will be returned, freight collect, to the Contractor.

Following final approval by the State Materials Laboratory, all equipment shall be removed from the State Materials Laboratory and delivered to sites as designated elsewhere in this contract.

Guarantees
The supplier shall furnish to the State any guarantee or warranty furnished as a normal trade practice in connection with any equipment supplied for this contract.

Signal Heads

Section 8-20.3(14)B is supplemented with the following:

(******)
Interim Signal Head Modification
The Contractor's traffic control operations may require that signal heads be moved or covered on an interim basis to maintain legal and optimal signal displays. When directed by the Engineer, the Contractor shall relocate and/or bag existing signal heads.

Induction Loop Vehicle Detectors

(******)
The width of the saw cut for loop detectors shall be at least 1/16 inch greater than the diameter of the loop wire, up to a maximum width of 3/8 inch. The width of the saw cut for twisted pair lead-in wiring shall be 1/16 inch greater than twice the diameter of the loop wire, up to a maximum width of 5/8 inch.

Section 8-20.3(14)C is supplemented with the following:

(******)
Damaged or substandard induction loop vehicle detectors shall be replaced after planing, cracksealing, and pavement repair operations, and prior to beginning the final lift of asphalt pavement.

The Contractor shall notify the WSDOT Olympic Region Signal Superintendent, Don Anders (360) 357-2616, a minimum of 3 days prior to disturbing any existing detection loops. The Region Signal Shop will provide fixed time settings. The signal system shall remain functional during construction.

The Contractor shall replace removed loop detectors within two calendar days of removing the detectors as directed by the Engineer.

Replaced induction loop vehicle detectors shall be constructed in accordance with Standard Plan J-8a and tested in accordance with Section 8-20.3(14)D.

(******)
Induction Loop Sealant for Portland Cement Concrete Pavement
Loop sealant for Portland cement concrete pavement shall be one of the following:

1. 3M
2. QCM
3. Gold Label Flex 1P (one part sealant)
4. ASTMD 312 Type 4

Round Loops

Where shown on the plans the contractor shall construct 6 feet diameter round detectors loops. Round loops shall be constructed in accordance with the requirements noted for Method A (Circular Saw) or Method B (Core Drill). Construction shall conform to Standard Plan J-8a as modified by the following:

Method A (Circular Saw)

1. Loop conductor and loop lead-in cable shall conform to Section 9-29.3.

2. Round saw cuts shall be 6 feet in diameter and shall be constructed using equipment designed for cutting round loops. The equipment shall utilize a concave, diamond-segmented blade. The saw-cuts shall be vertical and shall be a minimum of 1/4 inch wide. The saw cut shall be a minimum of 3 inches deep, measured at any point along the perimeter of the saw cut. Other methods of constructing the round saw-cut such as anchoring a router or flat blade saw will not be allowed.

3. The bottom of the saw cut shall be smooth. No edges created by differences in saw cut depths will be allowed.

4. All saw cut corners shall be rounded to a minimum 1.5 inches radius.

5. All saw cuts shall be cleaned with a high-pressure washer. Wash water and slurry shall be vacuumed out or blown dry with compressed air.

6. Loops shall be installed after all grinding and prior to paving the final lift of asphalt designated in the Plan.

7. The loop shall be constructed using 4 turns of conductor. The conductor shall be installed one turn on top of the previous turn. All turns shall be installed in a clockwise direction. The conductors shall be secured to prevent floating with 2 inches lengths of high temperature foam backer rod sized for a snug fit and spaced at 1 foot intervals around the perimeter of the saw cut and at the corners.

8. Loop sealant shall be installed as per manufacturer's recommendations.

9. The Contractor shall furnish to the State a warranty for the loop installation for defects in workmanship and construction for a period of 5 years from date of installation.

Method B (Core Drill)

Method B installation requirements are the same as Method A requirements except as follows:

2. Round saw-cuts shall be constructed using a 6 feet diameter core drill bit with diamond impregnated segments. The saw cut shall be vertical and shall be a minimum of 1/2 inch wide and a minimum of 3 inches deep measured anywhere along the perimeter of the saw cut. Other methods of constructing the round saw cut such as anchoring a router or flat blade saw will not be allowed.

7. The loop shall be constructed using 4 turns of conductor. The conductors shall be installed one turn on top of the previous turn. All turns shall be installed in a clockwise direction. The conductors shall be secured to each other and shall be secured to prevent floating with 2 inches lengths of high temperature foam backer rod sized for a snug fit and spaced at 2 feet intervals around the perimeter of the saw cut and at corners.

Signal Standards

Section 8-20.3(14)E is supplemented with the following:

(******)

Traffic Signal Standard Identification

Signal mast arms, Type II shafts, Type III shafts, Type IV shafts, Type V shafts and luminaire mast arms shall require identification tags. The identification shall consist of a corrosion resistant metal tag riveted to the component. Tags for shafts shall be located above the base plate handhole. Tags for signal mast arms shall be located above the arm connection. Tags for the luminaire arm shall be located above the connection point. The tag shall conform to the detail shown on the signal standard chart. Identification of Type PPB, Type PS and Type I standards is not required.

Section 8-20.3 is supplemented with the following:

(******)

Temporary Illumination System

The temporary illumination system shall be operational prior to removing the existing system. No temporary connection or detour shall be opened to traffic until the temporary illumination system associated with the temporary connection or detour is in place and operational. Where required, the Contractor shall perform necessary excavation and embankment around the pole shafts without disturbing them.

Wiring

System wiring shall conform to the appropriate articles of the Electrical Code and Section 8-20.3(8). Conductors between light standards, including equipment grounding conductor, shall be direct burial cable or aerial cable sized no smaller than No. 8. Minimum vertical clearance under any conductors shall be 25 feet over any ground or roadway.

Service

Electrical services for the temporary illumination system shall be from the proposed service SCA ____

The Contractor shall be responsible for the hookup, monthly power, and all other utility charges incurred during the life of the Contract.

Temporary Illumination System - Maintenance

The Contractor shall be responsible for the installation, operation, and maintenance of the temporary illumination system. This includes relamping and keeping the temporary illumination system in operation throughout the duration of the project. The Contractor shall perform relamping in the event of outages within one day following notification by the Engineer. All costs for maintenance shall be included in the lump sum contract price for "Temporary Illumination System".

Temporary Illumination - Removal

The temporary illumination system shall be removed when the permanent illumination system is operational.

(******)

ITS Systems

Service Number SCA-993

Interruptions of power to ITS elements and the traffic data site due to the relocation of power drops from service number SCA-993 shall be kept to a minimum. The maximum time power shall be interrupted shall be 24 hours. Illumination system power interruptions shall not be allowed during non-daylight hours.

Model 334 Traffic Data Cabinet Testing

Traffic data accumulation equipment shall undergo two separate sets of tests prior to final acceptance. These tests shall check the operation of each individual component as well as the component's ability to operate within the overall system.

Shop Testing

Shop testing shall consist of two separate stages:

Stage 1: Notification, Delivery and Assembly

Stage 2: Hardware and Systems Tests

Stage 1: Notification, Delivery and Assembly

Notification

The following documents shall be submitted to the Engineer along with a copy to the Olympic Region Signal Shop, not less than 10 working days before any equipment is delivered to the Signal Shop for testing:

1. Contractor's representative for tests: name, title, address and telephone number.
2. Inventory of items to be delivered including:
   a. The quantity of each item to be delivered;
   b. The number of maintenance and operations manuals to be delivered,
   c. The number of cabinet prints, equipment schematics, equipment manuals, et al., to be delivered;
   d. The contract number the equipment is being tested for.
3. Certificate confirming that Type 170 Traffic Signal Control Hardware Specification FHWA IP-78-16, as currently amended, has been met. The certificate shall indicate type and modes of equipment tested, date and place of test, and name of party responsible for conducting the test. The certificate shall include the serial number of the controller.
4. Scheduled delivery date of equipment to the Shop.

The Shop will not accept equipment for testing without proper notification.

During Stage 1, the Contractor shall request in writing a Stage 2 start date from the Engineer. The Engineer will provide the Contractor with a written notice of the Stage 2 start date. This date represents the date that Contracting Agency personnel will begin testing the controllers and modems.

Delivery

Delivery shall be made to the Olympic Region Signal Maintenance Office located at:

5720 Capitol Blvd.
Tumwater, WA 98501
Attention: Don Anders
(360) 357-2616

Delivery will be accepted only if all required equipment and materials described in the notification are on hand.

The Contractor shall be responsible for unloading all equipment and materials.

Assembly

All equipment shall be completely assembled in preparation for Stage 2 testing.

Stage 2: Hardware and Systems Test

The Contracting Agency will limit the Stage 2 testing to 25 calendar days for two controller and cabinet assemblies with 2 additional calendar days for each additional controller and cabinet.

The tests will verify whether or not the equipment supplied meets Type 170 environmental and operating standards and provides the functions and operations required in this contract.

Only two failures in each controller and cabinet assembly will be allowed. A third failure will result in rejection of the assembly.

A malfunctioning load switch and/or detection amplifier will not be considered a failure. However, replacement units shall be provided by the Contractor.

The Contractor will be notified of all rejections. The Contractor shall remove all equipment that is rejected from the Shop within seven calendar days following receipt of the rejection notice. If not removed accordingly, the Shop will forward the equipment to the Contractor, freight collect.

Stage 2 testing may extend beyond the allowed test period if:

1. A controller and cabinet assembly fails within the last 7 calendar days of Stage 2; or
2. A controller and cabinet assembly, which replaces a rejected assembly, is submitted for testing.

The extra time required under these conditions shall cost the Contractor $25.50 per hour of actual tests. The total cost shall be deducted under miscellaneous deductions during the progress payment.

In order to pass the Stage 2 test, the controller and cabinet assembly must have no failures during the last seven calendar days of the test period.

The Shop will release no equipment unless all documents are current and correct. Should any document require revising or updating, the Contractor shall provide two copies of that document with the changes marked in red. These documents include, but are not limited, to the following:

1. One reproducible Mylar wiring diagram of each cabinet supplied.
2. Two blue-tone wiring diagrams of each cabinet supplied.
3. Wiring diagrams for all auxiliary equipment furnished. One set per cabinet.
4. Type 170E controller operations and maintenance manuals. One set per cabinet. The Contractor shall provide two extra sets over and above the total number required for all cabinets.
5. Auxiliary equipment operations and maintenance manuals. One set per cabinet.

All equipment except accepted controllers and modems shall be removed from the Shop within seven working days following notice of final approval and acceptance. If not removed accordingly, the shop will forward the equipment to the Contractor freight collect. Accepted controllers and transceivers shall remain in the shop until requested by the Contractor for the turn-on test.

Fiber Optic Transceiver/Receiver Testing

All fiber optic transceivers and receivers will be tested by the Contracting Agency. The fiber optic equipment will be tested over a 24-hour period. Any transceiver or receiver failing the test will be rejected. The rejected transceiver or receiver shall be replaced at no added cost to the Contracting Agency.

Controller Testing

Controller testing will be primarily communications oriented. However, a hardware failure shall cause the controller being tested to fail the test. Each controller will be tested for communications compatibility with the TMC central computer over a 24-hour test period. The test will be considered successful if communications with the TMC central computer are maintained over the test period.

Communication Failure

Failure to properly communicate with the TMC central computer on each transmission during the 24-hour period shall cause the unit to fail the test. The Contractor shall diagnose the problem and document the solution upon notice of a failure.

Hardware-Oriented Problems
If the problem is hardware-oriented, the Contractor shall remove the failed unit from the TMC for repair or replacement. The repaired or replaced unit and its cabinet shall be delivered to the Shop for complete testing before re-testing at TMC.

Software-Oriented Problems
If the problem is software-oriented, the Contractor shall promptly notify TMC personnel of the problem. The Contractor shall demonstrate that it is a software problem and not a hardware incompatibility in the controller, to both the Freeway Operations Engineer's and the Engineer's satisfaction.

Work Delays
The Contractor will not be granted an extension of time for delays caused by rejected equipment.

Turn-On Test
Immediately following the field installation of the traffic data station controllers, the Contractor shall demonstrate that all functions of the controllers and cabinets operate as specified, specifically:

1. The ability of the cabinet to interface properly with field wiring and equipment. This shall include communicating with the TMC central computer over the communication lines, and detecting vehicle presence and absence over all induction loops. The Contractor shall correct any interfacing problems resulting from this installation.
2. The ability of the controller to gather, store, and transmit field data to the TMC central computer, including status of field equipment, as specified.
3. The ability of the controller to receive and process commands from the TMC central computer.

The turn-on tests shall be conducted only during the time period between 9:00 a.m. and 2:30 p.m. The Contractor shall notify the Engineer 10 working days in advance of the demonstration and perform the demonstration in the presence of the Engineer.

TMC personnel will be on-site to help in transmitting commands from the TMC central computer to the controller(s) at the Contractor's request.

CCTV System Number 4
The existing CCTV site at Center Street shall be removed and re-located to accommodate the new roadway alignments. The existing CCTV equipment shall be re-used except for the camera pole. The Contractor shall provide and install a new 50' steel camera pole for this location. The existing camera pole shall be delivered to the Olympic Region Signal Shop, located at:

5720 Capitol Blvd.
Tumwater, WA 98501
Attention: Don Anders
(360) 357-2616

Temporary CCTV System

Prior to completing the existing CCTV number 4 site, the Contractor shall provide and install a 50 foot utility pole as part of the temporary CCTV system shown in the plans. The existing CCTV equipment, (CCTV and control cabinet) at the Center Street site shall be re-located to this temporary CCTV site. The existing CCTV signal shall not be interrupted for more than 48 hours between disconnect and reconnect.

The Contractor shall modify the existing Closed Circuit Television Camera approach pad in accordance with the detail in the Plans. This work includes excavating, installing concrete ecology blocks, and backfilling.

