PART 4

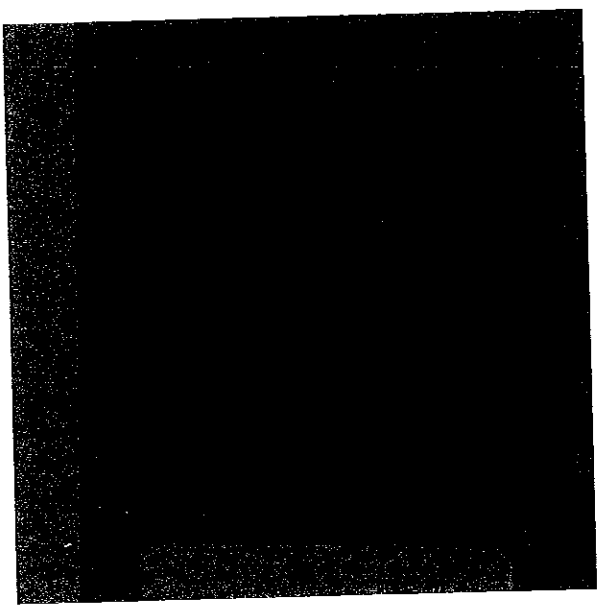
STANDARD MODIFICATIONS

AND SPECIAL PROVISIONS

to the STATE OF ALASKA

STANDARD SPECIFICATIONS
FOR
HIGHWAY CONSTRUCTION

2004



ANCHORAGE AREA SAFETY IMPROVEMENT PROJECT 2006
PROJECT NO. ACHHE-000S(583)/58012

SECTION 101

DEFINITIONS AND TERMS

Standard Modifications

101-1.03 DEFINITIONS. Delete text of PLANS and replace with: The Department's Contract drawings, profiles, typical cross sections, standard drawings, and supplemental drawings or reproductions showing the location, character, dimensions, and details of the work.
E32(01/27/07)

Delete text of SUBGRADE and replace with:

SUBGRADE. The soil or embankment upon which the pavement structure is constructed. E22(1/1/06)

Add the following definition:

QUALIFIED PRODUCTS LIST. A list of companies and products that the Department has found conforms to the SSHC. E36(01/27/07)

SECTION 102

BIDDING REQUIREMENTS AND CONDITIONS

Standard Modifications

102-1.04 EXAMINATION OF PLANS, SPECIFICATIONS, SPECIAL PROVISIONS, AND WORK SITE. Replace the second paragraph with the following: The records of geotechnical investigations including boring logs, test results, geology data reports, soil reports, material site reports, and geotechnical reports included in a bid package or made accessible to bidders or Contractors, are for information purposes only. These records are not part of the Contract. These records indicate subsurface conditions only at specific locations and times, and only to the depths penetrated. They do not necessarily reflect variations in soil, rock, or groundwater conditions that may exist between or outside such locations. Actual conditions may differ from what is shown in the records. Material Sources referenced in these records may not contain materials of sufficient quantity or quality to meet project requirements. The accessibility of these records does not constitute approval, nor guarantee suitability of soils or sources, or the rights to use sources for this project, except as specifically provided in subsections 106-1.02.4.b Mandatory Sources and 106-1.02.4.c Designated Sources. The records shall not substitute for independent investigation, interpretation, or judgment of the bidder or Contractor. The Department is not responsible for any interpretation or conclusion drawn from its records by the bidder or Contractor.

Bidders and Contractors shall examine subsection 106-1.02 Material Sources for further information about material source development. E23(1/1/06)

102-1.05 PREPARATION OF BID. Modify the second sentence in the third paragraph, after: "If a bidder is a corporation, the bid must be signed by a corporate officer," add: or agent. . (06/30/04)E18

SECTION 105

CONTROL OF WORK

Standard Modification

105-1.02 PLANS AND WORKING DRAWINGS. In the third paragraph delete: "(24"x36")" and replace with: (22"x34")

105-1.03 CONFORMITY WITH PLANS AND SPECIFICATIONS. In the first sentence of the first paragraph after: "Work performed and materials furnished shall conform to the Plans and Specifications" add: and approved Working Drawings,

In the first sentence of the second paragraph after: "Work or material not conforming to the Plans and Specifications" add: and approved Working Drawings,
E33(01/27/07)

Special Provisions

105-1.06 COOPERATION WITH UTILITIES. Add the following: Request locates from all the utilities having facilities in the area. Use the Alaska Digline, Inc. Locate Call Center for the following utilities:

ALASKA DIGLINE, INC.
Locate Call Center Anchorage Area..... 278-3121 Statewide.....800-478-3121 who will notify the following:
ACS Alaska Fiberstar Anchorage School District Anchorage Water & Wastewater Utility AT&T Alascom, Inc. Chugach Electric Assoc DOT Street Lights, State of Alaska Enstar Natural Gas GCI Communications MOA Street Maint. Dept MFS Technologies, Inc. Municipality of Anchorage Municipal Light & Power

Call the following utilities and agencies directly:

Contact the Central Region Maintenance & Operations Office at (907) 269-0760 to obtain the appropriate District Superintendent's phone number for this project.

There are various utility appurtenances located within the project limits. Utilities scheduled for relocation are addressed in the following utility specific sections.

Right of Way and/or Construction surveying is required before utility relocation.

Payment will be made as follows:

Subsidiary to Item 642(1), Construction Surveying, if the Contractor is required to provide the surveying as part of the contract an/or

Under Item 642(3), Three Person Survey Party, if the construction or Right of Way staking required by the utility is either in advance of the two (2) week work plan, or not required by the contract.

The utility shall give the Contractor, through the Engineer, fifteen (15) calendar days advance written notice for required staking.

(09/01/04)R3

Coordination between the Utility Companies will be required. Adjustments and required relocations on utility facilities must be scheduled with notice being provided for work to begin and end, as described in this Subsection.

When utility company facilities are not proposed for relocation, use locate information to determine the final location of construction elements such as excavation limits, pole locations and other underground activities to avoid conflict with existing utilities. If additional utility conflicts requiring utility relocation or adjustment are encountered, notify the utility companies through the Engineer to determine the appropriate course and timing of action.

CHUGACH ELECTRIC ASSOCIATION (CEA): CEA has sub-transmission and distribution lines paralleling Old Seward Highway (OSH) north and south of Dimond Boulevard. Overhead lines cross OSH from west to east, north of Dimond Boulevard, and continue south on the east side of the road. Underground primary cables cross Dimond Boulevard east of OSH and cross OSH south of Dimond Boulevard. The duct system of primary cable crossings is shown on the plans. Perform typical section and widening improvements along OSH and in the OSH-Dimond intersection to avoid conflict with these underground ducts and with surface appurtenances related to these primary circuits.

CEA has power poles located near the intersections of OSH-Dimond Boulevard and OSH-88th Avenue, on the east side. Perform improvements in these areas to avoid conflict with these poles.

For all areas where overhead electric facilities are located within the project work limits, comply with CEA's "2006 Electrical Facility Clearance Requirements" appended to the Special Provisions.

The contact for CEA is Gary Meadows, Manager, Distribution Construction (office tel. 762-4618, cell 242-2191).

ALASKA COMMUNICATIONS SYSTEMS (ACS): ACS has facilities along OSH south of Dimond Boulevard. As with CEA's facilities, perform improvements around ACS underground cables and pedestals to avoid conflict.

ACS has a telephone manhole located within proposed sidewalk work along Lake Otis, south of Northern Lights Boulevard and north of the Wendler School access. This manhole lid will require adjustment to final grade.

Improvements along Minnesota Drive between 36th Avenue and 32nd Avenue have been designed to avoid conflict with ACS telephone manhole(s). If adjustment to these facilities is required to accommodate grade changes, coordinate with ACS to determine the details of making adjustments.

The contact for ACS is Greg Schmid, 564-1820.

GENERAL COMMUNICATIONS, INC. (GCI): GCI has underground fiber optic cables paralleling C Street on the east side, approximately in line with proposed curb and gutter work. Coordinate improvements for street widening and storm drain work with GCI to minimize conflict. GCI will need to relocate their cable(s) horizontally or by lowering especially where new inlets are proposed.

In addition, GCI has facilities along OSH south of Dimond Boulevard. As with CEA's facilities, perform improvements around GCI underground cables and pedestals to avoid conflict.

The contact for GCI is Joe Whittaker, 229-9176.

ANCHORAGE WATER AND WASTEWATER UTILITY (AWWU): The Municipality of Anchorage (MOA) owns and operates sewer and water facilities throughout the MOA using the road system for primary conveyance of facilities.

Water mains will not be affected by resurfacing, channelization or curb ramp improvements, but appurtenances such as valve boxes will require adjustment or relocation based on the final grade of the roadway pavement and the final layout of curb ramps. In addition, fire hydrant relocations will be required as shown on the Plans.

Roadway resurfacing, channelization and curb ramp improvements will not affect sanitary sewer mains but will require adjustment of manholes based on final grade of improvements.

Coordination with AWWU will be required. The AWWU contact is Brian Baus, 564-2765.

105-1.07 COOPERATION BETWEEN CONTRACTORS. Add the following:
Projects that may be under construction concurrently with this project include, but are not limited to:

Project	Firm	Phone
36th Ave, Arctic Blvd to C Street	Lounsbury	(907) 272-5451

Coordinate traffic control, construction, and material hauling operations with the prime contractor of the above projects to minimize impact on the traveling public, and to minimize conflicts with the work being performed under the other contract. (02/01/00)R175M98

105-1.13 MAINTENANCE DURING CONSTRUCTION. Add the following at the end of this subsection: Costs of maintenance work during construction and before the project is accepted as substantially complete shall be subsidiary to the prices bid on the various Contract items, and the Contractor will not be paid an additional amount for such work.

If in the Engineer's opinion, the Contractor at any time fails to provide adequate maintenance, the Engineer will notify the Contractor of such noncompliance. The notification will specify the areas or structures for which there is inadequate maintenance, the corrective maintenance required, and the time allowed to complete corrective maintenance. If the Contractor fails to take the corrective action within the specified time, the Engineer may:

1. Suspend the work until corrective maintenance is completed;
2. Assess a traffic price adjustment against the Contract Amount when an adjustment rate is specified in the Contract; and
3. Employ others for corrective maintenance and deduct the cost from the Contract amount.

E33(01/27/07)

Special Provision

105-1.15 PROJECT COMPLETION. Add the following:

Seeding Date: Complete all seeding by August 15, 2008.

Final Completion Date: Complete all work by September 1, 2008.

Standard Modification

105-1.16 FINAL ACCEPTANCE AND RECORD RETENTION. Modify the first paragraph, Item 4., after: "DOLWD" add: and State Department of Revenue. (06/30/04)E19

Special Provision

105-1.17 CLAIMS. Add the following Any appeal to the superior court under AS 36.30.685 must be filed in the third judicial district. (3/21/01)R93

SECTION 106

CONTROL OF MATERIAL

Standard Modification

106-1.01 SOURCE OF SUPPLY AND QUALITY REQUIREMENTS. In fifth paragraph, in two places remove the text: "Approved Products List" and replace with: *Qualified Products List*
E36(01/27/07)

Special Provisions

Add the following:

Buy America Provision. Comply with the requirements of 23 CFR 635.410, Buy America Requirements, and shall submit a completed Material Origin Certificate, Form 25D-60, before award of the contract.

Steel and iron products which are incorporated into the work, shall be manufactured in the United States except that minor amounts of steel and iron products of foreign manufacture may be used, provided the aggregate cost of such does not exceed one tenth of one percent (0.001) of the total contract amount, or $2500, whichever is greater. For the purposes of this paragraph, the cost is the value of the products as they are delivered to the project including freight.

"Manufactured in the United States" means that all manufacturing processes starting with the initial mixing and melting through the final shaping, welding, and coating processes must be undertaken in the United States. The definition of "manufacturing process" is smelting or any subsequent process that alters the material's physical form, shape or chemical composition. These processes include rolling, extruding, machining, bending, grinding, drilling, etc. The application of coatings, such as epoxy coating, galvanizing, painting or any other coating that protects or enhances the value of steel or iron materials shall also be considered a manufacturing process subject to the "Buy America Requirements."

Buy America does not apply to raw materials (iron ore), scrap, pig iron, and processed, pelletized and reduced iron ore. It also does not apply to temporary steel items (e.g., temporary sheet piling, temporary bridges, steel scaffolding, and falsework). Further, it does not apply to materials that remain in place at the Contractor's convenience (e.g., sheet pilings, and forms).

The North American Free Trade Agreement (NAFTA) does not apply to the Buy America requirement. There is a specific exemption within NAFTA (article 1001) for grant programs such as the Federal-aid highway program.

When steel and iron products manufactured in the United States are shipped to a foreign country where non-steel or iron products are installed on or in them (e.g., electronic components in a steel cabinet), the steel and iron is considered to meet the requirements of this subsection.

Take whatever steps are necessary to ensure that manufacturing processes for each covered product comply with this provision. Non-conforming products shall be replaced at no expense to the State. Failure to comply may also subject the Contractor to default and/or debarment. False statements may result in criminal penalties prescribed under Title 18 US Code Section 1001 and 1020. (02/07/05)S13

Standard Modification

106-1.02 MATERIAL SOURCES.

1. a. General. Within Item a. delete text and replace with: Utilize Useable Excavation according to subsection 104-1.04 before using material sources listed in subsection 106-1.02.4. When there is insufficient useable excavation furnish additional required materials from sources of the Contractor's choice, except that the Contractor shall use a mandatory source when identified in the Contract.

4. Type of Sources. Replace the first paragraph with the following: The Contractor shall utilize Useable Excavation according to subsection 104-1.04 before using material sources listed in this subsection. When there is insufficient Useable Excavation, the Contractor shall furnish additional required materials from sources of the Contractor's choice, except that the Contractor shall use a mandatory source when identified in the Contract.

When there is insufficient Useable Excavation, the Contractor shall supply additional required material from the following sources:

4. d. Available Sources. Replace the second paragraph with the following: When the Department furnishes copies of existing boring logs, test results, or other data in its possession concerning Available Sources, the Contractor is responsible for determining the accuracy and completeness of this data, for assumptions the Contractor makes based on this data, and for exploring Available Sources to the Contractor's satisfaction.

4. e. Excluded Material Sources. Replace the paragraph with the following: Some material sources may not be considered acceptable regardless of location or ownership. The bid documents may identify some material sources excluded from use. The Department reserves the right to exclude a material sources or any portion of a material source, at any time after Contract award, that is determined by material testing to be unsuitable for use on the project.

E24(1/1/06)
Standard Modification

Add new subsection 106-1.08:

106-1.08 SUBMITTAL PROCEDURE. The Contractor shall complete a Submittal Register, and shall submit it to the Engineer on forms provided by the Department. The intent of the Submittal Register is to provide a blueprint for the smooth flow of specified project documents. The Contractor shall fill it out sequentially by bid item and allow at least three spaces between bid items. The Submittal Register shall list working drawings, schedules of work, and other items required to be submitted to the Department by the Contractor including but not limited to: Progress Schedule, anticipated dates of material procurement, Construction Phasing Plan, Traffic Control Plan, Storm Water Pollution Prevention Plan, Quality Control Program, Utility Progress Schedule, Blasting Plan, Mining Plan, annual EEO reports, DBE payment documentation and subcontracts.

The Contractor shall submit materials (product) information to the Engineer for review, as required by the Materials Certification List and the Contract.

The number of copies required for submittals may be included in the specifications for individual bid items. If the number of copies of a submittal is not otherwise specified, three copies shall be required. On each sheet submitted to the Department, including working drawings, catalog cuts, manufacturer's certifications, etc., space shall be provided for Contractor and Department review stamps.

Each copy of each submittal shall include a Submittal Summary sheet. The Contractor may use forms provided by the Department or a similar form of the Contractor's choice as approved by the Department. The Contractor shall sign submittals and submit them to the Engineer. The Department will review submittals within 30 days after they are received. The Department will return submittals to the Contractor as either: approved, conditionally approved with the conditions listed, or rejected with the reasons listed. The Contractor may resubmit a rejected submittal to the Engineer with more information or corrections. The Department will review resubmittals within 30 days after they are received.

The Contractor shall not order material or use working drawings that have not been approved by the Department. The Contractor shall be responsible for timely submittals. Failure by the Department to review submittals within the time given may be the basis for a request for extension of Contract time but not for additional compensation.

Payment for a specific Contract item will not be made until the Department has received the Submittal Register for all items and approved all required submittals for that specific Contract item.

When material invoices, freight bills and mill certificates are submitted, they shall provide sufficient information for the Engineer to identify the date, company and location

of invoice (bill, certificate); project name and number where material will be incorporated; manufacturer, product number, quantity and cost.

E34(01/27/07)

SECTION 107

LEGAL RELATIONS AND RESPONSIBILITY TO PUBLIC

Special Provisions

107-1.02 PERMITS, LICENSES, AND TAXES. Add the following after the first sentence: For the purposes of this subsection, the term "permits" will include but not be limited to Memorandum of Agreements (MOA's) and Temporary Construction Permits (TCP's).

Add the following: Obtain a written statement from the State Historic Preservation Officer stating that material disposal, extraction, stockpiling or staging, on off project site, is not expected to impact cultural resources. The State Historic Preservation Officer is with the Department of Natural Resources in Anchorage, and may be contacted at (907) 269-8715. If cultural resources are discovered during construction activities, stop work at that site and notify the Engineer.

Provide a wetland specialist able to conduct wetlands determinations and delineations according to the Corps of Engineers 1987 Wetland Delineation Manual. The wetland specialist shall conduct the determination and delineations of sites outside the project limits or not previously permitted, impacted by the Contractor's operations. These delineations will be subject to Corps of Engineers approval.

Provide the Engineer a copy of permits or clearances received before using sites outside the project limits. Additionally, provide the Engineer a written statement that permits or clearances have been obtained. Also provide a written statement to the Engineer listing agencies or offices contacted that responded that no additional action is required.

Obtain the required Municipality of Anchorage work permits. The ADEC Letter of Non-Objection, Permit # 07-WW-207-004 and a Municipality of Anchorage Noise Permit has been obtained and is included in Appendix D. (05/29/02)R7M98

107-1.07 ARCHAEOLOGICAL OR HISTORICAL DISCOVERIES. Change the first sentence to the following: When operations encounters historic or prehistoric artifacts, burials, remains of dwelling sites, paleontological remains, (shell heaps, land or sea mammal bones or tusks, or other items of historical significance), cease operations immediately and notify the Engineer. (05/29/02)R7M98

107-1.11 PROTECTION AND RESTORATION OF PROPERTY AND LANDSCAPE. Add the following: If you require water for construction purpose from a non-municipal water source, obtain a Temporary Water Use Permit from the Water Resource Manager, and provide a copy to the Engineer. The Water Resource Manager is with the Department of Natural Resources in Anchorage and may be contacted at (907) 269-8624. (05/29/02)R7M98

Standard Modification

Add the following paragraphs:

7. Restoring Areas. Areas used by the Contractor, including haul routes, shall be restored to their original condition after the Contractor's operations are completed. The original condition of an area shall be determined as follows: Before beginning operations, the Engineer and the Contractor shall inspect each area and haul route that will be used by the Contractor and take photographs to document their condition. After construction operations are completed, the condition of each area and haul route will be compared to the earlier photographs. Before demobilization the Contractor shall repair damages attributed to its operations. The Contractor agrees that costs associated with repairs shall be subsidiary to other items of work and will not be paid for directly.

8. Material Disposal Sites. Offsite disposal areas may be at locations of the Contractor's choice, provided the Contractor obtains from the owner of such land written permission for such dumping and a waiver of all claims against the State for any damage to such land which may result there from, together with permits required by law for such dumping. A copy of such permission, waiver of claims, and permits shall be filed with the Engineer before beginning work on private property. The Contractor's selected disposal sites shall also be inspected and approved by the Engineer before use of the sites.

E35(01/27/07)

Special Provisions

Add the following subsection:

107-1.21 FEDERAL AFFIRMATIVE ACTION. The Federal Equal Employment Opportunity, Disadvantaged Business Enterprise, and On-the-Job Training affirmative action program requirements that are applicable to this Contract are contained in the project Special Provisions and Contract Forms, and may include:

Disadvantaged Business Enterprise (DBE) Program	Section 120
Training Program	Section 645
Federal EEO Bid Conditions	Form 25A-301
EEO-1 Certification	Form 25A-304
DBE Subcontractable Items	Form 25A-324
ADOT&PF Training Program Request	Form 25A-310
Training Utilization Report	Form 25A-311
Contact Report	Form 25A-321A
DBE Utilization Report	Form 25A-325C
Summary of Good Faith Effort Documentation	Form 25A-332A
Required Contract Provisions, Federal-Aid Contracts	Form 25D-55

In addition to the sanctions provided in the above references, non-compliance with these requirements is grounds for withholding of progress payments. (01/22/02)S80

SECTION 108

PROSECUTION AND PROGRESS

Special Provisions

108-1.03 PROSECUTION AND PROGRESS. Delete the last sentence of the first paragraph and substitute the following: Submit the following at the Preconstruction Conference:

Delete item 1. A progress schedule. and substitute the following:

1. A Critical Path Method (CPM) Schedule is required, in a format acceptable to the Engineer, showing the order the work will be carried out and the contemplated dates the Contractor and subcontractors will start and finish each of the salient features of the work, including scheduled periods of shutdown. Indicate anticipated periods of multiple-shift work in the CPM Schedule. Revise to the proposed CPM Schedule promptly. Promptly submit a revised CPM Schedule if there are substantial changes to the schedule, or upon request of the Engineer. See also Section 646.

(12/13/02)R261M98

108-1.06 CONTRACT TIME, EXTENSION OF CONTRACT TIME AND SUSPENSION OF WORK. Add the following:

1. Long Lead Items. The Contractor shall provide the Engineer with copies of purchase orders for electrical items (poles, mast arms, and load centers) within 20 calendar days after receipt of Notice to Proceed. Include the estimated delivery date to Anchorage, Alaska for electrical items in the Purchase Order.

   Upon delivery of electrical items, the Contractor shall provide a copy of the delivery order to the Engineer. The Contractor has 45 days from delivery of electrical items to complete associated work. If the project is not completed within the 45 days, liquidated damages will be assessed at 25% of values according to subsection108-1.07 Failure to Complete on Time.

   The Contractor is responsible for maintenance of the project until Contract Time is suspended or the project is completed.

SECTION 109

MEASUREMENT AND PAYMENT

Special Provisions

109-1.02 MEASUREMENT OF QUANTITIES. Under subtitle Electronic Computerized Weighing System item (1) add the following to the end of the first sentence: ", CD, or a USB device."

109-1.05 COMPENSATION FOR EXTRA WORK. Under item 3. Equipment, item a. add the following to the second paragraph: The rental rate area adjustment factors for this project shall be as specified on the adjustment maps for the Alaska - South Region. (4/31/05)R14

109-1.07 PAYMENT FOR MATERIAL ON HAND. Add the following: The location of stockpiled materials for payment in acceptable storage facilities off the project will be in Anchorage, Alaska, at a location acceptable to the Engineer. (09/01/89)R16

Standard Modification

109-1.08 FINAL PAYMENT. Add the following sentence to the first paragraph: The Department will not process the final estimate until the Contractor completes Items 1 through 4 in the first paragraph of subsection 105-1.16. . (06/30/04)E11

Add the following Section:

SECTION 120

DISADVANTAGED BUSINESS ENTERPRISE (DBE) PROGRAM

Special Provisions

120-1.01 DESCRIPTION. The work consists of providing Disadvantaged Business Enterprises (DBEs), as defined in Title 49, CFR (Code of Federal Regulations), Part 26, with the opportunity to participate on an equitable basis with other contractors in the performance of contracts financed in whole, or in part, with federal funds. The Contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The Contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of USDOT assisted contracts.

120-1.02 INTERPRETATION. It is the intent of this section to implement the requirements of 49 CFR, Part 26, and the Department's federally approved DBE Program.

120-1.03 ESSENTIAL CONTRACT PROVISION. Failure to comply with the provisions of this section will be considered a material breach of contract, which may result in the termination of this contract or such other remedy as ADOT&PF deems appropriate. The Department also considers failure to comply with this section to be so serious as to justify debarment action as provided in AS 36.30.640(4).

120-1.04 DEFINITIONS AND TERMS. The following definitions will apply.

1. Broker. A DBE certified by the Department that arranges for the delivery or provision of creditable materials, supplies, equipment, transportation/hauling, insurance, bonding, etc., within its certified category, that is necessary for the completion of the project. A broker of materials certified in a supply category must be responsible for scheduling the delivery of materials and fully responsible for ensuring that the materials meet specifications before credit will be given.

2. Commercially Useful Function (CUF). The execution of the work of the Contract by a DBE carrying out its responsibilities by actually performing, managing, and supervising the work involved using its own employees and equipment. The DBE shall be responsible, with respect to materials and supplies used on the Contract, for negotiating price, determining quality and quantity, ordering the material, and installing (where applicable) and paying for the material itself. To determine whether a DBE is performing a commercially useful function, an evaluation of the amount of work subcontracted, industry practices, whether the amount the firm is to be paid under the Contract is commensurate with the work it is actually performing and the DBE credit claimed for its performance of the work. Other relevant factors will be considered. The Engineer makes the determination of

CUF after evaluating the way in which the work was performed during the execution of the Contract.

3. Disadvantaged Business Enterprise (DBE). An enterprise which is a for-profit small business concern

   a. that is at least 51 percent owned by one or more individuals who are both socially and economically disadvantaged or, in the case of a corporation, in which 51 percent of the stock is owned by one or more such individuals;

   b. whose management and daily business operations are controlled by one or more of the socially and economically disadvantaged individuals who own it; and

   c. has been certified by the Department in accordance with 49 CFR, Part 26.

4. DBE Key Employee. Permanent employees identified by the DBE owner in its certification file in the Department Civil Rights Office.

5. DBE Utilization Goal. The percent of work to be performed by certified DBEs that is established by the Department and specified in the Contract.

6. Good Faith Efforts. Efforts by the bidder or Contractor to achieve a DBE goal or other requirement of 49 CFR Part 26, by their scope, intensity, and appropriateness to the objective, that can reasonably be expected to fulfill the program requirement.

7. Manufacturer. A DBE certified by the Department in a supply category that changes the shape, form, or composition of original material in some way and then provides that altered material to the project and to the general public or the construction industry at large on a regular basis.

8. Notification. For purposes of soliciting DBE participation on a project and to count toward a contractor's Good Faith Efforts, notification shall be by letter or fax transmission, with a return receipt requested or successful transmission report. Telephonic contact with a DBE may be allowed, however it shall be based on the ability of Civil Rights staff to independently verify this contact.

9. Regular Dealer. A DBE certified by the Department in a supply category that

   a. maintains an in-house inventory on a regular basis of the particular product provided to this project; and

   b. keeps an inventory in an amount appropriate for the type of work using that product; and

c. offers that inventory for sale to the general public or construction industry at large (private and public sectors), not just supplied as needed on a project by project basis during the construction season, except where the product requires special or heavy equipment for delivery and the DBE possesses and operates this equipment on a regular basis throughout the construction season in order to deliver the product to the general public or construction industry at large. If the distribution equipment is rented or leased, it must be on a repetitive, seasonal basis; and may additionally

d. fabricates (assembles large components) for use on a construction project, consistent with standard industry practice, for delivery to the project.

120-2.01 UTILIZATION GOAL. The DBE Utilization Goal for this contract is shown on Form 25A324 (DBE Subcontractable Items) as a percentage of the total basic bid amount. A DBE may be considered creditable towards meeting the DBE Utilization Goal at time of Contract award, if the DBE is certified by the Department in a category covering the CUF to be performed at the time of listing on Form 25A325C (DBE Utilization Report).

A bidder shall demonstrate the ability to meet the DBE Utilization Goal or perform and document all of the required Good Faith Efforts under Subsection 120-3.02 in order to be eligible for award of this Contract.

If the quantity of work of a bid item involving a DBE firm is reduced by the Department, the DBE Utilization Goal on Form 25A325C will be reduced proportionately.

120-3.01 DETERMINATION OF COMPLIANCE

1. Phase I - Bid. Each bidder must register with the Civil Rights Office annually in accordance with §§26.11 & 26.53(b)(2)(iv) of 49 CFR, Part 26. No contract may be awarded to a bidder that is not registered.

2. Phase II - Award. The apparent low bidder will provide the following within 15 days of receipt of notice of intent to award:

   a. **Written DBE Commitment**. Written commitments from DBEs to be used on the project. The written commitment shall contain the following information:

      1) A description of the work that each DBE will perform;

      2) The dollar amount of participation by the DBE firm;

3) Written documentation of the bidder/offeror's commitment to use a DBE subcontractor whose participation it submits to meet a contract goal; and

4) Written confirmation from the DBE that it is participating in the contract as provided in the prime Contractor's commitment.

b. **DBE Utilization Report.** Form 25A325C listing the certified DBEs to be used to meet the DBE Utilization Goal.

c. **Good Faith Effort Documentation.** Summary of Good Faith Effort Documentation (Form 25A332A and attachments) and DBE Contact Reports (Form 25A321A) if the Contractor submits less DBE utilization on Form 25A325C than is required to meet the DBE Utilization Goal. If accepted by the Department, this lower DBE utilization becomes the new DBE Utilization Goal. If the bidder cannot demonstrate the ability to meet the DBE Utilization Goal, and can not document the minimum required Good Faith Efforts (as outlined in subsection 120-3.02 below), the Contracting Officer will determine the bidder to be not responsible.

3. Phase III - Construction.

a. **Designation of DBE/EEO Officer.** At the preconstruction conference, the Contractor shall submit, in writing, the designation of a DBE/EEO officer.

b. **DBE Creditable Work.** The CUF work items and creditable dollar amounts shown for a DBE on the DBE Utilization Report (Form 25A325C) shall be included in any subcontract, purchase order or service agreement with that DBE.

c. **DBE Replacement.** If the Engineer approves a DBE replacement, the Contractor shall replace the DBE with another DBE for the same work in order to fulfill its commitment under the DBE Utilization Goal. In the event that the Contractor cannot obtain replacement DBE participation, the Engineer may adjust the DBE Utilization Goal if, in the opinion of the Engineer and the Civil Rights Office, both of the following criteria have been met:

1) The Contractor has not committed any discriminatory practice in its exercise of good business judgement to replace a DBE.

2) If the Contractor is unable to find replacement DBE participation and has adequately performed and documented the Good Faith Effort expended in accordance with Subsection 120-3.02.

d. **DBE Utilization Goal.** The DBE Utilization Goal will be adjusted to reflect only that amount of the DBE's work that can not be replaced.

120-3.02 GOOD FAITH EFFORT

1. **Good Faith Effort Criteria.** The Contracting Officer will use the following criteria to judge if the bidder, who has not met the DBE Utilization Goal, has demonstrated sufficient Good Faith Effort to be eligible for award of the contract.

   Failure by the bidder to perform and document all of the following actions constitutes insufficient Good Faith Effort.

   a. Consideration of all subcontractable items. The bidder shall, at a minimum, seek DBE participation for each of the subcontractable items upon which the DBE goal was established as identified by the Department (on Form 25A324) prior to bid opening. It is the bidder's responsibility to make the work listed on the subcontractable items list available to DBE firms, to facilitate DBE participation.

   b. If the bidder can not achieve the DBE Utilization Goal using the list of available DBE firms based on the subcontractable items list, then the bidder may consider other items that could be subcontracted to DBEs.

   c. Notification to all active DBEs listed for a given region in the Department's most current DBE Directory at least 7 calendar days prior to bid opening. The bidder must give the DBEs no less than five days to respond. The bidder may reject DBE quotes received after the deadline. Such a deadline for bid submission by DBEs will be consistently applied. DBEs certified to perform work items identified on Form 25A324 must be contacted to solicit their interest in participating in the execution of work with the Contractor. Each contact with a DBE firm will be logged on a Contact Report (Form 25A321A).

   d. The bidder may reject non-competitive DBE quotes. Allegations of non-competitive DBE quotes must be documented and verifiable. A DBE quote that is more than 10.0% higher than the accepted non-DBE quote will be deemed non-competitive, provided the DBE and non-DBE subcontractor quotes are for the exact same work or service. Bidders must have a non-DBE subcontractor quote for comparison purposes. Such evidence shall be provided in support of the bidder's allegation. Where the bidder rejects a DBE quote as being non-competitive under this condition, the work must be performed by the non-DBE subcontractor and payments received by the non-DBE subcontractor during the execution of the Contract shall be consistent with the non-DBE's accepted quote. This does not preclude increases as a result of Change documents issued by the Department.

e. Provision of assistance to DBEs who need help in obtaining information about bonding or insurance required by the bidder.

f. Provision of assistance to DBEs who need help in obtaining information about securing equipment, supplies, materials, or related assistance or services.

g. Providing prospective DBEs with adequate information about the requirements of the Contract regarding the specific item of work or service sought from the DBE.

h. Follow-up of initial notifications by contacting DBEs to determine whether or not they will be bidding. Failure to submit a bid by the project bid opening or deadline by the bidder is de facto evidence of the DBE's lack of interest in bidding. Documentation of follow-up contacts shall be logged on the Contact Report (Form 25A321A).

i. Items c through h will be utilized to evaluate any request from the Contractor for a reduction in the DBE Utilization Goal due to the default or decertification of a DBE and the Contractor's subsequent inability to obtain additional DBE participation.

2. **Administrative Reconsideration.** Under the provisions of 49 CFR. Part 26.53(d), if it is determined that the apparent successful bidder has failed to meet the requirements of this subsection, the bidder must indicate whether they would like an opportunity for administrative reconsideration. The bidder must exercise such an opportunity within 3 calendar days of notification it has failed to meet the requirements of this subsection. As part of this reconsideration, the bidder must provide written documentation or argument concerning the issue of whether it met the goal or made adequate good faith efforts to do so.

a. The DBE Liaison Officer will make the decision on reconsideration.

b. The bidder will have the opportunity to meet in person with the DBE Liaison Officer to discuss the issue of whether it met the goal or made adequate good faith efforts to do so. If a meeting is desired, the bidder must be ready, willing and able to meet with the DBE Liaison Officer within 4 days of notification that it has failed to meet the requirements of this subsection.

c. The DBE Liaison Officer will render a written decision on reconsideration and provide notification to the bidder. The written decision will explain the basis for finding that the bidder did or did not meet the goal or make adequate good faith efforts to do so.

d. The result of the reconsideration process is not administratively appealable to US DOT.

120-3.03 COMMERCIALLY USEFUL FUNCTION (CUF).

1. **Creditable Work.** Measurement of attainment of the DBE Utilization Goal will be based upon the actual amount of money received by the DBEs for creditable CUF work on this project as determined by the Engineer in accordance with this Section. CUF is limited to that of a:
   a. regular dealer;
   b. manufacturer;
   c. broker;
   d. subcontractor;
   e. joint-venture; or
   f. prime contractor.

2. **Determination of Commercially Useful Function.** In order for the CUF work of the DBE to be credited toward the goal, the Contractor will ensure that all of the following requirements are met:

   a. The CUF performed by a DBE certified in a supply category will be evaluated by the Engineer to determine whether the DBE performed as either a broker, regular dealer, or manufacturer of the product provided to this project.

   b. A DBE trucking firm certified and performing work in a transportation/hauling category is restricted to credit for work performed with its own trucks and personnel certified with the CRO prior to submitting a bid to a contractor for DBE trucking. The DBE trucking firm must demonstrate that it owns all trucks (proof of title and/or registration) to be credited for work and that all operators are employed by the DBE trucking firm. A DBE trucking firm that does not certify its trucks and personnel that it employs on a job will be considered a broker of trucking services and limited to credit for a broker. (This does not affect the CUF of that same firm, when performance includes the hauling of materials for that work.)

   c. The DBE is certified in the appropriate category at the time of

      1) the Engineer's approval of the DBE subcontract, consistent with the written DBE commitment; and

      2) the issuance of a purchase order or service agreement by the Contractor to a DBE performing as either a manufacturer, regular dealer, or broker (with a copy to the Engineer).

d. The Contractor will receive credit for the CUF performed by DBEs as provided in this Section. Contractors are encouraged to contact the Engineer in advance of the execution of the DBE's work or provision of goods or services regarding CUF and potential DBE credit.

e. The DBE may perform work in categories for which it is not certified, but only work performed in the DBE's certified category meeting the CUF criteria may be credited toward the DBE Utilization Goal.

f. The work of the DBE firm must meet the following criteria when determining when CUF is being performed by the DBE:

1) The work performed will be necessary and useful work required for the execution of the Contract.

2) The scope of work will be distinct and identifiable with specific contract items of work, bonding, or insurance requirements.

3) The work will be performed, controlled, managed, and supervised by employees normally employed by and under the control of the certified DBE. The work will be performed with the DBE's own equipment. Either the DBE owner or DBE key employee will be at the work site and responsible for the work.

4) The manner in which the work is sublet or performed will conform to standard, statewide industry practice within Alaska, as determined by the Department. The work or provision of goods or services will have a market outside of the DBE program (must also be performed by non-DBE firms within the Alaskan construction industry). Otherwise, the work or service will be deemed an unnecessary step in the contracting or purchasing process and no DBE credit will be allowed.

There will be no DBE credit for lower-tier non-DBE subcontract work.

5) The cost of the goods and services will be reasonable and competitive with the cost of the goods and services outside the DBE program within Alaska. Materials or supplies needed as a regular course of the Contractor's operations such as fuel, maintenance, office facilities, portable bathrooms, etc. are not creditable.

The cost of materials actually incorporated into the project by a DBE subcontractor is creditable toward the DBE goal only if the DBE is responsible for ordering and scheduling the delivery of

creditable materials and fully responsible for ensuring that the materials meet specifications.