CCTV System Setup

The Contractor shall set the horizontal panning stops so that the 5-degree limit of horizontal panning, known as the dead spot, is oriented as shown in the Plans. The Contractor shall set the vertical tilting up limit stop to prohibit the camera from tilting above the highest point on the horizon when at full zoom. The Contractor shall set the vertical tilting down limit stop so that the camera movement does not interfere with the PTZ cable.

The camera and pan/tilt cable pigtails shall be weather protected until they are connected. The camera and pan/tilt shall not be installed until power is supplied to the camera cabinet. All cables shall be connected when the camera is installed to allow the camera heater to keep moisture out of the camera enclosure.

CCTV Test

The Contractor shall test the CCTV system using a Contractor-supplied NTSC-compatible video monitor and a Contractor-supplied camera control device. The control device may be an IBM-compatible laptop computer with a suitable EIA-422 converter running a Cohu MPC master control panel. The control device and monitor shall remain the property of the Contractor. The Contractor may obtain a copy of the Contracting Agency-supplied software and a demonstration of its basic features by submitting a written request to the Engineer. All test cables and connections shall be the responsibility of the Contractor.

During each testing phase, the Contractor shall repair, replace, or reconfigure the CCTV camera installation as necessary, at no additional cost to the Contracting Agency.

Bench CCTV Test

The Contractor shall perform a bench test on the camera, pan and tilt unit, and camera controller prior to installation. The bench test shall be performed at a location proposed by the Contractor and approved by the Engineer. The bench test shall consist of the following:

1. Display camera video on Contractor-provided monitor
2. Program I.D. generator (to be tested using two different text sets)
3. Pan and tilt camera
4. Zoom and focus camera in both fast and slow modes
5. Turn camera off and on and change iris between auto and manual
6. Adjust pan and tilt stops to the satisfaction of the Engineer
7. Color balance adjustment

Local CCTV Test

At the camera control cabinet the Contractor shall connect the video monitor to the coaxial video cable and connect the camera control device to Cohu MPC camera controller. The Contractor shall demonstrate to the Engineer the following features of the camera installation:

1. Camera displays video on the Contractor-provided monitor.
2. Program the I.D. generator to display the State Route on line 1 and the CCTV camera number on line 2.
3. Pan and tilt the camera.
4. Zoom and focus the camera in both fast and slow modes.
5. Turn the camera off and on; change the iris to auto and manual.
6. Color balance.
7. Verify pan and tilt stops.

TMC CCTV Test

At the Olympic Region Traffic Management Center, the Contractor shall witness the TMC CCTV Testing as performed by the Contracting Agency. The Contracting Agency will attempt to perform all of the Local CCTV Test features through an existing TMS control console at the TMC.

Warranty

The Closed Circuit Television System and all components shall be provided with a one-year, on-site parts and labor warranty from the date that the system successfully completed the TMC CCTV test. This quality assurance shall cover each piece of equipment and shall be provided by the manufacturer or agent of said equipment.

4-inch Conduit with Inner duct

The ITS conduit with inner duct system shall be installed as shown in the Plans encased in controlled density fill.

Location Wire

Wire conductor shall be installed in continuous sections for all underground inner duct conduit installation. A minimum of 6 feet of location wire shall be extended into each cable vault or pull box. The locate wire shall be attached to the "C" channel or the cover hinge bracket with stainless steel bolts and straps. A 1-foot loop of locate wire shall be provided above the channel as shown in the Plans. Locator wire shall be placed between the conduits in dual conduit installations or on top of conduits for single conduit installations.

Submittals

Within a maximum of 30 calendar days prior to anticipated construction, the Contractor shall provide all documentation pertaining to the materials and method of execution proposed to satisfy the requirements of this section. The Engineer's approval is required prior to the committing of any materials or the commencement of any work.

The Engineer shall either approve or disapprove each submitted item within 30 calendar days of submittal subject to the completeness of the contractor's submittal. Actual elapsed time for the Engineer's review is dependent upon the completeness and appropriateness of the documentation being submitted. Any

deficiencies in the Contractor's submittals shall require additional time for approval. Any delays caused by such deficiencies shall not be grounds for an extension of time. The Contractor shall anticipate review intervals and schedule submittals accordingly to ensure project progress in accordance with Section 1-08.3.

The Engineer's approval of any submitted documentation shall in no way relieve the Contractor from compliance with the safety and performance requirements as specified herein.

Submittals required by this item shall include, but not be limited to, the following:

1. A material staging plan, should the Contractor propose State owned property as a staging area.
2. Manufacturer's complete specifications for all communication system cables and, associated electronics and hardware components.
3. Manufacturer's complete specifications for optical fiber splice enclosures.
4. A detailed fiber optic cable installation procedure including the following:
   a. Fiber optic cable cutting lengths reflecting the cable order and reel allocations.
   b. Cable pulling plan which shall state the exact operational procedures to be utilized and which identifies the physical locations for equipment placement, proposed equipment setup at each location, pulling tension on all cables for each pull, staffing, and the pulling methodology for each type of cable.
   c. Exact splice points as provided for herein.
   d. Workforce proposed for all equipment, safety, and manual assist operations.
5. Factory test data sheets for each reel of cable delivered.

Cable Installation - General

The Contractor shall determine a suitable cable installation method to ensure that all cable installation requirements shall be met in all conduit sections. All work shall be carried out in accordance and consistent with the highest standards of quality and craftsmanship in the communication industry with regard to the electrical and mechanical integrity of the connections; the finished appearance of the installation; as well as the accuracy and completeness of the documentation.

The Contractor shall make a physical survey of the project site for the purpose of establishing the exact cable routing and cutting lengths prior to the commencement of any fiber optic work or committing any fiber optic materials. The Contractor shall submit a cable routing plan that shows the locations of all splices. All splice locations other than those shown in the Plans must be approved by the Engineer.

All work areas shall be clean and orderly at the completion of work and at times required by the Engineer during the progress of work.

Fiber Optic Cable Termination

The Contractor shall terminate all strands of the 12-count fiber optic cable into the patch panels in systems 3 through 10 using factory connectorized ST/UPC fusion spliced pigtails. For systems with both CCTV and Data Station/Ramp Meter cabinets, the fiber shall be terminated in the patch panel in the CCTV cabinet, and patch cords shall be used to link to the Data Station cabinet. The Contractor shall

provide patch cords to link the 12-count fiber from one system to the next in the patch panel, and to connect to the fiber optic transceivers.

The 48-count fiber shall be coiled with 200' of slack from existing cable vault number 1, through the inner duct, to cable vault number 4. If needed, a fusion splice of all 48 strands in cable vault number 2 is acceptable to accommodate two shorter lengths of fiber optic cable.

City of Tacoma Fiber Optic Cable Connection

The Contractor shall maintain the existing fiber optic cable connection to the System 9 CCTV site throughout construction. The Contractor shall replace this fiber connection with a new 36-count fiber optic cable link. This link shall run between two existing splice cabinets and through the communication conduit system including pull boxes 27, 28, and 29. The Contractor shall coil 50' of the 36-count fiber in the splice cabinets and coordinate with the City of Tacoma Fire Department to make the fusion splices to complete the system. The Contractor shall contact Nick Hartman at (253) 591-5719 more than 20 days prior to needing the fusion splices.

Fiber Optic Cable Installation

Fiber optic cables shall be installed in continuous lengths without intermediate splices throughout the project, except at the locations specified in the Plans.

The Contractor shall comply with the cable manufacturer's specifications and recommended procedures including, but not limited to the following:

1. Installation.
2. Proper attachment to the cable strength elements for pulling during installation.
3. Bi-directional pulling.
4. Cable tensile limitations and the tension monitoring procedure.
5. Cable bending radius limitations.

The Contractor shall protect the loops from tangling or kinking. At no time during the length of the project shall the cable's minimum bending radius specification be violated.

To accommodate long, continuous installation lengths, bi-directional pulling of the fiber optic cable shall be permitted.

In all cable vaults and at all splice locations; cable slack of 150 feet shall be left by the Contractor unless otherwise noted in the plans. In all pull boxes; cable slack of 50 feet shall be left by the Contractor. The length of slack fiber optic cable shall be coiled and secured with tie wraps to racking hardware.

Installation shall involve the placement of fiber optic cables in a specified inner duct as defined in the Plans. The Contractor shall ensure that inner ducts are secured to prevent movement during the cable installation process.

The pulling eye/sheath termination hardware on the fiber optic cables shall not be pulled over any sheave blocks.

When power equipment is used to install fiber optic cabling, the pulling speed shall not exceed 100 feet per minute. The pulling tension limitation for fiber optic cables shall not be exceeded under any circumstances.

Large diameter wheels, pulling sheaves, and cable guides shall be used to maintain the appropriate bending radius. Tension monitoring shall be accomplished using commercial dynamometers or load-cell instruments.

Patch cords, placed between pad-mounted cabinets, shall be protected by plastic spiral wrapping. Spiral wrap shall cover the entire length of the patch cord to within 12 inches of end. The spiral wrap shall be installed before the patch cords are pulled into the conduits and be rated for use in electrical installations.

Fiber Optic Cable Splicing

This section describes minimum requirements for splicing and connecting of the specified fiber optic cables.

Field splices for fusion-spliced pigtails terminating in patch panels shall be located as shown in the Plans. No additional splices shall be allowed without the approval of the Engineer.

The Contractor shall provide all required brackets and other racking hardware required for the fiber optic cable racking operations as specified.

All fusion splicing equipment shall be in good working order, properly calibrated, and meeting all industry standards and safety regulations. Cable preparation, closure installation and splicing shall be accomplished in accordance with accepted and approved industry standards.

Upon completion of the splicing operation, all waste material shall be deposited in suitable containers for fiber optic disposal, removed from the job site, and disposed of in an environmentally acceptable manner.

The Contractor shall use the fusion method with local injection and detection for all fiber optic splicing.

The average splice loss of each fiber shall be 0.15 dB or less per splice. The average splice loss is defined as the summation of the attenuation as measured in both directions through the fusion splice, divided in half.

No individual splice loss measured in a single direction shall exceed 0.2 dB.

The Contractor shall seal all cables where the cable jacket is removed. The cable shall be sealed per the cable manufacturer's recommendation with an approved blocking material.

All below ground splices shall be contained in waterproof splice enclosures. Splice enclosures shall be reusable and designed for use on fiber optic cables in an underground environment. The splice enclosures shall contain dry encapsulant to restrict moisture ingress.

All splices shall be contained in splice trays utilizing strain relief, such as heat shrink-wraps, as recommended by the splice tray manufacturer.

Fiber Optic Fusion Splicer

The Contractor shall provide a fusion splicer to the Contracting Agency. This equipment shall be delivered with the full and valid manufacture's warranty to the Olympic Region Signal Maintenance Office located at:

5720 Capitol Blvd.
Tumwater, WA 98501
Attention: Don Anders
(360) 357-2616

Fiber Optic Cable Labeling

Permanent cable labels shall be used to identify fibers and patch cords at each termination point. The cable labels shall consist of white colored heat shrink-wraps with identification based on the schematic shown on the ITS detail sheets.

Cable Racking in Cable Vaults

The Contractor shall rack the cable in vertical figure eight loops, which shall permit pulling slack from the vaults without introducing twist to the cable.

Cables shall be secured in racked positions with nylon ties. Identification or warning tags shall be securely attached to the cables in at least two locations in each cable vault or pull box.

All coiled cable shall be protected to prevent damage to the cable and fibers. Racking shall include securing cables to brackets (racking hardware) that extend from the sidewalls of the cable vault or pull box.

All racking hardware shall be stainless steel.

As Built Records

The Contractor shall provide the Engineer with a cable route diagram indicating the actual cable route and "foot marks" for all intersections, directional change points in the cable routing, and all termination points. The Contractor shall record these points during cable installation. Cable system "as-built" drawings showing the exact cable route shall be provided by the Contractor to the Engineer. All ITS equipment locations shall be included. Information such as the location of slack cable and its quantity shall also be recorded in the cable route diagram.

Fiber Optic Cable Testing

The installed optical fiber cable shall be tested for compliance with the transmission requirements of this specification, the cable and hardware manufacturer's specifications, and prescribed industry standards and practices.

Types of Testing

The types of acceptance testing for optical fiber cable system certification are:

Attenuation testing

Optical Time Domain Reflectometer (OTDR) testing

Attenuation Testing

Insertion loss testing shall be used to measure end-to-end attenuation on each new fiber installed between a field device and the patch panel in the communications cabinet as well as on all optical fiber prior to installation. Insertion loss testing shall be performed at the 1310 nanometer wavelength.

Prior to commencing testing, the Contractor shall submit the manufacturer and model number of the test equipment along with certification that it has been calibrated within 6 months of the proposed test dates.

The following information shall be documented for each fiber test measurement:

- Wavelength
- Fiber type
- Cable, tube and fiber IDs
- Near end and far end test locations
- End-to-end attenuation
- Date, time, and operator

Optical Time Domain Reflectometer (OTDR) Testing

An optical time domain reflectometer (OTDR) with recording capability shall be utilized to test the end-to-end transmission quality of each optical fiber. Quality tests shall consider both attenuation and discontinuities. The OTDR shall be equipped with 1310 nanometer and 1550 nanometer light sources for single mode optical fibers. The OTDR shall be capable of providing electronic and hard copy records of each test measurement.

The OTDR shall be equipped with sufficient internal masking to allow the entire cable section to be tested. This may be achieved by using an optical fiber pigtail of sufficient length to display the required cable section, or by using an OTDR with sufficient normalization to display the required cable section.

Prior to commencing testing, the Contractor shall submit the manufacturer and model number of the OTDR test unit along with certification that it has been calibrated within 6 months of the proposed test dates.

Each new lateral fiber shall be tested in both directions at the 1310 and 1550 nanometer wavelengths.

The following information shall be documented for each fiber test measurement:

- X-Y plot scaled for fiber length
- Wavelength
- Refraction index
- Fiber type
- Averaging time
- Pulse width
- Cable and fiber IDs
- Near end and far end test locations

- Date, time, and operator
- Event table that includes: event ID, type, location, loss, and reflection.

Fiber Cable Testing Documentation

The Contractor shall submit one hard copy and one electronic copy of the fiber test results to the Engineer for approval. The Contractor shall take corrective actions on portions of the fiber installation determined to be out of compliance with these specifications.

Upon acceptance of the cable installation and test results, the Contractor shall submit three hard copies and one electronic copy of the fiber test results to the Engineer.

Hard copy submittals shall be bound in 3-ring binders. The electronic submittal shall be on 3.5" floppy disks or a compact disk and include one licensed copy of the applicable OTDR reader program.

The following information shall be included in each test result submittal:

1. Contract number, contract name, contractor name and address.
2. Dates of cable manufacture, installation, and testing.
3. Cable specifications
4. Location of all splices
5. OTDR test results
6. Attenuation test results

Within 30 days of submitting the test results, the Contractor, in the presence of the Engineer, shall re-test a minimum of 5% of the previously tested locations to validate the test results. A 5% sample will be selected randomly from the terminal device locations.

Wiring and Cable for ITS System

All wiring, cable, and cords associated with this equipment shall be neatly dressed and secured to the rack frames or cable trays by nylon ties.

Documentation for ITS System

Documentation for each system element shall consist of the manufacturer's name and model number, serial number when available, materials and operating specifications, wiring schematic and parts list, owners manuals, factory service manuals, and procedures for factory testing and system acceptance testing specified elsewhere herein. The Contractor shall submit 3 copies of the documentation specified above prior to the installation of the cable or components described in the submittal. In addition, the Contractor shall submit 3 copies of an overall system wiring schematic and termination chart for the installed ITS elements. The Contractor shall submit 2 copies of operation and maintenance manuals for all fiber optic transmission equipment, the fiber optic cable splicer, the 170 controllers, and the Cohu CCTV equipment upon completion of the Contract. All documentation for each individual element shall be neatly bound together with the remainder of the documents in a way such that it is totally legible without removing the information from the binding. This documentation shall be in addition to any other data, shop drawings, etc. required to be submitted as specified in these Special Provisions.

Measurement

The first paragraph of Section 8-20.4 is supplemented with the following:

(******)
No specific unit of measurement will apply to traffic data accumulation and ramp meter system, closed circuit television system, communication conduit system, communication system cables and interfaces, video distribution and transmission system, data distribution and transmission system, but measurement will be for the sum total of all items for a complete system to be furnished and installed.

(******)
Modifying signal heads by relocating or bagging the signal heads will be measured per each, for each signal head that is relocated or bagged for an interim traffic configuration. Removal of the bag will not be measured.

Payment

Section 8-20.5 is supplemented with the following:

(******)
All costs associated with the delivery, of removed electrical equipment to remain the property of WSDOT, to the State's Olympic Region Signal Shop shall be included in the lump sum price for "Illumination System No. SCA_____".

All costs associated with the delivery, of removed electrical equipment to remain the property of the City of Tacoma, to the City's Signal Shop shall be included in the lump sum price for "Traffic Signal System No. _____".

All costs associated with the removal of the existing illumination system shall be included in the lump sum payment for "Illumination System No. SCA_____".

All costs associated with the removal of the existing traffic signal and illumination system shall be included in the lump sum payment for "Traffic Signal System No. _____".

All costs associated with the installation of additional illumination for signal systems shall be included in the lump sum payment for "Traffic Signal System No. _____"

All costs associated with the installation, maintenance and removal of the high mast illumination system shall be included in the lump sum price for "Temporary Illumination System SCA _____"

"Temporary Illumination System SCA ____", lump sum.

"Traffic Data Accumulation And Ramp Metering System", lump sum.

"Closed Circuit Television System", lump sum.

"Communication Conduit System", lump sum.

"Communication System Cables and Interfaces", lump sum.

"Video Distribution and Transmission System", lump sum.

"Data Distribution and Transmission System", lump sum.

All costs associated with the installation of loop detectors and lead in cables to existing ITS equipment shall be included in the lump sum price for "Traffic Data Accumulation And Ramp Metering System".

All costs associated with the removal of the existing Closed Circuit Television System shall be included in the lump sum payment for "Closed Circuit Television System".

All costs associated with the delivery of Closed Circuit Television equipment and camera pole to the Olympic Region Signal Shop shall be included in the lump sum payment for "Closed Circuit Television System".

All costs associated with the modification of the existing Closed Circuit Television Camera approach pad shall be included in the lump sum contract price for "Closed Circuit Television System".

All costs associated with the maintenance of the existing fiber optic cable link for CCTV site 016-TV-0038 shall be included in the lump sum payment for "Communication System Cables and Interfaces".

The unit contract price for "Communication Conduit System" shall be full pay for boring, clearing obstructions, clean up, backfilling and the use of crushed surfacing top course in the placement of pull boxes and cable vaults.

The unit contract price for "Communication System Cables and Interfaces" shall be full payment for the Fiber Optic Fusion Splicer.

"Interim Signal Head Modification", per each.

PERMANENT SIGNING

Materials

Sign Support Structures

Steel Structures and Posts
Section 9-28.14(2) is supplemented with the following:

(BSP June 11, 2003)
Monotube Sign Structures
Structural steel, except for cover plates, anchor rod templates and as otherwise shown in the Plans, shall conform to either ASTM A 572 Grade 50, or ASTM A 588. Cover plates shall conform to ASTM A 36.

Handhole cover screws shall conform to ASTM F 593, Grade 1.

Sign bracket bolts, nuts, and washers shall conform to Section 9-06.5(1).

Monotube splice bolts, mounting beam rods, and associated nuts and washers, shall conform to Section 9-06.5(3).

Anchor rods shall conform to ASTM F 1554 Grade 105, including supplemental requirements S2, S3, and S5. Nuts shall conform to AASHTO M 291 Grade DH. Washers shall conform to AASHTO M 293. Anchor rods shall be galvanized a minimum of 1'-0" at the exposed end in accordance with AASHTO M 232. Nuts and washers shall be galvanized in accordance with AASHTO M 232.

Construction Requirements

Sign Structures

Fabrication of Steel Structures

Section 8-21.3(9)A is supplemented with the following:

(BSP February 20, 2002)

Monotube Sign Structures

Bolted Connections

All bolted connections shall be made using the direct tension indicator method, except as otherwise specified.

The Contractor may use tension control bolts at all monotube splice locations, subject to the following conditions:

1. The tension control bolts shall incorporate a design feature intended to either indirectly indicate, or to automatically provide, the bolt tension as specified in Table 3 of Section 6-03.3(33).

2. The Contractor shall submit the tension control bolt system to the Engineer for approval, including but not limited to bolt capacities, type of bolt, nut, and washer lubricant, method of packaging and protection of the lubricated bolt, installation equipment, calibration equipment, and installation procedures.

3. Verification testing of the tension control bolt system shall be performed at the job site in a device capable of indicating the actual bolt tension. A representative sample of not less than three bolt and nut assemblies of each diameter, length, and grade, used for structure assembly shall be tested. The test assembly shall include the type of washers specified for the structure, and the bolt, nut, and washers shall be arranged in the device as specified in the Plans for the structure. The test assembly shall use the lubricated bolts as supplied by the manufacturer.

4. The verification testing shall demonstrate that each bolt develops a tension not less than the tension specified in Table 3 of Section 6-03.3(33).

5. The tension control bolt manufacturer's installation procedure shall be followed for installation of bolts in the verification testing device, in all calibration devices, and in all structure connections.

6. Upon receiving the Engineer's approval of the verification testing results, the Contractor shall assemble the bolts in the splice locations as follows:

    a. All bolts, nuts, and washers shall be lubricated as supplied by the manufacturer and as tested during verification testing.

    b. All bolts shall be initially tightened sufficiently to bring all plies of the splice joint into firm contact but without yielding or fracturing the tension control or tension indicator element of the bolts.

    c. All bolts shall be tightened further, progressing systematically from the most rigid part of the connection to the free edges in a manner that will minimize relaxation of previously tightened bolts. In some cases, proper tensioning of the bolts may require more than one cycle of systematic partial tightening prior to final yield or fracture of the tension control or tension indicator element of each bolt.

    d. If yield or fracture of the tension control or tension indicator element of a bolt occurs prior to the final tightening cycle, that bolt shall be replaced with a new one.

7. Additional field verification testing shall be performed as requested by the Engineer.

8. All bolts and connecting hardware shall be stored and handled in a manner to prevent corrosion and loss of lubricant. Bolts which are installed without the same lubricant coating as tested under the verification test will be rejected, shall be removed from the joint, and shall be replaced with new lubricated bolts at no additional cost to the Contracting Agency.

Shop Assembly

Prior to galvanizing, the Contractor shall shop assemble the completed structure lying on its side in an undeflected position to ensure correct alignment, accuracy of holes, fit of joints, smooth camber profile, and the specified amount of camber. The joints shall be bolted with a sufficient number of bolts tightened snug tight to close the joints as they would be in the final field assembled position. The Contractor shall not disassemble the sign structure for galvanizing as specified until receiving the Engineer's approval of the shop assembled structure.

Zinc Coating and Painting

All galvanized surfaces exposed to view after erection shall be painted in accordance with Section 6-07.3(4). Contact surfaces of the field bolted connections shall be left unpainted. The paint shall be applied in the field,

except as otherwise specified. The Contractor may apply the paint in the shop subject to the Engineer's prior approval, and provided that all surface areas with damaged paint or exposed metal following erection shall be repaired as specified below.

The color of the finish coat of paint shall match color No. 35237 Federal Standard 595B latest edition when dry.

All galvanized surfaces specified to be painted shall be prepared for painting in accordance with the ASTM D 2092. The method of preparation shall be as agreed upon by the paint manufacturer and the galvanizer. The Contractor shall not begin painting the sign structure until receiving the Engineer's approval of the prepared galvanized surface.

Damaged galvanized surfaces in the field shall be repaired by the Contractor at the Contractor's expense by painting with one coat of either Formula A-9-73 or Formula A-11-99, followed by field painting with the final two coats specified in Section 6-07.3(4).

Field Assembling

The Contractor shall furnish and install the vibration damper as shown in the Plans. The damper shall be installed before the sign structure is erected.

Welding Inspector Qualification

The fabricator shop will provide a Certified Welding Inspector. The inspector shall be a AWS Certified Welding Inspector (CWI) qualified and certified in accordance with the provisions of AWS QCI Standard for Qualification and Certification.

Welding Inspection

Welds for monotube sign structures shall be inspected using the methods described below.

1. Visual Inspection
   All welds shall have 100 percent of their length visually inspected.

2. Magnetic Particle Inspection
   Fillet welds, and longitudinal butt joint welds in beams, shall have 30 percent of their length inspected using magnetic-particle testing techniques. If rejectable flaws are found in any test length of the weld, the full length of the weld or five feet on either side of the test length, whichever is less, shall be tested.

3. Ultrasonic Inspection
   Groove welds, except the post to beam connection weld and longitudinal butt joint welds in beams, shall have 100 percent of their length inspected using ultrasonic testing techniques. The testing procedure and acceptance criteria for tubular members shall conform to the latest edition of the AWS Structural Welding Code D1.1-Steel.

4. Dye-Penetrant or Magnetic Particle Inspection
The post to beam connection weld shall have 100 percent of its length inspected using dye-penetrant or magnetic-particle testing techniques. The inspection shall be performed after the root pass and after completion of the weld.

Bridge Mounted Sign Brackets
Section 8-21.3(9)E is supplemented with the following:

(BSP December 14, 2000)
Bridge Mounted Sign Bracket No(s). *** 1, 2 and 3*** include the following quantities of structural carbon steel:

*** Bridge Mounted Sign Bracket No. 1	845	LBS
Bridge Mounted Sign Bracket No. 2	1,433	LBS
Bridge Mounted Sign Bracket No. 3	1,433	LBS ***

For bridge mounted sign brackets mounted with resin bonded anchors, the Contractor shall install resin bonded anchors in accordance with Section 6-02.3(18) as supplemented in these Special Provisions. For this type of mounting, Bridge Mounted Sign Bracket No(s). *** 1, 2 and 3 *** include the following quantities of drilled holes:

*** As shown in the Plans.

The removal and disposal of existing mounted sign brackets 1, 2 and 3 to the satisfaction of the Engineer shall be included in these items of work. ***

(BSP July 12, 2000)
Bases
Section 8-21.3(9)F is supplemented with the following:

(BSP July 12, 2000)
The Contractor shall not construct grout pads at the base of the monotube sign structures.

Measurement
Section 8-21.4 is supplemented with the following:

(BSP July 12, 2000)
*** The Sign Bridge No. 1, Sign Bridge No. 2, Cantilever Sign Structure No. 1, Cantilever Sign Structure No. 2, Cantilever Sign Structure No. 3, and Cantilever Sign Structure No. 4 *** contain(s) the following approximate quantities of material and work:

*** Sign Bridge No. 1

Structural Excavation Cl. A Incl. Haul	30	C.Y.
St. Reinf. Bar	7,900	LBS
Conc. Class 4000	6	C.Y.
Conc. Class 4000P	26	C.Y.
Structural Steel	22,000	LBS

<u>Sign Bridge No. 2</u>		
Structural Excavation Cl. A Incl. Haul	80	C.Y.
St. Reinf. Bar	2,000	LBS
Conc. Class 4000	6	C.Y.
Conc. Class 4000P	22	C.Y.
Structural Steel	25,500	LBS
<u>Cantilever Sign Structure No. 1</u>		
Structural Excavation Cl. A Incl. Haul	13	C.Y.
St. Reinf. Bar	2,355	LBS
Conc. Class 4000P	14	C.Y.
Structural Steel	8,000	LBS
<u>Cantilever Sign Structure No. 2</u>		
Structural Excavation Cl. A Incl. Haul	13	C.Y.
St. Reinf. Bar	2,000	LBS
Conc. Class 4000	3	C.Y.
Conc. Class 4000P	7	C.Y.
Structural Steel	9,500	LBS
<u>Cantilever Sign Structure No. 3</u>		
Structural Excavation Cl. A Incl. Haul	13	C.Y.
St. Reinf. Bar	2,400	LBS
Conc. Class 4000	3	C.Y.
Conc. Class 4000P	11	C.Y.
Structural Steel	8,000	LBS
<u>Cantilever Sign Structure No. 4</u>		
Structural Excavation Cl. A Incl. Haul	13	C.Y.
St. Reinf. Bar	2,000	LBS
Conc. Class 4000	3	C.Y.
Conc. Class 4000P	7	C.Y.
Structural Steel	9,000	LBS ***

The quantities are listed only for the convenience of the Contractor in determining the volume of work involved and are not guaranteed to be accurate. The prospective bidders shall verify these quantities before submitting a bid. No adjustments other than for approved changes will be made in the applicable sign structure lump sum contract price even though the actual quantities required may deviate from those listed.