6) Unless the Engineer's approval is given before subletting, use the same unit of measure as contained in the Bid Schedule for subcontract work, with the exception of truck hauling.

7) The DBE will control all business administration, accounting, billing, and payment transactions. The prime contractor will not perform the business, accounting, billing, and similar functions of the DBE. The Engineer may, in accordance with AS 36.30.420(b), inspect the offices of the DBE and audit the records of the DBE to assure compliance.

g. On a monthly basis, the Contractor shall report on Form 25A336 (Monthly Summary of DBE Participation) to the Department Civil Rights Office the payments made (canceled checks or bank statements that identify payor, payee, and amount of transfer) for the qualifying work, goods and services provided by DBEs.

3. **Decertification of a DBE**. Should a DBE performing a CUF become decertified during the term of the subcontract, purchase order, or service agreement for reasons beyond the control of and without the fault or negligence of the Contractor, the work remaining under the subcontract, purchase order, or service agreement may be credited toward the DBE Utilization Goal.

Should the DBE be decertified between the time of Contract award and the time of the Engineer's subcontract approval or issuance of a purchase order or service agreement, the work of the decertified firm will not be credited toward the DBE Utilization Goal. The Contractor must still meet the DBE Utilization Goal by either

a. withdrawing the subcontract, purchase order or service agreement from the decertified DBE and expending Good Faith Effort (Subsection 120-3.02, Items c through h) to replace it with one from a currently certified DBE for that same work or service through subcontractor substitution (Subsection 103-1.01); or

b. continuing with the subcontract, purchase order or service agreement with the decertified firm and expending Good Faith Effort to find other work not already subcontracted out to DBEs in an amount to meet the DBE Utilization Goal through either

1) increasing the participation of other DBEs on the project;
2) documenting Good Faith Efforts (Subsection 120-3.02, items c through h); or
3) by a combination of the above.

4. **DBE Rebuttal of a Finding of no CUF.** Consistent with the provisions of 49 CFR, Part 26.55(c)(4)&(5), before the Engineer makes a final finding that no CUF has been performed by a DBE firm the Engineer will coordinate notification of the presumptive finding through the Civil Rights Office to the Contractor, who will notify the DBE firm.

   The Engineer, in cooperation with the Civil Rights Office, may determine that the firm is performing a CUF if the rebuttal information convincingly demonstrates the type of work involved and normal industry practices establishes a CUF was performed by the DBE. Under no circumstances shall the Contractor take any action against the DBE firm until the Engineer has made a final determination. The Engineer's decisions on CUF matters are not administratively appealable to US DOT.

120-3.04 DEFAULT OF DBE. In the event that a DBE firm under contract or to whom a purchase order or similar agreement has been issued defaults on their work for whatever reason, the Contractor shall immediately notify the Engineer of the default and the circumstances surrounding the default.

The Contractor shall take immediate steps, without any order or direction from the Engineer, to retain the services of other DBEs to perform the defaulted work. In the event that the Contractor cannot obtain replacement DBE participation, the Engineer may adjust the DBE Utilization Goal if, in the opinion of the Engineer, the following criteria have been met:

1. The Contractor was not at fault or negligent in the default and that the circumstances surrounding the default were beyond the control of the Contractor; and

2. The Contractor is unable to find replacement DBE participation at the same level of DBE commitment and has adequately performed and documented the Good Faith Effort expended in accordance with items c through h of Subsection 120-3.02 for the defaulted work; or

3. It is too late in the project to provide any real subcontracting opportunities remaining for DBEs.

The DBE Utilization Goal will be adjusted to reflect only that amount of the defaulted DBE's work that can not be replaced.

120-4.01 METHOD OF MEASUREMENT. The Contractor will be entitled to count toward the DBE Utilization Goal those monies actually paid to certified DBEs for CUF work performed by the DBE as determined by the Engineer. The Contractor will receive credit for the utilization of the DBEs, as follows:

Credit for the CUF of a DBE prime contractor is 100% of the monies actually paid to the DBE under the contract for creditable work and materials in accordance with 49 CFR 26.55.

Credit for the CUF of a subcontractor is 100% of the monies actually paid to the DBE under the subcontract for creditable work and materials. This shall include DBE trucking firms certified as a subcontractor and not a broker. Trucks leased from another DBE firm shall also qualify for credit and conforms to the provisions of 49 CFR 26.55(d).

Credit for the CUF of a manufacturer is 100% of the monies paid to the DBE for the creditable materials manufactured.

Credit for the CUF of a regular dealer of a creditable material, product, or supply is 60% of its value. The value will be the actual cost paid to the DBE but will not exceed the bid price for the item.

Credit for the CUF of a broker performed by a DBE certified in a supply category for providing a creditable material, product or supply is limited to a reasonable brokerage fee. The brokerage fee will not exceed 5% of the cost of the procurement contract for the creditable item.

Credit for the CUF of a broker performed by a DBE certified in the transportation/hauling category for arranging for the delivery of a creditable material, product or supply is limited to a reasonable brokerage fee. The brokerage fee will not exceed 5% of the cost of the hauling subcontract.

Credit for the CUF of a broker performed by a DBE certified in a bonding or insurance category for arranging for the provision of insurance or bonding is limited to a reasonable brokerage fee. The brokerage fee will not exceed 5% of the premium cost.

Credit for the CUF of a joint venture (JV) (either as the prime contractor or as a subcontractor) may not exceed the percent of the DBE's participation in the joint venture agreement, as certified for this project by the Department. The DBE joint venture partner will be responsible for performing all of the work as delineated in the certified JV agreement.

120-5.01 BASIS OF PAYMENT. Work under this item is subsidiary to other contract items and no payment will be made for meeting or exceeding the DBE Utilization Goal.

If the Contractor fails to utilize the DBEs listed on Form 25A325C as scheduled or fails to submit required documentation to verify proof of payment or documentation requested by the Department to help in the determination of CUF, the Department will consider this to be unsatisfactory work. If the Contractor fails to utilize Good Faith Efforts to replace a DBE, regardless of fault (except for Subsection 120-3.04 item 3), the Department will also consider this unsatisfactory work.

Unsatisfactory work may result in disqualification of the Contractor from future bidding under Subsection 102-1.13 and withholding of progress payments consistent with Subsection 109-1.06.

(11/17/00)S 33

SECTION 201

CLEARING AND GRUBBING

Special Provisions

201-4.01 METHOD OF MEASUREMENT. Add the following: Clearing and Grubbing will not be measured.

201-5.01 BASIS OF PAYMENT. Add the following: Clearing and Grubbing shall be subsidiary to other Division 200 pay items listed in the bid schedule.

SECTION 202

REMOVAL OF STRUCTURES AND OBSTRUCTIONS

Special Provisions

202-1.01 DESCRIPTION. Add the following: This work also consists of pavement planing **to a depth of 2 inches** as specified in this section. (2/28/01)R143USC

202-3.05 REMOVAL OF PAVEMENT, SIDEWALKS, AND CURBS. Add the following: Pavement removed from the project shall be stockpiled at the Municipality of Anchorage maintenance yard. Coordinate with Dan Southard, Street Maintenance Manager, at 343-8277 for acceptance of material and desired location of stockpile.

Material not acceptable to the maintenance chief will be disposed of in an acceptable manner. Disposal areas shall be outside the project limits and according to subsection 202-3.05, Removal of Pavement, Sidewalks, and Curbs. Obtain written consent from the property owner. Obtain a solid waste disposal permit from the Department of Environmental Conservation (DEC) or use a site previously approved by DEC for disposal of removed asphalt. A DEC permitting officer in Anchorage may be contacted at (907) 269-7590.

202-3.06 PAVEMENT PLANING. Add the following Subsection: Remove existing asphalt concrete pavement by cold planing **to a depth of 2 inches** at locations shown on the Plans. The surface of the pavement after Planing shall be uniformly rough grooved or ridged.

If the pavement removed from the existing roadway is not to be used as Item 301 Aggregate Base Course then the Planed material shall be removed and stockpiled. Stockpile planed material at the Municipality of Anchorage maintenance yard. Coordinate with Dan Southard, Street Maintenance Manager, at 343-8277 for acceptance of material and desired location of stockpile.

Planed material not acceptable to the maintenance chief will be disposed of in an acceptable manner or incorporated into the road structural prism as directed by the Engineer. Disposal areas shall be outside the project limits and according to Subsection202-3.05, Removal of Pavement, Sidewalks and Curbs. For disposal of waste asphalt pavement, the Contractor shall obtain a solid waste disposal permit from the State of Alaska Department of Environmental Conservation (DEC) or use a site previously approved by DEC for disposal of removed asphalt. A DEC permitting officer in Anchorage may be contacted at (907) 269-7590. Obtain written permission of the property owner before disposal.

During the planing operation, sweep the streets with mechanical sweepers equipped with vacuum and water sprinkling devices to control dust and remove all loosened material

from the planed areas. The removal operation shall follow within 50 feet of the planing machine.

Do not allow traffic to travel on surfaces that have an abrupt longitudinal planed edge greater than 2 inches. In the event that it is necessary to route traffic across such edges, an asphalt concrete transition 2 feet in width shall be placed adjacent to the edge and to all gutters.

Maintain a tolerance of 0.1 foot between adjacent passes by the planer.

Remove existing asphalt concrete pavement overlay from gutters adjacent to the area being planed.

The existing curb and gutter not designated for removal shall not be damaged or disturbed. Any damage caused by the planing operation shall be removed and replaced by the Contractor at his expense.

The planing machine shall be specifically designed for the removal of bituminous pavement without the addition of heat. The cutting drum shall be a minimum of 5 feet wide and shall be equipped with cutting teeth placed in a variable lacing pattern to produce the desired finish.

The planing machine shall have the following capabilities:

1. operating speeds from 0 to 40 feet per minute,

2. self propelled,

3. able to spray water at the cutting drum to minimize dust,

4. able to remove material next to the gutter,

5. designed so that the operator can at all times observe the planing operation without leaving the controls,

6. adjustable as to slope and depth,

7. longitudinal grade control automatically actuated by the use of a 30 foot ski, and

8. able to cut up to 3 inches without producing fumes or smoke.

Provide a smaller machine to trim areas that are inaccessible to the larger machine at manholes, valve covers, curb returns, and intersections.

202-5.01 BASIS OF PAYMENT. After the third paragraph, add the following:

Item 202(15A) At the contract price per square yard. Payment is full compensation for mechanical sweepers during planing operations, removal of pavement from the gutter and stockpile of planed material per subsection 202-3.06.

Replace any Loop detectors damaged by the planing operation according to Section 660. Replace damage loop detectors at no additional expense to the Department. If loops are encountered within the planing depth specified in the plans, their replacement will be measured and paid as Item 660(11) Traffic Loop (or under Section 109-1.05, Compensation For Extra Work).

(2/28/01)R143USC

Payment will be made under:

Pay Item	**Pay Unit**
202(15A) Pavement Planing	Square Yard

SECTION 203

EXCAVATION AND EMBANKMENT

Special Provision

203-3.01 GENERAL. Add the following: Wait a minimum of 48 hours after staking is complete before commencing excavation activities. The Engineer, after staking by the Contractor, may adjust stationing of sections for best fit without additional compensation to the Contractor.

203-3.04 COMPACTION WITH MOISTURE AND DENSITY CONTROL. Delete this section in its entirety and substitute the following: Construct embankments with moisture and density control from specified materials placed and compacted at approximately optimum moisture content. Dry or moisten material as required.

Compact embankment material to not less than 95 percent of the maximum dry density as determined by WAQTC FOP for AASHTO T 99 / T 180 or ATM 212. The Engineer will determine in-place field densities using WAQTC FOP for AASHTO T 310 and WAQTC FOP for AASHTO T 224. (MATLS 2/05)

SECTION 301

AGGREGATE BASE AND SURFACE COURSE

Special Provisions

301-2.01 MATERIALS. Add the following after the first sentence: Recycled asphalt material (RAM) may be substituted for aggregate base course, inch for inch, if the following conditions are met:

1. RAM shall be crushed or processed to 100 percent by weight passing the 1.5 inch sieve and 95-100 percent by weight passing the 1 inch sieve.

2. The gradation of the extracted aggregate shall meet the following:

Sieve	Percent Passing by Weight
1 inch	100
3/4 inch	70-100
3/8 inch	42-90
No. 4	28-78
No. 16	11-54
No. 50	5-34
No. 100	3-22
No. 200	2-12

3. The asphalt content shall be 2.5 - 5.0 percent by weight of the RAM.
(01/24/07)R176USC02

301-3.01 PLACING. Add the following: Base course material used for a separated sidewalk and pathway foundation shall be placed with a "Layton box" or similar equipment capable of providing a specified depth with a uniform surface.
(09/01/89)R26MODIFIED

301-3.03 SHAPING AND COMPACTION. Add the following: If recycled asphalt material is substituted for aggregate base course, the following conditions shall be met:

1. Density acceptance will be based determined by control strip method ATM 412. Use a test strip with a vibratory compactor with a minimum dynamic force of 40,000 pounds. The optimum density will be determined by the Engineer using a

nuclear densometer gauge to monitor the test strip. Adequate water shall be added to aid compaction.

2. After the appropriate coverage with the vibratory compactor, a minimum of 6 passes with a pneumatic tire roller shall be completed. Tires shall be inflated to 80 psi (± 5 psi), and the roller shall have a minimum operating weight per tire of 3,000 pounds.

301-5.01 BASIS OF PAYMENT. Add the following: If recycled asphalt material is substituted for aggregate base course, it will be paid for as Item 301(1) Aggregate Base Course at the unit price shown on the bid schedule for that item. (01/24/07)R176USC02

Replace Section 401 with the following:

SECTION 401

HOT MIX ASPHALT AND SURFACE TREATMENTS

401-1.01 DESCRIPTION. Construct one or more layers of plant-mixed hot asphalt concrete pavement on an approved surface, to the lines, grades, and depths shown on the Plans.

MATERIALS

401-2.01 COMPOSITION OF MIXTURE - JOB MIX DESIGN. Meet the requirements of Table 401-1 for the Job Mix Design performed according to ATM 417.

TABLE 401-1
HOT MIX ASPHALT DESIGN REQUIREMENTS

DESIGN PARAMETERS	CLASS "A"	CLASS "B"
Stability, pounds	1800 min.	1200 min.
Flow, 0.01 inch	8-14	8-16
Voids in Total Mix, %	3-5	3-5
Compaction, number of blows each side of test specimen	75	50
Percent Voids Filled with Asphalt (VFA)	65-75	65-78
Asphalt Content, min. %	5.0	5.0
Dust-asphalt ratio*	0.6-1.4	0.6-1.4
Voids in the Mineral Aggregate (VMA), %, min.		
Type I	12.0	11.0
Type II	13.0	12.0
Type III, IV	14.0	13.0

*Dust-asphalt ratio is the percent of material passing the No. 200 sieve divided by the percent of effective asphalt (calculated by weight of mix).

The approved Job Mix Design will specify the target values for gradation, the target value for asphalt cement content, the Maximum Specific Gravity (MSG) of the hot mix asphalt, the additives, and the allowable mixing temperature range.

Target values for gradation in the Job Mix Design must be within the broad band limits shown in Table 703-3, for the type of hot mix asphalt specified. For acceptance testing, hot mix asphalt concrete mixture will have the full tolerances in Table 401-2 applied. Except the tolerances for the No. 200 sieve, the tolerance limits will apply even if they fall outside the broad band limits shown in Table 703-3. The tolerance limits for the No.

200 sieve will be confined by the broad band shown in Table 703-3. Tolerance limits will not be applied to the largest sieve specified.

Do not produce hot mix asphalt for payment until the Engineer approves the Job Mix Design. Do not mix asphalt produced from different plants.

Use Hot Mix Asphalt Type II, Class B, minimum, for temporary pavement.

Submit the following to the Engineer at least 15 days before the production of hot mix asphalt:

1. A letter stating the location, size, and type of mixing plant, the proposed gradation for the Job Mix Design, gradations for individual stockpiles with supporting process quality control information, and the blend ratio of each aggregate stockpile. The proposed gradation must meet the requirements of Table 703-3 for each type of hot mix asphalt specified in the Contract.

2. Representative samples of each aggregate (coarse, intermediate, fine, and blend material and/or mineral filler, if any) in the proportions required for the proposed mix design. Furnish a total of 500 pounds of material.

3. Five separate 1-gallon samples of the asphalt cement proposed for use in the hot mix asphalt. Include name of product, manufacturer, test results of the applicable quality requirements of subsection 702-2.01, manufacturer's certificate of compliance according to subsection 106-1.05, a temperature viscosity curve for the asphalt cement or manufacturer's recommended mixing and compaction temperatures, and current Material Safety Data Sheet.

4. One sample, of at least 1/2 pint, of the anti-strip additive proposed, including name of product, manufacturer, and manufacturer's data sheet, and current Material Safety Data Sheet.

The Engineer will then evaluate the material and the proposed gradation using ATM 417 and the requirements of Table 401-1 for the appropriate type and class of hot mix asphalt specified and establish the approved Job Mix Design that will become a part of the Contract.

No payment for hot mix asphalt for which a new Job Mix Design is required, will be made until the new Job Mix Design is approved. Approved changes apply only to hot mix asphalt produced after the submittal of the changes.

Changes. Failure to achieve results conforming to Table 401-1 or changes in the source of asphalt cement, source of aggregates, aggregate quality, aggregate gradation, or blend ratio, will require a new Job Mix Design. Submit changes and new samples in the same manner as the original submittal.

401-2.02 AGGREGATES. Conform to subsection 703-2.04.

Use a minimum of three stockpiles for crushed hot mix asphalt aggregate (coarse, intermediate, and fine). Place blend material or mineral filler, if any, in a separate pile.

401-2.03 ASPHALT CEMENT. Provide the grade of asphalt cement specified in the Contract meeting the applicable requirements of Section 702. If not specified, use PG 52-28.

Provide test reports for each batch of asphalt cement showing conformance to the specifications in Section 702 before delivery to the project. Require that the storage tanks used for each batch be noted on the test report, the anti-strip additives required by the mix design be added during load out for delivery to the project, and a printed weight ticket for anti-strip is included with the asphalt cement weight ticket. The location where anti-strip is added may be changed with the written approval of the Engineer.

Furnish the following documents at delivery:

1. Manufacturer's certificate of compliance (106-1.05).
2. Conformance test reports for the batch (Section 702).
3. Batch number and storage tanks used.
4. Date and time of load out for delivery.
5. Type, grade, temperature, and quantity of asphalt cement loaded.
6. Type and percent of anti-strip added.

401-2.04 ANTI-STRIP ADDITIVES. Use anti-strip agents in the proportions determined by ATM 414 and included in the approved Job Mix Design. At least 70% of the aggregate must remain coated when tested according to ATM 414.

401-2.05 PROCESS QUALITY CONTROL. Sample and test materials for quality control of the hot mix asphalt according to subsection 106-1.03. Provide copies of these test results to the Engineer within 24 hours.

Failure to perform quality control forfeits the Contractor's right to a retest under subsection 401-4.02.

Submit a paving and plant control plan at the pre-paving meeting to be held a minimum of 5 working days before initiating paving operations. Address the sequence of operations and joint construction. Outline steps to assure product consistency, to minimize segregation, and to prevent premature cooling of the hot mix asphalt. Include a proposed quality control testing frequency for gradation, asphalt cement content, and compaction.

CONSTRUCTION REQUIREMENTS

401-3.01 WEATHER LIMITATIONS. Do not place the hot mix asphalt on a wet surface, on an unstable/yielding roadbed, when the base material is frozen, or when weather conditions prevent proper handling or finishing of the mix. Do not place hot mix asphalt unless the roadway surface temperature is 40 °F or warmer.

401-3.02 EQUIPMENT, GENERAL. Use equipment in good working order and free of hot mix asphalt buildup. Make equipment available for inspection and demonstration of operation a minimum of 24 hours before placement of hot mix asphalt.

401-3.03 ASPHALT MIXING PLANT. Meet AASHTO M 156. Use an asphalt plant designed to dry aggregates, maintain accurate temperature control, and accurately proportion asphalt cement and aggregates. Calibrate the asphalt plant and furnish copies of the calibration data to the Engineer at least 4 hours before hot mix asphalt production.

Provide a scalping screen at the asphalt plant to prevent oversize material or debris from being incorporated into the hot mix asphalt.

Provide a tap on the asphalt cement supply line just before it enters the plant (after the 3-way valve) for sampling asphalt cement.

Provide aggregate and asphalt cement sampling conditions meeting OSHA safety requirements.

401-3.04 HAULING EQUIPMENT. Haul hot mix asphalt in trucks with tight, clean, smooth metal beds, thinly coated with a minimum amount of paraffin oil, lime water solution, or an approved manufactured asphalt release agent. Do not use petroleum fuel as an asphalt release agent.

Cover the hot mix asphalt in the hauling vehicle, when directed.

401-3.05 ASPHALT PAVERS. Use self-propelled pavers equipped with a heated vibratory screed. Control grade and cross slope with automatic grade and slope control devices. Use an erected string line, a 30-foot minimum mobile stringline (ski), or other approved grade follower, to automatically actuate the paver screed control system. Use grade control on either (a) both the high and low sides or (b) grade control on the high side and slope control on the low side.

Equip the paver with a receiving hopper having sufficient capacity for a uniform spreading operation. Equip the hopper with a distribution system to place the hot mix asphalt uniformly in front of the screed.

Use a screed assembly that produces a finished surface of the required smoothness, thickness and texture without tearing, shoving or displacing the hot mix asphalt. Heat

and vibrate screed extensions. Place auger extensions within 20 inches of the screed extensions or according to written manufacturer's recommendations.

Equip the paver with a means of preventing the segregation of the coarse aggregate particles from the remainder of the bituminous plant mix when that mix is carried from the paver hopper back to the paver augers. The means and methods used shall be approved by the paver manufacturer and may consist of chain curtains, deflector plates, or other such devices and any combination of these.

The following specific requirements apply to the identified bituminous pavers:

(1) Blaw-Knox bituminous pavers shall be equipped with the Blaw-Knox Materials Management Kit (MMK).
(2) Cedarapids bituminous pavers must have been manufactured in 1989 or later.
(3) Caterpillar bituminous pavers shall be equipped with deflector plates.

The use of a "Layton Box" or equivalent towed paver is allowed on bike paths, sidewalks, and driveways.

401-3.06 ROLLERS. Use both steel-wheel (static or vibratory) and pneumatic-tire rollers. Operate rollers according to manufacturer's instructions. Avoid crushing or fracturing of aggregate. Use rollers designed to compact hot mix asphalt and reverse without backlash.

Use fully skirted pneumatic-tire rollers with a minimum operating weight of 3000 pounds per tire.

401-3.07 PREPARATION OF EXISTING SURFACE. Prepare existing surfaces conforming to the Plans and Specifications. Before applying tack coat to the existing surface, clean out loose material from cracks in existing pavement wider than 1 inch in width full depth then fill using asphalt concrete tamped in place. Clean, wash, and sweep existing paved surfaces of loose material.

Preparation of a milled surface,

- Prelevel remaining ruts, pavement delaminations, or depressions having a depth greater than ½-inch with Asphalt Concrete, Type IV. No density testing is required for the leveling course material. The Engineer will inspect and accept this material.

- If planing breaks through existing pavement remove 2 inches of existing base and fill with Asphalt Concrete, Type II. Notify the Engineer of pavement areas that might be considered thin or unstable during pavement removal.

Existing surface must be approved by the Engineer before applying tack coat. Clean existing pave surfaces of loose material.

Before placing the hot asphalt mix, uniformly coat contact surfaces of curbing, gutters, sawcut pavement, cold joints, manholes, and other structures with tack coat material meeting Section 402.

Allow prime coat to cure and emulsion tack coat to break before placement of hot mix asphalt on these surfaces.

401-3.08 PREPARATION OF ASPHALT. Provide a continuous supply of asphalt cement to the asphalt mixing plant at a uniform temperature, within the allowable mixing temperature range.

401-3.09 PREPARATION OF AGGREGATES. Dry the aggregate so the moisture content of the hot mix asphalt, sampled at the point of acceptance for asphalt cement content, does not exceed 0.5% (by total weight of mix), as determined by WAQTC FOP for AASHTO T 329.

Heat the aggregate for the hot mix asphalt to a temperature compatible with the mix requirements specified.

Adjust the burner on the dryer to avoid damage to the aggregate and to prevent the presence of unburned fuel on the aggregate. Hot mix asphalt concrete containing soot or fuel is considered unacceptable according to subsection 105-1.11.

401-3.10 MIXING. Combine the aggregate, asphalt cement and additives in the mixer in the amounts required by the Job Mix Design. Mix to obtain 98% coated particles when tested according to AASHTO T 195.

For batch plants, put the dry aggregate in motion before addition of asphalt cement.

Mix the hot mix asphalt within the temperature range determined by the Job Mix Design.

401-3.11 TEMPORARY STORAGE. Silo type storage bins may be used, provided that the characteristics of the hot mix asphalt are not altered. Signs of visible segregation, heat loss, changes from the Job Mix Design, change in the characteristics of asphalt cement, lumpiness, or stiffness of the hot mix asphalt are causes for rejection.

401-3.12 PLACING AND SPREADING. Place the hot mix asphalt upon the approved surface, spread, strike off, and adjust surface irregularities. Use asphalt pavers to distribute hot mix asphalt, including leveling courses. The maximum compacted lift thickness allowed is 3 inches.

During placement, the Engineer may evaluate the hot mix asphalt immediately behind the paver for temperature uniformity. Areas with temperature differences more than 25°F

lower than the surrounding hot mix asphalt are likely to produce areas of low density. Any thermal images and/or thermal profile data will become part of the project record and shared with the Contractor. The Contractor shall immediately adjust laydown procedures to correct the problem.

Use hand tools to spread, rake, and lute the hot mix asphalt in areas where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impracticable.

When the section of roadway being paved is open to traffic, pave adjacent traffic lanes to the same elevation within 24 hours. Place approved material against the outside pavement edge when the drop off exceeds 2 inches.

When multiple lifts are specified in the Contract, do not place the final lift until all lower lifts throughout that section, as defined by the Paving Plan, are placed and accepted.

Do not pave against new Portland concrete curbing until it has cured for at least 72 hours.

Place hot mix asphalt over bridge deck membranes according to Section 508 and the manufacturer's specifications.

401-3.13 COMPACTION. Thoroughly and uniformly compact the hot mix asphalt by rolling. In areas not accessible to large rollers, compact with mechanical tampers or trench rollers.

The target value for density is 94% of the maximum specific gravity (MSG), as determined by WAQTC FOP for AASHTO T 209. For the first lot of each type of hot mix asphalt, the Job Mix Design will determine the MSG. For additional lots, the MSG will be determined by the sample from the first sublot of each lot.

Acceptance testing for density will be performed in according to WAQTC FOP for AASHTO T 166/T 275 using a 6-inch diameter core. (Acceptance testing for density of leveling course or temporary pavement is not required.)

Do not leave rollers or other equipment standing on hot mix asphalt that has not cooled sufficiently to prevent indentation.

401-3.14 JOINTS. Minimize the number of joints. Place and compact the hot mix asphalt to ensure a continuous bond, texture, and smoothness between adjacent sections of the hot mix asphalt.

Remove to full depth improperly formed joints resulting in surface irregularities, replace with new hot mix asphalt, and thoroughly compact.

Precut pavement removal to a neat line with a power saw or by other method approved by the Engineer.

Form transverse joints by saw cutting back on the previous run to expose the full depth of layer with a power saw or other method approved by the Engineer or use a removable bulkhead. Skew transverse joints between 15-25 degrees.

Offset the longitudinal joints in one layer from the joint in the layer immediately below by at least 6 inches. Align the joints of the top layer at the centerline or lane lines. Where preformed marking tape striping is required, offset the longitudinal joint in the top layer not more than 12 inches from the edge of the stripe.

Uniformly coat joint surfaces below the final lift with tack coat conforming to Section 703 before placing any fresh HMA against the joint.

Before placing an adjacent panel of hot mix asphalt to form a joint in the top layer, apply Crafco Pavement Joint Adhesive No. 34524 Deery Cold Joint Adhesive or approved equal, to the edge of the existing panel. Edge surface preparation, application temperature, thickness, and method shall be according to manufacturer's recommendations.

For the top layer of hot mix asphalt, the minimum specification limit for longitudinal joint density is 91% of the MSG of the panel completing the joint. Cut one 6 inch diameter core centered on the longitudinal joint at each location the panel completing the joint is cored for acceptance density testing. Density will be determined according to WAQTC FOP for AASHTO T 166/T 275.

For areas that fail to achieve the prescribed joint density seal the surface of the longitudinal joints with Asphalt Systems GSB-78 or approved equal, while the hot mix asphalt is clean, free of moisture, and before traffic marking. Longitudinal joint sealing shall be according to the manufacturer's recommendations and an application rate of 0.15 gallons per square yard. Apply the sealant at least 12 inches wide centered on the longitudinal joint.

Hot lapped joints formed by paving in echelon must be completed while the mat temperature is over 150°F. These joints do not need to be tacked and will be measured but not evaluated for joint density.

Longitudinal joints will be evaluated for acceptance according to subsection 401-4.05.

401-3.15 SURFACE TOLERANCE. The Engineer will test the finished surface after final rolling at selected locations using a 10 foot straightedge. Correct variations from the testing edge, between any two contacts of more than 1/4 inch.

(Note to the Designer, delete this portion of the specifications on projects that are remote, low volume, gravel to pave, small urban projects, and ownership transfers, also delete Evaluation of Pavement for Smoothness in 401-4.02)

The Engineer will measure the surface smoothness of the top layer of asphalt concrete pavement in the driving lanes with an inertial profiler before final acceptance of the project. Remove and replace, or grind smooth any area of final pavement surface that does not meet straight edge tolerances. Costs associated with meeting surface tolerances are subsidiary to the Hot Mix Asphalt pay item.

After completion of corrective work, the Engineer will measure the pavement surface in the driving lanes a second time for a smoothness price adjustment. No measurements will be taken in turn lanes, lane transitions, or within 25 feet of the existing pavement at the project beginning and end.

Smoothness will be measured in both wheel paths of each lane and reported as profilograph results (PrI) filtered with a 0.2 inch blanking band. Report PrI as a job average for all measured lanes, calculated to the nearest 0.1 inch.

401-3.16 PATCHING DEFECTIVE AREAS. Remove hot mix asphalt that becomes contaminated with foreign material, is segregated, or is in any way determined to be defective. Do not skin patch. Remove defective hot mix asphalt for the full thickness of the course. Cut the pavement so that edges are vertical, the sides are parallel to the direction of traffic and the ends are skewed between 15-25 degrees. Coat edges with a tack coat meeting Section 402 and allow to cure. Place and compact fresh hot mix asphalt according to subsection 401-3.13 to grade and smoothness requirements.

Costs associated with patching defective areas are subsidiary to the Hot Mix Asphalt pay item.

401-4.01 METHOD OF MEASUREMENT. Section 109 and the following:

Hot Mix Asphalt.

a) By weighing. No deduction will be made for the weight of asphalt cement or anti stripping additive.

b) By the area of final hot mix asphalt surface.

Asphalt Price Adjustment. Calculated by quality level analysis under subsection 401-4.03.

Asphalt Cement. By the ton, as follows.

1. Percent of asphalt cement for each sublot multiplied by the total weight represented by that sublot. ATM 405 or WAQTC FOP for AASTHO T 308 will determine the percent of asphalt cement. The same tests used for the acceptance testing of the sublot will be used for computation of the asphalt cement quantity. If no acceptance testing is required, the percent of asphalt cement is the target value for asphalt cement in the Job Mix Design.

2. Supplier's invoices minus waste, diversion and remnant. This procedure may be used on projects where deliveries are made in tankers and the asphalt plant is producing hot mix asphalt for one project only.

   The Engineer may direct, at any time, that tankers be weighed in the Engineers presence before and after unloading. If the weight determined at the project varies more than 1% from the invoice amount, payment will be based on the weight determined at the project.

   Any remnant or diversion will be calculated based on tank stickings or weighing the remaining asphalt cement. The Engineer will determine the method. The weight of asphalt cement in waste hot mix asphalt will be calculated using the target value for asphalt cement as specified in the Job Mix Design.

Method 1 will be used for determining asphalt quantity unless otherwise directed in writing. The procedure initially used will be the one used for the duration of the project. No payment will be made for any asphalt cement more than 0.4% above the optimum asphalt content specified in the Job Mix Design.

Job Mix Design. When specified, Contractor furnished Job Mix Designs will be measured at one according to the hot mix asphalt class and type.

Temporary Pavement. By weighing. No deduction will be made for the weight of asphalt cement or anti-stripping additive.

Longitudinal Joint Adhesive and Sealing. By the linear foot of longitudinal joint.

Preleveling. By weighing. No deduction will be made for the weight of asphalt cement or anti stripping additive.

401-4.02 ACCEPTANCE SAMPLING AND TESTING. The quantity of each class and type of hot mix asphalt produced and placed will be divided into lots and the lots evaluated individually for acceptance.

A lot will normally be 5,000 tons. The lot will be divided into sublots of 500 tons, each randomly sampled and tested for asphalt cement content, density, and gradation according to this subsection. If the project has more than 1 lot, and less than 8 additional sublots have been sampled at the time a lot is terminated, either due to completion of paving operations or the end of the construction season (winter shutdown), the material in the shortened lot will be included as part of the prior lot. The price adjustment computed, according to subsection 401-4.03, for the prior lot will include the samples from the shortened lot.

If 8 or 9 samples have been obtained at the time a lot is terminated, they will be considered as a lot and the price adjustment will be based on the actual number of test results (excluding outliers) in the shortened lot.

If the contract quantity is between 1,500 tons and 4,999 tons, the contract quantity will be considered one lot. The lot will be divided into sublots of 500 tons and randomly sampled for asphalt cement content, density, and gradation according to this subsection except that a determination for outliers will not be performed. Hot mix asphalt quantities of less than 300 tons remaining after dividing the Contract quantity into sublots will be included in the last sublot. Hot mix asphalt quantities of 300 tons or greater will be treated as an individual sublot. The lot will be evaluated for price adjustment according to subsection 401-4.03 except as noted.

For Contract quantity of less than 1,500 tons (and for temporary pavement), hot mix asphalt will be accepted for payment based on the Engineer's approval of a Job Mix Design and the placement and compaction of the hot mix asphalt to the specified depth and finished surface requirements and tolerances. The Engineer reserves the right to perform any testing required in order to determine acceptance. Remove and replace any hot mix asphalt that does not conform to the approved JMD.

Samples collected at the plant from dry batched aggregates, the conveyor system, or the asphalt cement supply line shall be taken by the Contractor in the presence of the Engineer. The Engineer will take immediate possession of the samples.

1. Asphalt Cement. Hot mix samples taken for the determination of asphalt cement content will be taken randomly from behind the screed before initial compaction, at the end of the auger, or from the windrow according to WATC FOP for AASHTO T 168 and ATM 403, as directed by the Engineer. Hot mix asphalt samples taken for the determination of both asphalt cement content and gradation will be taken randomly from behind the screed before initial compaction or from the windrow according to WAQTC FOP for AASHTO T 168 and ATM 403.

   Two separate samples will be taken, one for acceptance testing and one held in reserve for retesting if applicable. At the discretion of the Engineer, asphalt cement content will be determined according to ATM 405 or WAQTC FOP for AASHTO T 308.

2. Aggregate Gradation.

   a. Drum Mix Plants. Samples taken for the determination of aggregate gradation from drum mix plants will be from the combined aggregate cold feed conveyor via a diverter device, or from the stopped conveyor belt according to WAQTC FOP for AAHSTO T2, or from the same location as samples for the determination of asphalt cement content. Locate diverter devices for obtaining aggregate samples from drum mix plants on the conveyor system delivering combined aggregates into the drum. Divert

aggregate from the full width of the conveyor system and maintain the diverter device to provide a representative sample of aggregate incorporated into the hot mix asphalt. Two separate samples will be taken, one for acceptance testing and one held in reserve for retesting if applicable. The aggregate gradation for samples from the conveyor system will be determined according to WAQTC FOP for AASHTO T 27/T 11. For hot mix asphalt samples, the gradation will be determined according to WAQTC FOP for AASHTO T 30 from the aggregate remaining after the ignition oven (WAQTC FOP for AASHTO T 308) has burned off the asphalt cement.

b. Batch Plants. Samples taken for the determination of aggregate gradation from batch plants will be from the same location as samples for the determination of asphalt cement content, or from dry batched aggregates according to WAQTC FOP for AASHTO T 2. Two separate samples will be taken, one for acceptance testing and one held in reserve for retesting if applicable. Dry batched aggregate gradations will be determined according to WAQTC FOP for AASHTO T 27/T 11. For hot mix asphalt samples, the aggregate gradation will be determined according to WAQTC FOP for AASHTO T 30 from the aggregate remaining after the ignition oven (WAQTC FOP for AASHTO T 308) has burned off the asphalt cement.

3. Density. Cut full depth core samples from the finished hot mix asphalt within 24 hours after final rolling. Neatly cut one 6 inch diameter core sample with a core drill at each location marked by the Engineer. Use a core extractor to prevent damage to the core. The Engineer will determine the density of the core samples in accordance with WAQTC FOP for AASHTO T 166/T 275. Do not core hot mix asphalt on bridge decks. Backfill and compact voids left by coring with new hot mix asphalt within 24 hours.

Cores for longitudinal joint density shall be centered on the longitudinal joint at each location the panel completing the joint is cored for mat density acceptance testing.

4. Retesting. A retest of any sample outside the limits specified in Table 401-2 may be requested provided the quality control requirements of 401-2.05 are met. Deliver this request in writing to the Engineer within 7 days of receipt of the initial test result. The Engineer will mark the sample location for the density retest within a 2 foot radius of the original core. The original test results will be discarded and the retest result will be used in the price adjustment calculation regardless of whether the retest result gives a higher or lower pay factor. Only one retest per sample is allowed. Except for the first lot, gradation and asphalt cement content are determined from the same sample, retesting for gradation or asphalt cement from the first sublot of a lot will include retesting for the MSG;

when separate samples are used, retesting for asphalt cement content will include retesting for MSG.