Payment

Section 8-21.5 is supplemented with the following:

(******)

All costs associated with sign covering shall be included in the lump sum price for "Permanent Signing".

PAVEMENT MARKING

Description

Section 8-22.1 is supplemented with the following:

(******)

Plastic Junction Box Marking

A WHITE marking consisting of two 4 inches by 12 inches strips of plastic pavement marking material placed at the location of a junction box, one foot outside the pavement edge stripe. The strips shall be configured so that they overlap, forming an arrowhead, with a 90-degree internal angle, pointing at the junction box.

Construction Requirements

Marking Application

Section 8-22.3(3) is supplemented with the following:

All profiled lines shall be Type D.

Measurement

Section 8-22.4 is supplemented with the following:

(******)

Junction box marking will be measured per each marking placed.

Payment

Section 8-22.5 is supplemented with the following:

(******)

"Plastic Junction Box Marking", per each.

TEMPORARY PAVEMENT MARKINGS

Description

Section 8-23.1 is revised to read as follows:

(******)

The work shall consist of furnishing, installing and removing temporary pavement markings. Temporary pavement markings shall be provided where noted in the Plans and for all lane shifts and detours resulting from construction activities. Temporary pavement markings shall also be provided when permanent markings are eliminated because of construction operations. Temporary pavement markings shall be maintained in serviceable condition throughout the project until permanent pavement markings are installed. Temporary pavement markings that are damaged shall be repaired or replaced immediately. Edge lines shall be installed only if specifically required in the contract.

Lane line and right edge line shall be white in color. Left edge line shall be yellow in color. All temporary pavement markings shall be retroreflective.

Paint shall be used on all planed surfaces that are opened to traffic.

Temporary pavement marking installations are defined as described in Section 8-22.1.

Materials

Section 8-23.2 is supplemented with the following:

Paint for the temporary parking stall numbers shall conform to the requirements of Section 9-34.2, except that the color shall be green.

Construction Requirements

(******)

Preliminary Spotting and Removal

Section 8-23.3(1) is supplemented with the following:

(******)

Paint shall not be used for temporary marking on the final lift of asphalt concrete pavement or Portland cement concrete pavement.

Removable preformed tape shall be used for temporary marking on all concrete surfaces on the A22 Line.

Section 8-23.3 is supplemented with the following:

(******)

Replacing Pavement Markings

The following temporary pavement markings shall be replaced during the same shift if damaged by traffic or following grinding or paving operations:

Lane lines, wide lines and stop lines.

(******)

Temporary Parking Stall Number

Temporary parking stall numbers shall be installed at the temporary park-and-ride lot, located at the Tacoma Alliance Church, 2401 S. Orchard St, as detailed in the Plans.

Measurement

Section 8-23.4 is supplemented with the following:

(******)

Removable preformed tape will be measured by the linear foot of tape applied. Gaps in lines will not be measured.

Temporary parking stall numbers will be measured per each for each number installed.

Payment

The second paragraph in Section 8-23.5 is revised to read as follows:

(******)

The unit contract price per linear foot for "Temporary Pavement Marking", and "Removable Preformed Tape", shall be full pay for constructing and maintaining temporary lines and markers as specified. Unless a bid item has been included in the proposal to pay for removal of temporary pavement markings, all costs for removal of temporary pavement markings shall be included in the unit contract price per linear foot for "Temporary Pavement Marking", and "Removable Preformed Tape". No additional

compensation will be allowed when the Contractor is required to repair temporary taped markings that have been damaged or worn.

Section 8-23.5 is supplemented with the following:

(******)
"Removable Preformed Tape", per linear foot.

(******)
"Temporary Parking Stall Number", per each.

FIELD OFFICE BUILDING

(March 13, 1995)

Description

This work shall consist of furnishing and setting-up a temporary office building for the sole use of the Contracting Agency.

Construction Requirements

(******)
The building shall be set-up, at the location designated by the Engineer, within the first 10 working days, unless the Engineer has approved a different schedule.

The building shall be weather-tight, installed plumb and level, and provided with the following as a minimum:

1. Minimum 900 square feet of floor space
2. Above ground floor
3. Heat
4. Air conditioning
5. Electric lights
6. Telephone and multiple jacks
7. Adequate windows
8. Six square feet of shelving
9. Plan table: 3 feet 6 inches deep by 6 feet wide by 3 feet 3 inches high
9. Seven desks; each with 12.5 square feet of surface
9. Seven office chairs
12. Drafting stool
13. Conference table: 4 foot by 8 foot
14. Four conference chairs
15. Cylinder door lock and six keys
16. Sanitary facilities (unless existing facilities are available)

The building shall remain the property of the Contractor and removed from the site upon physical completion of the contract, or when designated by the Engineer.

(October 28, 1996)

Payment

Payment will be made in accordance with Section 1-04.1, for the following bid item:

"Field Office Building", lump sum.

The lump sum contract price for "Field Office Building" shall be full pay for furnishing, installing, maintaining, and removing the facility, including all costs associated with all required utility hook-ups and disconnects, and monthly utility charges for all utilities except telephone.

The monthly telephone costs will be paid by the Contracting Agency.

BOLLARDS
October 28, 1996

Description
This work shall consist of constructing steel bollards.

Materials
Post
Bollard posts, and the post sleeve for Type 1 bollards, shall be Schedule 80 steel pipe.

Hardware
All hardware shall be steel, conforming to the size and thickness shown in Standard Plans H-13 or H-13a. The welding shall ensure that the lid will fit into the hole in the cover plate.

All steel parts shall be hot-dip galvanized after fabrication in accordance with ASTM A 123.

Reflective Tape
Reflective tape shall be one of the following or an approved equal:

1. 3M 3810 Flexible High Intensity
2. Reflexite PC 100
3. 3M Diamond Grade
4. Stimeonite High Performance Grade

Concrete
Footings shall be constructed using concrete Class 3000.

Construction Requirements
Bollards shall be constructed in accordance with Standard Plan H-13 or H-13a.

Bollards shall not vary more than 1/2 inch in 30 inches from a vertical plane.

Bollard posts, and the exposed parts of the base assembly for Type 1 bollards, shall be painted with one coat of paint formula K-2-83.

Measurement
Measurement for bollards will be by the unit for each bollard furnished and installed.

Payment
Payment will be made in accordance with Section 1-04.1, for the following bid items:

"Bollard Type ___", per each.

(******)

LANDMARK SCULPTURE

Description

This work shall consist of installing two landmark sculpture foundations and connecting the electrical power supply.

Materials

Landmark sculpture foundations shall be constructed using commercial concrete in accordance with Section 6-02.3(2)B.

Construction Requirements

Landmark sculpture foundations shall be constructed as detailed in the Plans. For electrical power supply, see Illumination Plan.

Upon completion of the foundation construction, the Tacoma Solid Waste Management Division will place the two sculptures upon the foundations. The Contractor shall notify the Tacoma Solid Waste Management Division Manager at (253) 593-7739 and the Engineer, fourteen calendar days prior to requiring the sculptures to be placed on the foundations. Following placement, the Contractor shall connect the power supply.

Payment

Payment will be made in accordance with Section 1-04.1, for the following bid item:

"Landmark Sculpture", lump sum.

DIVISION 9
MATERIALS

AGGREGATES

(January 5, 2004)

HMA Test Requirements

Section 9-03.8(2) is supplemented with the following:

ESAL's

The number of ESAL's for the design and exceptance of the HMA shall be *** 14.0 *** million.

(April 5, 2004)

HMA Tolerances and Adjustments

The last two sentences of item 1 in Section 9-03.8(7) are revised to read:

> For VMA and VFA, the tolerance limits only apply to HMA accepted by statistical evaluation. The tolerance limits for VMA are applicable to mix design verification, acceptance of the test section and acceptance of the HMA; the tolerance limits for

VFA are only applicable to mix design verification and acceptance of the test section. The tolerances for Va apply as follows: for HMA accepted by statistical evaluation, the tolerance limits for Va apply to mix design verification, acceptance of the test section and acceptance of the HMA; and for HMA accepted by nonstatistical evaluation and commercial evaluation, the tolerance limits for Va only apply to mix design verification.

ILLUMINATION, SIGNALS, ELECTRICAL

Conductors, Cable

Section 9-29.3, item No. 8 is replaced with the following:

(******)
Detector loop conductors for standard plan installations and for Method A round loop construction shall use No. 14 stranded copper conductors, Class B, with Type XLP/USE insulation. Method B round loop construction shall use No. 14 stranded copper conductors, Class B, with XHHW or THHN insulation conforming to IMSA 51-3 requirements, encased in 1/4 inch outside diameter polyurethane tubing conforming to IMSA 51-5 requirements.

Luminaires

Section 9-29.10 is supplemented with the following:

(******)
Tunnel lighting fixtures shall be Kenall Millenium , model MR17ESR/PP-PP-MW-70S-1-240. Wall lighting fixtures shall be Kenall Millenium, model MR17ES/PP-PP-LG-70S-1-240. Kenall Millenium's local representative is Craig Tesdahl of Milligan and Associates, LLC, 922 SW 151st, Burien, WA 98166, telephone (206) 382-9410. Fixtures are manufactured by Kenall Manufacturing, 1020 Lakeside Drive, Gurnee, Illinois 60031, telephone (847) 360-8200.

Traffic Signal Controllers

Section 9-29.13 is supplemented with the following:

(******)
Signal cabinets shall be built as per cabinet wiring diagram as shown in the plans and the following WSDOT Olympic Region's cabinet specifications.

Equipment requirements for traffic signal no. 3 (Center St. and Mullen I/S) shall include the following:

1 ea. Type "P" Aluminum Controller Cabinet (Double Door).
Controller cabinets shall be finished inside with an approved finish coat of exterior white enamel and outside with an approved enamel finish, light gray or aluminum in color, with front and rear doors. Provide for temporary installation of lifting eyes. The cabinet shall include two shelves. Each shelf shall have additional support welded down the center. The bottom shelf shall contain a slide out with lid for a laptop computer and drawing storage.

1 ea. 16 Position Load Bay.
The load bay shall be fully wired including: 12 channel conflict monitor cables; controller special function cable; TMM 500 "A" and "E" cables, fused loadswitch outputs (KTK-10 or equal), with 9 in. clearance from field output terminals to cabinet floor. Fuse blocks shall be screw terminal type with No. 10 post capable of accepting no less than two No. 12 wires fitted with spade lugs. Phase amber or red flash sequence shall be changeable without the use of tools. All 8-phase Walk CMU inputs shall be made available on the backpanel front. Phase Walk CMU input to load switch shall be selectable with one jumper per phase.

11 ea. Type SP 4301 Dual Indicating Load Switches.

1 ea. Eberle Design Inc. Model SSM-12LE Data Logging conflict monitor or equal. CMU must display time, fault(s), and all load switch output conditions simultaneously.

1 ea. Stop Time Switch.
Cabinets shall be equipped with a three position toggle switch that provides Stop Time true inputs as follows: Auto - Stop Timing applied by CMU during an abnormal condition, or by the flash position of the police panel Flash-Auto switch. Off - Stop Timing not true any time. On - Stop Timing always true.

1 ea. 12 Two Channel Rackmounted Digital Loop Detectors (Timing Type)
14 Position Loop Detector/Opticom Card Rack
2 Positions wired for Opticom M752 Discriminators.
12 Positions wired for 2 channel loop detectors with respective phase green inputs as follows:

L11,L12,L13,L14,L15,L16
L21,L22,L23,L24,L25,L26
L31,L32,L33
L41,L42,L43
L51,L52,L53
L61,L62,L63,L64,L65,L66
L71,L72,L73
L81,L82,L83,L84

2 ea. External Logic Stop Bar Interrupt Circuits
Loops 21,22,61, & 62

2 ea. 3M model752 Phase Selectors (Opticom)

1 ea. Display Panel

24 vehicle detection displays (PSB-28 LAMPS)

4 pedestrian detection displays (PSB-28 LAMPS)

8 phase full quad vehicle displays (PSB-120 LAMPS)

4 pedestrian displays (PSB-120 LAMPS)

Detection switches shall be ¼ inch mount ALCO MTA106H (or equal) On-Off-On(Momentary) miniature toggle type.

Lamps shall be protected by Sylvania Osram 3016X series or equal lenses. Lamp caps are not acceptable.

1 ea. 4 wire interconnect Hayes smart type Dial-up Modem.

1 ea. Traconex TMP-390 (J8 software) Controller with Special Function Module shall meet or exceed the requirements specified in:

1. Washington Standard Specifications for Road, Bridge, and Municipal construction.

2. National Electrical Manufacturers Association (NEMA) Publication No. TS1-1976 as currently amended.

3. These Special Provisions.

1 ea. Traconex TMP-390 Multi-Comm Communication Module

1 ea. GDI 212
PC programmable "S" Registers
PC programmable "AT" Command Set
Shall maintain programming for 12 months while unpowered

The following functions shall also be provided in the local signal control unit:

1. Guaranteed Yellow
The Yellow interval for all phases shall be 3.5 seconds unless the operator sets a higher value for it.

2. Simultaneous Gap Out
Two concurrently timing phases shall simultaneously reach a rest state prior to their termination by gap out and prior to advancing across the barrier. A phase in dual ring operation may re-time its gap from a rest state upon vehicle actuation.

Equipment requirements for traffic signal no. 6 (SR 16 EB Ramps at S. Orchard) shall include the following:

1 ea. Type "P" Aluminum Controller Cabinet (Double Door).
Controller cabinets shall be finished inside with an approved finish coat of exterior white enamel and outside with an approved enamel finish, light gray or aluminum in color, with front and rear doors. Provide for temporary installation of lifting eyes. The cabinet shall include two shelves. Each shelf shall have additional support welded down the center. The bottom shelf shall contain a slide out with lid for a laptop computer and drawing storage.

1 ea. 16 Position Load Bay.
The load bay shall be fully wired including: 12 channel conflict monitor cables; controller special function cable; TMM 500 "A" and "E" cables, fused loadswitch outputs (KTK-10 or equal), with 9 in. clearance from field output terminals to cabinet floor. Fuse blocks shall be screw terminal type with No. 10 post capable of accepting no less than two No. 12 wires fitted with spade lugs. Phase amber or red flash sequence shall be changeable without the use of tools. All 8-phase Walk CMU inputs shall be made available on the backpanel front. Phase Walk CMU input to load switch shall be selectable with one jumper per phase.

5 ea. Type SP 4301 Dual Indicating Load Switches.

1 ea. Eberle Design Inc. Model SSM-12LE Data Logging conflict monitor or equal. CMU must display time, fault(s), and all load switch output conditions simultaneously.

1 ea. Stop Time Switch.
Cabinets shall be equipped with a three position toggle switch that provides Stop Time true inputs as follows: Auto - Stop Timing applied by CMU during an abnormal condition, or by the flash position of the police panel Flash-Auto switch. Off - Stop Timing not true any time. On - Stop Timing always true.

1 ea. 12 Two Channel Rackmounted Digital Loop Detectors (Timing Type)
14 Position Loop Detector/Opticom Card Rack
2 Positions wired for Opticom M752 Discriminators.
12 Positions wired for 2 channel loop detectors with respective phase green inputs as follows:

L41,L42,L43
L51,L52,L53,L54,L55,L56
L61,L62,L63,L64,L65,L66

2 ea. External Logic Stop Bar Interrupt Circuits
Loops 61, & 62

2 ea. 3M model752 Phase Selectors (Opticom)

1 ea. Display Panel

24 vehicle detection displays (PSB-28 LAMPS)

4 pedestrian detection displays (PSB-28 LAMPS)

8 phase full quad vehicle displays (PSB-120 LAMPS)

4 pedestrian displays (PSB-120 LAMPS)

Detection switches shall be ¼ inch mount ALCO MTA106H (or equal)

On-Off-On(Momentary) miniature toggle type.

Lamps shall be protected by Sylvania Osram 3016X series or equal lenses. Lamp caps are not acceptable.

1 ea. 4 wire interconnect Hayes smart type Dial-up Modem.

1 ea. Traconex TMP-390 (J8 software) Controller with Special Function Module shall meet or exceed the requirements specified in:

4. Washington Standard Specifications for Road, Bridge, and Municipal construction.

5. National Electrical Manufacturers Association (NEMA) Publication No. TS1-1976 as currently amended.

6. These Special Provisions.

1 ea. Traconex TMP-390 Multi-Comm Communication Module

1 ea. GDI 212
PC programmable "S" Registers
PC programmable "AT" Command Set
Shall maintain programming for 12 months while unpowered

The following functions shall also be provided in the local signal control unit:

3. Guaranteed Yellow
The Yellow interval for all phases shall be 3.5 seconds unless the operator sets a higher value for it.

4. Simultaneous Gap Out
Two concurrently timing phases shall simultaneously reach a rest state prior to their termination by gap out and prior to advancing across the barrier. A phase in dual ring operation may re-time its gap from a rest state upon vehicle actuation.

Equipment requirements for traffic signal no. 8 (SR 16 WB Ramps at N. Orchard) shall include the following:

1 ea. Type "P" Aluminum Controller Cabinet (Double Door).
Controller cabinets shall be finished inside with an approved finish coat of exterior white enamel and outside with an approved enamel finish, light gray or aluminum in color, with front and rear doors. Provide for temporary installation of lifting eyes. The cabinet shall include two shelves. Each shelf shall have additional support welded down the center. The bottom shelf shall contain a slide out with lid for a laptop computer and drawing storage.

1 ea. 16 Position Load Bay.
The load bay shall be fully wired including: 12 channel conflict monitor cables; controller special function cable; TMM 500 "A" and "E" cables,

fused loadswitch outputs (KTK-10 or equal), with 9 in. clearance from field output terminals to cabinet floor. Fuse blocks shall be screw terminal type with No. 10 post capable of accepting no less than two No. 12 wires fitted with spade lugs. Phase amber or red flash sequence shall be changeable without the use of tools. All 8-phase Walk CMU inputs shall be made available on the backpanel front. Phase Walk CMU input to load switch shall be selectable with one jumper per phase.

5 ea. Type SP 4301 Dual Indicating Load Switches.

1 ea. Eberle Design Inc. Model SSM-12LE Data Logging conflict monitor or equal. CMU must display time, fault(s), and all load switch output conditions simultaneously.

1 ea. Stop Time Switch.
Cabinets shall be equipped with a three position toggle switch that provides Stop Time true inputs as follows: Auto - Stop Timing applied by CMU during an abnormal condition, or by the flash position of the police panel Flash-Auto switch. Off - Stop Timing not true any time. On - Stop Timing always true.

1 ea. 12 Two Channel Rackmounted Digital Loop Detectors (Timing Type)
14 Position Loop Detector/Opticom Card Rack
2 Positions wired for Opticom M752 Discriminators.
12 Positions wired for 2 channel loop detectors with respective phase green inputs as follows:

L11,L12,L13,L14,L15,L16
L21,L22,L23,L24,L25,L26
L41,L42,L43,L44,L45
L61,L62,L63

2 ea. External Logic Stop Bar Interrupt Circuits
Loops 21,22 & 61

2 ea. 3M model752 Phase Selectors (Opticom)

1 ea. Display Panel

24 vehicle detection displays (PSB-28 LAMPS)

4 pedestrian detection displays (PSB-28 LAMPS)

8 phase full quad vehicle displays (PSB-120 LAMPS)

4 pedestrian displays (PSB-120 LAMPS)

Detection switches shall be ¼ inch mount ALCO MTA106H (or equal) On-Off-On(Momentary) miniature toggle type.

Lamps shall be protected by Sylvania Osram 3016X series or equal

lenses. Lamp caps are not acceptable.

1 ea. 4 wire interconnect Hayes smart type Dial-up Modem.

1 ea. Traconex TMP-390 (J8 software) Controller with Special Function Module shall meet or exceed the requirements specified in:

7. Washington Standard Specifications for Road, Bridge, and Municipal construction.

8. National Electrical Manufacturers Association (NEMA) Publication No. TS1-1976 as currently amended.

9. These Special Provisions.

1 ea. Traconex TMP-390 Multi-Comm Communication Module

1 ea. GDI 212
PC programmable "S" Registers
PC programmable "AT" Command Set
Shall maintain programming for 12 months while unpowered

The following functions shall also be provided in the local signal control unit:

5. Guaranteed Yellow
The Yellow interval for all phases shall be 3.5 seconds unless the operator sets a higher value for it.

6. Simultaneous Gap Out
Two concurrently timing phases shall simultaneously reach a rest state prior to their termination by gap out and prior to advancing across the barrier. A phase in dual ring operation may re-time its gap from a rest state upon vehicle actuation.

Equipment requirements for traffic signal no. 9 (SR 16 EB Ramps at Pearl St.) shall include the following:

1 ea. Type "P" Aluminum Controller Cabinet (Double Door).
Controller cabinets shall be finished inside with an approved finish coat of exterior white enamel and outside with an approved enamel finish, light gray or aluminum in color, with front and rear doors. Provide for temporary installation of lifting eyes. The cabinet shall include two shelves. Each shelf shall have additional support welded down the center. The bottom shelf shall contain a slide out with lid for a laptop computer and drawing storage.

1 ea. 16 Position Load Bay.
The load bay shall be fully wired including: 12 channel conflict monitor cables; controller special function cable; TMM 500 "A" and "E" cables, fused loadswitch outputs (KTK-10 or equal), with 9 in. clearance from field output terminals to cabinet floor. Fuse blocks shall be screw terminal type with No. 10 post capable of accepting no less than two

No. 12 wires fitted with spade lugs. Phase amber or red flash sequence shall be changeable without the use of tools. All 8-phase Walk CMU inputs shall be made available on the backpanel front. Phase Walk CMU input to load switch shall be selectable with one jumper per phase.

4 ea. Type SP 4301 Dual Indicating Load Switches.

1 ea. Eberle Design Inc. Model SSM-12LE Data Logging conflict monitor or equal. CMU must display time, fault(s), and all load switch output conditions simultaneously.

1 ea. Stop Time Switch.
Cabinets shall be equipped with a three position toggle switch that provides Stop Time true inputs as follows: Auto - Stop Timing applied by CMU during an abnormal condition, or by the flash position of the police panel Flash-Auto switch. Off - Stop Timing not true any time. On - Stop Timing always true.

1 ea. 12 Two Channel Rackmounted Digital Loop Detectors (Timing Type)
14 Position Loop Detector/Opticom Card Rack
2 Positions wired for Opticom M752 Discriminators.
12 Positions wired for 2 channel loop detectors with respective phase green inputs as follows:

L51,L52,L53,L54,L55,L56,L57,L58,L59
L61,L62,L63,L64,L65,L66
L81,L82,L83,L84,L85

2 ea. External Logic Stop Bar Interrupt Circuits
Loops 51,52,53,61 &62

2 ea. 3M model752 Phase Selectors (Opticom)

1 ea. Display Panel

24 vehicle detection displays (PSB-28 LAMPS)

4 pedestrian detection displays (PSB-28 LAMPS)

8 phase full quad vehicle displays (PSB-120 LAMPS)

4 pedestrian displays (PSB-120 LAMPS)

Detection switches shall be ¼ inch mount ALCO MTA106H (or equal) On-Off-On(Momentary) miniature toggle type.

Lamps shall be protected by Sylvania Osram 3016X series or equal lenses. Lamp caps are not acceptable.

1 ea. 4 wire interconnect Hayes smart type Dial-up Modem.

1 ea. Traconex TMP-390 (J8 software) Controller with Special Function Module shall meet or exceed the requirements specified in:

10. Washington Standard Specifications for Road, Bridge, and Municipal construction.

11. National Electrical Manufacturers Association (NEMA) Publication No. TS1-1976 as currently amended.

12. These Special Provisions.

1 ea. Traconex TMP-390 Multi-Comm Communication Module

1 ea. GDI 212
PC programmable "S" Registers
PC programmable "AT" Command Set
Shall maintain programming for 12 months while unpowered

The following functions shall also be provided in the local signal control unit:

7. Guaranteed Yellow
The Yellow interval for all phases shall be 3.5 seconds unless the operator sets a higher value for it.

8. Simultaneous Gap Out
Two concurrently timing phases shall simultaneously reach a rest state prior to their termination by gap out and prior to advancing across the barrier. A phase in dual ring operation may re-time its gap from a rest state upon vehicle actuation.

Equipment requirements for traffic signal no. 10 (SR 16 WB Ramps at 6th St.) shall include the following:

1 ea. Type "P" Aluminum Controller Cabinet (Double Door).
Controller cabinets shall be finished inside with an approved finish coat of exterior white enamel and outside with an approved enamel finish, light gray or aluminum in color, with front and rear doors. Provide for temporary installation of lifting eyes. The cabinet shall include two shelves. Each shelf shall have additional support welded down the center. The bottom shelf shall contain a slide out with lid for a laptop computer and drawing storage.

1 ea. 16 Position Load Bay.
The load bay shall be fully wired including: 12 channel conflict monitor cables; controller special function cable; TMM 500 "A" and "E" cables, fused loadswitch outputs (KTK-10 or equal), with 9 in. clearance from field output terminals to cabinet floor. Fuse blocks shall be screw terminal type with No. 10 post capable of accepting no less than two No. 12 wires fitted with spade lugs. Phase amber or red flash sequence shall be changeable without the use of tools. All 8-phase Walk CMU inputs shall be made available on the backpanel front. Phase Walk CMU input to load switch shall be selectable with one

jumper per phase.

6 ea. Type SP 4301 Dual Indicating Load Switches.

1 ea. Eberle Design Inc. Model SSM-12LE Data Logging conflict monitor or equal. CMU must display time, fault(s), and all load switch output conditions simultaneously.

1 ea. Stop Time Switch.
Cabinets shall be equipped with a three position toggle switch that provides Stop Time true inputs as follows: Auto - Stop Timing applied by CMU during an abnormal condition, or by the flash position of the police panel Flash-Auto switch. Off - Stop Timing not true any time. On - Stop Timing always true.

1 ea. 12 Two Channel Rackmounted Digital Loop Detectors (Timing Type)
14 Position Loop Detector/Opticom Card Rack
2 Positions wired for Opticom M752 Discriminators.
12 Positions wired for 2 channel loop detectors with respective phase green inputs as follows:

L21,L22,L23,L24,L25,L26
L41,L42,L43,L44,L45,L46,L47
L61,L62,L63,L64,L65,L66

2 ea. External Logic Stop Bar Interrupt Circuits
Loops 21,22,61 &62

2 ea. 3M model752 Phase Selectors (Opticom)

1 ea. Display Panel

24 vehicle detection displays (PSB-28 LAMPS)

4 pedestrian detection displays (PSB-28 LAMPS)

8 phase full quad vehicle displays (PSB-120 LAMPS)

4 pedestrian displays (PSB-120 LAMPS)

Detection switches shall be ¼ inch mount ALCO MTA106H (or equal) On-Off-On(Momentary) miniature toggle type.