5. Asphalt Cement.

The lot size for asphalt cement will normally be 200 tons. If a project has more than one lot and the remaining asphalt cement quantity is less than 150 tons, it will be added to the previous lot and that total quantity will be evaluated for price adjustment as one lot. If the remaining asphalt cement quantity is 150 tons or greater, it will be sampled, tested and evaluated as a separate lot.

If the contract quantity of asphalt cement is between 85 – 199 tons, the contact quantity will be considered as one lot and sampled, tested, and evaluated in accordance with this subsection. Quantities of asphalt cement less than 85 tons will be accepted based on manufacturer's certified test reports and certification of compliance.

Asphalt cement will be sampled according to WAQTC FOP for AASHTO T 40, tested for conformance to the specifications in Section 702, and evaluated for price adjustment in accordance with 401-4.03. Asphalt cement pay reduction factors for each sample will be determined from Table 401-4. Three separate samples from each lot will be taken, one for acceptance testing, one for Contractor retesting, and one held in reserve for referee testing if applicable.

The total asphalt cement price adjustment is the sum of the individual lot price adjustments and will be subtracted under Item 401(6) Asphalt Price Adjustment.

401-4.03 EVALUATION OF MATERIALS FOR ACCEPTANCE. The following method of price adjustment will be applied to each type of Hot Mix Asphalt for which the contract quantity equals or exceeds 1,500 tons, except as specified in subsection 401-4.02.

Acceptance test results for a lot will be analyzed collectively and statistically by the Quality Level Analysis method as specified in subsection 106-1.03 to determine the total estimated percent of the lot that is within specification limits.

The price adjustment is based on the lower of two pay factors. The first factor is a composite pay factor for hot mix asphalt that includes gradation and asphalt cement content. The second factor is for density.

A lot containing hot mix asphalt with less than a 1.00 pay factor will be accepted at an adjusted price, provided the pay factor is at least 0.75 and there are no isolated defects identified by the Engineer. A lot containing hot mix asphalt that fails to obtain at least a 0.75 pay factor will be considered unacceptable and rejected under subsection 105-1.11.

The Engineer will reject hot mix asphalt that appears to be defective based on visual inspection. A minimum of two samples will be collected from the rejected hot mix asphalt and tested if requested. If test results are within specification limits, payment will be made for the hot mix asphalt. If any of the test results fail to meet specifications, no payment will be made and the cost of the testing will be subtracted under Item 401(6) Asphalt Price Adjustment. Costs associated with removal and disposal of the rejected hot mix asphalt are subsidiary to the Hot Mix Asphalt pay item.

Outlier Test. Before computing the price adjustment, the validity of the test results will be determined by SP-7, the Standard Practice for Determination of Outlier Test Results. Outlier test results will not be included in the price adjustment calculations.

When gradation and asphalt cement content are determined from the same sample, if any size on the gradations test or the asphalt cement content is an outlier, then the gradation test results and the asphalt cement content results for that sublot will not be included in the price adjustment. The density test result for that sublot will be included in the price adjustment provided it is not an outlier also.

If the density test result is an outlier, the density test result will not be included in the price adjustment, however, the gradation and asphalt cement content results for that sublot will be included provided neither is an outlier.

When gradation and asphalt cement content are determined from separate samples, if any sieve size on the gradation test is an outlier, then the gradation test results for that sample will not be included in the price adjustment. The asphalt cement content and density test results for that sublot will be included in the price adjustment provided neither is an outlier. If the asphalt cement content test result is an outlier, it will not be included in the price adjustment but the gradation and density test results for the sublot will be included provided neither is an outlier. If the density test result is an outlier, it will not be included in the price adjustment but the gradation and asphalt cement content test results will be included provided neither is an outlier.

Quality Level Analysis. Pay factors are computed as follows:

1. Outliers (determined by SP-7), and any test results on material not incorporated into the work, are eliminated from the quality level analysis.

   The arithmetic mean ($\bar{x}$) of the remaining test results is determined: $\bar{x} = \frac{\Sigma x}{n}$

   Where: Σ = summation of
   x = individual test value to x_n
   n = total number of test values

   $\bar{x}$ is rounded to the nearest tenth for density and sieve sizes except the No. 200 sieve. $\bar{x}$ is rounded to the nearest hundredth for asphalt cement content and the No. 200 sieve.

2. The sample standard deviation(s), after the outliers have been excluded, is computed:

$$s = \sqrt{\frac{n\Sigma(x^2) - (\Sigma x)^2}{n(n-1)}}$$

Where: $\Sigma (x^2)$ = sum of the squares of individual test values.
$(\Sigma x)^2$ = square of the sum of the individual test values.

The sample standard deviation (s) is rounded to the nearest hundredth for density and all sieve sizes except the No. 200 sieve. The sample standard deviation (s) is rounded to the nearest 0.001 for asphalt cement content and the No. 200 sieve.

If the computed sample standard deviation (s) is <0.001, then use s = 0.20 for density and all sieves except the No. 200. Use s = 0.020 for asphalt cement content and the No. 200 sieve.

3. The USL and LSL are computed. For aggregate gradation and asphalt cement content, the Specification Limits (USL and LSL) are equal to the Target Value (TV) plus and minus the allowable tolerances in Table 401-2. The TV is the specification value specified in the approved Job Mix Design. Specification tolerance limits for the largest sieve specified will be plus 0 and minus 1 when performing PWL calculations. The TV for density is 94% of the maximum specific gravity (MSG), the LSL is 92% of MSG and the USL is 98%.

TABLE 401-2
LOWER SPECIFICATION LIMIT (LSL) & UPPER SPECIFICATION LIMIT (USL)

Measured Characteristics	LSL	USL
3/4 inch sieve	TV-6.0	TV+6.0
1/2 inch sieve	TV-6.0	TV+6.0
3/8 inch sieve	TV-6.0	TV+6.0
No. 4 sieve	TV-6.0	TV+6.0
No. 8 sieve	TV-6.0	TV+6.0
No. 16 sieve	TV-5.0	TV+5.0
No. 30 sieve	TV-4.0	TV+4.0
No. 50 sieve	TV-4.0	TV+4.0
No. 100 sieve	TV-3.0	TV+3.0
No. 200 sieve[1]	TV-2.0	TV+2.0
Asphalt %	TV-0.4	TV+0.4
Mat Density %	92	98

Note 1.Tolerances for the No. 200 sieve may not exceed the broad band limits in Table 703-3.

4. The Upper Quality Index (Q_U) is computed: $Q_U = \frac{USL - \bar{x}}{s}$

   Where: USL = Upper Specification Limit
   Q_U is rounded to the nearest hundredth.

5. The Lower Quality Index (Q_L) is computed: $Q_L = \frac{\bar{x} - LSL}{s}$

   Where: LSL = Lower Specification Limit
   Q_L is rounded to the nearest hundredth.

6. P_U (percent within the upper specification limit which corresponds to a given Q_U) is determined. See Subsection 106-1.03.

7. P_L (percent within the lower specification limit which corresponds to a given Q_L) is determined. See Subsection 106-1.03.

8. The Quality Level (the total percent within specification limits) is determined for aggregate gradation, asphalt cement content, and density.

   Quality Level = $(P_L + P_U) - 100$

9. Using the Quality Levels from Step 8, the lot Pay Factor is determined for Density (DPF) and gradation and asphalt cement content pay factors (PF) from Table 106-2. The maximum pay factor for the largest sieve size specification for gradation is 1.00.

10. The Composite Pay Factor (CPF) for the lot is determined using the following formula:

$$CPF = \frac{[f_{3/4\ inch}\ (PF_{3/4\ inch}) + f_{1/2\ inch}\ (PF_{1/2\ inch}) + \ldots . f_{ac}\ (PF_{ac})]}{\Sigma f}$$

The CPF is rounded to the nearest hundredth.

Table 401-3 gives the weight factor (f) for each sieve size and asphalt cement content.

TABLE 401-3
WEIGHT FACTORS

Sieve Size	Type I Factor "f"	Type II Factor "f"	Type III Factor "f"
1 inch sieve	4		
3/4 inch sieve	4	4	
1/2 inch sieve	4	5	4
3/8 inch sieve	4	5	5
No. 4 sieve	4	4	5
No. 8 sieve	4	4	5
No. 16 sieve	4	4	5
No. 30 sieve	4	5	6
No. 50 sieve	4	5	6
No. 100 sieve	4	4	4
No. 200 sieve	20	20	20
Asphalt Cement Content, %	40	40	40

The price adjustment will be based on either the CPF or DPF, whichever is the lowest value. The price adjustment for each individual lot will be calculated as follows:

Price Adjustment = [(CPF or DPF)* -1.00] x (tons in lot) x (PAB)

* CPF or DPF, whichever is lower.

PAB = Price Adjustment Base = $87 per ton

The total asphalt concrete price adjustment is the sum of all price adjustments for each lot and will be adjusted under Item 401(6) Asphalt Price Adjustment.

EVALUATION OF ASPHALT CEMENT

Asphalt cement will be randomly sampled and tested every 200 tons and evaluated for price adjustment. If the last sample increment is 100 tons or less, that quantity of asphalt cement will be added to the quantity represented by the previous sample and the total quantity will be evaluated for price adjustment. If the last sample increment is greater than 100 tons, it will be sampled, tested and evaluated separately. Asphalt cement pay reduction factors for each sample will be determined from Table 401-4.

The total asphalt cement price adjustment is the sum of the individual sample price adjustments and will be subtracted under Item 401(6) Asphalt Price Adjustment.

Table 401-4
ASPHALT CEMENT PAY REDUCTION FACTORS
(Use the single, highest pay reduction factor)

	Spec	Pay Reduction Factor (PRF)								
		0	**0.04**	**0.05**	**0.06**	**0.07**	**0.08**	**0.1**	**0.25**	**Reject or Engr Eval**
Tests On Original Binder										
Viscosity	<3 Pa-s	≤3		>3						
Dynamic Shear	>1.00 kPa	>1.00		0.88-0.99				0.71-0.89	0.50-0.70	<0.50
Toughness	>110 in-lbs	>93.5	90.0-93.4	85.0-89.9	80.0-84.9	75.0-79.9	70.0-74.9			<70.0
Tenacity	>75 in-lbs	>63.8	61.0-63.7	58.0-60.9	55.0-57.9	52.0-54.9	48.0-51.9			<48.0
Tests On RTFO										
Mass Loss	<1.00 %	<1.00		1.001-1.092				1.093-1.184	1.185-1.276	>1.276
Dynamic Shear	>2.20 kPa	>2.20		1.816-2.199				1.432-1.815	1.048-1.431	<1.048.
Test On PAV										
Dynamic Shear	<5000 kPa	<5000		5001-5289				5290-5578	5579-5867	>5867
Creep Stiffness, S	<300 MPa	<300		301-338				339-388	389-450	>450
Creep Stiffness, m-value	>0.300	>0.300		0.287-0.299				0.274-0.286	0.261-0.273	<0.261
Direct Tension	>1.0 %	>1.0		0.86-0.99				0.71-0.85	0.56-0.70	<0.56

Asphalt Cement Price Adjustment for each sample = 5 x PAB x Qty X PRF
PAB = Price Adjustment Base
Qty = Quantity of asphalt cement represented by asphalt cement sample
PRF = Pay Reduction Factor from Table 401-4

Asphalt Cement Appeal Procedure. Once notified of a failing test result of an asphalt cement sample, the Contractor has 21 days to issue a written appeal. The appeal must be accompanied by all of the Contactor's quality control test results and a test result of Contactor's sample of this lot tested by an AASHTO accredited asphalt laboratory (accredited in the test procedure in question). The Engineer will review these test results and using ASTM D3244 determine a test value upon which to base a price reduction.

If the Contractor challenges this value, then the referee sample held by the Engineer will be sent to a mutually agreed upon independent AASHTO accredited laboratory for testing. This test result will be incorporated into the ASTM D3244 procedure to determine a test value upon which to base a price reduction. If this final value incurs a price adjustment, the Contractor under Item 408(3) Asphalt Price Adjustment, shall pay the cost of testing the referee sample.

The total Asphalt Price Adjustment is the sum of all the price adjustments for each lot and will be included in 401(6) Asphalt Price Adjustment.

EVALUATION OF PAVEMENT SMOOTHNESS.

The top layer of hot mix asphalt will be measured according to 401-3.15 and evaluated for a smoothness price adjustment. The Engineer will calculate the smoothness price adjustment as follows:

Smoothness Price Adjustment = PAB x PQ x SF
PAB = Price Adjustment Base (401-4.03)
PQ = Final quantity of Hot Mix Asphalt, tons
PrI = Final measured hot mix smoothness, inches/mile
SF = Smoothness Factor

If the PQ is less than 1,500 tons, the SF = 0
If the PQ is 1,500 to 5,000 tons, the SF = 0.1333 – (0.01666 x PrI)
If the PQ is greater than 5,000 tons, the SF = 0.0666 – (0.0083 x PrI)

The smoothness price adjustment will be applied under Item 401(6) Asphalt Price Adjustment.

EVALUATION OF LONGITUDINAL JOINT DENSITY. Longitudinal joint density price adjustments apply when hot mix asphalt quantities are equal to or greater than 1,500 tons. A longitudinal joint density price adjustment for the top layer will be based on the average of all the joint densities on a project and determined as follows:

1. If project average joint density is less than 91% MSG, apply the following disincentive:

    a. Longitudinal joint density price adjustment equal to $3.00 per lineal foot is deducted under Item 401(6) Asphalt Price Adjustment.
    b. Sections of longitudinal joint represented by cores with less than 91% density shall be surface sealed according to subsection 401-3.14.

2. If project average joint density is greater than 92% MSG apply the following incentive:

    Longitudinal joint density price adjustment equal to $1.50 per linear foot is added under Item 401(6) Asphalt Price Adjustment.

The longitudinal joint price adjustment will be included in Item 401(6) Asphalt Price Adjustment.

401-4.04 ASPHALT MATERIAL PRICE ADUSTMENT – UNIT PRICE.

This subsection provides a price adjustment for asphalt material by:
(a) additional compensation to the Contractor or
(b) a deduction from the Contract amount.

1. This provision shall apply to asphalt material meeting the criteria of Section 702, and is included in items listed in the bid schedule of Sections 306, 307, 308, 401 thru 405, 608, and 609.

2. This provision shall only apply to cost changes in asphalt material that occur between the date of bid opening and the date the asphalt material is incorporated into the project.

3. The asphalt material price adjustment will only apply when:
    a. There is more than 500 tons of asphalt material in the bid schedule of Sections described in Item 1; and
    b. There is more than a 7.5% increase or decrease in the Alaska Asphalt Material Price Index, from the date of bid opening to the date the asphalt material is incorporated into the project.
4. As used in this subsection, the Alaska asphalt material price index is calculated bimonthly on the first and third Friday of each month, and will remain in effect from the day of calculation until the next bimonthly calculation. The Alaska asphalt material price index is posted on the Department's Statewide Materials website, and calculated according to the formula posted there.

5. Price adjustment will be cumulative and calculated with each progress payment. Use the price index in effect on the last day of the pay period, to calculate the price adjustment for

asphalt material incorporated into the project during that pay period. The Department will increase or decrease payment under this Contract by the amount determined with the following asphalt material price adjustment formula:

For an increase exceeding 7.5%, additional compensation = [(IPP – IB) – (0.075 x IB)] x Q

For a decrease exceeding 7.5%, deduction from contract = [(IB – IPP) – (0.075 x IB)] x Q

Where:

Q = Quantity of Asphalt Material incorporated into project during the pay period, in tons

IB = Index at Bid: the bimonthly Alaska asphalt material price index in effect on date of bid, in dollars per ton

IPP = Index at Pay Period: the bimonthly Alaska asphalt material price index in effect on the last day of the pay period, in dollars per ton

Method of measurement for determining Q (quantity) is the weight of asphalt material that meets the criteria of this subsection and is incorporated into the project. The quantity does not include aggregate, mineral filler, blotter material, thinning agents added after material qualification, or water for emulsified asphalt.

401-5.01 BASIS OF PAYMENT.

Sealing the surface of longitudinal joints according to subsection 401-3.12 will be subsidiary to 401 items.

Asphalt cement, anti stripping additives, tack coat, and crack sealing (401-3.07) are subsidiary to the hot mix asphalt unless specified as pay items.

Price adjustments will not apply to:

1. Hot Mix Asphalt for leveling course
2. Temporary Hot Mix Asphalt

Payment for furnishing and installing joint adhesive is subsidiary to the hot mix asphalt unless specified as pay items.

Failure to cut core samples within the specified period will result in a deduction of $100.00 per sample per day. Failure to backfill voids left by sampling within the specified period will result in a deduction of $100.00 per hole per day. The accrued amount will be subtracted under Item 401(6) Asphalt Price Adjustment.

The Engineer will assess a fee of $2,500.00 under Item 401(6) Asphalt Price Adjustment, for each mix design subsequent to the approved Job Mix Design for each Type and Class of Hot Mix Asphalt specified.
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Payment will be made under:

Pay Item	Pay Unit
401(1) Hot Mix Asphalt, Type II; Class A	Ton
401(2) Asphalt Cement, Grade PG 64-28	Ton
401(6) Asphalt Price Adjustment	Contingent Sum
401(10) Asphalt Material Price Adjustment	Contingent Sum

401-5.02 ASPHALT MATERIAL PRICE ADJUSTMENT.

Asphalt Material Price Adjustment. This subsection is a price adjustment for asphalt material that provides either additional compensation to the contractor or a deduction from the contract amount.

1. This provision shall only apply to cost changes in asphalt material that occur between the date of bid opening and the date the asphalt material is incorporated into the project.

2. The asphalt material price adjustment will only apply when:
   a. There is more than 500 tons of asphalt material in the bid schedule of Sections described in Item 3; and
   b. There is more than a 7.5% increase or decrease in the asphalt cement performance price index, from the date of bid opening to the date the asphalt material is incorporated into the project.

3. This provision shall apply to asphalt material in the bid schedule of Sections 306, 307, 308, 401, 405, 608, and 609; and meeting the criteria of Section 702.

4. The asphalt cement performance price index is the Alaska Asphalt Cement Index calculated by Poten and Partners, and posted bimonthly on the first and third Friday of each month. The performance price index will remain in effect from the day of posting until the next bimonthly posting.

5. The Department will adjust the Contract price for asphalt material using a contingent sum. Adjustment will be cumulative and calculated with each progress payment. The adjustment will be based on the bimonthly period the asphalt material is incorporated into the project. The Department will increase or decrease payment under this contract by the amount determined with the following asphalt material price adjustment formula:

For an increase exceeding 7.5%, additional compensation = [(BMPPI – BGI) – (0.075 x BGI)] x Q
For a decrease exceeding 7.5%, deduction from contract = [(BGI – BMPPI) – (0.075 x BGI)] x Q

Where:

Q = Quantity of Asphalt Material incorporated into project during the pay period, in tons

BGI = Bi-monthly asphalt cement performance price index in effect on date of bid, in dollars per ton

BMPPI = Bi-monthly asphalt cement performance price index in effect on the last day of the pay period, in dollars per ton

6. Method of measurement is weight of asphalt material incorporated into this project. Water for emulsified asphalt is subsidiary.

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SECTION 402

TACK COAT

Special Provisions

402-4.01 METHOD OF MEASUREMENT. Add the following: STE-1 Asphalt for Tack Coat will not be measured.

402-5.01 BASIS OF PAYMENT. Add the following: STE-1 Asphalt for Tack Coat shall be subsidiary to Item 401(1) Hot Mix Asphalt, **Type II, Class A** and Item 408(1) Hot Mix Asphalt, Type V.

Add the following Section:

SECTION 408

HOT MIX ASPHALT (SUPERPAVE)

408-1.01 DESCRIPTION. Construct one or more layers of plant mixed hot asphalt concrete pavement on an approved surface, to the lines, grades, and depths shown on the Plans.

408-2.01 COMPOSITION OF MIXTURE - JOB MIX DESIGN. Meet the requirements of Table 408-1 for the Job Mix Design performed in accordance with AASHTO R35 except evaluation of moisture sensitivity will determined by ATM 414 and not AASHTO T283.

TABLE 408-1
Hot Mix Asphalt Design Requirements

Design ESALs, millions	0.3 to < 3
Rut Index, max. ATM 419	3

The approved Job Mix Design will specify the target values for gradation, the target value for asphalt cement content, the Maximum Specific Gravity (MSG) of the hot mix asphalt, the additives, and the allowable mixing temperature range.

Target values for gradation in the Job Mix Design must be within the broadband limits shown in Table 703-3, for the type of hot mix asphalt specified. For acceptance testing, hot mix asphalt will have the full tolerances in Table 408-2 applied. Except for the No. 200 sieve, the tolerance limit will apply even if falling outside the broad band shown in Table 703-3. Tolerance limits will not be applied to the largest sieve specified.

Do not produce hot mix asphalt for payment until the Engineer approves the Job Mix Design. Do not mix hot asphalt produced from different plants.

Submit the following to the Engineer at least 15 days before the production of hot mix asphalt:

1. A letter stating the location, size, and type of mixing plant, the proposed gradation for the Job Mix Design, gradations for individual stockpiles with supporting process quality control information, and the blend ratio of each aggregate stockpile. The proposed gradation must meet the requirements of Table 703-3 for each type of hot mix asphalt specified in the Contract.

2. Representative samples of each aggregate (coarse, intermediate, fine, and blend material and/or mineral filler, if any) in the proportions required for the proposed mix design. Furnish a total of 500 pounds of material.

3. Five separate 1 gallon samples of the asphalt cement proposed for use in the hot mix asphalt. Include name of product, manufacturer, test results of the applicable quality requirements of subsection 702-2.01, manufacturer's certificate of compliance according to subsection 106-1.05, a temperature viscosity curve for the asphalt cement or manufacturer's recommended mixing and compaction temperatures, and current Material Safety Data Sheet.

4. One sample, of at least 1/2 pint, of the anti-strip additive proposed, including name of product, manufacturer, and manufacturer's data sheet, and current Material Safety Data Sheet.

The Engineer will then evaluate the material and the proposed gradation and the requirements of Table 408-1 for the appropriate type and class of hot mix asphalt specified, and establish the approved Job Mix Design that will become a part of the Contract.

No payment for hot mix asphalt for which a new Job Mix Design is required, will be made until the new Job Mix Design is approved. Approved changes apply only to hot mix asphalt produced after the submittal of the changes.

Changes. Failure to achieve results conforming to Table 408-1 or changes in the source of asphalt cement, source of aggregates, aggregate quality, aggregate gradation, or blend ratio, will require a new Job Mix Design. Submit changes and new samples in the same manner as the original submittal.

408-2.02 AGGREGATES. Conform to subsection 703-2.04.
Use a minimum of 3 stockpiles for crushed hot mix asphalt aggregate (coarse, intermediate, and fine). Place blend material or mineral filler, if any, in separate piles. Additional stockpiles may be required for some material sources to create a Design Aggregate Structure that meets the volumetric requirements of the mix design procedures.

408-2.03 ASPHALT MATERIALS. Conform to subsection 702-2.01, if not specified use PG 64-28. Table 1 of AASHTO M 232 will not apply.

Provide test reports for each batch of asphalt cement showing conformance to the specifications in Section 702 before delivery to the project. Storage tanks used for the batch shall be noted on the test report, the anti-strip additives required by the mix design shall be added during load out for delivery to the project, and a printed weight ticket for anti-strip is included with the asphalt cement weight ticket. The location where anti-strip is added may be changed with the approval of the Engineer.

Shipping documents shall include the following:

1. Manufacturers certificate of compliance, subsection 106-1.05

2. Conformance test results of the batch, Section 702.
3. Batch number and storage tanks used.
4. Date and Time of load out for delivery.
5. Type, grade, temperature, and quantity of materials loaded
6. Type and percent of anti-strip added.

408-2.04 ANTI-STRIP ADDITIVES. Use anti-strip agents in the proportions determined by ATM 414 and included in the approved Job Mix Design. At least 70 percent of the aggregate shall remain coated when tested according to ATM 414.

408-2.05 QUALITY CONTROL. Sample and test materials for quality control of the hot mix asphalt according to subsection 106-1.03. Provide copies of these test results to the Engineer within 24 hours.

Failure to perform quality control forfeits the Contractor's right to retest under subsection 408-4.02.

Submit a paving and plant control plan at the pre paving meeting to be held a minimum of 5 working days before beginning the paving operations. Address the sequence of operations and joint construction. Outline steps to assure product consistency, to minimize segregation, and to prevent premature cooling of the hot mix asphalt. Include a proposed quality control testing frequency for gradation, asphalt cement content and compaction.

CONSTRUCTION REQUIREMENTS

408-3.01 WEATHER LIMITATIONS. Do not place hot mix asphalt on a wet surface, on an unstable/yielding roadbed, when the base material is frozen, or when weather conditions prevent proper handling or finishing of the mix. Do not place hot mix asphalt unless the roadway surface temperature is 40°F or warmer. Do not place mix after September 15 unless approved by the Engineer in writing.

408-3.02 EQUIPMENT, GENERAL. Use equipment in good working order and free of hot mix asphalt buildup. Make equipment available for inspection and demonstration of operation a minimum of 24 hours before placement of hot mix asphalt.

408-3.03 BITUMINOUS MIXING PLANTS. Meet AASHTO M156. Use an asphalt plant designed to dry aggregates, maintain accurate temperature control, and accurately proportion asphalt cement and aggregates. Calibrate the asphalt plant and furnish copies of the calibration data to the Engineer at least 4 hours before hot mix asphalt production.

Provide a scalping screen at the asphalt plant to prevent oversize material or debris from being incorporated into the hot mix asphalt.

Provide a tap on the asphalt cement supply line just before it enters the plant (after the 3 way valve) for sampling asphalt cement.

Provide aggregate and asphalt cement sampling conditions meeting OSHA safety requirements.

408-3.04 HAULING EQUIPMENT. Haul hot mix asphalt in trucks having tight, clean, smooth metal beds, thinly coated with a minimum amount of paraffin oil, lime water solution or an approved manufactured asphalt release agent. Do not use petroleum fuel as an asphalt release agent.

Cover the hot mix asphalt in the haul vehicle, when directed.

408-3.05 ASPHALT PAVERS. Use self propelled asphalt pavers having a heated vibratory screed. Control with grade and cross slope using automatic grade and slope control devices. Use an erected string line, a 30 foot minimum mobile stringline (ski), or other approved grade follower, to automatically actuate the paver screed control system. Use grade control on either a) both the high and low sides or b) grade control on the high side and slope control on the low side.

Equip the paver with a receiving hopper having sufficient capacity for a uniform spreading operation. Equip the hopper with a distribution system to place the hot mix asphalt uniformly in front of screed.

Use a screed assembly that produces a finished surface of the required smoothness, thickness, and texture without tearing, shoving or displacing the hot mix asphalt.

Equip the paver with a means of preventing the segregation of the coarse aggregate particles from the remainder of the bituminous plant mix when the mix is carried from the paver hopper back to the paver augers. The means and methods used shall be approved by the paver manufacturer and may consist of chain curtains, deflector plates, or other such devices and any combination of these.

The following specific requirements apply to the identified bituminous pavers:

(1) Blaw-Knox bituminous pavers shall be equipped with the Blaw-Knox Materials Management Kit (MMK).
(2) Cedarapids bituminous pavers must have been manufactured in 1989 or later.
(3) Caterpillar bituminous pavers shall be equipped with deflector plates.

The use of a "Layton Box" or equivalent towed paver is allowed on bike paths, sidewalks, and driveways.

408-3.06 ROLLERS. Use both steel-wheel (static or vibratory) and pneumatic-tire rollers. Operate rollers according to manufacturer's instructions. Avoid crushing or fracturing of aggregate. Use rollers designed to compact hot asphalt concrete mixtures and reverse without backlash.

Use fully skirted pneumatic-tire rollers having a minimum operating weight of 3000 pounds per tire.

408-3.07 PREPARATION OF EXISTING SURFACE. Prepare the existing surfaces to conform to the Plans and Specifications. Before applying tack coat to the existing surface, clean out loose material from cracks in existing pavement wider than 1 inch in width full depth then fill using asphalt concrete tamp in place. Clean, wash, and sweep existing paved surfaces of loose material.

Preparation of milled surface.

- Prelevel remaining ruts, pavement delaminations, or depressions having a depth greater than ½ inch with Asphalt Concrete, Type IV (Section 401). No density testing is required for the leveling course material. The Engineer will inspect and accept this material.

- If planing breaks through existing pavement remove 2 inches of existing base and fill with Asphalt Concrete, **Type II, Class A** (Section 401). Notify the Engineer of pavement areas that might be considered thin or unstable during pavement

Existing paved surfaces shall be must be approved by the Engineer before tack is applied. Clean existing paved surfaces of loose material

Before placing the hot mix asphalt, uniformly coat contact surfaces of curbing, gutters, saw cut pavement, cold joints, manholes, and other structures with tack coat material meeting Section 402. Allow tack coat to break before placement of hot mix asphalt on these surfaces.

408-3.08 PREPARATION OF ASPHALT. Provide a continuous supply of asphalt cement shall be supplied to the mixer at a uniform temperature, within the allowable mixing temperature range noted in the approved mix design.

408-3.09 PREPARATION OF AGGREGATES. Dry the aggregate so the moisture content of the hot mix asphalt, sampled at the point of acceptance for asphalt cement content, does not exceed 0.5% (by total weight of mix), as determined by WAQTC TM 6 for AASHTO T 329.

Heat the aggregate for the hot mix asphalt to a temperature compatible with the mix requirements specified.

Adjust the burner on the dryer to avoid damage to the aggregate and to prevent the presence of unburned fuel on the aggregate. Hot mix asphalt containing soot or fuel is considered unacceptable according to subsection 105-1.11.

408-3.10 MIXING. Combine the aggregate, asphalt cement and additives in the mixer in the amounts required by the Job Mix Design. Mix to obtain 98% coated particles when tested according to AASHTO T 195.

For batch plants, put the dry aggregate in motion before addition of asphalt cement.

Mix the hot mix asphalt within the temperature range determined by the Job Mix Design.

408-3.11 TEMPORARY STORAGE OF ASPHALT CONCRETE MIXTURE. Silo type storage bins may be used, provided that the characteristics of the hot mix asphalt are not altered. Signs of visible segregation, heat loss, changes from the Job Mix Design, change in the characteristics of asphalt cement, lumpiness, or stiffness of the hot mix asphalt are causes for rejection.

408-3.12 PLACING AND SPREADING. Place the hot mix asphalt upon the approved surface, spread, strike off, and adjust surface irregularities. Use asphalt pavers to distribute hot mix asphalt concrete mixture, including leveling courses.

During placement, the Engineer may evaluate the hot mix asphalt immediately behind the paver for temperature uniformity. Areas with temperature differences more than 25°F lower than the surrounding hot mix asphalt are likely to produce areas of low density. Any thermal images and thermal profile data will become part of the project record and shared with the Contractor. The Contractor shall immediately adjust his laydown procedures to correct the problem.

Use hand tools to spread, rake, and lute the hot mix asphalt concrete mixture in areas where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impracticable.

When the section of roadway being paved is open to traffic, pave adjacent traffic lanes to the same elevation within 24 hours. Place approved material against the outside pavement edge when the drop-off exceeds 2 inches.

When multiple lifts are specified in the Contract, do not place the final lift until all lower lifts throughout that section, as defined by the Paving Plan, are placed and accepted.

Do not pave against new Portland concrete curbing until it has cured for at least 72 hours.

Place hot mix asphalt over bridge deck membranes according to Section 508 and the manufacturer's specifications.

408-3.13 COMPACTION. Thoroughly and uniformly compact the hot mix asphalt by rolling. In areas not accessible to large rollers, compact with mechanical tampers or trench rollers.

The target value for density is 94% of the maximum specific gravity (MSG), as determined by WAQTC FOP for AASHTO T 209. For the first lot of each type of hot mix asphalt, the Job Mix Design will determine the MSG. For additional lots, the MSG will be determined by the sample from the first sublot of each lot.

Acceptance testing for density will be performed according to WAQTC FOP for AASHTO T 166/T 275 using a 6 inch diameter core. (Acceptance testing for density of leveling course or temporary pavement is not required.)

Do not leave rollers or other equipment standing on hot mix asphalt that has not cooled sufficiently to prevent indentation.

408-3.14 JOINTS. Minimize the number of joints. Place and compact the hot mix asphalt to ensure a continuous bond, texture, and smoothness between adjacent panels of hot mix asphalt.

Remove to full depth improperly formed joints resulting in surface irregularities, replace with new hot mix asphalt, and thoroughly compact. Precut pavement removal to a neat line with a power saw or by other method approved by the Engineer.

Form transverse joints by saw cutting back on the previous run to expose the full depth of the layer with a power saw or other method approved by the Engineer, or use a removable bulkhead.

Offset the longitudinal joints in one layer from the joint in the layer immediately below by at least 6 inches. Align the joints of the top layer at the centerline or lane lines. Where preformed marking tape striping is required, offset the longitudinal joint in the top layer not more than 6 inches from the edge of the stripe.

Uniformly coat joint surfaces below the final lift with a tack coat conforming to Section 703 before placing any fresh HMA against the joint.

On the final lift, seal the vertical edge of pavement with Crafco Pavement Joint Adhesive No. 34524, Deery Cold Joint Adhesive, or approved equal before completing the longitudinal joint by paving against it. Apply a 1/8 inch, thick band of joint adhesive over the cold mat according to manufacturer's recommendations.

For the top layer of hot mix asphalt, the minimum specification limit for longitudinal joint density is 91% of the MSG of the panel completing the joint. Cut one 6 inch, diameter core centered on the longitudinal joint at each location that the panel completing the joint is cored for

acceptance density testing. Density will be determined according to WAQTC FOP for AASHTO T 166/T 275.

In the top layer, seal the longitudinal joints with Asphalt Systems GSB-78, or approved equal, while the hot mix asphalt is clean, free of moisture, and before traffic marking. Longitudinal joint sealing shall be applied to manufacturer's recommendations at a rate of 0.15 gallons per square yard. Apply the sealant at least 12 inches wide centered on the longitudinal joint.

Hot lapped joints formed by paving in echelon must be completed while the mat temperature is over 150° F. These joints do not need to be tacked and will be measured and evaluated for joint density.

Longitudinal joints will be evaluated for acceptance according to subsection 408-4.05.

408-3.15 SURFACE TOLERANCE. The Engineer will test the finished surface after final rolling at selected locations using a 10-foot or straightedge. Correct variations from the testing edge, between any two contacts, greater than 1/4 inch.

(Note to the Designer, delete this portion of the specifications on projects that are remote, low volume, gravel to pave less than 1 mile in length, small urban projects, and ownership transfers, also delete Evaluation of Pavement for Smoothness in 408-4.02)

The Engineer will measure the surface smoothness of the top layer of hot mix asphalt in the driving lanes with an inertial profiler before final acceptance of the project. Remove and replace, or grind smooth any area of final pavement surface that does not meet straight edge tolerances. Costs associated with meeting surface tolerances are subsidiary to the Asphalt Concrete pay item.

After completion of corrective work, the Engineer will measure the pavement surface in the driving lanes a second time for a smoothness price adjustment. No measurements will be taken in turn lanes, lane transitions, or within 25 feet of previously existing pavement at the project beginning and end.

Smoothness will be measured in both wheel paths of each lane and reported as profilograph results (PrI) filtered with a 0.2 inch blanking band. Report PrI as a job average for all measured lanes, calculated to the nearest 0.1 inch.

408-3.16 PATCHING DEFECTIVE AREAS. Remove hot mix asphalt that becomes contaminated with foreign material, is segregated, or is in any way determined to be defective. Do not skin patch. Remove defective hot mix asphalt for the full thickness of the course. Cut the pavement so that edges are vertical, the sides are parallel to the direction of traffic. Coat edges with a tack coat meeting Section 402 and allow to cure. Place and compact fresh hot mix asphalt according to subsection 408-3.13 to grade and smoothness requirements.

Costs associated with patching defective areas are subsidiary to the Hot Mix Asphalt pay item.

408-4.01 METHOD OF MEASUREMENT. Section 109 and the following:

Hot Mix Asphalt.

a) By weighing, no deduction will be made for the weight of asphalt cement or antistripping additive.

b) By the area of final hot mix asphalt surface.

Asphalt Price Adjustment. Calculated by quality level analysis under subsection 408-4.03.

Asphalt Cement. By the ton as follows:

1. Percent of asphalt cement for each sublot multiplied by the total weight represented by that sublot. ATM 405 or WAQTC FOP for AASHTO T 308 will determine the percent of asphalt cement. The same tests used for the acceptance testing of the sublot will be used for computation of the asphalt cement quantity. If no acceptance testing is required, the percent of asphalt cement is the target value for asphalt cement in the Job Mix Design.

2. Supplier's invoices minus waste, diversion and remnant. This procedure may be used on projects where deliveries are made in tankers and the asphalt plant is producing hot mix asphalt for one project only.

   The Engineer may direct, at any time, that tankers be weighed in the Engineers presence before and after unloading. If the weight determined at the project varies more than 1% from the invoice amount, payment will be based on the weight determined at the project.

   Remnant or diversion will be calculated based on tank stickings or weighing the remaining asphalt cement. The Engineer will determine the method. The weight of asphalt cement in waste hot mix asphalt will be calculated using the target value for asphalt cement as specified in the Job Mix Design.

Method 1 will be used for determining asphalt cement quantity unless otherwise directed in writing. The procedure initially used will be the one used for the duration of the project. No payment will be made for any asphalt cement more than 0.4% above the optimum asphalt cement content specified in the Job Mix Design.