Lamps shall be protected by Sylvania Osram 3016X series or equal lenses. Lamp caps are not acceptable.

1 ea. 4 wire interconnect Hayes smart type Dial-up Modem.

1 ea. Traconex TMP-390 (J8 software) Controller with Special Function Module shall meet or exceed the requirements specified in:

13. Washington Standard Specifications for Road, Bridge, and Municipal construction.

14. National Electrical Manufacturers Association (NEMA) Publication No. TS1-1976 as currently amended.

15. These Special Provisions.

1 ea. Traconex TMP-390 Multi-Comm Communication Module

1 ea. GDI 212
PC programmable "S" Registers
PC programmable "AT" Command Set
Shall maintain programming for 12 months while unpowered

The following functions shall also be provided in the local signal control unit:

9. Guaranteed Yellow
The Yellow interval for all phases shall be 3.5 seconds unless the operator sets a higher value for it.

10. Simultaneous Gap Out
Two concurrently timing phases shall simultaneously reach a rest state prior to their termination by gap out and prior to advancing across the barrier. A phase in dual ring operation may re-time its gap from a rest state upon vehicle actuation.

Equipment requirements for traffic signal no. 11 (SR 16 WB Ramps at Pearl St.) shall include the following:

1 ea. Type "P" Aluminum Controller Cabinet (Double Door).
Controller cabinets shall be finished inside with an approved finish coat of exterior white enamel and outside with an approved enamel finish, light gray or aluminum in color, with front and rear doors. Provide for temporary installation of lifting eyes. The cabinet shall include two shelves. Each shelf shall have additional support welded down the center. The bottom shelf shall contain a slide out with lid for a laptop computer and drawing storage.

1 ea. 16 Position Load Bay.
The load bay shall be fully wired including: 12 channel conflict monitor cables; controller special function cable; TMM 500 "A" and "E" cables, fused loadswitch outputs (KTK-10 or equal), with 9 in. clearance from field output terminals to cabinet floor. Fuse blocks shall be screw terminal type with No. 10 post capable of accepting no less than two No. 12 wires fitted with spade lugs. Phase amber or red flash sequence shall be changeable without the use of tools. All 8-phase Walk CMU inputs shall be made available on the backpanel front. Phase Walk CMU input to load switch shall be selectable with one jumper per phase.

6 ea. Type SP 4301 Dual Indicating Load Switches.

1 ea. Eberle Design Inc. Model SSM-12LE Data Logging conflict monitor or equal. CMU must display time, fault(s), and all load switch output conditions simultaneously.

1 ea. Stop Time Switch.
Cabinets shall be equipped with a three position toggle switch that provides Stop Time true inputs as follows: Auto - Stop Timing applied by CMU during an abnormal condition, or by the flash position of the police panel Flash-Auto switch. Off - Stop Timing not true any time. On - Stop Timing always true.

1 ea. 12 Two Channel Rackmounted Digital Loop Detectors (Timing Type)
14 Position Loop Detector/Opticom Card Rack
2 Positions wired for Opticom M752 Discriminators.
12 Positions wired for 2 channel loop detectors with respective phase green inputs as follows:

L11,L12,L13,L14,L15,L16
L21,L22,L23,L24,L25,L26L27,L28
L41,L42,L43,L44
L61,L62,L63,L64,L65,L66

2 ea. External Logic Stop Bar Interrupt Circuits
Loops 21,22,61 &62

2 ea. 3M model752 Phase Selectors (Opticom)

1 ea. Display Panel

24 vehicle detection displays (PSB-28 LAMPS)

4 pedestrian detection displays (PSB-28 LAMPS)

8 phase full quad vehicle displays (PSB-120 LAMPS)

4 pedestrian displays (PSB-120 LAMPS)

Detection switches shall be ¼ inch mount ALCO MTA106H (or equal) On-Off-On(Momentary) miniature toggle type.

Lamps shall be protected by Sylvania Osram 3016X series or equal lenses. Lamp caps are not acceptable.

1 ea. 4 wire interconnect Hayes smart type Dial-up Modem.

1 ea. Traconex TMP-390 (J8 software) Controller with Special Function Module shall meet or exceed the requirements specified in:

16. Washington Standard Specifications for Road, Bridge, and Municipal construction.

17. National Electrical Manufacturers Association (NEMA) Publication No. TS1-1976 as currently amended.

18. These Special Provisions.

1 ea. Traconex TMP-390 Multi-Comm Communication Module

1 ea. GDI 212
PC programmable "S" Registers
PC programmable "AT" Command Set
Shall maintain programming for 12 months while unpowered

The following functions shall also be provided in the local signal control unit:

11. Guaranteed Yellow
The Yellow interval for all phases shall be 3.5 seconds unless the operator sets a higher value for it.

12. Simultaneous Gap Out
Two concurrently timing phases shall simultaneously reach a rest state prior to their termination by gap out and prior to advancing across the barrier. A phase in dual ring operation may re-time its gap from a rest state upon vehicle actuation.

Vehicle Detector

Section 9-29.18 is supplemented with the following:

(******)

Preformed Loops

All preformed loops shall be designed for installation in hot asphalt overlay or in concrete as called for in the Plans.

All preformed loops shall consist of a minimum of four turns of #16 wire with Type TFFN insulation. The loop wires shall be encased in 0.35 in. polypropylene conduit in the square portion of the loop. The conduit shall be injected with hot rubber asphalt sealant to prevent the entrance of water and the movement of wires within the conduit. The loops shall contain sealed expansion-contraction joints.

All preformed loops shall carry a warranty stating that the loops will be free from defects in materials and workmanship for a service period of ten (10) years from the date of purchase.

Section 9-29 is supplemented with the following:

(******)

Intelligent Transportation System (ITS)

Transformers and Cabinets for ITS Equipment

The transformers to be furnished shall be indoor/outdoor dry type transformers rated as shown in the Plans. The transformer coils, buss bar, and all connections shall be copper. Transformers 7.5 kVA and larger shall be supplied with two capacity taps, one at 2.5% and one at 5% below the normal full capacity.

Transformer cabinets shall be fabricated of 0.125-inch sheet aluminum, 5052 alloy, with mill finish, in accordance with Section 9-29.13(7)D, Item number 1. Painted or anodized aluminum is not allowed.

Model 170E Controller

Each controller unit furnished shall meet the requirements specified in the Type 170E Traffic Signal Control Hardware Specification, FHWA IP-78-16, as currently amended and modified as follows:

1. The 170E CPU module shall operate a 68HC11F1 MPU at a crystal frequency of 8MHz. The MPU shall be socket mounted in a PLCC socket.

2. The EPROM shall be resident on the CPU module. The EPROM socket shall be a 32-pin lever-controlled ZIF device. The EPROM shall be either a 32K x 8 or a 128K x 8 device. The device size shall be jumper selectable.

3. Feature and Location switches shall be provided on the front portion of the CPU module. Each switch shall be an 8-position front-reading dipswitch. The switches shall be addressed as follows:

   Location Switch at 7000 (Port A)
   Feature Switch at 700A (Port E)

4. There shall be one LED indicator located on the front of the CPU module. This LED shall be connected to bit 3 of Port G.

5. The 170E controller shall have a minimum of 28 kB of battery-backed static RAM on the CPU module. RAM shall be continuous from location 0000 to 6FFF.

6. Four Asynchronous Communication Interface Adapters (ACIAs) shall be provided on the same board as the CPU. The ACIAs shall be 6850 ICs operating at a crystal frequency of 6.144MHz. Each ACIA shall have 5 programmable jumpers to select 5 communication baud rates (1200, 2400, 4800, 9600, 19200) for a total of 20 jumpers. All ACIAs shall be active. An IRQ status register shall be provided at 75FF.

7. The Model 412C PROM module shall not be provided. A blank panel shall cover the PROM slot.

8. Two blank 27256 EPROM chips shall be provided with the CPU module.

9. Each controller shall have an ACIA C20 wrap-around with the following pin connections:

C20 Function Pin		C20 Function Pin
(J) RTS	to	(M) CTS
(J) RTS	to	(H) DCD
(K) DATA-IN	to	(L) DATA-OUT

Model 334 Cabinet

Each traffic data station 334 controller cabinet shall be fabricated of 0.125-inch sheet aluminum, 5052 alloy, with mill finish, in accordance with Section 9-29.13(7)D, Item number 1. Painted or anodized aluminum is not allowed.

The contractor shall provide and install rack-mounted 24-port fiber optic patch panel as specified later in these provisions at each 334 cabinet. The Contractor shall use ST/UPC patch cords from the patch panel to the International Fiber Systems fiber optic transceiver. Fiber optic cables entering into the 334 cabinets shall have fusion splice pigtails terminating in the interconnection sleeves. Twelve ST/UPC patch cables shall be supplied at each 334 cabinet.

Loop lead-in cables shall be labeled and connected to cabinet terminals according to the ITS Data Loop Wiring Chart shown in the Plans.

Model 222 Loop Detector Amplifiers

Only self-tuning amplifier units shall be allowed. Loop detector amplifiers Model 222 (as specified in FHWA IP-78-16) shall be rack mounted, plug-in printed circuit boards, with all operational controls and indicator lamps located on the front panel. The edge of the card shall be provided with heavy gold plated contact fingers to mate with an edge connector.

Physical Features:

Operational mode selector switch	One per channel to allow switching between presence and pulse mode.
Sensitivity selector switch	One per channel to allow independent selection of the sensitivity settings for each channel.
Indicator lamp	One per channel which shall be activated independently when vehicle presence is detected on corresponding loop.
Frequency switch	To allow selection of one of three frequencies of the detector amplifier to reduce cross talk between units.
Power requirement	24 VDC with a dissipation of not more than 5 watts.
On/Off switch	One per channel to allow disabling of unused channels.

Digital System:

The unit's digital system shall be programmed to recognize the occurrence of an open loop and shall respond with a continuous call when an open loop

occurs. When power outage occurs, the open circuit shall cause a continuous call.

Detector Output:
Output of the detector shall be an optically isolated solid state device. The optic-isolation shall effect an open circuit when no vehicle is detected. This shall be the interface between the induction loop detector amplifier and the controller.

Closed Circuit Television Camera (CCTV Camera)
The Television cameras shall be manufactured by Cohu and shall be supplied as a unit including Model 3800 camera with integrated lens and id generator, camera controller, pressurized environmental enclosure, pan and tilt mechanism and rain/sun shade.

1. Equipment Model Numbers:

   High Speed Camera Positioning System
   Model 3855-1000PEDD

2. Manufacturer:

   Cohu
   5755 Kearny Villa Road
   San Diego, CA 92123
   Telephone: (858) 277-6700

CCTV Camera Pole
The Contractor shall furnish and install a tapered and galvanized steel pole as shown in the Plans for mounting the CCTV camera, including the foundation for the pole, all associated mounting hardware and transmission system components. The Contractor shall design the pole, hardware, and components to the requirements as shown in the Plans. The camera pole shall be installed in accordance with section 8-20.3(4)A.

Camera poles shall provide a flat mounting surface at the top of the pole to attach the camera assembly. The mounting plate shall have 1.75-inch hole to pass the camera connector into the top section of the pole. The plate shall also provide predrilled 7/16-inch bolt holes in a 4.75-inch bolt circle to match the base plate of the camera assembly.

Submittal
The Contractor shall submit all structural calculations and shop drawings to the Engineer for approval in accordance with Section 6-03.3(7), prior to fabrication of the poles and hardware.

CCTV Camera Control Cabinet
The camera control cabinet shall contain the equipment shown in the Plans. The cabinet shall have the same external physical dimensions and appearance of Model 334 cabinets and shall conform to the following:

1. The cabinet shall be fabricated of 0.125 inch sheet aluminum, 5052 alloy, with mill finish, in accordance with Section 9-29.13(7)D, Item number 1. Painted or anodized aluminum is not allowed.

2. Cabinet doors shall have a three-point latch and two-position stop assembly with spring loaded construction core lock capable of accepting a Best Lock Company 6-pin CX series core. The Contractor shall supply red or blue construction cores. Upon contract completion, the Contractor shall deliver two master keys to the Engineer.

3. The cabinet shall be equipped with an electric strip heater with a rating of 100 watts and 120 VAC and a ventilation fan meeting the requirements specified in Chapter 12 of FHWA IP-78-16. The strip heater shall not be mounted directly under the equipment and shall be shielded in a manner that prevents damage to nearby electrical cables.

   The fan and strip heater shall be controlled by a high-low adjustable thermostat that can be set to ensure the cabinet interior temperature remains between 60°F and 125°F. The heater strip shall be shielded.

4. Two shatterproof fluorescent interior cabinet lights with self-starting ballast shall be furnished, one fixture mounted on the rear rack near the top and the second mounted at the top of the front rack. Door switches shall automatically turn on both lights when either door is opened.

5. The cabinet shall be equipped with a power distribution panel mounted on a standard EIA 19 inches rack utilizing no more than five rack mounting spaces (8.66 inches). The following devices shall be provided with the power distribution panel:

   a. Duplex 120 VAC power receptacle.
   b. Main circuit breaker, 120 VAC, 50 amp.
   c. Four load circuit breakers, 120 VAC, 15 amp.
   d. Neutral bus.
   e. Ground bus.
   f. Surge suppresser and filter unit, 120 VAC, 50 amp.

   Power distribution panel components shall be mounted in or on the panel such that they are readily accessible, provide dead front safety, and all hazardous voltage points are covered to prevent inadvertent contact.

6. The camera control equipment cabinet shall house two termination blocks for termination of the camera control cable, the optical transmitter, and the camera control receiver. These cables shall be identified and marked by the Contractor.

7. Two controller unit shelves, which attach to the front rails of the EIA rack, shall be provided in lieu of the two controller unit support angles. The shelves and mounting brackets shall be 12 inches deep and fabricated from aluminum. The shelves shall be installed such that they do not interfere with access to any terminal block. The shelves shall contain roll-out flip-top drawers for storage of wiring diagrams and manuals.

8. The Contractor shall provide and install an International Fiber Optics VT4930WDM-B fiber optic transmitter in the camera control cabinet.

9. The Contractor shall provide and install a rack-mounted 48 port fiber optic patch panel at the camera cabinet as specified in the Plans. The Contractor shall use an ST/UPC patch cord from the patch panel to the IFS video transmitter. Fiber optic cables entering into the camera cabinets shall have fusion spliced pigtails terminating in the interconnection sleeves.

System 2 CCTV Cabinet

The Contractor shall provide and install 4 each VR4930WDM-R3-B fiber optic receivers in the existing camera control cabinet. The Contractor shall also provide and install a VT7830DRDT-HP-R3 eight channel video multiplexer in the existing cabinet. The Contractor shall provide and install all necessary patch cords and cables to transmit video and data between this equipment.

CCTV System Cabling

Cable connections between the camera system (Model 3855) and the control cabinet shall be as shown in the Plans. The cables shall be factory terminated. Cable installation shall only require installing the connector shell at the camera end. The cable used between the CCTV camera and the camera control cabinet shall be:

COHU #AC-33

4-inch PVC and Steel Conduit With Inner duct

The conduit shall be free from defects, including non-circularity, foreign inclusions, etc. It shall be uniform in color, density, and physical properties. It shall be straight and the ends shall be cut square to the inside diameter. All conduit shall display the Underwriters Laboratory certification (UL Listed). All conduit shall continue to meet the requirements of Section 9-29.1 unless specified otherwise herein.

Galvanized Steel Conduit Outer duct

Conduit shall be hot-dipped galvanized inside and out. The conduit shall be smooth and free from burrs and coated with rust inhibitor. Conduit shall be supplied and shipped with thread protectors.

The steel conduit system shall provide fixed sweeps with system compatible threads and reversing couplings.

Prefabricated Fixed Bends:

The standard steel bends provided shall have a four-foot radius and sweep angles of 11.25°, 22.5°, 45°, and 90° bends.

Warning Tape

Warning tape shall be polyethylene with a metallic backing. The polyethylene shall have a minimum 4-mil thickness and be 3 inches wide. The polyethylene shall be orange in color and printed in black with the words "Fiber Optic Cable Buried Below."

Location Wire
Location wire shall be #14 AWG THWN or XHHW orange colored wire.

Cable Vaults and Pull Boxes
Cable vaults and pull boxes shall meet AASHTO M-199, H-20 or H-35 loading requirements. Cable vaults and pull boxes installed in paved shoulders or lanes that will be subjected to continual vehicular traffic during any phase of this contract or as specified in the Plans shall meet H-35 loading requirements. Cable vaults and pull boxes shall be fabricated in accordance with ASTM C857-83 and C858-83. All cable vaults and pull boxes shall include the following provisions:

1. A sump 6 inches in diameter by 2 inches in depth with a 1-inch diameter drain hole in the center of the sump.
2. Cable pulling irons positioned to afford bi-directional cable installation through the cable vault or pull box.
3. Factory installed knock-outs for conduit entry.
4. All cable racking hardware shall be stainless steel.
5. Cable vaults meeting H-20 requirements shall have a hinged and spring-assisted double steel plate cover. Cable vaults and Pull boxes meeting H-35 requirements shall have round cast iron lids. Pull boxes meeting H-20 requirements shall have a hinged, single plate cover.
6. All cable vaults shall include a removable galvanized steel ladder mounted per the vault manufacturer's specifications. In cable vaults meeting H-20 requirements the ladder shall be located on the wall opposite of the cable racking.

Above ground pull boxes shall be a minimum 16 inches wide, 16 inches high and 8 inches deep, unless otherwise specified in the Plans. Above ground boxes shall be fabricated in accordance with NEMA 4X designation for stainless steel enclosures. Pull boxes shall be equipped with a removable front panel for access to all conduits. The front panel shall be hinged and the entire pull box shall be fabricated from stainless steel.

Controlled Density Fill (CDF)
CDF shall be in accordance with Section 2-09.2 and Section 2-09.3(1)E. CDF shall be tinted orange.

Submittals for ITS Construction
Within a minimum of 30 calendar days prior to anticipated construction, the Contractor shall provide all documentation pertaining to the materials and method of execution proposed to satisfy the requirements of this section. The Engineer's approval is required prior to the committing of any materials or the commencement of any work.

The Contractor shall anticipate a minimum of 30 calendar days for approval or disapproval of each submitted item. Actual time for the Engineer's review is dependent upon the completeness and appropriateness of the documentation being submitted. Any deficiencies will require additional time for approval. Any delays caused by such deficiencies will not be considered grounds for extension of project time. The Contractor shall anticipate review intervals to ensure project progress in accordance with Section 1-05.3.

The Engineer's approval of any submitted documentation shall in no way relieve the Contractor from compliance with the safety and performance requirements as specified herein.

Submittals required by this item shall include, but not be limited to, the following:

1. The manufacturer's specifications for cable vaults and pull boxes.
2. Detailed shop drawings of pull box and cable vault fabrication.
3. Manufacturer's specifications for all conduit, fittings and accessories.
4. Three foot sample of each type (steel and PVC) of conduit with bell ends and one sample of each item listed in **"Accessory Hardware"**.
5. Certificate of compliance with requirements for coefficient of friction and Bellcore GR-356-CORE for inner ducts.
6. The manufacturer's specifications for the ESS site, including all sensors, enclosures, and tower.
7. Detailed shop drawings of tower construction, RPU enclosure mounting, and sensor installation and/or mounting to tower.

Quality Assurance for Communication System Cables and Interfaces

All work described in this section shall meet or exceed the applicable provisions of the following documents:

1. CFR 1755.900, RUS Specification for Filled Fiber Optic Cables
2. ANSI, C8.47-1983, American National Standard for Polyolefin-insulated Thermoplastic Jacketed Communication Cables
3. EIA-455-27A, Method of Measuring (Uncoated) Diameter of Optical Waveguide Fibers
4. EIA-455-28B, Method For Measuring Tensile Failure Point of Optical Waveguide Fibers
5. EIA-455-34, Interconnection Device Insertion Loss Test
6. EIA-455-95, Absolute Optical Power Test for Optical Fibers and Cables
7. EIA-455-103, Buffered Fiber Bend Test
8. EIA-359-A-1, Special Colors

Fiber Optic Cable Fusion Splicer

The Contractor shall provide a fiber optic fusion splicer prior to completion of the contract. The fusion splicer shall include the following features:

- Wind protector designed to withstand 30 mph cross wind
- Automatic core-to-core, low loss splicing regardless of fiber quality or age
- Choice of monitor and tube heater position
- 15 second splicing time
- Excellent visibility in bright sunlight with 5" LCD monitor
- Multiple pre-programmed modes for special splicing

- Multiple tube heater and attenuation modes
- Selectable image display with single and dual axis fiber viewing

The fusion splicer shall meet the following specifications:

• Fiber splicing Capability	SM, MM, NZ-DS
• Splice Loss	0.02dB with SM fiber
• Return Loss	60dB
• Cleaved Fiber End Angle Alarm	Programmable up to 5 degrees
• Fusion Splices/Battery Charge	30(including splice protection sleeve
• Tube heater cycle)	
• Viewing Method	Dual CCD cameras with high resolution 5" LCD monitor with 264X and 132X magnification, external RCA jacks for NTSC video signal
• Splice Sleeve Compatibility	Both 40 mm and 60 mms sleeves as well as micro sleeves
• Atmospheric Compensation	Fully automatic up to 11,500 ft
• Power Supply	85 to 265 VAC (50/60Hz) &10 to 15 VDC
• Attenuation Capability	Programmable from 1dB up to15dB
• Splice Data Storage	2000 splice data records
• Splice Modes	60 Pre-programmed, 40 user programmable
• Splice Protection Sleeve Heater Modes	30 Pre-programmed

The fusion splicer shall be purchased such that all factory warranties will be valid for possession of the Contracting Agency.

Cables

The Contractor shall provide all materials required for the installation and splicing of the specified communications cables, power cables and associated interface devices.

The Contractor shall provide an unconditional warranty on all installed cable for a period of one (1) year.

At the request of the Engineer, the Contractor shall submit a three-foot sample cable section to the Engineer for approval for each type of cable to be utilized.

Fiber Optic Cable

All Fiber optic cable shall be singlemode. The fiber optic cable network shall be capable of supporting both transmission speeds and protocols up to 2.4 Gb/s, and NTSC quality, color video applications.

The Contractor shall provide manufacturer's certification that the offered cable shall comply with the Rural Utilities Service (RUS) Specification 1755.900 as currently amended and with the requirements set forth in this special provision.

Any deviations from these specifications shall be conspicuously noted in the Contractor's submittal.

Each cable shall contain the total number of optical fibers as specified in the Plans. For all cables, the fibers shall be placed in loose buffer tubes in groups of 6.

Fiber Optic Connectors

All Fiber optic connectors for pigtails and patch cords shall be factory-connectorized ST/UPC connectors.

Interfaces

Fiber Optic Patch Panels/Splice Panels

The fiber optic patch panel shall be rated by the manufacturer as a patch panel and designed to hold the specified number of interconnection sleeves and splice trays. Each patch panel shall be fully populated with interconnection sleeves. All unterminated interconnection sleeves shall have protective dust cover installed. The patch panels shall be 19 inch rack mountable.

A wiring diagram shall be supplied with each patch panel. The wiring diagram shall identify each fiber terminated in the patch panel using the fiber optic cable labeling method as specified later in these provisions. The wiring diagram shall be placed in a plastic sheet protector next to the patch panel.

24 Port Fiber Optic Patch Panel

The fiber optic patch panel shall be designed to hold a minimum of 24 ST/UPC fiber optic interconnection sleeves and splice trays with 24 splice capacity. The patch panel shall allow for full access to the splice trays and both sides of the fiber optic interconnection sleeves from the front of the patch panel. The splice trays and the fiber optic interconnection sleeves shall be enclosed on all sides by the patch panel when the patch panel is closed. The patch panel shall not exceed 6 inches in height.

48 Port Fiber Optic Patch Panel

The fiber optic patch panel shall be designed to hold a minimum of 48 ST/UPC fiber optic interconnection sleeves and splice trays with 48 splice capacity. The patch panel shall allow for full access to the splice trays and both sides of the fiber optic interconnection sleeves from the front of the patch panel. The splice trays and the fiber optic interconnection sleeves shall be enclosed on all sides by the patch panel when the patch panel is closed. The patch panel shall not exceed 12 inches in height.

Fiber Optic Splice Enclosure

All fiber optic splice enclosures shall be re-enterable and reusable and be designed for use on fiber optic cables in an underground, submerged environment. All splice enclosures shall be rated for 1310 and 1550 nanometer wavelengths. Splice enclosures shall contain a valve to allow pressurization of the housing.

Fiber Optic Cable Labeling

Permanent cable labels shall be used to identify fibers and patch cords at each termination point. The cable labels shall consist of white colored heat shrink-wraps with identification based on the schematic shown on the ITS detail sheets.

Data Distribution and Transmission System

If any equipment specified in this section has been superseded by a newer product that is interchangeable, the newer product shall be supplied. If the product is no longer available and has no replacement, the Contractor shall propose a different product meeting the same performance and material specifications as the discontinued one.

Data Transceivers and Receivers

Fiber optic data transceivers / receivers shall be used to transmit data via fiber optic cable from the data stations / ramp meter sites to the existing system 2 CCTV cabinet.

1. Equipment Model Numbers:

RS-232 Rack Mount Drop/Repeat Transceiver	D9130-B
RS-232 Rack Mount Line Terminating Transceiver	D9130E-B

2. Manufacturer:

International Fiber Systems, Inc.
16 Commerce Road
Newton, CT 06470
(203) 426-1180
sales @ ifs.com

GP Marketing (sales)
(425) 889-1677

The data transceiver units supplied shall be compatible with the fiber and connectors specified in the Plans. The contractor shall install a data transceiver in each 170 control cabinet as per these Special Provisions and the Plans. The contractor shall also install a data transceiver in the existing 170 control cabinet for system 3.

Data Distribution System Cabling

The Contractor shall utilize 25 TWP, stranded #22 AWG telephone cable for the transmission medium in this item.

The Contractor shall provide and install all cabling and connectors required between the fiber optic data transceivers in the field and the equipment in the control cabinets.

Data Transmission System Cabling

The Contractor shall utilize singlemode fiber optic cable for the transmission medium in this item. The Contractor shall provide and install fiber optic jumper cables between the fiber optic patch panels and the data transceivers. The

contractor shall provide and install a 48 count or 12 count fiber optic cable between each fiber optic patch panel as shown in the Plans.

Video Distribution And Video Transmission Systems

If any equipment specified in this section has been superseded by a newer product that is interchangeable, the newer product shall be supplied. If the product is no longer available and has no replacement, the Contractor shall propose a different product meeting the same performance and material specifications as the discontinued one.

Video Distribution System Cabling

The Contractor shall utilize singlemode fiber optic cable for the transmission medium in this item. The Contractor shall provide and install fiber optic jumper cables between the fiber optic patch panels and the data transceivers and the video transmitter. The contractor shall provide and install a 12 count fiber optic cable between each fiber optic patch panel as shown in the Plans.

The Contractor shall provide and install all required equipment interconnection cabling to include video coaxial cables, power cables, ancillary cables, and connectors as required by the equipment vendor and as shown in the Plans. Cables shall be of all copper construction.