Temporary Pavement. By weighing. No deduction will be made for the weight of asphalt cement or anti-stripping additive.

Job Mix Design. When specified, Contractor furnished Job Mix Designs will be measured at one per hot mix asphalt class and type.

Longitudinal Joint and Joint Adhesive. By the lineal foot.

408-4.02 ACCEPTANCE SAMPLING AND TESTING. The quantity of each class and type of hot mix asphalt produced and placed will be divided into lots and the lots evaluated individually for acceptance.

A lot will normally be 5,000 tons. The lot will be divided into sublots of 500 tons; each randomly sampled and tested for asphalt cement content, density, and gradation according to this subsection. If the project has more than 1 lot, and less than 8 additional sublots have been sampled at the time a lot is terminated, either due to completion of paving operations or the end of the construction season (winter shutdown), the material in the shortened lot will be included as part of the prior lot. The price adjustment computed, according to subsection 408-4.03, for the prior lot will include the samples from the shortened lot.

If 8 or 9 samples have been obtained at the time a lot is terminated, they will be considered as a lot and the price adjustment will be based on the actual number of test results (excluding outliers) in the shortened lot.

If the contract quantity is between 1,500 tons and 5000 tons, the Contract quantity will be considered 1 lot. The lot will be divided into sublots of 500 tons and randomly sampled for asphalt cement content, density, and gradation according to this subsection except that a determination for outliers will not be performed. Hot mix asphalt quantities of less than 300 tons remaining after dividing the Contract quantity into sublots will be included in the last sublot. Hot mix quantities of 300 tons or greater will be treated as an individual sublot. The lot will be evaluated for price adjustment according to subsection 408-4.03 except as noted.

For Contract quantity of less than 1,500 tons, (or for temporary pavement), hot mix asphalt will be accepted for payment based on the Engineer's approval of a Job Mix Design and the placement and compaction of the hot mix asphalt to the specified depth and finished surface requirements and tolerances. The Engineer reserves the right to perform any testing required in order to determine acceptance. Remove and replace any hot mix asphalt that does not conform to the approved JMD.

Samples collected at the plant from dry batched aggregates, the conveyor system, or the asphalt cement supply line shall be taken by the Contractor in the presence of the Engineer. The Engineer will take immediate possession of the samples.

1. Asphalt Cement Content. Hot mix asphalt samples taken for the determination of asphalt cement content will be taken randomly from behind the screed before initial compaction,

at the end of the auger, or from the windrow according to WAQTC FOP for AASHTO T168 and ATM 403 as directed by the Engineer. Hot mix asphalt samples taken for the determination of both asphalt cement content and gradation will be taken randomly from behind the screed before initial compaction or from the windrow according to WAQTC FOP for AASHTO T 403.

Two separate samples will be taken, one for acceptance testing and one held in reserve for retesting if applicable. At the discretion of the Engineer, asphalt cement content will be determined according to ATM 405 or WAQTC FOP for AASHTO T 308.

2. Aggregate Gradation.

   a. Drum Mix Plants. Samples taken for the determination of aggregate gradation from drum mix plants will be from the combined aggregate cold feed conveyor via a diverter device, or from the stopped conveyor belt according to WAQTC FOP for AASHTO T2, or from the same location as samples for the determination of asphalt cement content. Locate diverter devices for obtaining aggregate samples from drum mix plants on the conveyor system delivering combined aggregates into the drum. Divert aggregate from the full width of the conveyor system and maintain the diverter device to provide a representative sample of aggregate incorporated into the hot mix asphalt. Two separate samples will be taken, one for acceptance testing and one held in reserve for retesting if applicable. The aggregate gradation for samples from the conveyor system will be determined according to WAQTC FOP for AASHTO T 27/T 11. For hot mix asphalt samples, the gradation will be determined according to WAQTC FOP for AASHTO T 30 from the aggregate remaining after the ignition oven (WAQTC FOP for AASHTO T 308) has burned off the asphalt cement.

   b. Batch Plants. Samples taken for the determination of aggregate gradation from batch plants will be from the same location as samples for the determination of asphalt cement content, or from dry batched aggregates according to WAQTC FOP for AASHTO T 2. Two separate samples will be taken, one for acceptance testing and one held in reserve for retesting if applicable. Dry batched aggregate gradations will be determined according to WAQTC FOP for AASHTO T 27/T 11. For hot mix asphalt samples, the aggregate gradation will be determined according to WAQTC FOP for AASHTO T 30 from the aggregate remaining after the ignition oven (WAQTC FOP for AASHTO T 308) has burned off the asphalt cement.

3. Density. Cut full depth core samples from the finished hot mix asphalt within 24 hours after final rolling. Neatly cut one 6 inch diameter core sample with a core drill at each location marked by the Engineer. Cut 6 inch diameter core samples for assurance testing as directed by the Engineer. Use a core extractor to prevent damage to the core. The

Engineer will determine the density of the core samples according to WAQTC FOP for AASHTO T 166/T 275. Do not core hot mix asphalt on bridge decks. Backfill and compact voids left by coring with new hot mix asphalt within 24 hours.

Cores for longitudinal joint density shall be centered on the longitudinal joint at each location the panel completing the joint is cored for mat density acceptance testing.

4. Retesting. A retest of any sample outside the limits specified in Table 408-2 may be requested provided the quality control requirements of 408-2.05 are met. Deliver this request in writing to the Engineer within 7 days of receipt of the initial test result. The Engineer will mark the sample location for the density retest within a 2 foot radius of the original core. The original test results will be discarded and the retest result will be used in the price adjustment calculation regardless of whether the retest result gives a higher or lower pay factor. Only one retest per sample is allowed. Except for the first lot, when gradation or asphalt cement content are determined from the same sample retesting for gradation or asphalt cement content from the first sublot of a lot will include retesting for the MSG; when separate samples are used, retesting for asphalt cement content will include retesting for the MSG.

5. Asphalt Cement.

The lot size for asphalt cement will normally be 200 tons. If a project has more than one lot and the remaining asphalt cement quantity is less than 150 tons, it will be added to the previous lot and that total quantity will be evaluated for price adjustment as one lot. If the remaining asphalt cement quantity is 150 tons or greater, it will be sampled, tested and evaluated as a separate lot.

If the Contract quantity of asphalt cement is between 85 – 199 tons, the contact quantity will be considered as one lot and sampled, tested, and evaluated according to this subsection. Quantities of asphalt cement less than 85 tons will be accepted based on manufacturer's certified test reports and certification of compliance.

Asphalt cement will be sampled according to WAQTC FOP for AASHTO T 40, tested for conformance to the specifications in Section 702, and evaluated for price adjustment in accordance with 408-4.03. Asphalt cement pay reduction factors for each sample will be determined from Table 408-4. Three separate samples from each lot will be taken, one for acceptance testing, one for Contractor retesting, and one held in reserve for referee testing if applicable.

The total asphalt cement price adjustment is the sum of the individual lot price adjustments and will be subtracted under Item 408(3) Asphalt Price Adjustment.

408-4.03 EVALUATION OF MATERIALS FOR ACCEPTANCE. The following method of price adjustment will be applied to each type of Hot Mix Asphalt for which the contract quantity equals or exceeds 1,500 ton, except as defined in subsection 408-4.02.

Acceptance test results for a lot will be analyzed collectively and statistically by the Quality Level Analysis method as specified in subsection 106-1.03 to determine the total estimated percent of the lot that is within specification limits.

The price adjustment is based on the lower of two pay factors. The first factor is a composite pay factor for hot mix asphalt that includes gradation and asphalt cement content. The second factor is for density.

A lot containing hot mix asphalt with less than a 1.00 pay factor will be accepted at an adjusted price, provided the pay factor is at least 0.75 and there are no isolated defects identified by the Engineer. A lot containing hot mix asphalt that fails to obtain at least a 0.75 pay factor will be considered unacceptable and rejected under subsection 105-1.11.

The Engineer will reject hot mix asphalt that appears to be defective based on visual inspection. A minimum of two samples will be collected from the rejected hot mix asphalt and tested if requested. If test results are within specification limits, payment will be made for hot mix asphalt. If a test results fail to meet specifications, no payment will be made and the cost of the testing will be subtracted under Item 408(3) Asphalt Price Adjustment. Costs associated with removal and disposal of the rejected hot mix asphalt are subsidiary to the Hot Mix Asphalt pay item.

Outlier Test. Before computing the price adjustment, the validity of the test results will be determined by SP-7, the Standard Practice for Determination of Outlier Test Results. Outlier test results will not be included in the price adjustment calculations.

When gradation and asphalt cement content are determined from the same sample, if a sieve size on a gradation test or the asphalt cement content is an outlier, then the gradation test results and the asphalt cement content results for that sublot will not be included in the price adjustment. The density test result for that sublot will be included in the price adjustment provided it is not an outlier. If the density test result is an outlier, the density test result will not be included in the price adjustment, however, the gradation and asphalt cement content results for that sublot will be included provided neither is an outlier.

When gradation and asphalt cement content are determined from separate samples, if any sieve size on the gradation test is an outlier, then the gradation test results for that sample will not be included in the price adjustment. The asphalt cement content and density test results for that sublot will be included in the price adjustment provided neither is an outlier. If the asphalt cement content test result is an outlier, it will not be included in the price adjustment but the gradation and density test results for the sublot will be included provided neither is an outlier. If

the density test result is an outlier, it will not be included in the price adjustment but the gradation and asphalt cement content test results will be included provided neither is an outlier.

Quality Level Analysis. Pay factors are computed as follows:

1. Outliers (determined by SP-7), and any test results on material not incorporated into the work, are eliminated from the quality level analysis.

   The arithmetic mean ($\bar{x}$) of the remaining test results is determined: $\bar{x} = \frac{\Sigma x}{n}$

   Where: Σ = summation of
   x = individual test value to x_n
   n = total number of test values

   $\bar{x}$ is rounded to the nearest tenth for density and all sieve sizes except the No. 200 sieve.
   $\bar{x}$ is rounded to the nearest hundredth for asphalt cement content and the No. 200 sieve.

2. The sample standard deviation(s), after the outliers have been excluded, is computed:

$$s = \sqrt{\frac{n\Sigma(x^2) - (\Sigma x)^2}{n(n-1)}}$$

   Where: $\Sigma(x^2)$ = sum of the squares of individual test values.
   $(\Sigma x)^2$ = square of the sum of the individual test values.

   The sample standard deviation (s) is rounded to the nearest hundredth for density and all sieve sizes except the No. 200 sieve. The sample standard deviation (s) is rounded to the nearest 0.001 for asphalt cement content and the No. 200 sieve.

   If the computed sample standard deviation (s) is <0.001, then use s = 0.20 for density and all sieves except the No. 200. Use s = 0.020 for asphalt cement content and the No. 200 sieve.

3. The USL and LSL are computed. For aggregate gradation and asphalt cement content, the Specification Limits (USL and LSL) are equal to the Target Value (TV) plus and minus the allowable tolerances in Table 408-2. The TV is the specification value specified in the approved Job Mix Design. Specification tolerance limits for the largest sieve specified will be plus 0 and minus 1 when performing PWL calculations. The TV for density is 94% of the maximum specific gravity (MSG), the LSL is 92% of MSG and the USL is 98%.

TABLE 408-2
LOWER SPECIFICATION LIMIT (LSL) &
UPPER SPECIFICATION LIMIT (USL)

Measured Characteristics	**LSL**	**USL**
3/4 inch sieve	TV-6.0	TV+6.0
1/2 inch sieve	TV-6.0	TV+6.0
3/8 inch sieve	TV-6.0	TV+6.0
No. 4 sieve	TV-6.0	TV+6.0
No. 8 sieve	TV-6.0	TV+6.0
No. 16 sieve	TV-5.0	TV+5.0
No. 30 sieve	TV-4.0	TV+4.0
No. 50 sieve	TV-4.0	TV+4.0
No. 100 sieve	TV-3.0	TV+3.0
No. 200 sieve[1]	TV-2.0	TV+2.0
Asphalt %	TV-0.4	TV+0.4
Density %	92	98

Note 1.Tolerances for the No. 200 sieve may not exceed the broadband limits in Table 703-3.

4. The Upper Quality Index (Q_U) is computed: $Q_U = \frac{USL - \bar{x}}{s}$

   Where: USL = Upper Specification Limit
   Q_U is rounded to the nearest hundredth.

5. The Lower Quality Index (Q_L) is computed: $Q_L = \frac{\bar{x} - LSL}{s}$

   Where: LSL = Lower Specification Limit
   Q_L is rounded to the nearest hundredth.

6. P_U (percent within the upper specification limit which corresponds to a given Q_U) is determined. See Subsection 106-1.03.

7. P_L (percent within the lower specification limit which corresponds to a given Q_L) is determined. See Subsection 106-1.03.

8. The Quality Level (the total percent within specification limits) is determined for aggregate gradation, asphalt cement content, and density.

$$\text{Quality Level} = (P_L + P_U) - 100$$

9. Using the Quality Levels from Step 8, the lot Pay Factor is determined for Density (DPF) and gradation and asphalt cement content pay factors (PF) from Table 106-2. The maximum pay factor for the largest sieve size specification for gradation is 1.00.

10. The Composite Pay Factor (CPF) for the lot is determined using the following formula:

$$CPF = \frac{[f_{3/4\ inch}\ (PF_{3/4\ inch}) + f_{1/2\ inch}\ (PF_{1/2\ inch}) + \ldots . f_{ac}\ (PF_{ac})]}{\Sigma f}$$

The CPF is rounded to the nearest hundredth.

Table 408-3 gives the weight factor (f) for each sieve size and asphalt cement content.

TABLE 408-3
WEIGHT FACTORS

Sieve Size	Type I	Type II	Type III
	Factor "f"	Factor "f"	Factor "f"
1 inch sieve	4		
3/4 inch sieve	4	4	
1/2 inch sieve	4	5	4
3/8 inch sieve	4	5	5
No. 4 sieve	4	4	5
No. 8 sieve	4	4	5
No. 16 sieve	4	4	5
No. 30 sieve	4	5	6
No. 50 sieve	4	5	6
No. 100 sieve	4	4	4
No. 200 sieve	20	20	20
Asphalt Cement Content, %	40	40	40

The price adjustment will be based on either the CPF or DPF, whichever is the lowest value. The price adjustment for each individual lot will be calculated as follows:

Price Adjustment = [(CPF or DPF)* -1.00] x (tons in lot) x (PAB)

* CPF or DPF, whichever is lower.

PAB = Price Adjustment Base per ton = $55 per ton

Table 408-4
ASPHALT CEMENT PAY REDUCTION FACTORS
(Use the single, highest pay reduction factor)

	Spec	Pay Reduction Factor (PRF)								
		0	0.04	0.05	0.06	0.07	0.08	0.1	0.25	Reject or Engr Eval
Tests On Original Binder										
Viscosity	≤3 Pa-s	≤3		>3						
Dynamic Shear	≥1.00 kPa	≥1.00		0.88-0.99				0.71-0.87	0.50-0.70	<0.50
Toughness	>110 in-lbs	>93.5	90.0-93.4	85.0-89.9	80.0-84.9	75.0-79.9	70.0-74.9			<70.0
Tenacity	>75 in-lbs	>63.8	61.0-63.7	58.0-60.9	55.0-57.9	52.0-54.9	48.0-51.9			<48.0
Tests On RTFO										
Mass Loss	<1.00 %	<1.00		1.001-1.092				1.093-1.184	1.185-1.276	>1.076
Dynamic Shear	≥2.20 kPa	≥2.20		1.816-2.199				1.432-1.815	1.048-1.431	<1.048
Test On PAV										
Dynamic Shear	≤5000 kPa	≤5000		5001-5289				5290-5578	5579-5867	>5867
Creep Stiffness, S	≤300 MPa	≤300		301-338				339-388	389-450	>450
Creep Stiffness, m-value	>0.300	>0.300		0.287-0.299				0.274-0.286	0.261-0.273	<0.261
Direct Tension	>1.0 %	>1.0		0.86-0.99				0.71-0.85	0.56-0.70	<0.56

Asphalt Cement Price Adjustment for each sample = 5 x PAB x Qty X PRF
PAB = Price Adjustment Base
Qty = Quantity of asphalt cement represented by asphalt cement sample
PRF = Pay Reduction Factor from Table 408-4

Asphalt Cement Appeal Procedure. Once notified of a failing test result of an asphalt cement sample, the Contractor has 21 days to issue a written appeal. The appeal must be accompanied by all of the Contactor's quality control test results and a test result of Contactor's sample of this lot tested by an AASHTO accredited asphalt laboratory (accredited in the test procedure in question). The Engineer will review these test results and using ASTM D3244 determine a test value upon which to base a price reduction.

If the Contractor challenges this value, then the referee sample held by the Engineer will be sent to a mutually agreed upon independent AASHTO accredited laboratory for

testing. This test result will be incorporated into the ASTM D3244 procedure to determine a test value upon which to base a price reduction. If this final value incurs a price adjustment, the Contractor under Item 408(3) Asphalt Price Adjustment, shall pay the cost of testing the referee sample.

The total Asphalt Price Adjustment is the sum of all the price adjustments for each lot.

408-4.04 EVALUATION OF PAVEMENT FOR SMOOTHNESS.

The top layer of hot mix asphalt will be measured according to 401-3.15 and evaluated for a smoothness price adjustment. The Engineer will calculate the smoothness price adjustment as follows:
Smoothness Price Adjustment = PAB x PQ x SF
PAB = Price Adjustment Base (408-4.03)
PQ = Final quantity of Hot Mix Asphalt
PrI = Final measured hot mix asphalt smoothness, inches/mile
SF = Smoothness Factor

If the PQ is less than 1,500 tons, SF = 0
If the PQ is 1,500 to 5,000 tons, SF = 0.1333 – (0.01666 x PrI)
If the PQ is greater than 5,000 tons, SF = 0.0666 – (0.0083 x PrI)

The smoothness price adjustment will be applied under Item 408(3) Asphalt Price Adjustment.

408-4.05 EVALUATION OF LONGITUDINAL JOINTS FOR ACCEPTANCE.
Longitudinal joint density price adjustments apply when hot mix asphalt quantities are equal to or greater than 1,500 tons.

A longitudinal joint density price adjustment for the top layer will be based on the averages of the joint densities on a project and determined as follows:

1. If project average joint density is less than 91% MSG, the following disincentives apply:

   Longitudinal joint density price adjustment equal to $3.00 per lineal foot is deducted under Item 408(3) Asphalt Price Adjustment.

2. If project average joint density is greater than 92% MSG apply the following incentive applies:

   Longitudinal joint density price adjustment equal to $1.50 per lineal foot is added under Item 408(3) Asphalt Price Adjustment.

408-5.01 BASIS OF PAYMENT. Anti-stripping additives and tack coat are subsidiary to the hot mix asphalt.

Payment for furnishing and installing joint adhesive and sealing pavement adjacent to the joints is subsidiary to the hot mix asphalt.

The accepted quantity will be paid for at the adjusted contract unit price for the pay item listed below, complete in place.

The Asphalt Price Adjustment will be the sum of the price adjustments for each lot, and for fees accrued for failure to cut cores and/or backfill voids left by sampling in the allotted time as outlined in subsection 408-4.02.

The Engineer will assess a mix design fee of $2,500.00 under Item 408(3) Asphalt Price Adjustment for each mix design subsequent to the first approved Job Mix Design for each Type and Class of Hot Mix Asphalt specified.

Failure to cut core samples within the specified period will result in a deduction of $100.00 per sample per day. Failure to backfill voids left by sampling within the specified period will result in a deduction of $100.00 per hole per day. The accrued amount will be subtracted under Item 408(3) Asphalt Price Adjustment.

Price adjustments will not apply to:

1. Asphalt Concrete Mixture for leveling course
2. Temporary Pavement

Pay Item	**Pay Unit**
408(1) Hot Mix Asphalt, Type V	Ton
408(2) Asphalt Cement, Grade PG 64-28	Ton
408(3) Asphalt Price Adjustment	Contingent Sum

R274USC04(01/24/07) MODIFIED

SECTION 504

STEEL STRUCTURES

Standard Modification

504-3.01 FABRICATION. Delete subsection 8 in its entirety and replace with the following:

8. Welding. Perform welding and Nondestructive Examination (NDE) as specified or shown on the Plans. Conform to the ANSI/AASHTO/AWS *Bridge Welding Code* D1.5 when welding new steel bridge girders, beams and stringers. Conform to the *Structural Welding Code* AWS D1.1 when welding all other steel structures.

   At least 30 days before welding, submit for approval a welding plan that has been signed and stamped by a Certified Welding Inspector (CWI) responsible for Quality Control (QC) and consisting of the following documents:

   a. Quality Control personnel qualifications listing CWI number;
   b. Welding Procedure Specifications (WPS) using forms in AWS D1.1, Sample Welding Forms;
   c. Procedure Qualification Records (PQR) when applicable, using forms in AWS D1.1, Sample Welding Forms;
   d. Welder Performance Qualification Records (WPQR) using forms in AWS D1.1, Sample Welding Forms with the documentation of current welder certification;
   e. Sample daily inspection sheet; and
   f. Type and extent of NDE to be conducted, as required in the specifications.

   Perform Quality Control inspection necessary to ensure the materials and workmanship meet the requirements of the contract documents. Use a CWI for welding inspection.

   Correct deficiencies in materials and workmanship revealed by Quality Control and Quality Assurance inspections without additional compensation.

   Furnish completed Quality Control inspection documents to the Engineer and to the Quality Assurance representative designated by the State (when designated).

   Meet Charpy V-notch impact test requirements as shown on the Plans and according to Sections 715 and 716; except that the impact energy values for filler metals must not be less than that of the base metals to be joined, when tested at the same temperature as the base metal. E39(01/27/07)

SECTION 604

MANHOLES AND INLETS

Special Provisions

604-3.01 CONSTRUCTION REQUIREMENTS. Add the following after the first paragraph: Any proposed access manhole that falls within a concrete sidewalk or asphalt pathway must have a lid with a rough cobbled grit surface, or be specifically designed to hold a minimum of 1-inch of concrete or asphalt, as applicable.

Under the heading "Reconstruct existing manhole by using one or more of the following methods," add the following:

8. Remove and dispose of the existing reducing slab and adjustment rings and install a new cover slab.

Add the following: Notify the Engineer a minimum of five (5) days before removing the frame and grate. The Engineer will notify M&O and have an M&O representative physically identify frames and grates to be salvaged. Deliver frames and grates designated to be salvaged to the local State M&O yard. Frames and grates not designated for salvage shall become the Contractor's property.

When installing new pipe in an existing manhole, cleanly cut a hole by approved means at the invert elevation given on the Plans and 2 inches larger than the outside diameter of the new pipe. Then, grout joint with non-shrinking cement mortar.

Curb inlet structures shall have a 3-inch formed hole approximately 2 feet below the top of casting on the project centerline side to provide for direct drainage during subgrade construction to avoid embankment saturation. Keep the openings functional. This may require temporary dikes, RMC extensions, etc., as necessary. Fill these holes with grout upon final paving.

Cast standard drainage structure steps during structure pour or install them before concrete hardens.

Where a new manhole is placed in an existing line, the existing pipe may be cut back a short distance to facilitate manhole construction. The pipe shall be connected to the existing pipe with new corrugated steel pipe. Both ends and the connecting band shall be painted with an approved bituminous coating.

There are natural gas utilities at unknown depths in the project area, at locations shown on the plans. The Contractor shall exercise caution when excavating in these areas. When gas utilities are encountered, the Contractor shall determine if potential conflicts exist prior to installing storm drain facilities. If a potential conflict exists, the Contractor

shall notify the Engineer before proceeding. Encountered utility locations and depths shall be added to the as-built plan set.

Costs incurred for the removal and realignment of pipes placed in conflict with utilities shall be borne by the Contractor.

604-4.01 METHOD OF MEASUREMENT. Add the following: Frames, grates, and lids will not be measured for payment.

Any cleaning of the storm drain system required for removal, installation, or reconstruction of the structure, removal or installation of the pipe will be subsidiary to the structure or pipe.

604 5.01 BASIS OF PAYMENT. Add the following: Frames, grates and lids are subsidiary to the new or reconstructed drainage structure. (09/11/03)R43USC02

Removal of short pipe sections, and providing new short connecting pipe and bands that are necessary to connect new structures to existing pipes will be subsidiary to the structure.

Delete Item 604(1) Storm Sewer Manhole and add the following new pay item:

Pay Item	**Pay Unit**
604(1) Storm Drain Manhole, Type 1	Each

SECTION 608

SIDEWALKS

Special Provisions

608-1.01 DESCRIPTION. Add the following: This work also consists of constructing concrete median(s) in conformance with the Plans.

608-2.01 MATERIALS. Delete paragraph number 2 and substitute the following:

2. Asphalt Sidewalk and Asphalt Pathway

Asphalt Cement, PG 52-28	subsection 702-2.01
Aggregate, Type II or III	subsection 703-2.04
Mix Design Requirements (ATM 417)	
Marshall Stability, pounds, min.	1,000
Percent Voids, Total Mix	2-5
Compaction, Blows/side	50

(01/24/07)R47USC

Standard Modification

608-3.03 CURB RAMPS. Replace this subsection with the following: Construct curb ramps according to the details and the locations shown on the Plans. Follow the construction requirements of subsection 608-3.01. Give the exposed concrete surface a coarse broom finish. Install detectable warnings.

Add the following subsections:

Standard Modification

608-3.05 DETECTABLE WARNINGS. Construct detectable warnings according to the details and the locations shown on the Plans. Install detectable warning tile by embedding tile flanges into cast in place concrete construction so there are no vertical changes in grade exceeding 0.25 inches or horizontal gaps exceeding 0.5 inches. Align pattern on a square grid in the predominant direction of travel. Install Armor-Tile ADA-C Series tactile detectable warning tile made of composite materials, safety yellow color, slip resistant surface, full length flanges on bottom, and truncated dome pattern, or approved equal.

Detectable warnings shall be manufactured and installed according to the Americans with Disabilities Act Accessibility Guidelines. E25(1/01/06)

Special Provisions

608-3.07 IMPRINTED COLORED CONCRETE. The concrete median shall be a cast-in-place, colored, textured and imprinted architectural concrete paving as manufactured by Bomanite Corporation, P.O. Box 599, Madera, California 93639-0599, 559-673-2411, www.bomanite.com. No substitutions will be allowed without prior written approval from the Engineer.

1. Description. Imprinted concrete includes:
   a. Materials: Welded wire fabric (WWF), concrete, hardener, curing compound, release agent and sealer.
   b. Special imprinting and texturing tools.
   c. Concrete placement and finish.
   d. Color hardener and release agent placement.
   e. Pressure washing to remove excess release agent.
   f. Sealer application.

2. References and Standards. Install Bomanite/Bomacron imprinted concrete in accordance with the standards and specifications of Bomanite Corporation and the American Concrete Institute (ACI).

3. Related Work.
   a. Preparation work, include sub-grade preparation, finish grading, placing and setting screeds, and furnishing and placement of welded wire fabric.
   b. Provide and place concrete with integral color.
   c. Provide and apply color hardener.
   d. Provide and apply liquid release agent. Bomanite Liquid Release is a clear liquid used to facilitate release of the imprinting tools from concrete surface.
   e. Provide and apply Bomacron imprinting tools.
   f. Provide and apply curing treatment. Bomanite Con-Shield will help prevent deterioration and spalling from deicing salts used in freeze/thaw conditions. Bomanite Con-Shield will also increase the abrasion resistance of finished Bomacron surface.
   g. Provide and apply membrane forming sealer. Bomanite Hydrolock, as membrane forming sealer, meets all EPA VOC Laws and Regulations.

4. Quality Assurance.
   a. The Bomanite contractor shall provide a qualified foreman or supervisor who has a minimum of 3 years experience with imprinted and textured concrete, and who has successfully completed at least 5 Bomanite/ Bomacron imprinted concrete installations of high quality and similar in scope to that specified herein. Evidence that the contractor is qualified to complete the project in a workman like manner as specified herein shall be submitted to and approved by the engineer.
   b. All Bomanite work shall comply with the current specifications and quality standards issued by Bomanite Corporation.

c. The Bomanite contractor shall provide a job site sample (referee sample) of 100 square feet minimum to be approved by the engineer prior to start of construction. Said sample shall be the standard for the balance of the work installed, and shall be protected against damage until final approval from the engineer. Unsightly or poorly finished surfaces will be considered basis for rejection of the work involved.

5. Concrete Mix Design.
   a. Use Class A concrete that meets the requirements of Section 501, Structural Concrete..
   b. Do not use calcium chloride in mix.
   c. Slump Range: 4" to 5". Higher slumps shall be achieved by using water reducing or plasticizing admixtures, not by adding water.
   d. Use Bomanite integral colored admixture.

6. Coloring, Imprinting, Curing and Sealing Materials.
   a. Bomanite Integral Color: The concrete shall be colored with the following integral color:

36th Avenue:	Red Clay.
88th Avenue:	Apricot.
Minnesota Dr.:	Apricot.

   b. Bomacron Color Hardener: The following Bomacron Color Hardener color shall be applied to all concrete surfaces to be imprinted and textured:

36th Avenue:	Colonial Red.
88th Avenue:	Harvest Amber.
Minnesota Dr.:	Harvest Amber.

   c. Pattern: The following Bomacron pattern shall be used:

36th Avenue:	Running Bond Brick.
88th Avenue:	Running Bond Regular Slate.
Minnesota Dr.:	Running Bond Regular Slate.

   All imprinting tools used in the execution of this project shall be manufactured by Bomanite Corporation.
   d. Reinforcement: Use 6x6 W14xW1.4 steel welded wire fabric.
   e. Curing and densifier: The concrete shall receive a cure treatment utilizing Bomanite Con-Shield.
   f. Sealer: Concrete slabs shall be sealed in accordance with the manufacturer's recommendations using Bomanite Hydrolock.

7. Installation Procedures.
   a. The area to receive Bomanite/Bomacron integrally colored imprinted concrete shall have the sub-grade prepared and compacted in accordance with 608-3.01 Concrete Sidewalks.
   b. Provide and install 6x6 W1.4xW1.4 steel welded wire fabric.

c. Control joints and/or expansion joints shall be provided in accordance with Section 608, Sidewalks and the guidelines established by the American Concrete Institute. The contractor shall advise the engineer to determine the best location for these joints to minimize the visibility of the joints and to minimize unsightly cracking.

d. The concrete shall be placed and screeded to the finish grade, and floated to a uniform surface using standard finishing techniques.

e. Bomanite Color Hardener shall be applied evenly to the troweled surface prior to imprinting.

f. Bomanite Liquid Release agent shall be applied evenly to the troweled surface prior to imprinting.

g. While the concrete is still in its plastic stage of set, imprinting tools shall be applied to the surface.

h. Bomanite Con-Shield shall be applied to Bomacron after Bomanite Liquid Release has dissipated.

i. After the initial curing period, the surface of the slab shall be sealed.

At times when the air temperature is at or near freezing, the concrete slab shall instead be cured using a suitable curing blanket, and if possible, the slab shall later be sealed with Bomanite Hydrolock when the temperature is safely above freezing.

If, at any time during the curing period, any of the forms are removed, a coat of curing compound shall be applied immediately to the exposed surface. Additional coats shall be applied if the Engineer determines that the coverage is not adequate. The concrete shall be cured for the minimum period of time set forth below.

Type I Portland Cement Concrete	5 days
Type III Portland High Early Strength Cement Concrete	3 days

j. Protect sidewalk, and curb and gutter from color stains. When directed by the Engineer, remove surface stains caused by your work to the satisfaction and approval by the Engineer.

Standard Modification

608-4.01 METHOD OF MEASUREMENT. Delete the fifth paragraph beginning with: "Curb Ramp" and replace with the following:

Curb Ramp. By each installation, complete in place, including detectable warnings, ramp runs, backing curbs, flares, and landings necessary to provide a single street level access.
E25(1/01/06)

Special Provisions

Imprinted Colored Concrete. Exclusive of curb, by the square yard of finished surface, complete in place, including reinforcement.

608-5.01 BASIS OF PAYMENT. Add the following: The composite detectable warning tiles are subsidiary to Item 608(6), Curb Ramp. (06/11/02)R256USC

Asphalt cement for Asphalt Sidewalk will not be paid for separately, but will be subsidiary to respective pay item.

Embankment and bed course materials will be furnished, placed and paid under Sections 203 and 301, respectively. (01/24/07)R47USC MODIFIED

The welded wire fabric (WWF) is subsidiary to item 608(25) Imprinted Colored Concrete.

Backing curb will be subsidiary to Item 608(6), Curb Ramp.

Add the following pay items:

Pay Item	Pay Unit
608(25) Imprinted Colored Concrete	Square Yard

SECTION 609

CURBING

Special Provisions

609-3.02 CAST-IN-PLACE CONCRETE CURBING. Add the following to the sixth paragraph: Concrete placed by the extrusion or slip-form process shall have a slump of less than 2 inches. (11/06/02)R202USC02

609-5.01 BASIS OF PAYMENT. Add the following: Curb, Type 1 and Doweled Curb will be paid under Item 609(2), Curb and Gutter, Type 1.

SECTION 615

STANDARD SIGNS

Special Provisions

615-2.01 MATERIALS. Under item 1. delete the first sentence and substitute the following: Unless Shop Drawings have been provided in the Contract, submit shop drawings for signs that require the use of the Alaska Sign Design Specifications (ASDS), the Department of Transportation and Public Facilities - Sign Face Fabrication Requirements, and the Alaska Traffic Manual, letter width and spacing charts for approval before fabrication.

Standard Modifications

In Item 2.a. Orange Background Signs, add: Roll Up Signs: Use 3M series RS 24, Reflexite Marathon Orange, or approved equal (based on durability and reflectivity, as determined by the Engineer). Use flexible signs with fluorescent reflective sheeting that is Type VI or better.
E41(01/27/07)

615-2.01 MATERIALS. Delete the first paragraph of Item 2, including subitems a., b., and c. and replace with:

2. Sign Fabrication. Use Type IV reflective sheeting (for lettering, symbols, borders, and background) on sheet aluminum panels for signs except the following:

   a. Orange Background Signs: Use either Type II or Type III orange reflective sheeting or use Type VII or Type IX fluorescent orange reflective sheeting. For temporary installations place reflective sheeting on sheet aluminum, plastic, or plywood panels.

   b. Railroad Crossbucks and Vertical Crossbuck Supports: Use white Type VIII or Type IX reflective sheeting for background of sign and strips.

   c. Non-Illuminated Overhead Signs with White Legends on Green Backgrounds: Use Type IX reflective sheeting for legends and background. Create the legend in one of the following ways:
      (1) Cut border and legend from white Type IX reflective sheeting and adhere to a green Type IX background, or
      (2) Cut stencil of border and legend out of green transparent acrylic film and use transparent adhesive to overlay the film on a white Type IX reflective background.

d. Fluorescent Yellow-Green School Area Signs: Use Type VIII or Type IX reflective sheeting for background.

Add the following: Reflective Sheeting Warranty. Supply manufacturer's warranty for reflective sheeting, including retention of fluorescent yellow-green (measured according to ASTM E 2301) for ten years according to the following criteria:

Minimum Fluorescent Luminance Factor Y_F: 20%
Minimum Total Luminance Factor Y_T: 35%

The warranty shall stipulate that: If the sheeting fails to meet the minimum fluorescence values within the first 7 years from the date of fabrication, the manufacturer shall, at the manufacturer's expense, restore the sign surface to its original effectiveness. If the reflective sheeting fails to meet the minimum fluorescence values within the 8th through the 10th year from the date of fabrication, the manufacturer shall, at the manufacturer's expense, provide enough new replacement sign sheeting to the Department to restore the sign surface to its original effectiveness. E26(1/1/06)

Special Provisions

615-3.01 CONSTRUCTION REQUIRMENTS. Add the following to item 7: The sign panels, posts and hardware shall be delivered to the State Maintenance Yard located at 5300 East Tudor Road in Anchorage, Alaska. Notify maintenance yard staff at 338-1466 one week before your planned delivery date.

615 3.02 SIGN PLACEMENT AND INSTALLATION. Add the following: Do not remove existing signs without authorization from the Engineer.

615-5.01 BASIS OF PAYMENT. Delete the first sentence and substitute the following: Sign posts, bases, mounting hardware, and concrete used for sign bases are subsidiary.

(11/06/02)R50USC02

Add the following: No separate payment for keeping existing signs in service until they are no longer needed or temporary relocation of existing signs will be made. This work is subsidiary to Item 615(1) Standard Sign.

Payment for removal of existing sign post foundations or work required to abandon them in place will not be made, but shall be subsidiary to Items 615(2) Remove and Relocate Existing Sign and 615(6) Salvage Sign.

(07/20/06)USKH

No separate payment for Salvaging Existing Signs will be made. This work will be subsidiary to Item 615(1) Standard Sign.

SECTION 618

SEEDING

Special Provisions

618-1.01 DESCRIPTION. Add the following: Seed new or disturbed slopes and other areas directed by the Engineer. Apply seed, mulch, fertilizer, and water. Provide a living ground cover on slopes as soon as possible.

618-2.01 MATERIALS. Add the following to the list of material specifications:

Topsoil	Subsection 726-2.01
Mulch	Subsection 727-2.01

618-3.01 SOIL PREPARATION. Delete the last two paragraphs and add the following: Apply seed as detailed in Subsection 618-3.03 immediately after the shaping the slopes. Cover all slopes to be seeded with topsoil according to Section 620.

618-3.02 SEEDING SEASONS. Add the following: Seeding shall be performed between May 15 and August 15.

618-3.03 APPLICATION. Add the following: Apply seed, mulch, and fertilizer as follows per thousand square feet (MSF). Apply seed and mulch in one application if using the hydraulic method. Apply fertilizer two weeks later using the hydraulic method.

Component	Ingredients	Application Rate (per MSF)
Seed	Slender Wheatgrass (Wainwright) Red Fescue (Arctared) Annual Ryegrass (Lolium)	0.50 lbs. 0.40 lbs. 0.10 lbs. Total = 1.00 lbs
Soil Stabilizer Slope ≤ 3:1 Slope >3:1	 Mulch Mulch with tackifier	 46 lbs. 45-58 lbs.
Fertilizer	20-20-10	12.0 lbs.

Do not remove the required tags from the seed bags.

Upon the Engineer's approval, Nortran Tufted Hairgrass may be used as a substitute for Slender Wheatgrass (Wainwright) if Slender Wheatgrass (Wainwright) is commercially unavailable. If this substitution is made, apply at the same application rate.

(01/27/07)R52USC

618-3.04 PLANT ESTABLISHMENT AND MAINTENANCE. Add the following: Watering equipment shall be equipped with, or followed by a vehicle equipped with a Type B advance warning arrow panel using caution mode in accordance with Part VI of the Alaska Traffic Manual.

618-4.01 METHOD OF MEASUREMENT. Add the following: No measurement will be made of work required, including any required reseeding.

618-5.01 BASIS OF PAYMENT. Add the following: The lump sum contract amount will include all work required to provide a living ground cover.

Seed, water, fertilizer, mulch and carrier as described above, including labor, equipment, and materials required to repair seeded surfaces will not be paid for directly, but will be subsidiary to Item 618(6) Topsoil and Seeding.

Water required for the hydraulic method of application is subsidiary to seeding.

Add the following pay item:

Pay Item	**Pay Unit**
618(6) Topsoil and Seeding	Lump Sum

SECTION 620

TOPSOIL

Special Provisions

620-2.01 MATERIALS. Add the following: Provide topsoil for areas to be seeded. Areas to be seeded are shown on the typical sections and elsewhere in the drawings.

620-3.01 PLACING. Add the following: Spread the topsoil evenly to a minimum depth of 4 inches, after compaction and settlement, on designated areas to be seeded and as described in Section 618.

Areas to be topsoiled and seeded shall be stabilized by compacting with a hand operated, non-vibrating, water filled roller. This should be completed as soon as topsoil is placed. Topsoiled areas shall be evenly compacted.

Equipment performing the placement of topsoil, or other operations for this project shall be kept clear of wetland areas. If access into the wetland is required, it shall be approved by the Engineer and shall be performed under close supervision.

Topsoil shall not be placed in heavy rainfall, snowfall, when the ground or topsoil is frozen, excessively wet, or in a condition detrimental to the work. Contractor shall keep roadway surfaces clean of topsoil during hauling and spreading operations.

Apply seed as detailed in subsection 618-3.03 immediately after the shaping of the slopes. Cover all slopes to be seeded with topsoil according to Section 620. Prepare slopes for seed by "raking", so that no slip planes are created. Complete slope preparation as soon as topsoil is placed on the slopes. Rounding the top and bottom of the slopes is acceptable to create a pleasing appearance, but do not disrupt drainage flow lines.

620-5.01 BASIS OF PAYMENT. Add the following: No additional payment will be made for the work required to prepare topsoil. Topsoil will not be paid for separately but will be paid under Item 618(6) Topsoil and Seeding.

SECTION 621

PLANTING TREES AND SHRUBS

Special Provisions

621-1.01 DESCRIPTION. Add the following: Item 621(18) Replace Existing Landscaping includes, but is not limited to, replacing or relocating existing, trees, shrubs, rocks, edging and mulch where shown on the plans. The impacted landscaping items shall be replaced with equal materials.

Standard Modification

621-3.04 PERIOD OF ESTABLISHMENT. Add the following second paragraph: The Engineer may, but is not required to, determine the Project is complete except for the period of establishment, and issue a letter of final acceptance. After final acceptance, work or materials due under this subsection during any remaining period of establishment are considered warranty obligations that continue to be due following final acceptance according to subsection 105-1.16.
E43(01/27/07)

Special Provisions

621-4.01 METHOD OF MEASUREMENT. Add the following: No measurement of Item 621(18) Replace Existing Landscaping will be made

621-5.01 BASIS OF PAYMENT. Add the following: Payment for Item 621(18) Replace Existing Landscaping will be for all labor, materials and equipment required to replace, remove or relocate existing landscaping impacted by the project construction. The lump sum amount will include, but not be limited to, removal of the existing materials and installation of the replacement trees or shrubs, topsoil backfill mix, landscape edging, mulch, staking and guying, fertilizing, relocating rocks and water for maintenance, as required.

Add the following pay item:

Pay Item	Pay Unit
621(18) Replace Existing Landscaping	Lump Sum

For information only, Replace Existing Landscaping includes but not limited to the following items:

C&36th

Station 260+45 LT Remove two 4" diameter trees and two 3' high bushes

Station 260+45 RT	Remove one 3' x 3' x 3' rock
Station 262+90 RT	Move one 2' x 3' x 4' rock approximately 6' east
Station 263+20 RT	Remove three 3' high bushes & 75 square feet of mulch. Move 30' of edging easterly to back of proposed improvements
Station 263+25 LT	Move one 3' x 4' x 8' rock approximately 4' west
Station 264+00 LT	Move one 3' high bush approximately 3' southwesterly
Station 264+55 LT	Move 8' of edging westerly to back of proposed improvements

Lake Otis

Replacing the following Landscaping;
2 – 4" Maple Tree,
2 – 5 ft./6 ft. Spruce Trees,
1 – 9 ft./10 ft. Spruce Tree,
1 – 3" Crab Apple Tree,
3 – 5 " Birch Trees,
17 – Shrubs (assorted species),
2 – Low Evergreen Trees,
PVC Edging as required,
Peastone as required,
Weed Mat as required.
Note: No plant material designed for transplanting

SECTION 627

WATER SYSTEM

Special Provisions

627-1.01 DESCRIPTION. Add the following before the first paragraph: For purposes of these specifications, Water Utility shall mean the water system operated by Anchorage Water and Wastewater Utility (AWWU).

Add the following: Coordinate a preconstruction inspection of the AWWU facilities located within the limits of the project before construction activity begins and a post construction inspection after paving operations are complete. Any deficiencies found during the preconstruction inspection of the AWWU facilities and before the Contractor begins work on the project will be AWWU responsibility to correct.

Replace main valve box top section and lids within the projects limits with AWWU supplied materials. To obtain these materials contact Brian Baus (564-2765 in the AWWU Planning office 3 working days in advance.

627-2.01 MATERIALS. Delete the section and replace with the following:

1. Water Conduit. All water mains, hydrant lines and service lines 3 inches and larger shall be Class 52 Ductile Iron Pipe with push-on joints and shall be encased in 8 mil polyethylene per Subsection 707-2.05. Pipe fittings shall be minimum 250 psi rated, mechanical joint or all bell, lined or unlined, either cast or ductile iron, conforming to AWWA C110/ANSI A21.10. Rubber gaskets joints shall conform to AWWA C111/ANSI A21.11.

   Service lines smaller than 3 inches shall be soft drawn, Type K copper.

2. Continuity Straps. No.2 AWG copper wire bonded to the pipeline with an exothermic welding process approved by the Engineer. Protect weld with a coating of asbestos-free roofing mastic, or by a protective cap approved by the Engineer.

3. Class "C" Bedding. Materials furnished by the Contractor for use as Class "C" bedding and initial backfill shall be graded within the limitations delineated below:

Sieve Size	Cumulative percent Passing by Weight
2-inch	100
1-inch	40-100
No. 4	20-75
No. 10	12-60

Sieve Size	Cumulative percent Passing by Weight
No. 40	2-30
No. 200	0-6

In addition to the bedding limits listed above, the fraction of material passing the No. 200 sieve shall not be greater than 20% of that fraction passing the No. 4 sieve.

4. Restrained Joints. Tie back rods and/or tie back rod and shackle assemblies will not be acceptable as restrained joints or restraining system for fittings, piping, deflection points, or inside casings.

   Restrained joints, EBAA Iron MEGALUG or approved equal, shall be installed where the pipeline terminates, branches, changes alignment utilizing a fitting, and on hydrant lines. Install restrained joints per manufacturer's instructions. Provide manufacturer submittals for each type of thrust restraint to be used. Such submittals shall include thrust restraint calculations and other appropriate data.

5. Thrust Blocks. Concrete for thrust blocks shall be placed against undisturbed soil or Type A Select Material, that has previously been compacted to 95% maximum density. Concrete for thrust blocks shall be Class W. All pipe and fittings exposed to concrete shall be double wrapped with 4 mil polyethylene film prior to placement of the concrete.

6. Gate Valves. Gate valves shall be iron body, fully bronze mounted, double disc, parallel or resilient seat valves manufactured in accordance with AWWA C500. All valves shall be non-rising stem type with an O-ring seal and a two-inch square operating nut. Valves shall open counter-clockwise and have mechanical joint ends.

7. Valve Boxes. Valve boxes shall be cast iron of sliding, adjustable height type with round or oval bottom hood sections to fit over the top of the valve. The top section shall be recessed to receive a close fitting "eared" lid with the word "water" cast into it. Internal diameter of the smallest section shall not be less than five (5) inches. Minimum thickness of the metal shall not be less than five-sixteenth (5/16) inch. Castings shall be smooth and the workmanship shall be acceptable to the Engineer.

   Valve boxes shall be of sufficient length for the pipe cover depth on the profile drawings and in accordance with the Standard Detail of these Specifications.

8. Fire Hydrants. Fire hydrants shall conform to the requirements of ANSI/AWWA C502 for Dry Barrel Fire Hydrants. Fire hydrants shall be Mueller Centurian or equal.

a. All fire hydrants shall be supplied with 5-1/4-inch main valve opening.

b. All connections shall be restrained mechanical joints unless otherwise indicated in the Contract Documents.

c. Single pumper fire hydrants shall be furnished with two (2) 2-1/2-inch hose connections and one (1) 4-1/2-inch pumper connection.

d. Double pumper fire hydrants shall be furnished with two (2) 4-1/2-inch hose connections and one (1) 2-1/2-inch pumper connection.

e. Unless otherwise required by the Contract Documents, all hydrants shall be furnished with a barrel length that will allow a minimum of 10 feet of bury.

f. The main valves shall be of the compression type, where water pressure holds the main valve closed permitting easy maintenance or repair of the entire barrel assembly from above the ground without the need of a water shut-off.

g. All fire hydrants shall be furnished with a breakaway flange that allows both barrel and stem to break clean upon impact from any angle. Traffic flange design must be such that repair and replacement can be accomplished above ground.

h. Painting and coating shall be in accordance with cited AWWA specifications. After installation, the hydrant section from the traffic flange to the top of the operating nut shall be painted "Caterpillar Yellow".

i. Operating and nozzle nuts shall be pentagon shaped with 1-1/2-inch point to flat measurements.

j. Hose nozzle threading shall be in conformance with NFPA #194 for National (America) Standard Fire Hose Coupling Screw Threads.

k. All working parts shall be bronze or noncorrosive metal in accordance with the requirements of ANSI/AWWA C502.

l. All hydrants shall be left-hand opening (counter-clockwise).

m. All hydrants shall be draining (drain plug removed).

n. Hydrant leg and barrel section shall be wrapped with 8-mil polyethylene wrap.

9. Corporation Stops. Line size, quarter turn, iron pipe thread x copper flare, Mueller H-15025 or approved equal.

10. Curb Stops. Brass, line size, quarter turn, closed bottom with drain, copper flare x copper flare, Mueller Mark II Oriseal H-15214 or approved equal.

11. Key Box. Key boxes shall be as specified on the Drawings. Key boxes shall provide a clear and unobstructed access for operation of the curb stop. Key boxes shall not be in contact with a gas main. Key boxes shall be installed in the standard location as shown on the Drawings.

Add the following: AWWU will supply the Main Valve Box Top Sections and Lids required for the project. Contact Brian Baus (564-2765) 3 working days in advance to schedule the pick up of AWWU supplied materials for the project.

CONSTRUCTION REQUIREMENTS

627-3.01 GENERAL. Delete the first paragraph and add the following:

Permanent Water System
Prior to commencement of work to install the water system, the Contractor shall submit to the Engineer for review, a detailed plan for the installation of the new water systems and for removal/abandonment of existing water systems that are to be removed or abandoned. The plan shall be of sufficient detail to clearly indicate the proposed work sequence, schedules, and disruption of water service.

The Water Utility, through the Engineer, reserves the right to suspend the permanent water system installation at any time that the Contractor fails to meet the requirements set forth herein until such time as the Contractor makes the necessary corrections. Suspensions of work will not entitle the Contractor to an extension of time for the completion of the project, and will not entitle him to extra payment for costs incurred.

If construction or excavation require the removal of any existing privately owned facilities or improvements within the provided temporary construction easements, the Contractor shall be responsible for coordinating with the owner and for reestablishing lawns, driveways, parking lots, etc., at the Contractor's cost. Any restorative work will be completed as soon as practicable after the installation, but in no case shall the period of time exceed two weeks. The contractor shall restore property disturbed by contract activity to the preconstruction condition.

Delete the second paragraph.

Add the following to the fourth sentence of the third paragraph: "or so proper alignment and/or grade may be determined before the pipe sections are laid in the trench and backfilled."

Add the following after the fourth paragraph: Contact AWWU in writing a minimum of three working days in advance construction activities to schedule a preconstruction inspection of the valves and valve boxes. Provide the Engineer a copy of the written notice. The Contractor shall furnish the required traffic control and personal to assist AWWU while locating and performing the preconstruction and post construction inspections. Both the Contractor and the Engineer shall witness the condition and location of each valve and/or valve box. The Contractor forfeits the right to deny damages done by the Contractor or agents during the course of work if the Contractor fails to participate in this inspection. It is the Contractor's responsibility to protect and maintain valves and valve boxes in an operable condition during construction. If AWWU finds valves or valve boxes damaged or rendered inoperable after the above inspection and before final inspection the Contractor shall repair the valves and/or valve boxes at the Contractor's expense.

Delete the fifth and sixth paragraphs and substitute the following: At least 48 hours prior to removing or disrupting service to fire hydrants, the Contractor shall contact the Water Utility. Any hydrant taken out of service shall be immediately and securely wrapped in black plastic to indicate its status.

The Contractor shall notify Brian Baus at AWWU 72 hours prior to an interruption of water service. Additionally, the Contractor shall notify all affected property owners and the Engineer, 48 hours prior to interruption of the Water Utility's water service. The Contractor shall provide temporary service to all those property owners with disrupted water service if the interruption exceeds 4 hours duration.

The Contractor shall provide any necessary fittings, valves, temporary connections or appurtenances necessary in order to maintain the water distribution system. Any costs involved in service changeovers and providing temporary water service shall be subsidiary. The Contractor shall be responsible for all damages incidental to interruption of service that may be due to his operations.

Delete the eighth paragraph and substitute the following: In addition to restrained joints, poured-in-place concrete thrust blocks with the minimum base area as shown in the Drawings shall be installed where pipeline terminates, branches or changes alignment utilizing a fitting.

Add the following:

Trench Excavation and Backfill
Excavation and backfill shall be to the width and depth as shown on the drawings. Trench width at or below the top of the pipe shall be of a width that will allow compaction equipment to be utilized at the sides of the pipe.

Contractor shall erect and maintain barricades to prevent access around all excavations left open at the end of the workday. Contractor shall provide and maintain adequate barricades to ensure public safety at all times during the prosecution of the Work.

Contractor shall perform all excavation of every material encountered. Excavated material shall be placed in an orderly manner and at a distance from the trench conforming to all State and/or Federal safety codes. Excavated material meeting the requirements of Select Material shall be stockpiled separately and reused in the Work.

Not more than 200 feet of trench shall be open in advance of the pipe installation unless authorization, in writing, is obtained from the Engineer. Not more than 100 feet of trench shall be left open at the end of the workday, unless otherwise approved by the Engineer.

All bedding material and backfill material shall be placed in uniform layers of not more than 12 inches in depth and compacted in accordance with Subsection 203-3.04. In no case shall bedding material be placed above the springline of the pipe in a single lift. Ponding or jetting of backfill will not be permitted unless approved in writing.

When existing conduits or utilities, which are not scheduled for removal or abandonment, are encountered in the excavation, they shall be adequately supported and protected from damage.

All sheeting and bracing used in excavation shall be removed by the Contractor following the completion of the work.

Abandon Existing Pipe

Existing pipe shown to be abandoned shall be abandoned-in-place as an incidental item of construction. Pipe abandoned-in-place shall have the ends capped. In those areas that the presence of existing pipe causes a conflict with new or existing utilities or facilities, the pipe may be removed as an incidental item of construction. All abandoned materials removed and not reused shall become the property of the Contractor, unless specifically addressed otherwise in these special provisions.

Remove Existing Pipe

Pipe and appurtenances called out on the plans to be removed shall be an incidental item of construction. All removed materials shall become the property of the Contractor, unless specifically addressed otherwise in these special provisions.

Rights In and Use of Materials Found on the Work Site

Unless specifically addressed otherwise in these special provisions, all existing water valves, tees, bends, and conduit (including ductile iron pipe) removed but not reinstalled, and declared "salvageable materials" shall become the property of the Contractor.

Final Acceptance

The Contractor shall, upon completion of all work involved, notify the Engineer in writing of completion and request a pre-final inspection of the project. This inspection will be performed in the presence of the Engineer, the Water Utility, and the Contractor. Copies of a list of deficiencies, if any, indicated by this inspection will be furnished to the

Contractor for remedial action. When all corrective action has been completed, the Contractor shall notify the Engineer, and an acceptance inspection will be performed.

627-3.02 INSTALLATION OF CONDUIT. Delete the first and second paragraphs and substitute the following: Installation shall be in accordance with these specifications and AWWA C600. The interior of the conduit and accessories shall be thoroughly cleaned of foreign matter before being lowered into the trench. The conduit shall be kept clean during laying operations by plugging. Lay conduit to the grades and lines shown on the Plans. However, at a sufficient distance prior to encountering a known obstacle or tying into an existing conduit, the Contractor shall expose and verify the exact location of the obstacle or conduit so proper alignment and/or grade may be determined before the conduit sections are laid in the trench and backfilled. The costs incurred for removal and realignment of backfilled conduit sections due to improper verification methods shall be borne by the Contractor.

Delete the seventh and eighth paragraphs and substitute the following: Deflections from a straight line or grade, as required by vertical curves, horizontal curves, or offsets shall not exceed 60 percent of the manufacturer's recommended maximum deflection. If the alignment requires deflection in excess of the above limitations, the Contractor shall furnish special bends to provide angular deflections within the limits allowable. Wherever possible, the Contractor shall achieve the desired deflection by taking advantage of reduced deflections over multiple joints. Short-radius curves and closures shall be formed by shorter lengths of conduit, bevels, or fabricated specials.

Conduit shall be so laid in the trench that after the line is completed, the bottom of the conduit conforms accurately to the grades and alignment shown on the Plans. A maximum 0.2-foot deviation from design alignment and elevation will be allowed. Both line and grade shall be checked and recorded in a field book for each piece of conduit and appurtenance installed. All adjustments to line and grade shall be done by scraping away or filling the earth under the body of the conduit and not by blocking or wedging up.

The Contractor shall have survey instruments such as transit and level for transferring alignment and grades from offset hubs. He shall also have in his employ a person who is qualified to use such instruments and who shall have the responsibility of placing and maintaining such construction guides. The Contractor shall furnish to the Engineer a copy of the surveyor's record notes for the newly installed conduit and appurtenances. The practice of placing backfill over a section of conduit to provide a platform for the instruments shall be subject to the approval of the Engineer.

A minimum of 10-foot horizontal separation shall be maintained between water and sanitary sewer mains and services, or water and storm drains. Locations having less than 10-foot minimum separation require an ADEC waiver.

A minimum vertical separation of 18 inches shall be maintained at water and sewer or water and storm drain crossings. Where a storm drain and water main cross with less

than 3-feet vertical separation (outside of conduit to outside of conduit), insulate the water main with 4-inch thick rigid insulation board (Rmin=4.5 per inch).

Conduit that has the grade or joint disturbed after laying shall be taken up and relaid. Water shall be kept out of the trench until the jointing is completed. No conduit length less than 8 feet shall be incorporated into the system except those necessary for fire hydrants or valve locations.

The Contractor has the option of using either mechanical or push-on joints for conduit installed in trenches, except in those areas where restrained joints are required. All joints shall conform to the requirements of AWWA C600.

The Contractor will be required to use restrained joints on all fire hydrant leads. The Engineer may check any or all restrained joints to assure proper torque as specified by the manufacturer.

Two electrical continuity straps shall be installed on each side joint for conduits less than 12 inches in diameter. Straps are to be welded to a clean, dry surface. All welds and uncoated surfaces shall be coated with a coal tar pitch to the satisfaction of the Engineer.

Polyethylene Encasement

The outside of all ductile iron and cast iron conduit and fittings used in water system construction shall be encased with one layer of 8 mil thick polyethylene film. Valves and other appurtenances used in water system construction shall be encased with two layers of 4 mil thick polyethylene film. The polyethylene encasement material for conduit shall conform to AWWA C105/ANSI A21.5. The polyethylene encasement shall be installed in strict conformance to the methods described in AWWA C105/ANSI A21.5 and the Ductile Iron Pipe Research Association's "A Guide for the Installation Of Ductile Iron Pipe."

Thrust Restraint

Restrained joints, of the type specified herein, and thrust blocks, shall be installed where the conduit line changes alignment utilizing a tee, cross, bend, or similar fitting and at conduit ends.

Conduit ends left for future connections shall be plugged or capped and anchored as shown on the plans, or as directed by the Engineer.

627-3.03 FIRE HYDRANTS. Delete this subsection in its entirety and substitute the following:

The Work under this section consists of the performance of all Work required for Fire Hydrant Installation, including furnishing and installation of single/double pumper fire hydrant, conduit between the hydrant and the main, auxiliary gate valve, valve box, steam thaw piping, thrust restraint, guardposts, and Polyethylene wrap, at locations shown on the Plans.

Auxiliary Gate Valve and Valve Box
Auxiliary gate valves and valve boxes shall be furnished and installed in accordance with 627-2.01 and 627-3.05.

Leg Thaw Pipe
The leg thaw pipe shall be installed on the left hand side of the hydrant and fabricated into an "L" shape. The vertical portion shall be 6 inches to the side and 3 inches to the rear of the traffic flange extending 15 inches above finished grade with no perforations. The horizontal portion shall be 6 inches above and 6 inches to the side of the hydrant leg and shall be perforated with 1/8 inch diameter holes, spaced 1 foot apart facing the center of the hydrant leg.

Barrel Thaw Pipe
The barrel thaw pipe shall be installed on the right hand side of the hydrant from 6 inches above the hydrant leg and extending 15 inches above finished grade, and installed vertically 3 inches to the rear and 6 inches to the side of the traffic flange. The barrel thaw pipe shall be perforated with 1/8 inch diameter holes spaced 1 foot apart starting 18 inches below finished grade and facing the hydrant barrel. A ¼ inch machine screw shall be installed 1 inch below the cap to provide identification of the barrel thaw pipe.

Joint Restraint
All joints shall be restrained in accordance with 627-2.01.

Guard Posts
Install guard posts at each hydrant installation as shown on the plans.

Contractor shall make final adjustments to the traffic flange.

Hydrants installed but not available for use shall be covered with burlap and securely tied.

Hydrant legs shall be installed level and barrels installed plumb.

Contractor shall paint or use permanent-ink marker to stencil 2-inch black letters on the hydrant bonnet indicating the direction and distance to the auxiliary valve box, to the nearest 0.1 foot.

Where hydrants are removed, the entire hydrant assembly from the main to the hydrant shall be removed and, where the main is to be abandoned in place, the tee is to be capped watertight.

627-3.04 VALVES. Delete this subsection and substitute the following: Valves shall be installed where shown on the plans. Valves shall be installed plumb. Valves shall have the interiors cleaned of all foreign matter before installation. If the valve is at the end of the line, it shall be plugged prior to backfilling. The valve shall be inspected by the

Water Utility's representative, in the open and closed positions to ascertain that all parts are in good working condition.

627-3.05 VALVE BOXES. Delete this subsection and substitute the following: Valve boxes shall be installed over the valves as shown on the plans, with base section centered over the operating nut of the valve and resting on well compacted backfill. Top section shall be so set as to allow equal movement above and below finished grade. Final elevation shall be as shown on the Plans.

Top of base section shall be approximately on line with nut at top of valve stem, and the entire assembly shall be plumb. Provisions shall be made to restrict the soils from entering the bottom section of the valve box. Wrap burlap inside bottom section under the packing gland and wrap 3 layers of non-woven geotextile fabric around the outside of the valve and base section of the valve box and secure the fabric at the top and bottom with wire or tape.

The Contractor shall expose all valve boxes for pre-final and final inspection. After final inspection of the valves located in unpaved areas, sawdust shall be poured directly over the valve box lid and covered with gravel to facilitate location in the future.

627-3.06 TESTING WATER SYSTEM. Delete this subsection and substitute the following: The Contractor shall notify the Engineer in writing 48 hours in advance (two working days) prior to any test. The Water Utility and the Engineer shall be present during all tests. Two hours notice in advance of the scheduled time shall be given to the Engineer if the test is to be postponed or canceled.

Contractor shall submit a request to supply water for flushing, testing and disinfecting in writing to the Engineer at least 24 hours prior to obtaining Water Utility supplied water. The request for water will be subject to water availability and meeting the Contractor's schedule may not be possible.

The Water Utility reserves the right to provide a test gauge or to check and test the Contractor's test gauge at any time.

Flushing

All flushing shall be coordinated with the Water Utility. All newly laid water conduit shall be "open-bore" flushed to remove any foreign matter to the satisfaction of the Water Utility. A detailed plan for cleaning of the lines shall be submitted to the Engineer for review and approval prior to commencement of work.

"Open-bore" flushing shall be accomplished prior to hydrostatic testing and disinfection at all extremities including all stubouts and dead-ends. The Contractor shall furnish, install and remove all fittings and conduit necessary to perform the flushing. Under no circumstances will "open-bore" flushing through hydrants or reduced outlets be permitted.

Flushing of newly installed conduit may be required to occur between the hours of 1:00 AM and 6:00 AM, depending on availability of water, as authorized by the Water Utility. Flushing shall be considered incidental to this work and no separate payment will be made.

Hydrostatic Testing

A hydrostatic test shall be conducted on all newly constructed water conduit, service lines, fire hydrant leads and stub-outs after "open-bore" flushing in the presence of the Engineer and the Water Utility in accordance with the requirements of AWWA C600 unless hereinafter modified. The Contractor, at his option, may either use a pressure test or a leakage test.

The Contractor shall furnish all necessary assistance, equipment, labor, materials and supplies (including the test pressure gauge) necessary to complete the test to the satisfaction of the Water Utility. The Contractor shall suitably valve off or plug the outlet to the existing or previously-tested water main at his expense, prior to making the required hydrostatic test.

Prior to testing, all air shall be expelled from the conduit. If permanent air vents are not located at all high points, the Contractor shall, at his expense, install corporation cocks at such points so the air can be expelled as the conduit is slowly filled with water.

Where any section is provided with poured-in-place concrete thrust blocks for fittings or hydrants, the hydrostatic test shall not be made until at least seven days after installation of the thrust blocks unless otherwise approved by the Engineer.

No hydrostatic test section shall exceed 1,000 feet unless approved by the Water Utility in writing. All main line valves, fire hydrant auxiliary valves, fire hydrant main valves and plugs shall be tested. All intermediate valves within the section being tested will be fully closed and reopened as directed by the Engineer during the actual test. Only static pressure will be allowed on the opposite side of the end valves of the section being tested.

All hydrostatic testing will be performed through test copper. Use of fire hydrants and service connections for testing will not be allowed.

The hydrostatic pressure shall be 150 psi and the duration of each hydrostatic pressure test shall be 30 minutes. After the required test pressure has been reached, the pumping will be terminated. If the pressure remains constant for 30 minutes without the aid of a pump, that section of the conduit will not be subjected to any further hydrostatic tests.

If a hydrostatic pressure test fails on any section, the Contractor has the option to perform a leakage test on that section. The Contractor will furnish the test gauge and measuring device, and the Contractor shall furnish all other necessary assistance, equipment, labor, material and supplies to conduct the test.

Leakage for a newly-installed conduit is determined by the following formula:

$$L=\frac{ND(P)^{.05}}{7400}$$

where: L = Allowable leakage in gallons per hour
N = Summation of mechanical and push-on joints in length of pipe tested
D = Diameter of conduit in inches
P= Test pressure in pounds per square inch

The duration of each leakage test shall be 2 hours and during the test, the conduit shall be subjected to the constant test pressure as defined above. The test pump shall be valved to ensure that constant test pressure is maintained throughout the test and all excess water will be returned to a storage tank. If the pressure decreases below the required test pressure during the 2-hour period, the preceding portion of that test shall be declared void.

Cracked or defective conduit, gaskets, mechanical joints, fittings, valves or hydrants discovered as a consequence of the hydrostatic tests shall be removed and replaced with sound material at the Contractor's expense. The test shall then be repeated until the results are satisfactory.

In the instance where connection is made to an existing water conduit, a new valve shall be installed on the connection. The Contractor shall suitably seal off the outlet leading to the existing conduit prior to making the field tests.

Continuity Tests
The Contractor shall perform electrical conductivity tests on all mains less than 12 inches in diameter in the presence of the Engineer and the Water Utility. The Contractor shall maintain a circuit of 600 amperes DC current for a period of 15 minutes. Return current shall be at least 90 percent of the input current. All equipment necessary to maintain the circuit shall be supplied by the Contractor.

All continuity tests will be through wires brought to the surface or through ¾-inch minimum copper pipe connected to the main. The use of fire hydrants and valves, as substitutes for wires will not be accepted. All wires brought to the surface to complete the continuity test shall be removed to a depth of two feet below finished street grade upon completion of the tests.

Removal of Test and Air Vent Copper Pipe
After completion of testing, all test and air vent copper pipe shall be removed and the stop closed at the main, in the presence of the Engineer and Water Utility.

627-3.07 DISINFECTION OF WATER LINES. Delete this subsection and substitute the following: All portions of the water system shall be disinfected, including all valves and stops and any portion of the existing connection system that might have become contaminated during construction activities. Disinfection shall be accomplished after

completion of pressure and/or leakage tests in compliance with AWWA C651, Disinfecting Water Mains.

Chlorine shall be used for disinfection, and shall be applied only by one of the following methods:

1. liquid chlorine gas and water mixture
2. direct chlorine gas feed
3. calcium hypochlorite and water mixture

Calcium hypochlorite shall be comparable to commercial products known as HTH, Perchloren or Machochlor. The chlorinating agent shall be applied at the beginning of the section adjacent to the feeder connection, insuring treatment of the entire line. Water shall be fed slowly into the new conduit with chlorine applied in amounts to produce a dosage of 40 to 50 ppm. Application of the chlorine solution shall continue until the required dosage is evident at all extremities of the newly-laid conduit.

Chlorine gas-water mixture shall be applied by means of a solution-feed chlorinating device. Chlorine gas shall be fed directly from a chlorine cylinder equipped with a suitable device for regulating the rate of flow and effective diffusion of gas within the conduit. Calcium hypochlorite shall be injected or pumped into the water conduit. During the chlorination process, all intermediate valves and accessories shall be manipulated so that the strong chlorine solution in the conduit being treated will not flow back into the conduit supplying the water. Hydrostatic testing of water conduit containing the chlorine mixture will not be allowed.

A residual of not less than 5 ppm chlorine shall be produced in all parts of the water conduit and retained for a minimum period of 24 hours, after which it shall be flushed from the conduit at its extremities until the replacement water tests are equal chemically and bacteriologically to those of the permanent source of supply. In no instance will a water conduit be chlorinated before "open-bore" flushing.

CHLORINATION

Conduit Diameter	Dosage (oz. per 100 feet)
6 in	1.35 oz.
8 in	2.75 oz.
10 in	4.30 oz.
12 in	6.19 oz.
16 in	11.00 oz.

The above table is to be used as a guide for chlorinating mains by the calcium hypochlorite and water mixture method. The given dosage per 100 feet results in a chlorine solution of 40 to 50 ppm. This dosage takes into account that Contractors most frequently use granular HTH, which is 65 percent pure. If another chlorinating agent is used, the dosage must be adjusted. Caution should be exercised against producing too high a concentration of chlorine in the conduit.

After completion of all testing, all test and air vent copper pipe shall be removed and the corporation cock closed at the main in the presence of the Engineer and the Water Utility.

Add the following subsection:

627-3.08 AS-BUILT PLANS AND WORKING DRAWINGS. A complete and accurately dimensioned record of all deviations, deletions, additions and alterations from and to the contract plans and specifications shall be maintained by the Contractor to indicate the work as actually installed. This as-built information shall be recorded on a print of the plans affected and on the applicable pages of the specifications with supplementary notes. This record set of plans and specifications shall be kept by the Contractor. Conduit and appurtenances shall be referenced by stationing, showing design line and grade, and as-built line and grade.

When the water system is completed, the Contractor shall certify the accuracy of the construction survey notes and of each revision on the plans and in the specifications by written signature endorsement, and deliver them to the Engineer prior to final acceptance of the system by the Water Utility.

627-5.01 BASIS OF PAYMENT. Delete the first through fifth paragraphs and substitute the following:

All labor, tools, equipment, fittings, pipe, and demolition necessary to connect new water main to the existing water mains as shown on the drawings, is subsidiary.

The contract price for Water Conduit includes trench excavation, bedding, backfill, Select A backfill, disposal of surplus excavated material, pipe, fittings, tees, reducers, crosses, bends, polyethylene encasement, couplings, thrust blocks, testing, disinfection, connection to existing mains, abandonment or removal of the existing conduit, etc.

The contract price for Fire Hydrant Installation, Single Pumper and Fire Hydrant Installation, Double Pumper includes trench excavation, bedding, backfill, disposal of surplus excavated material, fire hydrant, tee in main, auxiliary gate valve with valve box, conduit between the main and the hydrant, all fittings and materials required, testing, disinfection, painting, removal of existing hydrants and associated piping, valves and appurtenances.

The contract price for Water Service Connection includes trench excavation, backfill, disposal of surplus excavated material, valves, key box, lengthening or shortening private side of service, and removal of the existing service pipe and valves.

Repair of existing improvements on private property and repair of existing utilities damaged by the Contractor will not be paid for directly but will be considered subsidiary.

No separate payment will be made for preparing as-built plans, this work will be subsidiary to the water system.

Add the following: The Contract price for item 627(10) includes removing and replacing the existing valve boxes shown on the Plans for the project with AWWU supplied materials. Any intermediate adjustments required are subsidiary as well. Payment also includes full compensation for the transporting the AWWU supplied valve box and lids to the project site from the AWWU warehouse.

The pre and post inspections are subsidiary to item 627(10) and no separate payment shall be made. Traffic control required for the pre and post inspections shall be paid under the specific 643 Items.

Add the following pay items:

Pay Item	**Pay Unit**
627(5a) Fire Hydrant Installation, Single Pumper	Each
627(5b) Fire Hydrant Installation, Double Pumper	Each

Delete this Section in its entirety and substitute the following:

SECTION 639

DRIVEWAYS

Special Provisions

639-1.01 DESCRIPTION. Construct approaches, residential or commercial driveways at the locations shown in the Plans.

639-2.01 MATERIALS. Use materials that conform to the standards for the main roadway.

639-3.01 CONSTRUCTION. Construct driveways and approaches to the dimensions shown on the Plans.

639-4.01 METHOD OF MEASUREMENT. By the number of driveways and approaches constructed as shown on the Plans or as directed. Pavement removal and excavation required beyond the limits of the adjacent mainline will be subsidiary.

639-5.01 BASIS OF PAYMENT. At the contract unit price shown in the bid schedule. The contract unit price for driveways and approaches shall be full compensation for furnishing equipment and labor necessary to complete the work as specified.

Materials required to construct driveways and approaches will be paid for separately under the respective items listed in the bid schedule.

Native material meeting the minimum requirements of Selected Material, Type C will not be paid for directly, but will be considered subsidiary to 639 items. (05/09/02)R58M98

Payment will be made under:

Pay Item	Pay Unit
639(6) Approach	Each

Delete Section 641 in its entirety and substitute the following:

SECTION 641

EROSION, SEDIMENT, AND POLLUTION CONTROL

641-1.01 DESCRIPTION. Plan, provide, inspect, and maintain control of erosion, sedimentation, water pollution, and hazardous materials contamination.

641-1.02 DEFINITIONS.

1. BMP (Best Management Practices). A wide range of project management practices, schedules, activities, or prohibition of practices, that when used alone or in combination, prevent or reduce erosion, sedimentation, and/or pollution of adjacent water bodies and wetlands. BMP include temporary or permanent structural and nonstructural devices and practices. Common BMP can be found on the EPA website: *National Menu of Storm Water Best Management Practices.* [www.epa.gov/npdes/stormwater/menuofbmps]

2. ESCP (Erosion and Sediment Control Plan). The ESCP is a project specific document that illustrates measures to control erosion and sediment problems on a project. The ESCP normally consists of a general narrative and a map or site plan. It is developed by the Department and included in the project plans and specifications. It serves as a resource for bid estimation and a framework from which the Contractor develops the project SWPPP.

3. Final Stabilization. A point in time when ground disturbing activities are complete and permanent erosion and sediment controls are established and functional. The stabilized site is protected from erosive forces of raindrop impact and water flow. Typically, unpaved areas except graveled shoulders, crushed aggregate base course, or other areas not covered by permanent structures are protected by either a uniform blanket of perennial vegetation (at least 70% cover density) or equivalent permanent stabilization measures such as riprap, gabions or geotextiles.