Optical Video Transmitter and Receiver

Video transmitter and receiver system shall be by International Fiber Systems, Inc.

1. Equipment Model Numbers:

   Singlemode:

Video Transmitter	VT 4930WDM
Video Receiver	VR 4930WDM-R3
Video/Data Multiplexer	VT 7830-2DRDT-HP-R3
Video/Data Multiplexer	VR 7830-2DRDT-HP-R3
Video Multiplexer	VT 71630-2DRDT-R3
Video Multiplexer	VR 71630-2DRDT-R3
Rack (Card Cage) R3	

2. Manufacturer:

   International Fiber Systems, Inc.
   16 Commerce Road
   Newton, CT 06470
   Telephone: (203) 426-1180
   Sales @ Ifs.com

   GP Marketing (sales)
   (425) 889-1677

The video transmitter and receiver units supplied shall be compatible with the fiber and connectors specified in the Plans. The Contractor shall install a VT 4930WDM video transmitter in the new camera control cabinets constructed as a part of this project as per these Special Provisions and the Plans. The

Contractor shall install four VR4930WDM-R3 fiber optic video receivers in the Union Ave CCTV Cabinet to receive the CCTV images within the project limits. The contractor shall also install one VT 7830-2DRDT-HP-R3 fiber optic video/data multiplexer in the Union Ave CCTV Cabinet to multiplex the video images provided by this project onto one fiber. The Contractor shall provide one VR 7830-2DRDT-HP-R3 fiber optic video/data multiplexer and deliver this equipment to the WSDOT Signal Superintendent for installation by the Contracting Agency for the compression of the new and existing video signals. In addition, the Contractor shall provide one VT 71630-2DRDT-R3 and one VR 71630-2DRDT-R3 fiber optic video multiplexer for installation by the Contracting Agency. This equipment shall be delivered to the Olympic Region Signal Maintenance Office with the full and valid manufacturer's warranty, located at:

5720 Capitol Blvd.
Tumwater, WA 98501
Attention: Don Anders
(360) 357-2616

APPENDICES
(July 12, 1999)

The following appendices are attached and made a part of this contract:

*** APPENDIX A:
Implementing Agreement Between the Washington State Department of Ecology and the Washington State Department of Transportation

APPENDIX B:
Summary of Geotechnical Conditions.

APPENDIX C:
Log of Test Borings

APPENDIX D:
NPDES Industrial Stormwater Permit For Construction Activities

APPENDIX E:
Hydraulic Project Approval

APPENDIX F:
Not Used

APPENDIX G:
Department of The Army Section 404 Nationwide Permit

APPENDIX H:
Section 401 Water Quality Certification

APPENDIX I:
Coastal Zone Management Consistency Certification

APPENDIX J:
Critical Area Ordinance Permit***

STANDARD PLANS
December 6, 2004

The State of Washington Standard Plans for Road, Bridge and Municipal Construction M21-01 (English) transmitted under Publications Transmittal No. PT 04-040, effective August 2, 2004 is made a part of this contract.

The Standard Plans are revised as follows:

C-1 Sheet 2
The SNOW LOAD RAIL WASHER dimensions are revised to 1 3/4" from 2", and to 7/8" from 1".

C-11b Sheets 1 and 2
In the PRECAST FOOTING, ELEVATION view (Sheet 1) and in the CAST-IN-PLACE FOOTING, ELEVATION view (Sheet 2), COMMERCIAL CONCRETE is revised to CONCRETE CLASS 4000.

C-14f
In SECTION "A", the reference to SEE STD. PLAN C-14b is revised to SEE STD. PLAN C-14e.

C-14g
In SECTION "A" and SECTION "B", the reference to SEE STD. PLAN C-14b is revised to SEE STD. PLAN C-14e.

D-2n Sheet 2
In DETAIL A, the specification for 1/4" Anchor bolt is revised to 1 1/4" Anchor bolt.

In the BASE PLATE DETAIL the reference to AASHTO M 183 is revised to ASTM A 36.

F-2b Sheet 1
Note 2 is revised to: "Type 4a and Type 5a curbs do not require steel tie bars for anchoring."

The EXTRUDED CURB AT GUARDRAIL section is revised to include the note: "The face of curb shall be at the face of guardrail in transitions to Conc. Barrier or Bridge Rail."

G-4a Sheet 1
On the SINGLE POST INSTALLATION (Elevation View) the reference to Std. Plan G-9d is omitted.

G-8a
The notes under the HINGE CONNECTION DETAIL are revised to read:

Hinge Connection Bolts shall be tightened ½ turn past snug tight.

The hinge plate shall be of the size and type as provided by TransPo Industries.

G-8q

In Note 3 (Sheet 1), the reference to Standard Plan G-8b is revised to G-9b.

K-1 through K-27

These plans shall not be used on projects administered by WSDOT.

The following are the Standard Plan numbers applicable at the time this project was advertised. The date shown with each plan is the publication approval date shown in the lower right-hand corner of that plan. Standard Plans not having this date shall not be used in this contract.

A-1	5/13/02	A-3	5/30/02	A-5	2/24/03
A-2	5/09/02	A-4	3/07/97	A-6	2/24/03
B-1	7/21/03	B-4g	7/18/97	B-20d	6/30/04
B-1a	6/23/04	B-4h	5/09/97	B-21	7/18/97
B-1b	6/23/04	B-7	5/09/97	B-21a	8/10/98
B-1e	5/20/04	B-7a	6/17/02	B-22	7/21/03
B-1z	6/23/04	B-8	6/23/04	B-22a	8/01/97
B-2	6/17/02	B-8a	6/23/04	B-23a	5/09/97
B-2a	6/17/02	B-9	5/09/97	B-23b	5/09/97
B-2b	6/17/02	B-9a	5/09/97	B-23c	5/20/04
B-2c	6/17/02	B-9b	5/09/97	B-23d	5/09/97
B-2d	6/17/02	B-9c	7/18/97	B-25	6/30/04
B-2e	2/25/04	B-9d	7/18/97	B-26	7/18/97
B-3	1/28/02	B-11	7/31/01	B-27	8/01/97
B-3a	5/09/97	B-13	12/04/98	B-28	10/06/99
B-4b	5/09/97	B-18	5/09/97	B-29	4/24/98
B-4c	5/09/97	B-18a	5/09/97	B-30	8/10/98
B-4d	9/16/02	B-18b	7/18/97		
B-4f	5/09/97	B-19	5/30/97		
C-1	10/31/03	C-3a	10/31/03	C-8e	6/24/02
C-1a	7/31/98	C-3b	10/31/03	C-8f	6/30/04
C-1b	10/31/03	C-3c	10/31/03	C-10	7/31/98
C-1c	5/30/97	C-4	7/13/01	C-11	5/20/04
C-1d	10/31/03	C-4a	7/13/01	C-11a	5/20/04
C-2	1/06/00	C-4b	6/23/00	C-11b	5/20/04
C-2a	7/17/98	C-4e	2/20/03	C-12	7/27/01
C-2b	6/12/98	C-4f	6/30/04	C-13	4/16/99
C-2c	2/20/03	C-5	10/31/03	C-13a	4/16/99
C-2d	5/22/98	C-6	5/30/97	C-13b	4/16/99
C-2e	3/07/97	C-6a	3/14/97	C-14a	7/26/02
C-2f	3/14/97	C-6c	1/06/00	C-14b	7/26/02
C-2g	7/27/01	C-6d	5/30/97	C-14c	7/26/02
C-2h	3/28/97	C-6f	7/25/97	C-14d	7/26/02
C-2i	3/28/97	C-7	10/31/03	C-14e	7/26/02
C-2j	6/12/98	C-7a	10/31/03	C-14f	7/26/02
C-2k	7/27/01	C-8	4/27/04	C-14g	10/31/03
C-2n	7/27/01	C-8a	7/25/97	C-14h	12/02/03
C-2o	7/13/01	C-8b	7/17/98	C-14i	12/02/03

1	C-2p 10/31/03	C-8c 5/30/97	C-14j 12/02/03
2	C-3 ..... 10/31/03	C-8d 5/20/04	
3			
4	D-1a 1/23/02	D-2i 3/14/97	D-2w 3/07/97
5	D-1b 10/06/99	D-2j 3/14/97	D-2x 3/07/97
6	D-1c..... 10/06/99	D-2k 3/14/97	D-2y 9/12/97
7	D-1d 10/06/99	D-2l 3/14/97	D-3 ..... 6/30/04
8	D-1e 1/23/02	D-2m 3/14/97	D-3a 6/30/04
9	D-1f 10/06/99	D-2n 3/14/97	D-3b 6/30/04
10	D-2a 3/14/97	D-2o 3/14/97	D-3c 6/30/04
11	D-2b 3/14/97	D-2p 3/14/97	D-4 ..... 12/11/98
12	D-2c..... 3/14/97	D-2q 3/14/97	D-6 ..... 6/19/98
13	D-2d 3/14/97	D-2r..... 3/14/97	D-7 ..... 10/06/99
14	D-2e 3/14/97	D-2s 3/14/97	D-7a 10/06/99
15	D-2f 3/14/97	D-2t..... 3/14/97	D-9 ..... 12/11/98
16	D-2g 3/14/97	D-2u 3/07/97	
17	D-2h 3/14/97	D-2v 3/07/97	
18			
19	E-1 ..... 7/25/97	E-4 ..... 8/27/03	E-5 ..... 5/29/98
20	E-2 ..... 5/29/98	E-4a 8/27/03	
21			
22	F-1 ..... 12/17/02	F-2c 6/23/04	F-3c..... 1/13/03
23	F-1a..... 12/17/02	F-2d 6/23/04	F-3d 1/29/03
24	F-2..... 8/27/99	F-3 ..... 1/13/03	F-3e 1/13/03
25	F-2a..... 6/23/04	F-3a 1/29/03	F-4 ..... 1/13/03
26	F-2b..... 6/23/04	F-3b 1/13/03	
27			
28	G-1 ..... 9/12/01	G-4b..... 6/30/04	G-8b..... 6/04/02
29	G-2 ..... 6/04/02	G-6..... 8/27/03	G-8f..... 6/30/04
30	G-2a 6/04/02	G-6a..... 8/27/03	G-8g..... 6/30/04
31	G-3 ..... 6/04/02	G-6b..... 8/27/03	G-9a..... 6/25/02
32	G-3a 6/04/02	G-7..... 7/18/97	G-9b..... 4/02/99
33	G-4a 5/20/04	G-8a..... 10/06/99	
34			
35	H-1 ..... 1/10/02	H-4a 3/11/03	H-7 ..... 8/10/98
36	H-1a 4/14/00	H-5 ..... 2/18/00	H-8 ..... 9/18/98
37	H-1b 5/05/00	H-5a 2/18/00	H-9 ..... 4/18/97
38	H-1c..... 1/10/02	H-5b 2/18/00	H-10 ..... 5/29/98
39	H-1d 1/10/02	H-5c 6/24/02	H-12 ..... 5/09/02
40	H-1e 4/14/00	H-5d 4/14/00	H-12b 2/25/04
41	H-2 ..... 5/29/02	H-5e 2/20/03	H-13 ..... 7/25/97
42	H-3 ..... 4/14/00	H-5f 6-23/04	H-13a 7/25/97
43	H-3a 6/23/00	H-5h 4/27/04	H-14 ..... 4/23/99
44	H-4 ..... 10/29/03	H-6 ..... 10/29/03	
45			
46	I-1 ..... 7/18/97	I-6 ..... 7/17/03	I-11 ..... 9/11/03
47	I-2 ..... 4/23/99	I-7 ..... 7/17/03	I-12 ..... 7/17/03
48	I-3 ..... 8/20/99	I-8 ..... 7/17/03	I-13 ..... 7/17/03
49	I-4 ..... 7/17/03	I-9 ..... 7/17/03	I-14 ..... 7/17/03
50	I-5 ..... 7/17/03	I-10 ..... 7/17/03	
51			
52	J-1b 10/08/99	J-5..... 8/01/97	J-8a..... 5/20/04

1	J-1c 4/24/98	J-6c..... 4/24/98	J-8b.....5/20/04
2	J-1e 8/01/97	J-6f..... 4/24/98	J-8c.....5/20/04
3	J-1f 6/23/00	J-6g..... 12/12/02	J-8d.....5/20/04
4	J-3 ..... 8/01/97	J-6h..... 4/24/98	J-9a.....4/24/98
5	J-3b 11/05/03	J-7a..... 9/12/01	J-10.....7/18/97
6	J-3c 6/24/02	J-7c..... 6/19/98	J-11a.....9/12/01
7	J-3d 11/05/03	J-7d..... 4/24/98	J-12.....5/20/04
8			
9	K-1 ..... 12/20/02	K-10 ..... 12/20/02	K-19 .....12/20/02
10	K-2 ..... 12/20/02	K-11 ..... 12/20/02	K-20 .....12/20/02
11	K-3 ..... 12/20/02	K-12 ..... 12/20/02	K-21 .....12/20/02
12	K-4 ..... 12/20/02	K-13 ..... 12/20/02	K-22 .....12/20/02
13	K-5 ..... 12/20/02	K-14 ..... 12/20/02	K-23 .....12/20/02
14	K-6 ..... 12/20/02	K-15 ..... 12/20/02	K-24 .....12/20/02
15	K-7 ..... 12/20/02	K-16 ..... 12/20/02	K-25 .....12/20/02
16	K-8 ..... 12/20/02	K-17 ..... 12/20/02	K-26 .....12/20/02
17	K-9 ..... 12/20/02	K-18 ..... 12/20/02	K-27 .....12/20/02
18			
19	L-1 .....7/18/97	L-3 ..... 7/18/97	L-5a.....7/31/98
20	L-2.....7/18/97	L-5 ..... 7/31/98	L-6 .....7/25/97
21			
22			
23			