4. HMCP (Hazardous Material Control Plan). The Contractor's detailed plan for prevention of pollution that stems from the use, containment, cleanup, and disposal of hazardous material, including petroleum products generated by construction activities and equipment.

5. eNOI. Electronic Notice of Intent to begin construction activities under the NPDES General Permit. Use EPA Form 3510-9 found at www.epa.gov/npdes/stormwater/enoi

6. eNOT. Electronic Notice of Termination of coverage under the NPDES General Permit. Use EPA Form 3510-13 found at www.epa.gov/npdes/stormwater/cgp

7. NPDES General Permit. The Storm Water General Permit for Large and Small Construction Activities, issued by the Environmental Protection Agency (EPA) under the National Pollutant Discharge Elimination System (NPDES). It requires an approved SWPPP and NOIs listed as active status by the EPA before ground disturbing activities for the project.

8. SPCC Plan (Spill Prevention, Control and Countermeasure). The Contractor's detailed plan for oil spill prevention and control measures, that meets the requirements of 40 CFR 112.

9. SWPPP (Storm Water Pollution Prevention Plan). The Contractor's plan for erosion and sediment control and storm water management. The SWPPP is developed by the Contractor and identifies specific areas where erosion may occur, describes site specific controls to prevent erosion and manage sediment and establishes a record of the installation and removal of these controls. The approved SWPPP replaces the ESCP.

641-1.03 REFERENCES.

The following websites have up to date information about erosion, sediment and pollution control.

Developing the SWPPP. EPA. January 2007. Includes a SWPPP template in WORD [www.epa.gov/npdes/swpppguide]

National Menu of Storm Water Best Management Practices. EPA. [www.epa.gov/npdes/stormwater/menuofbmps]

International Erosion Control Association website [www.ieca.org/Resources/Resources.asp]

Construction Industry Compliance Assistance Center website [www.CICAcenter.org/bmps.html]

641-1.04 SUBMITTALS. Submit two copies each of the SWPPP and HMCP to the Engineer for approval. Submit one copy of the SPCC Plan (if required under subsection 641-2.03) to the Engineer. Sign submittals. Deliver these documents to the Engineer.

The Department will review the SWPPP and HMCP submittals within 14 calendar days. Submittals will be returned to the Contractor as either requiring modification, or as approved by the Department. The approved SWPPP must contain certifications, and be signed according to the Standard Permit Conditions of the NPDES General Permit. Approval of the SWPPP must be received before submitting the eNOI to the EPA.

For projects that disturb five acres or more of ground, submit a copy of the approved and signed SWPPP, with the required permit fee to the Alaska Department of Environmental Conservation (ADEC) Storm Water Coordinator. Transmit proof of this submission to the Engineer.

For projects that disturb one acre or more, submit the signed eNOI to EPA. Submit copies of the signed eNOI receipt to the Engineer and to ADEC. Transmit proof of the ADEC submission to the Engineer. The Department will transmit the Department's NOI to the EPA. Allow adequate time for state and federal processing, before beginning ground disturbing activities.

The active status NOIs, approved SWPPP, approved HMCP, and submitted SPCC Plan (when required) become the basis of the work required for the project's erosion, sediment, and pollution control.

Submit the signed eNOT to EPA with a copy to the Engineer when notified by the Engineer that the Project is stabilized. The Department will transmit the Department's eNOT to the EPA.

641-2.01 STORM WATER POLLUTION PREVENTION PLAN (SWPPP) REQUIREMENTS. Prepare a Storm Water Pollution Prevention Plan. Use the Department's ESCP to develop a SWPPP based on scheduling, equipment, and use of alternative BMPs. The SWPPP Preparer must visit the project site before preparing the SWPPP. The plan must include both erosion control and sediment control measures. The plan must address first preventing erosion, then minimizing erosion, and finally trapping sediment before it leaves the project site.

The SWPPP must follow the format presented in Appendix A of *Developing Your Storm Water Pollution Prevention Plan* (EPA, January 2007) found at http://cfpub.epa.gov/npdes/stormwater/swppp.cfm.

The plan must address site specific controls and management plan for the construction site as well as for material sites, waste disposal sites, haul roads, and other affected areas, public or private. The plan must also incorporate the requirements of the project permits.

Specify the line of authority and designate a field representative for implementing SWPPP compliance.

641-2.02 HAZARDOUS MATERIAL CONTROL PLAN (HMCP) REQUIREMENTS. Prepare a HMCP for the handling, storage, cleanup, and disposal of petroleum products and other hazardous substances. (See 40 CFR 117 and 302 for listing of hazardous materials.)

List and give the location of hazardous materials, including office materials, to be used and/or stored on site, and estimated quantities. Detail a plan for storing these materials as

well as disposing of waste petroleum products and other hazardous materials generated by the project.

Identify the locations where storage, fueling, and maintenance activities will take place, describe the maintenance activities, and list controls to prevent the accidental spillage of oil, petroleum products, and other hazardous materials.

Detail procedures for containment and cleanup of hazardous substances, including a list of the types and quantities of equipment and materials available on site to be used.

Detail a plan for the prevention, containment, cleanup, and disposal of soil and water contaminated by accidental spills. Detail a plan for dealing with unexpected contaminated soil and water encountered during construction.

Specify the line of authority and designate a field representative for spill response and one representative for each subcontractor.

641-2.03 SPILL PREVENTION, CONTROL AND COUNTERMEASURE (SPCC) PLAN REQUIREMENTS. Prepare and implement a SPCC Plan when required by 40 CFR 112, including:

Control

Prepare and implement a SPCC Plan when required by 40 CFR 112, including:

1. When oil spills may reach navigable waters; and
2. Total above ground oil storage capacity is greater than 1,320 gallons.

Prevention and Countermeasures

Comply with 40 CFR 112 and address the following issues in the SPCC Plan:

1. Operating procedures that prevent oil spills;
2. Control measures installed to prevent a spill from reaching navigable waters; and
3. Countermeasures to contain, clean up, and mitigate the effects of an oil spill.

Self certify the SPCC Plan if the total above ground oil storage capacity is 10,000 gallons or less, and the requirements for self certification in 40 CFR 112 is met. Otherwise the SPCC Plan must be certified, stamped with the seal of, dated by, and signed by a Professional Engineer registered in the State of Alaska.

641-3.01 CONSTRUCTION REQUIREMENTS. On projects with 1 acre or more of ground disturbing activity, do not begin construction activities until the EPA has acknowledged receipt of the Contractor's NOI and Department's NOI, and has listed both as active status. The EPA will post the status of the NOIs on the EPA website. On projects with less than 1 acre of ground disturbing activity, where submittal of an eNOI to EPA is not required, do not begin construction activities until authorized by the Engineer.

Postings.

Post at the construction site:

1. NPDES Permit number, if available, and a copy of the NOI,
2. Name and phone number of the Contractor's local contact person, and
3. Location of a SWPPP available for viewing by the public.

The above notices must be posted at publicly accessible locations. At a minimum post notices at the BOP, EOP, near the intersection of the highway with a major side street, and the Project Office.

Comply with requirements of the approved HMCP, the submitted SPCC Plan, and state and federal regulations that pertain to the handling, storage, cleanup, and disposal of petroleum products or other hazardous substances. Contain, clean up, and dispose of discharges of petroleum products and other materials hazardous to the land, air, water, and organic life forms. Perform fueling operations in a safe and environmentally responsible manner. Comply with the requirements of 18 AAC 75 and AS 46, Oil and Hazardous Substances Pollution Control. Report oil spills as required by federal, state and local law, and as described in the SPCC Plan.

Comply with requirements of the NPDES General Permit, implement temporary and permanent erosion and sediment control measures identified in the SWPPP, and ensure that the SWPPP remains current. Maintain temporary and permanent erosion and sediment control measures in effective operating condition.

Coordinate BMPs with Utility Companies doing work in the project area.

Inspections

Perform inspections and prepare inspection reports to comply with the project SWPPP and the NPDES General Permit.

1. Joint Inspections. Before start of construction, conduct a joint on site inspection with the Engineer, the SWPPP Preparer, and the Contractor's field representative to discuss the implementation of the SWPPP.

   Conduct the following additional joint on site inspections with the Engineer:

   a. During construction, inspect the following at least once every seven days and within 24 hours of the end of a storm exceeding ½ inch in 24 hours (as recorded at or near the project site):
      (1) Disturbed areas that have not been finally stabilized
      (2) Areas used for storage of erodible materials that are exposed to precipitation
      (3) Sediment and erosion control measures

(4) Locations where vehicles enter or exit the site
(5) Offsite materials sources and waste sites
(6) Staging and equipment storage areas.

b. During construction, the SWPPP preparer shall review the Project Site, Materials Sites, Waste Sites, and the SWPPP for conformance with the NPDES General Permit at least once per month and after every major change in earth disturbing activities for compliance with the General Permit.

c. Before winter shutdown, to ensure that the site has been adequately stabilized and devices are functional.

d. At project completion, to ensure final stabilization of the project.

2. Winter Inspections. During winter shutdown, conduct inspections at least once every month and within 24 hours of a storm resulting in rainfall of 1/2 inch or greater. The Engineer may waive monthly inspection requirements until one month before thawing conditions are expected to result in a discharge, if all of the following requirements are met:
   a. Below freezing conditions are anticipated to continue for more than one month.
   b. Land disturbance activities have been suspended.
   c. The beginning and ending dates of the waiver period are documented in the SWPPP.

3. Inspection Reports. Prepare and submit, within three working days of each inspection, a report on the DOT&PF SWPPP Inspection Report Form (February 2007). At a minimum the report will contain the following information:
   a. A summary of the scope of the inspection
   b. Name(s) of personnel making the inspection
   c. The date of the inspection
   d. Observations relating to the implementation of the SWPPP
   e. Any actions taken as the result of the inspection
   f. Incidents of noncompliance

   Where a report does not identify any incidents of noncompliance, certify that the facility is in compliance with the SWPPP and NPDES General Permit. The Contractor and the Engineer will sign the report according to the Standard Permit Conditions of the NPDES General Permit. Include reports as an appendix to the SWPPP.

Record Retention

Keep the SWPPP up to date at all times. The SWPPP shall denote the location, date of installation, date maintenance was performed, and the date of removal for BMPs. It shall also contain copies of inspection reports and amendments.

Maintain the following records as part of the SWPPP:
1. Dates when major grading activities occur;
2. Dates when construction activities temporarily or permanently cease on a portion of the site; and
3. Dates when stabilization measures are initiated.
4. Daily precipitation as measured from an on site rain gauge.

Provide the Engineer with copies of SWPPP revisions, up dates, records, and inspection reports at least weekly.

Retain copies of the SWPPP and other records required by the NPDES General Permit for at least three years from the date of final stabilization.

If unanticipated or emergency conditions threaten water quality, take immediate suitable action to preclude erosion and pollution.

Amendments

Submit amendments to the SWPPP to correct problems identified as a result of:
1. Storm or other circumstance that threatens water quality, and
2. Inspection that identifies existing or potential problems.

Submit SWPPP amendments to the Engineer within seven days following the storm or inspection. Detail additional emergency measures required and taken, to include additional or modified measures. If modifications to existing measures are necessary, complete implementation within seven days.

Stabilize areas disturbed after the seeding deadline within seven days of the temporary or permanent cessation of ground disturbing activities.

Notice of Termination

For projects that disturb one acre or more of land, submit the signed eNOT to EPA with a copy to the Engineer when the Engineer notifies that:

1. The Project site (including material sources, and disposal sites) has been finally stabilized and that storm water discharges from construction activities authorized by this permit have ceased, or

2. The construction activity operator (as defined in the NPDES General Permit) has changed.

641-4.01 METHOD OF MEASUREMENT. Section 109 and as follows:

Items 641(2) and (4) will be measured as specified in the Contract or directive authorizing the work.

641-5.01 BASIS OF PAYMENT. The Bid Schedule will include either items 641(1), (2), and (5) or items 641(1), (3), (4), and (5).

1. Item 641(1) Erosion and Pollution Control Administration. At the Contract lump sum price for administration of work under this Section. Includes, but is not limited to, plan preparation, plan amendments and updates, inspections, monitoring, reporting, and record keeping.

2. Item 641(2) Temporary Erosion and Pollution Control. At the prices specified in the Contract or as provided in the Directive authorizing the work to install and maintain temporary erosion, sedimentation, and pollution control measures.

3. Item 641(3) Temporary Erosion and Pollution Control. At the lump sum price shown on the bid schedule to install and maintain temporary erosion, sedimentation, and pollution control measures required to complete the project according to Plan and with the BMP, the ESCP, and the original approved SWPPP and HMCP.

4. Item 641(4) Temporary Erosion and Pollution Control Amendments. At the prices specified in the Directive for extra, additional, or unanticipated work to install and maintain temporary erosion, sedimentation, and pollution control measures. Work paid under this Item will be shown as amendments to the original approved SWPPP or HMCP.

5. Item 641(5) Erosion and Pollution Control Price Adjustment. The total value of this Contract will be adjusted as specified in subsection 641-3.01. In addition, a price adjustment equivalent to penalties levied against the Department by the EPA or other state and federal agencies for violations of the Clean Water Act and the NPDES General Permit will be made if the Department is issued a Notice of Violation (NOV) by these agencies. This price adjustment is the actual cost of fines levied against the Department. An amount equal to the maximum fine for the violation will be withheld temporarily until the actual cost of the fine is known. The difference, excluding price adjustments will be released by the Engineer upon satisfactory completion of the requirements of the NPDES General Permit. The Contractor is responsible for the payment of the Contractor's fines.

Temporary erosion and pollution control measures that are required at Contractor furnished sites are subsidiary.

Work that is paid for directly or indirectly under other pay items will not be measured and paid for under this Section, including but not limited to dewatering, shoring, bailing,

installation and removal of temporary work pads, temporary accesses, temporary drainage pipes and structures, and diversion channels.

Perform temporary erosion and pollution control measures that are required due to negligence, carelessness, or failure to install permanent controls as a part of the work as scheduled or ordered by the Engineer, or for the Contractor's convenience, at the Contractor's expense.

Permanent erosion and pollution control measures will be measured and paid for under other Contract items, when shown on the bid schedule.

Failure

If the Contractor fails to coordinate temporary or permanent stabilization measures with the earthwork operations in a manner to effectively control erosion and prevent water pollution, the Engineer may suspend earthwork operations and withhold monies due on current estimates for such earthwork items until aspects of the work are coordinated in a satisfactory manner.

If there is failure to:

1. Pursue the work required by the approved SWPPP,
2. Respond to inspection recommendations and/or deficiencies in the SWPPP, or
3. Implement erosion and sedimentation controls identified by the Engineer,

the Contractor will be assessed a permanent price adjustment of $500 per day for each day of nonaction, under Item 641(5) Erosion and Pollution Control Price Adjustment. In addition, the Engineer may, after giving written notice, proceed to perform the work and deduct the cost thereof, including project engineering costs, from progress payments under item 641(5).

Pay Item	Pay Unit
641(1) Erosion and Pollution Control Administration	Lump Sum
641(3) Temporary Erosion and Pollution Control	Lump Sum
641(4) Temporary Erosion and Pollution Control Amendments	Contingent Sum
641(5) Erosion and Pollution Control Price Adjustment	Contingent Sum

(04/17/07)R272USC04

SECTION 642

CONSTRUCTION SURVEYING AND MONUMENTS

Special Provisions

642-1.01 DESCRIPTION. Delete the sentences that begin "Furnish and install..." and "Adjust existing monuments..."

642-3.01 GENERAL. Delete the text of item 9.

642-3.02 CROSS SECTION SURVEYS. Delete the text of item 13.

642-3.03 MONUMENTS. Delete the entire subsection.

642-3.05 FINAL TRAVERSE. Delete the entire subsection.

SECTION 643

TRAFFIC MAINTENANCE

Special Provisions

643-1.01 DESCRIPTION. Add the following as a third paragraph:
Illuminate construction activities listed in Table 643-2 during hours of night work on roads open to the public within project limits. (03/15/06)ES14

643-1.02 DEFINITIONS. Add the following paragraphs after paragraph titled "Construction Phasing Plan":

Balloon Light: Light surrounding by a balloon like enclosure kept inflated by pressurized air or helium, and producing uniform light through 360 horizontal degrees. The top half of the balloon enclosure shall be constructed of an opaque material.

Night Work: Work occurring between sunset and sunrise on all days except the "No Lighting Required" period shown in the table below:

Latitude	**No Lighting Required**		**Nearby**
(degrees)	**Start**	**End**	**Cities**
< 61	Lighting Required All Year		Everything South of Hope
61	June 11	July 1	Anchorage, Valdez, Girdwood, Wasilla, Palmer, Glennallen
62	June 2	July 13	Talkeetna
63	May 27	July 17	Cantwell, Paxson, McGrath
64	May 22	July 21	Tok, Delta, Nome
65	May 18	July 25	Fairbanks
66	May 14	July 29	Circle City
67	May 10	August 2	Coldfoot, Kotzebue
68	May 7	August 6	Galbraith Lake
69	May 3	August 9	Happy Valley
70	April 30	August 12	Deadhorse
71	April 27	August 15	Barrow
72	April 24	August 19	

ES14(3/15/06)

643-1.03 TRAFFIC CONTROL PLAN. Replace the last paragraph with the following:
A waiver may be requested of regulation 17 AAC 25 regarding oversize and overweight vehicle movements within this project in writing. If the waiver is approved, movements of oversize and overweight vehicles in or near traffic within the project limits will be done according to the provisions of an approved Traffic Control Plan. Maintain a minimum12 foot lateral separation between the nonstreet legal vehicles and the motoring

public. The Traffic Control plan shall specify the traffic control devices required for these operations. (12/14/06)R222USC04

643-1.04 WORKSITE TRAFFIC SUPERVISOR. Add the following to Item 2. Duties:

i. Supervise lighting of Night Work.

(03/15/06)ES14

Standard Modification

643-2.01 MATERIALS. Under Item 16. Flagger Paddles, replace the last sentence with the following: Use reflective sheeting that meets AASHTO M 268 Type VIII or IX. Use background colors of fluorescent orange on one side and red on the other side. E56(5/01/07)

Special Provision

643-2.01 MATERIALS Add the following:

17. Flexible Markers. Refer to subsection 606-2.01 Materials. (12/14/06)R222USC04

Standard Modification

643-3.01 GENERAL CONSTRUCTION REQUIREMENTS. Add the following: Immediately notify the Engineer of a traffic related accident that occurs within the project limits as soon as becoming aware of the accident. (05/01/07)E56

Special Provisions

643-3.01 GENERAL CONSTRUCTION REQUIREMENTS. Add the following: Whenever construction activity encroaches onto the safe route in a traffic control zone, station a flagger at the encroachment to assist pedestrians and bicyclists past the construction activity.

Maintain business accesses during flagging operations. (12/14/06)R222USC04

For intersection closures, furnish and implement portable changeable message board signs 72 hours in advance of any intersection closures or as directed by the Engineer.

643-3.02 ROADWAY CHARACTERISTICS DURING CONSTRUCTION. Add the following: Pave lanes next to the median first. Pave lanes next to exit and entrance ramps last. Place a temporary 12:1 sloped wedge of asphalt concrete against the abrupt pavement edge on lanes next to exit and entrance ramps. Do not open the roadway to traffic until slope wedges are in place.

643-3.04 TRAFFIC CONTROL DEVICES.
Delete the first sentence of the eighth paragraph and substitute the following: Items paid under this Section remain the Contractor's property unless stated otherwise.

Add the following to item 1. Embankments.: Close trenches and excavations at the end of each continuous work shift.

Add the following to item 3. Fixed Objects.: Remove obstructions greater than 4 inches above the nominal foreslope grade at the end of each continuous work shift.

Delete item 4.b. and replace with the following: Flagger Certification by ATSSA

Delete item 6 and replace with the following:

6. Street Sweeping. Keep free of loose material paved portions of the roadway and haul routes open to the public, including sections of roadway off the project where the Contractor's operations have deposited loose material using a street sweeper that can collect materials rather than eject them to the shoulder of the road.

7. Power Brooming. Keep free of loose material paved portions of the roadway and haul routes open to the public, including sections of roadway off the project where the Contractor's operations have deposited loose material using a power broom that can eject them to the shoulder of the road.

Change items 7 and 8 to 8 and 9 respectively.

Add the following:

10. ET-2000 LET. The price listed in the Traffic Control Rate Schedule will be full compensation for the purchase, installation, maintenance during construction, removal and salvaging the ET-2000 LET unit(s). Deliver the salvaged unit(s) to the nearest DOT &PF Maintenance and Operations' district office, or as directed by the Engineer. (12/14/06)R222USC04

Standard Modification

643-3.04 TRAFFIC CONTROL DEVICES. In the sixth paragraph and also in Item 4.b., delete: "ATTSA" and replace with "ATSSA". E56(5/01/07)

Special Provisions

643-3.05 AUTHORITY OF THE ENGINEER. Replace the first sentence with the following: When existing conditions adversely affect the public's safety or convenience, the Contractor will receive an oral notice. A written notice will follow the oral notice according to subsection 105-1.01 Authority of the Engineer.

Add the following after the second sentence: In no case shall this time exceed 24 hours.

643-3.06 TRAFFIC PRICE ADJUSTMENT. Add the following: Traffic Price Adjustment will also apply to unacceptable driving conditions, such as severe bumps, "washboarding," potholes, excessive dust or mud, or dirty or out of place traffic control devices. The Engineer will make the sole determination as to whether the roadway or pedestrian facility is acceptable for full unimpeded use by the public. Failure to maintain an acceptable infrastructure or traffic control plan will result in a price adjustment equal to 100 percent of the applicable rate shown in Table 643-1, for the time the roadway or pedestrian facility is in an unacceptable condition.

Delete Table 643-1 and substitute the following:

TABLE 643-1
ADJUSTMENT RATES

Published ADT	Dollars/Minute of Delay/Lane
0-9,999	$30
10,000+	$40

If a curb ramp is not completed within 6 days, the Contractor will be assessed $4.00 for every minute the curb ramp remains under construction, under Item 643(23) Traffic Price Adjustment.

643-3.08 CONSTRUCTION SEQUENCING. Delete the last sentence and substitute the following: Unless otherwise determined by the Engineer and on an approved Traffic Control Plan (TCP), do not restrict traffic during the times listed below.

Lane Restrictions

1. Monday through Sunday from 0500 hours to 2000 hours apply at the following two locations:
   Old Seward Hwy and Dimond Blvd
   Minnesota Dr and 33rd Ave

2. Monday through Friday from 0600 hours to 0800 hours and 1600 hours to 1930 hours. Saturday from 0500 hours to 2000 hours apply at the following two locations:
   C St and 36th Ave
   Lake Otis Pkwy and Northern Lights Blvd

School Coordination Plan

Obtain the local school bus schedule and coordinate his work efforts to ensure the school buses are not delayed through the construction zone. This plan shall be submitted, as a

TCP, to the Engineer for approval before the implementation of the school bus coordination plan.

Closures

The Contractor will be allowed two-weekend closure for each of the following intersections:

1. Old Seward Highway and 88th Avenue – paving, median, curb and gutter, and electrical work.

2. C Street and 36th Avenue – paving, median, curb and gutter, and electrical work.

The closures shall be from Friday at 2200 hours to Monday at 0500 hours.

Phasing

The Contractor may work at multiple locations simultaneously. However, once work has started at a location, all work must be completed at that location within the following number of calendar days:

1.	Old Seward Hwy and 88th Ave	30 days
2.	C St and 36th Ave	26 days
3.	Minnesota Dr and 33rd Ave	20 days
4.	Northern Lights Blvd and Lake Otis Pkwy	20 days

Failure to complete the work at the above locations in the times indicated will result in traffic price adjustments. Installation of the above ground signal and illumination components may fall outside of these times. In this case, traffic signal and illumination installation shall be completed according to subsection 108-1.06.

Work Restrictions

No construction activity shall occur on the west leg of 88th Ave during the months of November through December.

643-3.09 INTERIM PAVEMENT MARKINGS. In the second paragraph, delete the words "or cover them with black removable preformed marking tape."

Replace the first sentence in the last paragraph with the following: Apply final pavement markings according to subsection 670-3.01, Construction Requirements of these Special Provisions. (12/14/06)R222USC04

Add the following subsection:

643-3.10 LIGHTING OF NIGHT WORK

Illuminate the night work areas specified in Table 643-2 to the light levels specified.

Table 643-2 does not provide a comprehensive list of operations that require lighting. Provide lighting for other operations when necessary.

Table 643-2 Night Work Illumination Level and Area of Coverage

Type of Work or Equipment	Lighting Configuration
Paving, Milling, Striping, Pavement Marking Removal, Rumble Strip Installation	At least 2 machine mounted balloon lights with a cumulative wattage of at least 4000 watts. Provide additional lights or wattage if necessary to provide complete coverage.
Rolling, pavement sweeping	At least 4 sealed beam halogen lamps in the front and four in the back. Each should be at least 55 watts.
Flagging	Two balloon lights of at least 2000 watts each located within 30 feet of the normal flagger location. Locate one on the right side of the road beyond the flagger and the other on the left side of the road in front of the flagger.
Truck Crossings (meaning where haul vehicles cross or enter a road): 1) with roads with ADTs over 10,000 or 2) that are controlled by portable traffic signals or flaggers	Two balloon lights of at least 2000 watts each, located on the main road, one on the far right side of the intersection, the other on the near left. Locate lights within 30 feet of the edges of the side street. If there is a flagger at the crossing, locate the lights to also meet the requirements for flagging.

Use balloon lighting as the main light sources. Do not use floodlights without approval by the Engineer. When approved, install floodlighting in a manner that minimizes glare for motorists, workers, and residents living along the roadway. Locate, aim, louver, and/or shield light sources to achieve this goal.

The Engineer shall be the sole judge of when glare is unacceptable, either for traffic or for adjoining residences. When notified of unacceptable glare, modify the lighting system to eliminate it.

If the Contractor fails to provide required lighting equipment or provides lighting that creates unacceptable glare at any time, the Contractor shall cease the operation that requires illumination until the condition is corrected.

Lighting equipment shall be in good operating condition and comply with applicable OSHA, NEC, and NEMA codes.

Provide suitable brackets and hardware to mount lighting fixtures and generators on machines and equipment. Design mountings so lights can be aimed and positioned as necessary to reduce glare. Locate mounting brackets and fixtures so they don't interfere with the equipment operator or overhead structures. Connect fixtures securely in a manner that minimizes vibration.

Ensure ground, trailer, and equipment mounted light towers or poles are sturdy and freestanding without the aid of guy wires. Towers shall be capable of being moved as necessary to keep pace with the construction operation. Position ground and trailer mounted towers and trailers to minimize the risk of being impacted by traffic on the roadway or by construction traffic or equipment.

Raise trailer or equipment mounted lights to maximum height, except do not exceed the clearance required for overhead objects such as overhead signals, overhead signs, trees, aerial utilities, or bridges. Aim and adjust lights to provide the required light levels. Provide uniform illumination on the hopper, auger, and screed areas of pavers. Illuminate the operator's controls on machines uniformly.

Furnish each side of nonstreet legal equipment with a minimum of 75 square inches high intensity retroreflective sheeting in each corner, so at least 150 square inches of sheeting is visible from each direction. Provide red sheeting on the rear of the equipment and yellow sheeting elsewhere.

Existing street and highway lighting and conventional vehicle headlights do not eliminate the need for the Contractor to provide lighting meeting the requirements of Table 643-2.

Provide sufficient fuel, spare lamps, spare generators, and qualified personnel to ensure that required lights operate continuously during nighttime operations. Ensure generators have fuel tanks of sufficient capacity to permit operation of the lighting system for a minimum of 12 hours. In the event of a failure of the lighting system, discontinue the operation that requires illumination until the required level and quality of illumination is restored.

Maintain a supply of at least twenty emergency flares for use in the event of emergency or unanticipated situations. Comply with local noise ordinances.

Install post mounted electroliers located within the clear zone, on NCHRP 350 compliant breakaway bases.

Standard Modifications

Add the following new subsection:

643-3.11. HIGH VISIBILITY CLOTHING. Ensure workers within project limits wear an outer visible surface or layer that complies with the following requirements:

1. Standards.

   Use high visibility garments conforming to the requirements of ANSI/ISEA 107-2004, Class 2 for tops or Class E for bottoms, and Level 2 retroreflective material.

2. Labeling.

   Use garments labeled in conformance with Section 11.2 of ANSI/ISEA 107-2004; except you may use previously purchased garments labeled in conformance with ANSI/ISEA 107-1999 until 1/1/08.

3. Tops.

   Wear high visibility vests, jackets, or coverall tops at all times.

4. Bottoms.

   Wear high visibility pants or coverall bottoms during nighttime work (sunset to sunrise). Worksite traffic supervisors, employees assigned to traffic control duties, and flaggers wear high visibility pants or coverall bottoms at all times.

5. Outer Raingear.

   Wear raingear tops and bottoms conforming to requirements of in this subsection 643-3.11.

6. Exceptions.

   When workers are inside an enclosed compartment of a vehicle, they are not required to wear high visibility clothing.

7. Condition.

   Furnish and maintain vests, jackets, coveralls, rain gear, hard hats, and other apparel in a neat, clean, and presentable condition. Maintain retroreflective material to Level 2 standards. (3/15/06)E29

Special Provisions

643-4.01 METHOD OF MEASUREMENT. Add the following:

Replace the second sentence of Item 2 with the following: Special Construction Signs are measured by the total area of legend bearing sign panel, as determined under subsection 615-4.01 and compensation for a 24 hour period shall be made under Construction Signs in the Traffic Control Rate Schedule.

Add the following: No measurement required to provide a 24-hour toll free (1-800-###-####) "hotline road report" telephone with a prerecorded message, and weekly notices with daily updates. Work will be subsidiary to Item 643(1) or 643(2), Traffic Maintenance. (12/14/06)R222USC04

Item 643(20A) Temporary Detour at Old Seward Hwy and 88th Ave will not be measured for payment.

Item 643(20B) Temporary Detour at C Street and 36th Ave will not be measured for payment.

Standard Modification

643-5.01 BASIS OF PAYMENT. Add the following: Payment for high visibility clothing for workers is subsidiary to other items. (5/01/07)E29

Special Provisions

643-5.01 BASIS OF PAYMENT. Add the following:

16. Work Zone Illumination. Payment for work zone illumination and any required adjustments to work zone illumination is subsidiary to other items. ES14(3/15/06)

17. Temporary Detour. The lump sum payment for Item 643(20) Temporary Detour will consist of all traffic control devices, flaggers, pilot cars, portable changeable message board signs, and subsidiary items necessary to implement the detour. Warning lights, high-level warning devices, vertical panels, and sign supports required for traffic control devices are subsidiary.

Add the following: The Engineer does not require a change order/directive for Item 643(25) Traffic Control.

The Engineer will pay for Item 643(15) Flagging on a contingent sum basis at the rate of $41/hour. The Engineer does not require a change order/directive for the flagging pay item. Flagging associated with Change Order work will be paid at the prices according to subsection 109-1.05 Compensation for Extra Work. (12/14/06)R222USC04

TRAFFIC CONTROL RATE SCHEDULE

Traffic Control Device	Pay Unit	Unit Rate
Construction Signs	Each/Day	$5.00
Special Construction Sign	Square Foot	$20.00
Type II Barricade	Each/Day	$ 3.00
Type III Barricade	Each/Day	$ 10.00

Traffic Control Device	Pay Unit	Unit Rate
Traffic Cone or Tubular Marker	Each/Day	$ 1.00
Drums	Each/Day	$ 3.00
Sequential Arrow Panel	Each/Day	$55.00
Portable Concrete Barrier	Each	$60.00
Temporary Crash Cushion / ET-2000 LET	Each	$3,000.00
Pilot Car	Hour	$65.00
Watering	M-Gallon	$ 20.00
Street Sweeping	Hour	$150.00
Power Broom	Hour	$75.00
Plastic Safety Fence	Foot	$.75
Portable Changeable Message Board Sign	Calendar Day	$150.00
Temporary Sidewalk Surfacing	Square Foot	$1.15
Flexible Markers	Each	$50.00
Removal of Pavement Markings	Foot	$1.25
Temporary Guardrail	Foot	$21.00

Delete Item 643(15) and add the following pay items:

Pay Item	Pay Unit
643(15) Flagging	Contingent Sum
643(20A) Temporary Detour at Old Seward Hwy and 88th Ave	Lump Sum
643(20B) Temporary Detour at C St and 36th Ave	Lump Sum
643(20C) Temporary Detour at Lake Otis Pkwy and Northern Lights Blvd	Lump Sum

(12/14/06)R222USC04

SECTION 644

SERVICES TO BE FURNISHED BY THE CONTRACTOR

Special Provisions

644-2.01 FIELD OFFICE. Delete this subsection in its entirety and substitute the following: Furnish and maintain a suitable office for the Engineer, available for occupancy from 2 weeks before beginning work, through 30 days after issuance of the notice of project completion as defined in subsection 105-1.15. The following office requirements shall be met:

1. A minimum of 1,000 square feet of floor area. The office area shall be divided so that it contains an office room separated by a closable door. The office room shall have a minimum of 160 square feet of floor area.

2. A thermostatically controlled interior heating system with necessary fuel.

3. Adequate electrical lighting and 120 volt, 60 hertz power, with a minimum of 6 electrical outlets.

4. A minimum of 100 square feet of window area and adequate ventilation.

5. Adequate parking for a minimum of 16 vehicles, with one handicap parking space meeting the requirements of Americans with Disabilities Act Accessibility Guidelines (ADAAG).

6. Attached indoor plumbing with sanitary lavatory facilities and potable drinking water provided.

7. Four telephone service lines available at the office location. One of the lines provided is to be available for a facsimile machine/dial-up Internet connection. Provide Internet connection with send and receive data capability supporting 56 kilobytes per second or higher data transfer rate.

8. If a part of the Contractor's building, it shall be completely partitioned off from the balance of the structure and provided with a separate outside door equipped with a lock.

9. Located within 3 miles of the project.

10. Weekly janitorial service consisting of emptying trash receptacles, vacuuming office area and cleaning restrooms and counter areas.

11. Provide one mobilization and one demobilization of the Engineer's office equipment and furniture from Anchorage.

644-4.01 BASIS OF PAYMENT. Add the following: Long distance calls made by State personnel and the Internet service provider will be paid by the State. Local calls and connection fees shall be paid by the Contractor. (01/11/07) R63USC

SECTION 646

CPM SCHEDULING

Special Provisions

646-2.01 SUBMITTAL OF SCHEDULE Replace this subsection with the following: Submit a detailed initial CPM Schedule at the preconstruction conference for the Engineer's acceptance as set forth below.

The construction schedule for the entire Project shall not exceed the specified contract time. Allow the Engineer 14 days to review the initial CPM Schedule. Revise promptly. The finalized CPM Schedule must be completed and accepted before beginning work on the Project.

646-3.01 REQUIREMENTS AND USE OF SCHEDULE. Delete item 2. 60-Day Preliminary Schedule.

Delete the first sentence of item 3. Schedule Updates. and substitute the following: Hold job site progress meetings with the Engineer for updating the CPM Schedule. Meet with the Engineer monthly, or as deemed necessary by the Engineer. (12/13/02)R261M98

SECTION 660

SIGNALS AND LIGHTING

Special Provisions

660-2.01 MATERIALS.

1. Equipment List(s) and Drawings. Delete item a in its entirety and the last sentence in item d and substitute the following:

   a. Materials on the *Qualified Products List*: The Qualified Products List does not apply to the 660 items. Provide catalog cuts of materials to the Engineer for review and approval.

   d. Materials Not Requiring Certification: Only submit these materials for review and approval if they are included on the Materials Certification List (MCL).

2. As-Built Plans. Add the following:

   The Engineer will deliver one copy each to State Maintenance and Operations; Technical Services; and attach the appropriate sheets of the last set in clear plastic envelopes to the inside of each controller assembly and load center. In addition, submit two complete sets of all electrical related plan sheets. The Engineer will deliver one copy each to MOA Signal Electronics and MOA Street Light Maintenance.

CONSTRUCTION REQUIREMENTS

660-3.01 GENERAL. Delete items 3 through 8 in their entirety and substitute the following:

3. Excavating and Backfilling. Complete excavation and backfill required to install the signal and lighting components embedded in the roadway as shown in the Plans, including foundations, conduits, junction boxes, and loop detectors. Provide traffic control to complete this work according to the requirements of Section 643. Place excavated materials where it will not interfere with surface drainage.

   Support and protect conduits and utilities scheduled to remain in service when encountering them during excavation.

   Excavate trenches wide enough to install the number of conduits specified side by side, to provide clearances of at least 2½ inches around 2 inch conduits and at least 2 inches around conduits larger than 2 inches, and to compact the bedding and backfill materials according to these specifications.

To install conduits, excavate trenches deep enough to allow for 6 inches of bedding material, the depth of the largest conduit, and the minimum burial depth specified between the top of the conduit and finished grade of the ground above the conduit. Keep the longitudinal profile of trench bottoms free of irregularities that would prevent the assembled conduit run from continuously contacting the top of the bedding material.

Dispose of, according to subsection 203-3.01, excavated materials that remains after completing backfill work and excavated material not meeting the requirements of Selected Material, Type C, as defined in subsection 703-2.07.

Dewater excavations immediately before and during embedding and backfilling operations. Backfill excavations with materials that meet the following requirements

a. Around formed foundations and the tops of pipe pile foundations, use material that meets the requirements of Selected Material, Type A that passes through a 3 inch sieve,

b. Within the limits of the typical section, embed conduits and backfill trenches using material that meets the requirements of the lift where it is located, reusing excavated materials if it meets the requirements of the applicable lift,

c. In other locations, embed conduits and backfill trenches using material that meets the requirements of Selected Material, Type C, reusing excavated materials if it meets this requirement.

d. Import, when ordered, embedment and backfill materials that satisfy the preceding materials requirements.

Embed conduit(s) between two 6 inch lifts of material gleaned free of rocks exceeding a 1 inch maximum dimension. Grade and compact the first lift to provide a surface that continuously contacts the assembled conduit run.

Within 6 feet of paved surfaces and around foundations, backfill in uniform layers no more than 6 inches deep and compact each layer according to subsection 203-3.04. In other locations, compaction may be as approved by the Engineer.

4. Welding. Complete welding according to subsection 504-3.01.8. Welding and approved shop drawings.

Submit shop drawings of the proposed work with the welding plans for approval. The shop drawings shall include material specifications, component dimensions, the types of welds that will be made, and the proposed type and extent of weld inspection.

Repair the holes, which were used to mount equipment, in reused poles and mast arms by welding in disks flush with the adjoining surface. For the disk material,

use steel that matches the ASTM designation, grade, and thickness of the steel used to fabricate each pole. Cut disks that match the dimensions of the hole being repaired from pieces of steel plate bent to match the pole's radius at the hole. Grind the welds smooth and flush with the adjoining pole and disk surfaces. Repair the damaged finish according to subsection 660-3.01.8.

5. Removing and Replacing Improvements. The Contractor shall complete the following work at the Contractor's expense.
   a. Remove improvements that block completion of the work detailed in the Plans as specified herein.
   b. Reconstruct with new materials the nonreusable improvements the Contractor removed to complete the work, unless other items in the contract cover the improvements.
   c. Replace with new materials the reusable items damaged by the Contractor, that are specified for reuse.
   d. Reconstruct with new materials improvements that the Contractor damaged or removed, that do not conflict with the work and are not scheduled for removal.

Nonreusable improvements consist of cast in place items, including: asphalt concrete pavement, sidewalks, curb and gutter, lawns, and traffic markings. Reusable improvements include the items that were made before installation. Crushed aggregate base material may not be used as backfill in the base course if excavation depth exceeds the thickness of the base course.

Complete reconstruction work, including materials, according to the applicable sections of the Alaska SSHC, and leave the work in a satisfactory and serviceable condition. In completing the reconstruction work, match the alignments, widths, thicknesses, shapes, sizes, cross sections, and finishes of the existing improvements.

If removing a portion of sidewalk or curb and gutter, remove an entire segment between the weakened plane contraction joints or between an expansion joint and a weakened plane contraction joint.

Before removing a segment of Portland or asphalt cement concrete material, cut completely through the material with a saw along the outline of the area to be removed. Make cuts neat and true and prevent shatter outside the area removed.

To replace lawns, leave the top of the backfilled excavation low enough to install 4 inches of compacted topsoil. Match the top of the topsoil with the bottom of the vegetative mat. Apply seed and keep the seeded areas watered according to Section 618.

Remove, keep alive, and replant trees, shrubs, and plants according to Section 621. Replace the trees, shrubs, and plants that do not survive with plants of like size and type.

6. Salvaging and Reusing Electrical Equipment. When the Plans include existing electrical equipment scheduled for removal or relocation, remove and store the equipment listed in the following paragraph without damaging it. Deliver removed equipment not scheduled for reuse to the nearest District Maintenance Station or place specified in the Plans or Special Provisions. Notify the district superintendent or person specified by telephone one-week before planned delivery date.

Salvage the controller assemblies, signal heads, mounting brackets, luminaires, lighting standards, signal posts and poles, mast arms, optical detectors, load centers, light emitting diode optical units, and the lids of junction boxes scheduled for removal and other materials scheduled for relocation. The Contractor shall replace at the Contractor's expense salvaged equipment damaged or destroyed before or during delivery or reinstallation.

Controller assemblies and load centers include the cabinet and equipment contained in the cabinet before Contract award.

Remove from the highway right-of-way materials associated with the equipment removed or relocated and not scheduled for reuse, including conduits, junction boxes, conductors, and foundations. Raze the tops of foundations abandoned in place according to subsection 660-3.02. Fill the holes left by removing junction boxes and foundations with selected material type A and compact as directed.

With approval, after removing conductors, buried conduits that do not interfere with other construction may be abandoned in place with a credit taken by the Department. Remove the ends of abandoned conduits from the junction boxes that will remain in service.

Within 15 days of the Notice to Proceed, complete an inventory of the materials that will be salvaged in the presence of the Engineer. Note the location and condition of the materials. When material specified for reuse is found in an unserviceable condition, the Engineer will determine whether to repair it or replace it with new material, which will be paid for as extra work under subsection 109-1.05. Retain a copy of the inventory and give the original documents to the Engineer.

When the Plans specify reinstalling existing equipment at new locations and installing State furnished equipment, complete the following work at the Contractor's expense.

a. For poles, install new foundations, furnishing the new nuts, bolts, washers, and conduits needed to complete the installations.

b. For lighting poles, install new illumination tap wires and fused disconnect kits.

c. For luminaires, clean the luminaires inside and out and install new lamps of the same wattage.

d. For signal heads, furnish and install the mounting brackets needed to complete the relocation, and clean the signal heads inside and out.

e. For poles and undisturbed poles from which the Plans specify removing equipment, repair the holes that were made to mount equipment according to subsection 660-3.01.4. Welding and repair the finishes according to subsection 660-3.01.8.

When ordered, the Engineer will pay for repairing damaged finishes on existing equipment according to subsection 660-3.01.8 as extra work.

If deciding to use new equipment rather than reusing the equipment specified, notify the Engineer of the change and include a submittal according to subsection 660-2.01.1.

7. Field Tests. Electrical circuits must pass the following tests before the Engineer will accept the work for payment. Perform these tests in the presence of the Engineer, and document the results of each test on a per circuit basis. Retain a copy of test results and give the original documents to the Engineer. Furnish equipment needed to perform these tests.

Replace or repair at the Contractor's expense, and in an approved manner, faulty materials and work revealed by these tests. After making repairs, repeat tests on the repaired circuit and continue this process until circuits have passed required tests. The Department reserves the right to have the Contractor retest circuits, and to use the retest results to accept or reject individual circuits.

a. Grounds. Before completing the circuitry and functional tests, physically examine conduits ends, junction box lids, load centers, and the foundations for signal posts and poles, lighting poles, and controller cabinets to ensure the grounding system required by subsections 660-3.06 and 661-3.01 has been installed and splices and connections are mechanically firm.

b. Continuity. Test each loop detector circuit for continuity at the roadside junction box before splicing the loop detector to the lead-in cable. Each loop detector must have a resistance less than 0.5 ohms.

After splicing the loop detectors to the lead-in cables, test each pair at the controller or detector cabinet. Each pair must have a value less than 5 ohms for single pair lead-in cables and 10 ohms for multipair lead-in

cables. The continuity test ohm reading at the cabinet must be greater than the ohm reading measured for the loop detector at the junction box.

c. Insulation Resistance (megohm) Test. Complete this test to verify the integrity of each conductor's insulation after pulling the conductors and cables into position and before terminating the conductors. At 500 volts DC, each conductor's insulation shall measure a minimum resistance of 100 megohms or the minimum specified by the manufacturer. With single conductors, complete the test between each conductor and ground. In each multiconductor cable, complete the test between conductors and between each conductor and ground.

After splicing the loops to the shielded pairs in the lead-in cables, measure each pair in the lead-in cables at the controller or detector cabinet between one conductor and the cabinet ground rod.

d. Inductance Test. Measure each detector loop and lead-in cable system at the controller or detector cabinet. The inductance must be in the range of 50 to 500 microhenries.

e. Circuit. Energize every signal indication circuit with lamps installed before installing the load switches.

f. Functional. Perform the following tests on each signal and lighting system after the component circuits have satisfactorily passed the tests for continuity, grounding, insulation integrity, and circuitry.

1) For each new traffic signal system, complete at least 24 hours of flashing operation, followed by not less than 5 days of continuous, satisfactory operation. The Engineer may decide to omit the flashing portion of the test for modified signal systems and for new signals that replaced existing signals that remained in operation during the construction phase.

If the Engineer omits flashing operation and the system performs unsatisfactorily, correct the condition and repeat the test until the system runs for five days with continuous, satisfactory operation.

Begin the signal functional tests between 9:00 a.m. and 2:00 p.m. on any day, except a Friday, Saturday, Sunday, a legal holiday, or the day before the legal holiday.

Before each system turn on, aim signal faces according to subsection 660-3.08 and ensure equipment specified in the Plans is installed and operable, including: pedestrian signals and push

buttons; signal backplates and visors; vehicle detectors; highway lighting; and regulatory, warning, and guide signs.

2) Perform the functional test for each highway lighting system and sign illumination system until the systems burn continuously 5 days without the photocell, followed by a 5 day operational test using the photocell.

3) Perform the functional test for each flashing beacon system for not less than 5 days of continuous, satisfactory operation.

4) Perform a continuous 5 day burning test on each pedestrian overpass and underpass lighting system before final acceptance.

A shut down of the electrical system due to a power interruption does not constitute discontinuity of the functional test if the system functions normally when power is returned.

8. Repairing Damaged Finishes. Examine new, reused, and State furnished equipment for damage to its finish before putting the equipment into service. Repair the damaged finishes found according to the following:

a. Galvanized. Repair damaged areas more than 12 inches away from welds and slip fit areas, by applying a minimum 7.8 mils of zinc based alloy applied according to ASTM A780.

If the damaged areas are within 12 inches of welds and slip fit areas, make the repair by applying a minimum 7.8 mils of zinc rich paint applied according to ASTM A780.

b. Painted. Repair damage to painted finishes according to the following

(1) Wash the equipment with a stiff bristle brush using a solution containing two tablespoons of heavy-duty detergent powder per gallon of water. After rinsing, wire brush surfaces to remove poorly bonded paint, rust, scale, corrosion, grease, or dirt. Remove dust or residue remaining after wire brushing before priming.

(2) Factory or shop cleaning methods may be used for metals if equal to the methods specified herein.

(3) Immediately after cleaning, coat bare metal with pretreatment, vinyl wash primer, followed by 2 prime coats of zinc chromate primer for metal.

(4) Give signal equipment, excluding standards, a spot finishing coat on newly primed areas, followed by 1 finishing coat over the entire surface.

(5) Give nongalvanized standards 2 spot finish coats on newly primed

areas.

Paint coats may be applied either by hand brushing or by approved spraying machines. Perform the work in a neat and workmanlike manner. The Engineer reserves the right to require the use of brushes for the application of paint, should the work done by the paint spraying machine prove unacceptable.

Add the following new item 9:

9. Regulations and Code. Complete work according to the standards of the NEC, the NESC, and local safety codes as adopted and amended by the authority having jurisdiction.

660-3.02 FOUNDATIONS. Under item 1. Cast-in-Place Foundations., add the following to the first paragraph: Locate the tops of traffic signal post and pole foundations flush with the adjacent finished: walkway, shoulder, or surrounding ground.

1. Cast-in-Place Foundations. In subparagraph f, revise the second sentence to read: Before placing the form or reinforcing steel cage, remove loose material from the bottom of the hole to ensure the foundation rests on firm, undisturbed ground.

In the second sentence of sub-item i delete "prior to grouting." and substitute "before attaching the skirt."

In the first sentence of sub-item j, delete "concrete pile caps" and substitute "foundations"

Delete item k and add the following new items k and l:

k. Install the bottoms of the bottom leveling nuts in a level plane within 1 inch of the top of foundations. Adjust all nuts until their tops form a level plane. Install one washer on top of all leveling nuts and, after setting the pole on these washers, install one washer under all top nuts.

Bring all leveling nuts (bottom nuts) to full bearing on the bottom of the base plate.

Generously lubricate the bearing surface and internal threads of top nuts with beeswax. Tighten all top nuts to a "snug" condition. Use a click-type torque wrench to apply 600 foot-pounds of torque to the "snug" top nuts.

After torquing the top nuts, use a hydraulic wrench to rotate all top nuts an additional one sixth (60°) turn, while preventing the leveling nuts from turning.

l. Attach a #4 AWG, bare, solid copper wire as a grounding electrode conductor to the #4 spiral bar in the reinforcing steel cage. Use an irreversible compression connector or cadweld to make the attachment. Protect the attachment during concrete placement. In foundations that lack reinforcing steel cages, install 21 feet of coiled 4 AWG, bare, solid copper wire as the grounding electrode. Route the conductor to protrude near the top, center of the foundations. Slide a minimum 6-inch long, nonmetallic, protective sleeve over the conductor. Allow 1 inch of the sleeve and 24 inches of conductor to protrude from the foundations.

Replace subsection 660-3.03 with the following:

660-3.03 CONDUIT. Electrical conductors shall be installed in conduit, except for overhead wiring, wiring inside poles, and when otherwise specified. Use rigid metal conduits (RMC) and fittings for raceways, including bored casings, except when the Plans specify using polyethylene conduits. Install conduits of the sizes specified along the routes detailed on the Plans. When routing is not shown, route conduits as directed by the Engineer.

1. Install conduits at least 30 inches below the finished grade of the ground above the conduit, except conduits that will be sealed under a minimum 4 inch thick Portland cement concrete sidewalk may be installed a minimum of 18 inches below the top back of curb or surface above the conduit, whichever is lower.

2. Install conduits that cross unpaved areas and paved roadways that will be overlaid in excavated trenches. Excavate, bed conduits, and backfill trenches according to subsection 660-3.01.3, Excavating and Backfilling.

3. Install conduit(s) under paved roadways and approaches that will not be overlaid by boring or drilling methods. Jacking conduits into position is allowed. However, if subsurface conditions prevent the successful completion of the work, install the conduit(s) by boring or drilling methods without additional compensation.

4. Sweep both rigid metal and polyethylene conduits through the open bottom of junction boxes by installing 90 degree rigid metal elbows on the ends of conduit runs. To each elbow, install a nipple that terminates 5 to 12 inches above the bottom edge of each junction box.

5. Install the tails of loop detectors without elbows through the walls of junction boxes at elevations that ensure the loops drain into the box. Extend the ends a minimum of 2 inches beyond the inside wall of the box.

6. Drill a 3/8 inch drain hole in the bottom of the lower straight section of elbows and in the bottom of conduits at the low points of conduit runs. Smooth the edges of the drilled holes on the inside of elbows to prevent scraping the conductors.

Cover the holes with a wrap of approved filter cloth secured with 2 self clinching nylon cable ties.

7. Keep conduits clean. Install grounding bushings and approved plastic insert type plugs on the ends of conduit runs before backfilling around the conduit ends.

8. At the low points of conduit runs, install sumps containing a minimum 2 cubic-feet of coarse concrete aggregate material that conforms to subsection 703-2.02. Compact the aggregate sumps as directed to prevent settlement of the trench backfill.

9. Install conduits that must cross existing facilities such as storm drain pipes, duct systems, and other underground utilities at the minimum depths specified, going under the facilities if necessary. Install additional drains and aggregate sumps at the low spots, if any.

10. Position conduits in trenches, junction boxes, and foundations to provide clearances of at least 2½ inches around 2 inch conduits and at least 2 inches around conduits larger than 2 inches.

11. Fabricate rigid metal conduits less than 10 feet long from standard lengths of conduit. Cut conduits squarely to ensure the threading die starts squarely on the conduit. Cut the same number of threads as found on the factory threaded ends. Ream the inside of conduit ends cut in the shop or field to remove burrs and sharp edges. Do not use slip joints or pieces of running thread pipe.

12. Coat drilled holes, shop and field cut threads, and the areas with damaged zinc coating with zinc rich paint.

13. When standard couplings cannot be used to join conduit components, use approved threaded unions.

14. Bury a continuous strip of 4 mils thick, 6 inch wide polyethylene marker tape above underground conduit runs. Install the tape 9 inches (± 3 inches) below finished grade, using two strips side by side to mark road crossings. Furnish tapes with a black legend on a red background.

15. If encountering obstructions during jacking or drilling operations, obtain approval and cut small holes in the pavement to clear the obstruction. Locate the bottom inside face of the bore pit no closer than the catch point of a 1¼ to 1 slope (a horizontal to vertical ratio) from the edge of pavement. Do not leave these pits unattended until installing an approved means of protection.

16. When the Plans specify using polyethylene conduit, install RMC in structures and foundations, between type 2 and 3 load centers and the nearest junction box, and on the surfaces of poles and other structures.

17. In foundations, install 90 degree elbows and conduits of the size and quantity shown on the Plans. Extend the conduits a maximum of 2 inches above the top of the foundations for posts and poles with breakaway bases and 4 inches above the top of foundations for fixed base structures.

18. Seal conduits leading to electrical equipment mounted on soffits, walls, and other locations below the grade of the serving junction box with an approved duct sealing compound.

19. Install expansion fittings in conduits that cross expansion joints.

20. Install a polypropylene pull rope with a minimum 200 pound tensile strength in future use or spare conduits, and reinstall the plugs. Double back at least two feet of pull rope into both ends of each conduit.

21. The Contractor may install conduits larger than the sizes specified. If used, it must be for the entire length of the run. Reducing couplings or bushings are not allowed. Complete work associated with installing conduits larger than specified without extra compensation.

22. Clean existing conduits that will remain in service using a heavy duty air compressor that delivers at least 125 cubic feet of air per minute at a pressure of 110 pounds per square inch. Clean the conduits before pulling in new cables and after removing cables specified to be removed or replaced as follows:

    a. When the conduits contain cables that will remain in service, leave the cables in place during the cleaning, and
    b. Ream empty conduits with a mandrel or cylindrical wire brush before blowing them out with compressed air.

23. When modifying existing conduit runs, complete the work as required for new installations using the same sizes and types of conduit. When extending existing conduits, add no more than 90 degrees of horizontal bend to the extension.

24. When installing a junction box in a continuous run of existing conduit, remove a length of conduit in each conduit run and complete the work of installing the conduits, elbows, and nipples as required for a new installation.

25. When adjusting existing junction boxes to a new grade, remove cables and replace the nipples as required to provide the clearances specified for new installations.

26. Remove the ends of abandoned conduits from junction boxes that will remain in service.

27. When Plans call for connecting polyethylene conduit to RMC use an electrofusion coupler rated for direct bury application. The coupler must be rated for same wall thickness as the adjoining conduits. Thread the ends of the RMC with the same number of threads as found on the factory threaded ends of RMC. Ream the inside of conduit ends cut in the shop or field to remove burrs and sharp edges.

Replace subsection 660-3.04 with the following:

660-3.04 JUNCTION BOXES. Install precast reinforced concrete junction boxes of the types specified. For junction boxes that contain traffic signal conductors, furnish cast iron lids with the word TRAFFIC inscribed into them. For junction boxes that contain lighting conductors exclusively, furnish cast iron lids with the word LIGHTING inscribed into them.

Junction Box Location

When shown, install junction boxes at the station and offset locations specified. When lateral locations are not specified, install junction boxes 8 feet from the face of curb or edge of pavement. If the 8 feet offset falls:

1. In a pedestrian facility separated less than 7 feet from the roadway face of curb or edge of pavement, increase the offset and install the junction boxes on the backside of the facility. When lacking the right of way to install junction boxes outside the pathway, install at locations as directed, avoiding curb ramps, curb ramp landings, and the middle of walkways.
2. In a pedestrian facility separated at least 7 feet from the roadway face of curb or edge of pavement, reduce the offset and install the junction box next to the facility.
3. Outside the right of way, install the boxes just inside the right of way line.
4. In a raised median, install junction boxes near the center of the median.
5. In a ditch bottom or area that collects drainage, install the junction boxes at locations as directed.
6. Behind guardrails that shield slopes steeper than 3:1 (a horizontal to vertical ratio), install junction boxes between posts and at least 5 feet back from the face of rail.
7. On top of underground utilities or storm drains, install the junction boxes at locations as directed.

Longitudinally, install junction boxes adjacent to the loop detectors or pole they serve, except avoid installing type 1A junction boxes in driveways and in locations subject to use by heavy trucks. When shown near the ends of medians, install junction boxes at least 10 feet from the median end. When the offsets for electroliers and flashing beacon posts place them near the junction boxes that serve them, install the junction boxes on the side of the electroliers and posts downstream of traffic flow.

Limitations

Limit the distance between adjacent junction boxes to the following dimensions:

1. 400 feet for conduits that contain signal interconnect cable only.
2. 300 feet for conduits that exclusively contain two loop lead-in cables.
3. 300 feet for conduits that contain a single cable other than signal interconnect.
4. 190 feet for conduits that contains more than one cable.

When establishing junction box spacing a bare ground conductor is not considered a cable.

If the preceding limitations require installing additional junction boxes not shown on the Plans, the Engineer will pay for them as extra work, otherwise, installing additional junction boxes will be at the Contractor's expense.

After grading the roadside, vertically adjust those junction boxes that do not conform to the following criteria. In unpaved areas that will not be seeded, in areas adjacent to pedestrian facilities, and in paved medians, install the tops of junction boxes 1 inch below finished grade. In seeded areas, install the tops of junction boxes to 2 inches below the seeded surface.

Bond junction box lids to an equipment grounding conductor according to subsection 660-3.06. Attach the jumpers to the lids with brass or stainless steel hardware.

Install a stone drain under each junction box. Drains shall consist of coarse aggregate for concrete that conforms to subsection 703-2.02. Minimum drain dimensions include an 18" depth and a length and width equal to those of the junction box it drains. Compact the aggregate material as directed to prevent junction box settlement.

In every new and reused junction box, install an electronic marker that consists of an antenna encapsulated in a 4 inch diameter red polyethylene ball. Furnish markers that conform to the American Public Works Association standards for locating power. Markers shall respond to locator devices up to 5 feet away, work at all temperatures, and contain no internal power source. (4/17/07)R66USC04

All knockouts for conduits entering through the side of a junction box shall be neatly grouted. Where existing conduit which enters through the side of a junction box is removed, the knockout shall be neatly grouted.

660-3.05 WIRING. Delete the second paragraph in its entirety and substitute the following:

Conditions

Do not pull conductors into conduits until the following conditions are met:

a. The prescribed clearances around conduit ends are provided,
b. Crushed rock sumps are installed under junction boxes,

c. Conduit ends protrude above the bottom of junction boxes within the prescribed range,
d. New conduits are free of material that became lodged in them during the completion of the work,
e. Reused conduits are cleaned according to subsection 660-3.03,
f. Junction boxes are set to grade, and
g. Grounding bushings are installed on the ends of metallic conduits.

Delete item 3 in its entirety and substitute the following:

3. Pull, as a unit, the conductors specified to be installed into clean conduits, leaving existing conductors that will remain in service in place.

Add the following line to Table 660-1 under subitem a. of item 9.

LOOP DETECTOR NUMBER	COLORED PAIR
Usually a spare pair	Orange and Black

Delete items 11 and 12 in their entirety and substitute the following:

11. Encapsulate illumination cable splices in rigid 2 piece plastic molds filled with an insulating and sealing epoxy resin. Furnish molds large enough to complete the splices and encase the cable jackets in the epoxy resin. Furnish molds rated for 600 volts AC operation and feature fill and vent funnels for epoxy resin. Fill the splice mold bodies with epoxy resin that is resistant to weather, aromatic and straight chain solvents, and that will not sustain combustion.

    When approved by the Engineer, 1 splice may be used in the following cases;

    a. An in-line splice may be used when a planned cable run exceeds the length available from the manufacturer on a single spool of cable.
    b. In a run of 1,000 linear feet or more.

    When a cable is spliced it shall occur within an appropriately sized j-box or in the base of an electrolier designed for said splice.

12. Encapsulate loop lead-in and telemetry cable splices in rigid, transparent, PVC molds filled with reenterable polyurethane electrical insulating and sealing compound. Furnish splice kits rated for 1000 volts AC operation and direct burial.

    Provide reuseable four piece molds that are held together with stainless steel hose clamps. Two pieces form a cylinder and two flexible end caps seal the ends and allow the conductor entry. Use molds with dimensions suitable for the splice made, encase the cable jackets, and have fill and vent funnels.

Insert a loose woven polyester web that allows a full ¼ inch of insulating compound to flow between the splice and the inside of the mold. Fill the PVC molds with reenterable polyurethane electrical insulating and sealing compound that cures transparent, is nontoxic, is noncorrosive to copper, and does not support fungi or mold growth.

Add the following items:

18. Retrofit reused poles with new tap wires, fused disconnect kits, and fuses.

19. Whenever conductors can not be terminated as specified in the Plans in circuit breakers due to size, splice a piece of #8 AWG power conductor onto the end of each conductor using an overlap type, irreversible compression connector. Insulate the splice with heat shrink tubing. Complete the splice in the space between the top of the load center foundation and the bottom of the cabinet. Limit the length of the #8 AWG conductor to 5 feet.

Replace subsection 660-3.06 with the following:

660-3.06 BONDING AND GROUNDING. Bond and ground branch circuits according to the NEC and the following requirements. Make noncurrent carrying but electrically conductive components, including: metal conduits, junction box lids, cabinets, transformer cases, and metal posts and poles, mechanically and electrically secure to an equipment grounding conductor. Make fixtures mounted on metal poles, including signal components and luminaires, mechanically and electrically secure to the pole.

Install grounding bushings with insulated throats on the ends of metallic conduits.

Install a bare stranded copper wire for the equipment grounding conductor in conduits, except those conduits installed for future use. Install size 8 AWG conductors, except in those conduits that contain circuit conductors larger than 8 AWG. In this case, install a wire equal in size to the largest circuit conductor. Attach the grounding conductors to the grounding bushings, leaving 12 inches of slack between each bushing. Connect grounding conductors together using irreversible compression type connectors to form a fully interconnected and continuous grounding system.

Retrofit existing spare conduits that will contain new cables exclusively with new grounding bushings. When the Plans require installation or removal of conductors from existing conduits, retrofit with new grounding conductors sized according to the preceding paragraph.

Bond junction box lids to the grounding conductor using copper braid with a cross sectional area equal to an 8 AWG conductor and eyelets spaced at 6 inch intervals. Connect bonding jumpers to the grounding conductors using irreversible compression type connectors. Replace missing or damaged conduit and junction box lid bonding jumpers.

Join the equipment grounding conductors from the conduits to the 4 AWG grounding electrode conductor using irreversible compression connectors at Portland cement concrete foundations. For pile foundations, attach the equipment grounding conductor from the conduit to the pile cap adapter with a listed mechanical grounding connector.

When installing signal poles, signal posts, and lighting standards with frangible coupling bases, run a 4 feet long grounding conductor from the grounding bushing on the conduit to the grounding lug located in the hand hole of each pole.

Bond slip base type standards and pedestals by using 2 conductors from the conduit, one attached with a ground rod clamp to an anchor bolt and the other connected to the grounding lug located in the hand hole of each pole.

Ground one side of the secondary circuit of a transformer.

Install a ¾ inch by 10 feet copper clad ground rod inside each controller cabinet foundation and a 6 AWG bare stranded copper wire for the grounding electrode conductor.

Replace subsection 660-3.08 with the following:

660-3.08 SIGNAL AND LIGHTING INSTALLATION REQUIREMENTS. Install signal and lighting equipment according to the details shown on the Plans and the following:

Apply antiseizing compound to the following fasteners: frangible couplings, mechanical grounding connectors, bolts that secure hand hole covers and signal mounting hardware to poles and mast arms. Remove the fasteners from luminaire mounting brackets, fused disconnect kits, grounding bushings, and signal faces which secure the visors, and apply antiseizing compound to these fasteners before completing the installation.

Before passing conductors through the holes made in posts, poles, and mast arms for wireways, remove the burrs and sharp edges from the inside and outside of these holes.

Until each traffic signal and/or flashing beacon goes into operation, keep the vehicular and pedestrian signal faces covered with beige colored canvas shirts sized to fit the signal faces shown in the Plans. Each signal shirt shall feature elasticized openings that fit over the visors and at least two straps to secure it to the signal. Provide shirts with a legend that reads "out of service" and a center section that allows an operator to see the indications during system tests.

When not shown in the Plans, determine the shaft lengths of lighting and signal poles and signal mast arm connector plate locations to provide the plan mounting heights of luminaires and traffic signal heads.

Furnish work to install foundations for relocated poles, including: conduit, excavation, reinforcing steel, class A concrete, anchor bolts, nuts, and washers.

1. Electrolier Installation. Before installing electroliers, check the socket position of each luminaire to verify it matches the position indicated in the instructions for the light distribution type shown on the Plans.

   Install electroliers with mast arms with a slight rake by plumbing the side of the pole opposite the mast arm. After the pole has been plumbed, level the luminaire as recommended by the manufacturer.

   Install electroliers without mast arms with the centerline of the pole plumb.

2. Signal Pole Installation. Install signal poles with a slight rake by plumbing the side of the pole opposite the mast arm just above the base plate. Tighten the nuts on the anchor bolts as described in subsection 660-3.02k.

   Cover the gap between the foundation and base plate by installing a metal skirt around the base plate, secured with stainless steel sheet metal screws.

3. Vehicular Signal Head Installation. With two piece mast arms, do not install signal heads within 12 inches on either side of the slip type field splice.

   Attach each side mounted terminal compartment with two ½" x 13 bolts, with washers, threaded into holes tapped into the side of the pole at the location shown on Standard Drawing T-30. Install the vertical pipe members plumb.

   When installing 5 section vertically stacked signal heads on the sides of poles, secure the vertical pipe to the pole using a steel conduit hanger mounted 6 inches below the top horizontal pipe.

   Aim through phase vehicular signal faces at a point located a distance from the face as shown in Table 660-2. If two through signal faces are not visible from this point at a height of 42 inches above finished grade, consult the Engineer for corrective measures.

TABLE 660-2	
THROUGH PHASE SIGNAL FACE AIMING POINTS	
85th Percentile Speed (mph)	Minimum Visibility Distance (feet)
20	175
25	215
30	270
35	325
40	390
45	460
50	540
55	625
60	715

4. Pedestrian Signal and Push Button Installation. Orient pedestrian signal faces at the center of the crosswalk on the opposite side of the street. Attach each clamshell bracket with two ½" x 13 bolts threaded into holes tapped into the side of the pole. Install a spacer, furnished by the bracket manufacturer, on each bolt.

   Install the push button on the crosswalk side of the pole. Install R10-3B (R or L) push button signs above each push button. Furnish signs with the arrow pointing in the direction of the appropriate crosswalk. When channel is used for mounting push button signs, tap the top and bottom sign bolts into the pole.

5. High Tower Lighting System Installation. Assemble and install high tower poles according to the written instructions furnished by the manufacturer. To assemble and install poles other than as recommended, furnish a plan stamped by a registered professional engineer to the Engineer for approval. Furnish timbers required to assemble the pole, regardless of the method of assembly.

   Position the pole during assembly to avoid moving the pole on the ground when lifting the pole to install it on its foundation. When conditions around a foundation preclude assembling the pole on site, assemble the pole as close as possible to the foundation and move the pole into position for installation on its foundation. Before moving a pole, submit a plan stamped by a register professional engineer for moving poles without damage to the Engineer for approval.

   Install the lowering system including masthead assembly, luminaire ring, winch assembly, and cables as instructed by the manufacturer's on site representative.

   Install and level the luminaires according to the manufacturer's written installation instructions.

Furnish the Engineer an instruction sheet from the manufacturer for orienting reflectors in luminaires that provide an asymmetrical light distribution. Adjust the luminaire reflectors on each pole according to this sheet until they are oriented in the same direction and distribute light according to the pattern shown on the illumination sheets.

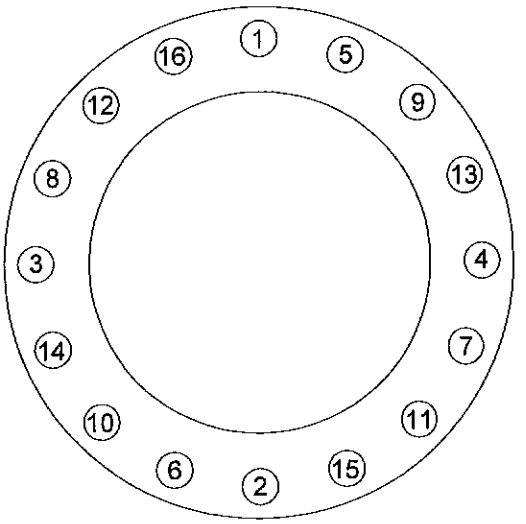
Use steel templates to accurately locate and hold the anchor rods plumb and in proper alignment during concrete placement. Leave this template in place for at least 24 hours after completing concrete placement. The Engineer will reject foundations with anchor rods that are out of position or more than 1:40 out of plumb. The Department does not allow bending of anchor rods to plumb the ends or to move them into position, or altering a pole's base plate to match the anchor bolts.

Tighten the nuts that secure high tower lighting poles to concrete foundations according to the following procedure. Use nuts that conform to ASTM Specification A 194 or A 563 of the grade, surface finish, and style for 2 inch diameter anchor rods that conform to ASTM F 1554, Grade 55. Washers shall conform to ASTM F 436 Type 1.

Thread nuts onto the anchor rods to within 1 inch above the top of the concrete base and adjust them downward, if necessary, to provide a minimum ¼ inch projection of the rod above the top of the top nut in the tightened position. Adjust nuts until their tops form a level plane. Install one washer on top of leveling nuts and, after setting the pole on these washers, install one washer under top nuts.

Bring leveling nuts (bottom nuts) to full bearing on the bottom of the base plate.

Apply beeswax to the top nut bearing face and top nut internal threads before threading it onto the anchor rod. Tighten top nuts to a "snug" condition. Use a click type torque wrench to apply 600 foot-pounds of torque to the "snug" top nuts. Torque the top nuts in the following crisscross pattern.



After torquing the top nuts, use a hydraulic wrench to rotate top nuts an additional one sixth (60°) turn, while preventing the leveling nuts from turning. Use the crisscross pattern shown above.

6. Underpass Lighting System Installation. Mount the luminaires as detailed on the drawings to orient the axis of the lamp perpendicular to the axis of the underpass.

7. Flashing Beacon Installation. When the Plans specify using the flasher in a signal controller cabinet to energize beacons, furnish a two pole, fused block with built in fuse pullers and two fuses to protect the flasher. Furnish and leave 5 feet of cable in the cabinet. Others will install the fused block and terminate the beacon cables.

8. Wood Pole Installation. Place the poles in the ground to at least 6 feet deep.

After setting each pole in the ground, backfill the space around the pole with selected earth or sand, free of rocks 4 inches and larger, or deleterious material. Place the material in layers approximately 4 inches thick and thoroughly compact them with mechanical tampers.

Furnish poles that provide a minimum vertical clearance of 21 feet between the pavement and low point of overhead conductor.

660-3.09 MAINTAINING EXISTING AND TEMPORARY ELECTRICAL SYSTEMS. Delete this subsection in its entirety and substitute the following: This work consists of protecting and maintaining the existing and temporary electrical systems during the life of the contract. The work includes: locating, repairing, replacing, adjusting, realigning, cleaning, and relocating components of traffic signals, lighting systems, and flashing beacons to keep them wholly operational and positioned according to the following specifications.

If the existing lighting systems is not kept fully operational as specified herein, the Engineer will reduce the payments under Item 660(22) Illumination Price Adjustment.

Furnish the Engineer with the name and phone number of the person who will maintain the existing and temporary electrical facilities at the Preconstruction Conference. Make this person available at times until the date of Acceptance for Traffic and Maintenance and provide labor, materials, and equipment this person may need to complete repairs ordered by the Engineer.

When beginning work, the Engineer will notify the Contractor and the local maintenance agencies in writing of the transfer of maintenance responsibilities, providing an effective date and time. Maintenance does not include replacing defective equipment or repairing equipment damaged before the transfer of maintenance responsibility. Therefore, before starting work on the project, inventory the condition of the existing equipment with the Engineer and document the damaged and defective equipment. If beginning work before providing the Engineer with an inventory, the Contractor waives the right to claim extra compensation when the Engineer later finds damaged or defective equipment.

Keep components of the existing and temporary electrical systems operational during the progress of the work, except when the Engineer allows shutdowns to alter or remove the systems. The Engineer will consider these systems operational when no damaged or defective equipment is found in service, components are clean, located, and aligned as specified herein, and photoelectric controls operate the lighting systems. The State will pay for electricity used to operate the systems, if the public benefits from their operation. Furnish replacement equipment compatible with equipment used in the Central Region.

Begin work to repair, replace, adjust, realign, clean, and/or relocate components of an affected system within one hour when ordered by the Engineer. If work is not complete, the Engineer may have outside forces complete the repairs and deduct the amount billed from monies due the Contractor.

Records. When working on a traffic signal system, print a record of work performed in the diary found in each controller cabinet. Make sure each entry includes

1. The dates and times beginning and completing work, and the names of the crewmembers completing the work.

2. The characteristics of the equipment failure or faulty operation evident before repair.

3. The changes made or corrective actions taken.

4. The printed name and signature of the person responsible for making the repairs or changes.

The Engineer will limit signal system shutdowns to the hours traffic restrictions allowed in subsection 643-3.08, Construction Sequencing. During shutdowns, use flag persons to control traffic. Provide local traffic enforcement and maintenance agencies 24-hour notice before shutting down a traffic signal system.

Locate existing conduit runs, buried cables, junction boxes, and underground utilities before starting work that may damage these facilities or interfere with these systems.

Where roadways remain open to traffic and the work includes modifying the existing lighting systems, energize the modified circuit by sunset on the same day the Contractor retires the original circuit.

Relocate or replace signal poles, lighting standards, sign poles, flashing beacon poles, load centers, and controller cabinets whenever reducing clearance from the traveled way to less than 6 feet.

Alignment. During the various phases of construction, shift the signal heads to keep them aligned horizontally and vertically with the approaches according to the following:

1. For overhead signals located 53 feet and more from the stop line, maintain 17.5 feet to 21.5 feet of clearance between the traveled way and the bottom of each signal. For closer signals refer to the MUTCD for maximum clearances.

2. For side mounted signals, maintain nine feet to 11 feet of clearance between the traveled way and the bottom of the signal.

3. Align overhead signals controlling a single lane with the center of the lane.

4. Align overhead signals controlling two or more lanes with the lane lines separating the lanes.

5. When the horizontal angle to the side mounted far right signal exceeds 20°, relocate this signal to an overhead location. Measure the angle 10 feet back from the stop line on the lane line between the two farthest left through lanes.

    i. With two or more through lanes, center one signal head over each lane.

    ii. With one through lane and protected permitted signal phasing, leave the five section signal over the lane line and center the signal to be relocated over the through lane.

    iii. Otherwise, install the relocated signal 8 feet to the right of the signal centered over the through lane.

6. For pedestrian signals, maintain 7 to 9 feet between the traveled way and the bottom of each pedestrian signal.

7. Aim signal heads according to Table 660-2 found in subsection 660-3.08, Signal and Lighting Structures.

Maintain fully actuated traffic signals during the normal course of construction by installing loop or optical detectors as directed by the Engineer. During winter shutdown, provide loop detectors in the signal systems according to Section 6.080 of Chapter 6 of the Municipality of Anchorage's Design Criteria Manual.

When no longer required, salvage original and Department provided equipment according to the Plans and item 6. Salvaging or Reusing Electrical Equipment found in subsection 660-3.01, and remove other materials used in the temporary systems from the project.

Add the following subsection:

660-3.11 SIGNAL SYSTEM TIMING AND ADJUSTMENTS. The Engineer will use Municipality of Anchorage (MOA) signal maintenance personnel for certain work inside controller cabinets. Before MOA personnel arrive to terminate conductors, ensure terminal connectors are attached to conductor ends and paired loop detector conductors and cables are labeled as specified in subsection 660-3.05, Wiring.

Controller Cabinet Preparation. Ship the traffic controller cabinet(s) and equipment to the Municipality of Anchorage Traffic Signal Electronics Shop at 3650 E. Tudor Road, Building C. MOA will inspect cabinet wiring, burn in signal equipment, customize cabinets for desired operation, and test the equipment according to subsection 660-3.07, Shop Tests.

1. Loop Detector Wiring. Municipality of Anchorage Traffic Signal Maintenance (MOA Signal Maintenance) will test and connect paired loop detector conductors to the terminal blocks, and install new detector loop amplifiers and harnesses.
2. Control Cable Wiring. When modifying an operational signal system or controller assembly, MOA Signal Maintenance will connect control cables within the controller cabinet to the terminal blocks.
3. Timing Adjustments. During construction, MOA Signal Maintenance may adjust the system and intersection operational timing to accommodate project conditions.
4. Interconnect Wiring. MOA Signal Maintenance will test and connect interconnect wiring to the terminal blocks.

660-4.01 METHOD OF MEASUREMENT. Add the following:

Item 660(13B), Electrolier and Foundation Removal. By each complete unit, removed.

Item 660(18), Adjust Junction Box. By each unit adjusted to final grade.

Item 660(22), Illumination Price Adjustment. By the mile for each roadway with all or part of its illumination system inoperative. A divided roadway is considered one roadway. Ramps are considered a separate roadway. The Engineer will measure each unlit section less than one mile long as one mile.

660-5.01 BASIS OF PAYMENT. Add the following: Pay Item 660(1) Traffic Signal System Complete will not include payment for 660(11) Traffic Loops, 660(25) Controller Cabinet Preparation, and 660(26) Signal System Timing and Adjustments. This work will be paid under their respective items. Pay Item 660(1) Traffic Signal System Complete will include payment for extending interconnect cables required for the Traffic Signal System.

Pay item 660(18) Adjust Junction Box applies to the work along Minnesota Drive that is identified in the plans. Pay Items 660(17E) Signal Modifications at Old Seward Hwy and 88th Ave , 660(17F) Signal Modifications at Old Seward Hwy and Dimond Blvd , and 660(17G) Signal Modifications at C St And 36th Ave will not include payment for 660(18) Adjust Junction box. This work will be paid under their respective items.

Saw cutting, planing, asphalt removal, aggregate base course, tack coating, and installing new asphalt concrete associated with the installation of Loop Detectors will be subsidiary to Item 660(11) Traffic Loop, unless it appears in the bid schedule. **Hot Mix Asphalt Type V shall be installed on Dimond Blvd and on C Street. In other locations, use Hot Mix Asphalt Type II, Class A.**

Payment for Item 660(13B) Electrolier and Foundation Removal, includes full compensation for:

a. Removal of the foundation to at least 1 foot below existing ground.
b. Removal and disposal of existing branch circuit conductors,
c. Removal and disposal of existing junction boxes,
d. Removal, salvage, and delivery of all junction box lids,
e. Removal, salvage, and delivery of all slip and transformer base assemblies and the poles and mast arms specified to be salvaged, and
f. Removal and disposal of all luminaires and the poles and mast arms specified to be disposed of.

The Engineer will pay Item 660(25) Controller Cabinet Preparation, based on paid receipts plus 15 percent for authorized work performed, and expenses incurred, by the Municipality of Anchorage Traffic Signal Maintenance Section. A directive will not be required to initiate payment for work performed under Item 660(25). The Contractor shall pay all costs of the Municipality for re-testing of work or equipment that fails to comply with the Plans and Specifications. This pay item will reimburse the Municipality for the work to install new detector loop amplifier harnesses.

The Engineer will pay Item 660(26) Signal System Timing and Adjustments, based on paid receipts plus 15 percent for authorized work performed by the Municipality of Anchorage. A directive will not be required to initiate payment for work performed

under Item 660(26). Pay costs of the Municipality retesting equipment that fails to comply with the Plans and Specifications.

The amount bid for an item shall include full compensation for:

a. Excavation, bedding, and backfill to install the components shown in the Plans. Dewatering excavations is subsidiary to completion of the excavation work.

b. Removing and repairing existing improvements to complete the work, unless other items in the contract cover the repairs.

c. Work associated with installing loop detectors, including: saw cutting, asphalt removal, aggregate base course, tack coating, and installing new asphalt concrete

The Engineer will pay for the disposal of all surplus and unusable excavation and for all imported backfill and bedding material at their respective contract unit prices, or as extra work if the contract does not include these items.

The costs of repairing damage to finishes on new equipment are a subsidiary obligation.

The costs of maintaining the existing and temporary electrical system to keep them fully operational are a subsidiary obligation of the 660 items included in the contract.

For each mile of roadway with existing lighting systems that is not kept fully operational, the Engineer will deduct $1275.00 per day from the payments due the Contractor. (04/04/07)R65USC02 MODIFIED

Add the following pay items:

Pay Item	Pay Unit
660(3C) Highway Lighting System Complete at Old Seward Hwy	Lump Sum
660(3D) Highway Lighting System Complete at C St	Lump Sum
660(3E) Highway Lighting System Complete at Minnesota Dr	Lump Sum
660(3F) Highway Lighting System Complete at Lake Otis Pkwy	Lump Sum
660(7A) Temporary Signal System Complete at Old Seward Hwy and 88th Ave	Lump Sum
660(7B) Temporary Signal System Complete at C St and 36th Ave	Lump Sum
660(13B) Electrolier and Foundation Removal	Each
660(17E) Signal Modifications at Old Seward Hwy and 88th Ave	Lump Sum
660(17F) Signal Modifications at Old Seward Hwy and Dimond Blvd	Lump Sum
660(17G) Signal Modifications at C St And 36th Ave	Lump Sum
660(17H) Signal Modifications at Lake Otis Pkwy and Northern Lights Blvd	Lump Sum
660(18) Adjust Junction Box	Each
660(22) Illumination Price Adjustment	Contingent Sum
660(25) Controller Cabinet Preparation	Contingent Sum
660(26) Signal System Timing and Adjustments	Contingent Sum

Add the following Section:

SECTION 662

SIGNAL INTERCONNECT

Special Provisions

662-1.01 DESCRIPTION. This item consists of the work required to furnish and install signal interconnect in conduit between the controller assemblies shown on the Plans along the route indicated or on a route as directed by the Engineer.

662-1.02 REGULATIONS AND CODE. Complete the work in accordance with these Specifications and Section 660, Signals and Lighting. The Department requires third-party certification for high-density polyethylene conduit.

662-2.01 MATERIALS. Submit the materials for review and approval per the requirements of item 1.. Equipment List and Drawings. . of Subsection 660-2.01, Materials.

Furnish a 25 pair #19 telephone cable conforming to REA Specification PE-39 for the interconnect cable. Install the interconnect cable in a 2-inch polyethylene conduit.

Encapsulate completed splices in waterproof re-enterable type splice kits of the same type used for loop lead-in cable splices. REA Bulletin 344-2 entitled "Lists of Materials Acceptable for use on Telephone Systems of REA Borrowers" provides a list of acceptable splice materials.

662-2.02 POLYETHYLENE DUCT SYSTEM. Install a polyethylene duct system in which to pull the interconnect cable. The Department will not permit the installation of the polyethylene conduit in a plowed trench.

Furnish a Type III polyethylene duct made from ultra high molecular weight, high-density, polyethylene (PE) pipe, with a tensile yield strength of 3,200 psi when tested in accordance with ASTM D 638.

Furnish fittings used in the duct system such as elbows, etc. made from the same type polyethylene as the duct. Fuse connections using the manufacturer's recommended procedure and equipment.

Keep junction boxes and ends of conduit covered unless you are pulling conductors.

Mark underground conduits with a continuous strip of polyethylene marker taped. Furnish marker tape with a black legend on a red background that is 4 mil thick and 6 inches wide. Install the tape 6 inches below finished grade.

Use care during compaction operations to prevent damage to the junction boxes and conduits. Remove and replace items damaged during the backfill and compaction operations at no additional cost to the Department.

After testing and installing the conductors, plug conduit openings with duct seal to prevent water from entering the duct system.

662-2.03 JUNCTION BOX. Furnish pre-cast, reinforced concrete junction boxes conforming to the sizes and details shown on the Plans. Install junction box lids made of cast iron.

662-3.01 CONSTRUCTION REQUIREMENTS. The signal interconnect consists of cable, conduit, junction boxes, other necessary hardware required to complete the item, cable splicing, and the termination of conductors on terminal blocks.

Install the polyethylene conduits at least 30 inches below finished grade.

Install junction boxes at all abrupt changes in conduit alignment and on 400-foot maximum centers. Angle points and curves with delta angles greater than 45 degrees constitute an abrupt change. Install Type 1A junction boxes, except when you need to splice interconnect cables together. Complete the interconnect cable splices in Type II or III junction boxes. Complete the splices in accordance with Rural Electrification Administration (REA) Specification PC-2 for splicing telephone cables. You may determine the locations for making signal interconnect splices. The Engineer, however, will not allow splices to be made at low points in the terrain or the bottom of sag vertical curves. Keep splices in the interconnect cable to an absolute minimum and get the splice locations approved by the Engineer beforehand.

Furnish the controller cabinets with terminal blocks for the interconnect cable.

662-3.02 EXCAVATING AND BACKFILLING. Backfill the excavations according to Section 204.

The Engineer will not allow ripping or plowing for installation of conduit. Backfill around the polyethylene conduit with a 6-inch lift of material free of rocks exceeding a 1-inch maximum dimension. (11/19/02)R67USC02

662-4.01 METHOD OF MEASUREMENT. The signal interconnect will not be measured for payment.

662-5.01 BASIS OF PAYMENT. The signal interconnect work shown in the plans will be subsidiary to Section 660 pay items listed in the bid schedule.

SECTION 670

TRAFFIC MARKINGS

Special Provisions

670-1.01 DESCRIPTION. Delete this subsection in its entirety and substitute the following: This work consists of furnishing, preparing and placing pavement markings at the locations shown on the Plans or as directed. Meet these Specifications and the applicable portions of the Alaska Traffic Manual.

Pavement markings for crosswalks at C Street and 36th Avenue shall be inlaid. Other pavement marking shall be surface applied.

670-3.01 CONSTRUCTION REQUIREMENTS. Delete all paragraphs under item 4. Methyl Methacrylate Pavement Markings. and substitute the following:

a. General. 15 days before starting work meet with the Engineer for a prestriping meeting. At this meeting, do the following:

   1. Furnish a striping schedule showing areas and timing of work, placing materials and the Traffic Control Plans to be used.
   2. Discuss placement of materials, potential problems.
   3. Discuss work plan at off ramps, on ramps and intersections.
   4. Discuss material handling procedures.
   5. Provide copies of the manufacturer's installation instructions and copies of the Material Safety Data Sheets.

b. Manufacturer's Representative. Provide the services of a manufacturer's representative (the "Manufacturer's Representative"). Ensure the Manufacturer's Representative observes the application of the pavement marking materials. Cooperate with the Manufacturer's Representative and the Engineer to ensure that the materials are placed according to these Specifications and the manufacturer's recommended procedures.

c. Manufacturer Certified Installers. Install methyl methacrylate pavement markings using only striping installers certified by the marking materials manufacturer for the specific striping material and method. Submit these certifications to the Engineer at the Preconstruction Conference.

d. Preparation. Prepare the roadway surface to receive methyl methacrylate according to these Specifications and the manufacturer's recommendations. Clean and dry the roadway surface. Completely remove contaminants such as dirt, loose asphalt, curing agents, surface oils, or existing road marking materials before applying pavement marking material.

e. Application. Apply methyl methacrylate marking material according to these Specifications and the manufacturer's recommendations. Use equipment designed and capable of properly mixing at the point and time of application and approved by the manufacturer for the type of product being installed. Unless specified otherwise all marking shall be surface applied as defined below.

For longitudinal markings use truck mounted automatic extrusion equipment capable of installing a double centerline and a single shoulder line in a single pass. Use automatic bead applicators that place a uniform layer of beads on the lines. Hand units will not be allowed.

For Transverse markings legends, symbols, and transverse markings use manual or automatic application equipment. Stencils or extruders are required to form sharply defined markings

For inlaid applications use grooving equipment that produces a dry cut. Use vacuum shrouded equipment or other equally effective containment procedures. Install markings in the same work shift as the grooving operation.

(1) Longitudinal Markings Surface Applied. Apply markings for lane lines, edge lines, and centerlines to yield a minimum thickness of 90 mils as measured from the surface of the pavement. Use Type B material, as specified in subsection 712-2.17.

(2) Longitudinal Extruded Markings Inlaid. Apply markings for lane lines, edge lines, and centerlines to yield a thickness of 250 mils as measured from the surface of the pavement. Use Type b material. Groove the area for the inlaid markings to a depth of 250 mils.

(3) Transverse and Symbol Markings Inlaid. Apply markings for onlys, arrows, stop bars, gore stripes, railroad symbols, and cross walks to yield a thickness of 250 mils as measured from the surface of the pavement. Use Type C material, as specified in subsection 712-2.17. Groove the area for inlaid marking to a depth of 250 mils.

(4) Traverse and Symbol Markings Surface Applied. Apply markings for onlys, arrows, stop bars, gore stripes, and cross walks to yield a thickness of 120 mils as measured from the surface of the pavement. Use Type C material.

f. Disposal of Waste. Waste material becomes the Contractor's property. This includes grindings and removed marking material. Do not dispose of or store stripe removal wastes material or asphalt grindings on State property. Dispose of waste material according to applicable Federal, State, and local regulations.

g. Sampling. On the form provided by the Engineer on a 8.5 x 11 sheet of paper, record the following readings, and the locations where they were taken using project stationing, and submit them to the Engineer within 24 hours for evaluation. Thickness of material and depth of slot are measured from the surface of the pavement.

(1) For inlay applications, record the depth of the slot every 300 feet during the grinding operation.

(2) For other longitudinal applications, measure the thickness of the lines (above the pavement surface), at the time of application, every 300 feet.

(3) For surface applied transverse markings measure the thickness in three locations for each marking.

(4) Inspect the markings initially, and again two weeks after placement, to ensure the material has cured properly. Remove soft spots or abnormally darkened areas and replace with material meeting specifications.

(5) Measure the retroreflecivity of each transverse marking at three locations, and of each line at intervals not to exceed 1,500 feet. Take these measurements using a Delta LTL2000 Retrometer, a 100 foot retro-reflectometer, or approved similar device. Perform testing within 72 hours of curing. On a 8.5" x 11" sheet of paper, record the following readings, and the locations where they were taken using project stationing, and submit them to the Engineer within 24 hours for evaluation.

The Engineer may elect to use the Contractors readings or perform additional sampling.

670-3.04 PAVEMENT MARKING REMOVAL. Add the following: Coordinate removal work with construction activity. Remove pavement markings the same day permanent markings are applied, unless otherwise directed. Use vacuum shrouded equipment or other equally effective containment procedures.

Add the following subsection:

670-3.07 TOLERANCES FOR METHYL METHACRYLATE PAVEMENT MARKINGS.

1. Length of Stripe. ± 2 inches.
2. Width of Stripe. ± 1/8 inch.
3. Lane Width. ± 4 inches from the width shown in the Plans.
4. Stripes on Tangent. Do not vary more than 1 inch laterally within a distance of 100 feet when using the edge of the stripe as a reference.
5. Stripes on Curves. Uniform in alignment with no apparent deviations from the true curvature.

6. All Stripes. Keep the center of the stripe within 4 inches from the planed alignment.
7. Double Stripes. ± ¼ inches
8. Thickness of surface applied. Minimum specified to a maximum of + 30 mils.
9. Depth of Inlay Slot. Minimum 250 mils to a maximum of 290 mils.
10. Thickness of Inlaid Marking Material. Fill inlay area completely from the bottom of the inlay to the surface of the pavement.

If it is determined that the material is being placed too thin, or otherwise not to specification, make immediate adjustments to correct the problem.

Methyl methacrylate pavement markings applied by any method will be unacceptable if:

1. The marking is not straight or wide enough.
2. The thickness of the line is not uniform or less than specified.
3. The top of the line is not smooth and uniform.
4. The material is uncured.
5. The material blackens or is inconsistent in color.
6. The inlay slot is not ground to the specified depth.
7. The inlay slot is not filled to the specified depth.
8. The edge of the markings are not clear cut and free from overspray.
9. The reflective elements are not properly embedded.
10. The markings exhibit poor adhesion.
11. The retro-reflectivity of the markings is less than specified.
12. The color is not as specified.

Perform repairs using equipment similar to the equipment initially used to place the materials. Do not perform repairs in a "patch-work" manner. If more than one repair is required in a single 300-foot section, grind and repair the entire section.

670-4.01 METHOD OF MEASUREMENT. Delete Items 2 and 3 and replace with the following:

2. Square Foot Basis. Transverse pavement marking lines, stop bars, cross walks and gore stripes will be measured by nominal width times actual length. This does not include 24" wide lines required for Railroad Markings.

3. Each. Symbol pavement markings only's and arrow's will be measured on a unit basis with each separate word or symbol constituting a unit. Railroad Markings will be measured by the complete unit shown for each lane of travel.

4. Foot Basis: Longitudinal Pavement Markings, surface applied or inlaid, will be measured by the linear foot of 4-inch wide line. Wider striping will be measured in multiples of 4 inches.

Add the following: Thickness will be measured from the top of the marking to the top of the pavement surface. Marking material placed in a depression left by pavement line removal will not be included in measuring the thickness of the line.

Removal of pavement markings will not be measured for payment.

670-5.01 BASIS OF PAYMENT. Add the following: There will be no separate or additional payment for the following:

- Over-runs of material caused by the variation of the gradation of the asphalt.
- Additional material required to achieve the thickness specified an open graded pavement.

Milling for installation of the inlaid markings is subsidiary to 670 items. Payment includes costs associated with this item, including the removal of millings.

Traffic control required for the installation of the permanent and temporary markings is subsidiary to 670 items.

Temporary traffic markings required for all phases of the construction of the roadway is subsidiary to 670 items.

Delete pay item 670(9).

SECTION 701

HYDRAULIC CEMENT

Standard Modification

701-2.01 PORTLAND CEMENT. After: "Meet AASHTO M 85" add: or ASTM C 150
E45(01/27/07)

SECTION 703

AGGREGATES

Special Provisions

703-2.03 AGGREGATE FOR BASE. Delete Table 703-2 and substitute the following:

TABLE 703-2
AGGREGATE FOR UNTREATED BASE
Percent Passing By Weight

Sieve Designation	Grading C-1	Grading D-1	Grading E-1
1 ½ inch	100		
1 inch	70-100	100	100
¾ inch	60-90	70-100	70-100
3/8 inch	45-75	50-79	50-85
No. 4	30-60	35-58	35-65
No. 8	22-52	20-47	23-50
No. 30	10-33	10-26	13-31
No. 50	6-23	6-19	10-26
No. 200	0-6	0-6	8-15

(05/01/06)R199usc04

Replace subsection 703-2.04 with the following:

703-2.04 AGGREGATE FOR ASPHALT CONCRETE PAVEMENT.

Coarse Aggregate (retained on the No. 4 sieve). Crushed stone or crushed gravel consisting of sound, tough, durable rock of uniform quality. Remove natural fines passing a #4 sieve before crushing aggregates for Type V or VH asphalt concrete mixtures. Free from clay balls, organic matter, and other deleterious material. Not coated with dirt or other finely divided mineral matter. Meet the following requirements (note A or B indicate class of mix, see Table 401-1), the Engineer may modify the fracture requirements if the hard aggregate sources stated in 106-1.02 do not meet specifications:

		Type IIA, IV	Type I, IIB, III	Type V	Type VH
LA Wear, % max	**AASHTO T 96**	**45**	**45**	**45**	**45**
Degradation Value, min	**ATM 313**	**30**	**30**	**30**	**30**
Sodium Sulfate Loss % max (5 cycles)	**AASHTO T 104**	**9**	**9**	**9**	**9**
Fracture, min %	**WAQTC FOP for AASHTO TP61**	**90, 2 face**	**80, 1 face**	**98, 2 face**	**98, 2 face**
Thin-Elongated Pieces, max % **1:5** **1:3**	**ATM 306**	 **8** **20**	 **8** -	 **3** **8**	 **3** **8**
Nordic Abrasion, max.%	**ATM 312**			**12**	**8**
Absorption, max. %	**AASHTO T85**	**2.0**	**2.0**	**2.0**	**2.0**

TABLE 703-3
BROAD BAND GRADATIONS FOR ASPHALT CONCRETE PAVEMENT AGGREGATE
Percent Passing by Weight

SIEVE	GRADATION				
	Type I	**Type II**	**Type III**	**Type IV**	**Type V, VH**
1 inch	100				
¾ inch	80-90	100			100
½ inch	60-84	75-90	100	100	65-80
3/8 inch	48-78	60-84	80-90	80-95	48-60
No. 4	28-63	33-70	44-81	55-70	30-45
No. 8	14-55	19-56	26-70	35-50	20-30
No. 16	9-44	10-44	16-59	20-40	≤22
No. 30	6-34	7-34	9-49	15-30	≤17
No. 50	5-24	5-24	6-36	10-24	≤14
No. 100	4-16	4-16	4-22	5-15	≤12
No. 200	3-8	3-8	3-8	3-8	3-8

(05/01/07)R199usc04

Fine Aggregate (passing the #4 sieve). Meet the quality requirements of AASHTO M 29, including S1.1, Sulfate Soundness.

For Type IV, V and VH mixes, remove natural fines passing a #4 sieve before crushing aggregates for this asphalt concrete mixture. Consist entirely of aggregate produced from aggregate crushing process and be non-plastic as determined by WAQTC FOP for AASHTO T 90, and meets the following:

Property	Test Method	Requirement
Fine Aggregate Angularity	AASHTO T 304	45% min.

SECTION 707

METAL PIPE

Standard Modification

Delete Subsection 707-2.07 and replace with the following:

707-2.07 GALVANIZED STEEL WATER CONDUIT. Meet the following:

Galvanized Pipe ASTM A 53 or ASTM A 120, galvanized per AASHTO M 111

Galvanized Fittings ASTM A 234 galvanized per AASHTO M 232.

(06/30/04)E17

SECTION 712

MISCELLANEOUS

Standard Modification

712-2.06 FRAMES, GRATES, COVERS, AND LADDER RUNGS. In Gray iron castings, delete text and replace with: AASHTO M 306 and AASHTO M 105, Class 35B.
E46(01/27/07)

Special Provisions

712-2.17 METHYL METHACRYLATE PAVEMENT MARKINGS. Delete the first and second paragraphs under item 1. Quality Requirements: and substitute with the following: Use a marking material formulated for the application type specified. Use a marking material manufactured from new materials and free from dirt and other foreign material. Use a methyl methacrylate based resin system for part "A". Use benzoyl peroxide system for part "B".

Extruded application: Material formulated for extruded application with factory intermix beads and anti skid aggregate, and additional surface applied beads.

2. Performance Properties: Add the following:

1.	Color:	Yellow, PR-1 chart, 33538 Federal Yellow. White, minimum daylight reflectance of 84.

712-2.18 GLASS BEADS FOR METHYL METHACRYLATE PAVEMENT MARKINGS. Delete the bead table and substitute the following: Use the type and amount of beads specified in writing by the marking material manufacturer necessary to meet the performance requirements.

(01/04/06)R246usco04

SECTION 724

SEED

Special Provisions

724-2-02. MATERIALS. Delete Table 724-1 and add the following:

Table 724-1
Type A Seed: Lawn/Grass Requirements

Species	Sproutable Seed*, %, Min.
Arctared Red Fescue	78
Egan American Sloughgrass	67
Norcoast Bering Hairgrass	71
Nortran Tufted Hairgrass	71
Wainwright Slender Wheatgrass	88
Alyeska Polargrass	71
Bluejoint	71
Tilesy Sagebrush	71
Tundra Glaucous Bluegrass	76
Gruening Alpine Bluegrass	72
Nugget Kentucky Bluegrass	76
Beach Wildrye	70
Annual Ryegrass	76
Perennial Ryegrass	76

* Sproutable Seed is the mathematical product of Germination and Purity.
(01/27/07)R52USC

SECTION 730

SIGN MATERIALS

Special Provisions

730-2.04 SIGN POSTS. Add the following item:

7. Structural Tubing and W-Shape Beams.

   a. Structural tubing shall conform to either ASTM A500, grade B, or ASTM A501. The tubing shall be square and of the dimensions called for in the Plans with 0.2-inch thick walls. 0.4-inch diameter holes shall be drilled as required to permit mounting of the sign.

   b. W-shape beams shall conform to ASTM A36.

c. Structural tubing and W-shape beams shall be hot dip galvanized according to 1.b. of this subsection. Damaged and abraded tubes and beams shall be repaired according to 1.c. of this Subsection.

(06/22/04)R81USC04

SECTION 740

SIGNALS AND LIGHTING MATERIALS

Special Provisions

Replace subsection 740-2.02 with the following:

740-2.02 SIGNAL AND LIGHTING POLES.

1. Design. Design and fabricate highway lighting and traffic signal structures with pole shaft lengths to 65 feet long to conform to the 1994 Edition of AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals* with interim revisions. For the design and fabrication of high tower poles, see subsection 740-2.04.

   A registered professional engineer shall design the structures and provide stamped shop drawings and calculations. Submit the stamped drawings and calculations for each pole to the Engineer for approval. Design for stresses on the completed structure with hardware in place.

   a. In the stamped calculations, indicate the edition of Standard Specifications to which the poles are being designed and provide the input data used to design each pole and mast arm, including: design wind speed, cross section shape, yield strengths of the component materials, dimensions of the pole components, and a summary of the loads used.

   b. On the stamped shop drawings, provide design wind speed and the details for building the poles and mast arms, including: materials specifications, slip fit joint dimensions, pole component dimensions, welds that will be made, and the welding inspection that will be done.

   Submit the mill certifications for the steel items (piles, plates, bolts, and other related items) to the Engineer for approval.

   Design poles for 100 mph winds with a 1.3 gust factor.

   Design each electrolier to support a sign with an area of 16 square feet with its centroid located 14 feet above the base of the pole.

2. Fabrication. Fabricate signal and lighting structures from tapered steel tubes with a round or 16 sided cross section. Orient hand holes located near the base of poles to face downstream of traffic flow.

   Provide traffic signal poles, lighting poles, and signal mast arms in lengths evenly divisible by 5 feet.

Furnish poles and mast arms up to 40 feet long in one piece. Poles and mast arms longer than 40 feet may be furnished in one piece or in two segments with a slip type field splice. For slip type joints, provide a minimum overlap of two feet or 1.5 times the inside diameter of the female section whichever is larger. In mast arms, locate these splices at least one foot away from the Plan location of signal heads and signs. In signal poles, locate the edge of the female section at least 6 inches above the top of the signal mast arm connection.

Fabricate tubes with walls up to ½ inch thick from the prequalified base metals listed in AWS D1. Fabricate elements greater than ½ inch thick from steel that conforms to ASTM A 709 and meets the Fracture Critical Impact Test requirements for zone 3. The Department will not accept structures that contain or are made with laminated steel elements.

Fabricate each tube from no more than 2 pieces of steel. When using 2 pieces, place the longitudinal welded seams directly opposite one another. Place the welded seams on adjacent sections to form continuous straight seams from the base to the top of the pole.

When tenons are needed to install traffic signals and luminaires, make them from two inch nominal schedule 40 pipe that conforms to ASTM A 53 Grade B.

Fabricate 10 feet long signal posts from 11 US Standard Gage sheet steel. Fabricate each post with a minimum inside diameter of five inches at the base plate. Use a 3½-inch long piece of four inch nominal schedule 40 pipe that conforms to ASTM A 53 Grade B as a post-top adapter.

The Department does not allow holes made for lifting purposes in the ends of tubular segments, except in the free ends of luminaire mast arms. To add lift points, weld them to the tube opposite the longitudinal seam weld on the outside of female segments and on the inside of male segments. Before shipment, remove lift points added to the outside of the tubes, grind the area smooth with the base metal, and hot stick repair the finish according to subsection 660-3.01.8.a. Lift points added to the inside of tubes in place may be left in place.

Hot dip galvanize lighting and signal structures to meet AASHTO M 111 and these specifications. Completely submerge pole and mast arm segments in one dip in a kettle of concentrated zinc ammonium chloride flux solution heated to 130 °F, then completely submerge in one dip in a separate kettle of prime western grade zinc heated to approximately 825 °F. Galvanize bolts and fasteners to meet AASHTO M 232.

After the poles and mast arms are galvanized, remove all excess zinc from all drip lines and points and the surfaces of all tube ends that form slip type joints to provide a smooth finish.

The Department will reject poles and mast arms that are:

a. Not fabricated according to these specifications or the approved shop drawings,

b. Bowed with sweeps exceeding ¾ inch throughout the length of the pole, mast arm, or segment, if furnishing a 2 piece pole or mast arm,

c. Out of round. Sections are out of round when the diameters of round members or the dimension across the flats of multisided members exceed 2 percent of the dimension specified on the shop drawings.

Fabricate pile cap adapters from grade X42 steel line pipe that conforms to API 5L and from steel plate that conforms to ASTM A 709 Grade 50. Attach the anchor plate to the pile section with a complete joint penetration (CJP) weld. Fabricate the anchor plate to match the base plate of the lighting standard.

3. Welding. Perform welding to conform to subsection 504-3.01 8. Welding and the following:

a. Make welds continuous. Grind exposed welds flush with the base metal at slip joints, the length of the slip fit joint plus on half diameter of the female section.

b. Use partial joint penetration (PJP) welds in longitudinal seams. PJP welds must provide at least 60% penetration.

c. Use CJP groove welds to connect base plates to tubes with walls 5/16 inch thick and thicker. When CJP groove welds are used, the designer may use additional fillet welds when deemed necessary.

d. Use socket type joints with two fillet welds to connect base plates to tubes with walls less than 5/16 of an inch thick.

e. On steels 5/16 of an inch thick and thicker, inspect 100 Percent of CJP welds by either radiography (RT) or ultrasound (UT).

f. Inspect a random 25 percent of PJP and fillet welds by magnetic particle (MT). If a defect is found, inspect 100% of the PJP and fillet welds made to fill the order. In steels less than 1/8 inch thick, complete the tests according to AWS D1.3.

g. Only visually inspect welds made on luminaire mast arms.

4. Miscellaneous. Finish the edges of poles and mast arms to conform to the following requirements. Before hot dip galvanizing, neatly round the following features to the radius specified

a. On holes through which electrical conductors pass, provide a 1/16 inch radius on both the entrance and exit edges,

b. On pole base plates, provide a 1/8 inch radius on edges along which plate thickness is measured and a smooth finish on all other exposed edges,

c. On the ends of tubes that form slip type joints, complete the following tasks on the two surfaces that contact one another. First, provide 1/16 inch radii on the inside and outside edges of the female and male segments, respectively. Then for the length of the joint plus 6 inches grind down welds until they feature a radius concentric with the mating surface and remove material protruding from the two surfaces, and

d. Grind exposed welds flush with the base metal, except fillet welds and seam welds on top of mast arms. Grinding seam welds on multisided poles is not required, except in slip type joints.

Provide caps to cover the free ends of poles and mast arms.

Identify critical information for poles and arms with visible permanent aluminum tags that contain the information shown in Table 740-1. The measurements shown are for illustration purposes only. Use tags large enough to include required information using ¼ inch high text, 3/8 inch of space between successive lines of text, and at least 3/8 inch of space between the edges of the tag and the text. Secure the tags with two 1/8 inch blind rivets at the base of poles and the under side of mast arms. If furnishing a two piece signal mast arm with slip type joint, mark both pieces with the same message.

TABLE 740-1

POLE MARKINGS

Note: *Italic type indicates additional Tag Markings if poles have 2 luminaire or 2 signal mast arms.*

	MEASUREMENTS	TAG MARKINGS
Signal Poles		
a) Signal mast arm length	45 ft./*55 ft.*	SMA 45/*SMA 55*
b) Luminaire mast arm length	22 ft./*18 ft.*	LMA 22/*LMA 18*
c) Pole height	36 ft.	PH 36
d) Intersection number (if more than one) -pole number		1 - P 4
e) Sum of signal mast arm moments about centerline of signal pole		SM 4000/*SM 3200*
f) Design wind speed	100 mph	DWS 100

TABLE 740-1 POLE MARKINGS		
Note: *Italic type indicates additional Tag Markings if poles have 2 luminaire or 2 signal mast arms.*		
	MEASUREMENTS	**TAG MARKINGS**
Light Poles		
a) Luminaire mast arm length	15 ft./*15 ft.*	LMA 15/*LMA 15*
b) Pole height	37 ft.	PH 37
Signal Mast Arm		
a) Mast arm length	40 ft.	SMA 40
b) Intersection number (if more than one) -pole number		1 - P 4
c) Sum of signal mast arm moments about centerline of signal pole		SM 3740
d) Design wind speed	100 mph	DWS 100
Luminaire Mast Arm		
a) Mast arm length	18 ft.	LMA 18
b) Pole number (if unique arm design)		P 4

Replace subsection 740-2.04 with the following:

740-2.04 HIGH TOWER POLES.

1. Design. Design and fabricate high tower lighting poles to conform to the 2001 Edition of AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals* with interim revisions.

   A registered professional engineer shall design the structures and provide stamped shop drawings and calculations. Submit the stamped drawings and calculations for each pole to the Engineer for approval. Design for stresses on the completed structure with hardware in place.

   a. In the stamped calculations, indicate the edition of Standard Specifications to which the poles are being designed and provide the input data used to design each pole, including: design wind speed, cross section shape, yield strengths of the component materials, dimensions of the pole components, and a summary of the loads used.

   b. On the stamped shop drawings, provide the criteria to which the poles are designed and the details for building the poles, including: materials specifications, slip fit joint dimensions, dimensions of the tube segments and other components, the total weight of each segment, the welds that will be made, and the welding inspection that will be done.

The pole manufacturer shall submit a pole installation plan that details the work required to assemble each pole, the locations of timber supports during and after pole assembly. Submit this plan with the stamped plans and calculations.

Submit the mill certifications for steel items (piles, plates, bolts, and other related items) to the Engineer for approval.

Design high tower poles for a 50 year design life and the basic wind speed shown in the 2001 AASHTO Standard Specifications for Structural Supports or for 100 mph, whichever is greater. Use a gust effect factor of 1.14.

For fatigue design, use fatigue category I importance factors for lighting poles, and design poles that taper less than 0.14 inches of diameter per foot to resist the effects of vortex shedding.

Furnish poles fabricated from tapered steel tubes with a round, 16 sided, or 12 sided cross section. Use no more than four tapered tube segments with slip type field splices to form each pole. For the slip type joints, provide a minimum overlap of 24 inches or 1.5 times the inside diameter of the female section whichever is larger.

Furnish poles that allow the luminaire ring to descend within five feet of the base plate.

Design poles to support a load that consists of the lowering device and ten luminaires equipped with light shields. Use the following values for these components.

Component	Effective Projected Area	Weight
One lowering device	8.6 ft^2	309 lbs
Ten luminaires	21.5 ft^2	617 lbs
Ten light shields	30.0 ft^2	22 lbs

2. Fabrication. Provide a reinforced rectangular hand hole that provides an opening large enough to install the winch assembly.

Provide a detachable door over the hand hole frame including hinges, nuts to fasten the door to the frame, and a neoprene gasket to provide a watertight seal around the frame. Provide for a locking mechanism for the hand hole door.

Fabricate the reinforced rectangular hand hole to provide maintenance access to the integral luminaire lowering device with a minimum clearance of 12 inches and a maximum clearance of 18 inches between the top of the base plate and the bottom of the hand hole opening.

Fabricate the base plate to match the bolt circle diameter and the quantity and size of anchor bolts of the foundation detailed on the Plans. The anchor bolts conform to ASTM F 1554, Grade 55 with Supplemental Impact Test Requirements of Section S4. The distance from bottom of the leveling nut to the top of the concrete of the anchor bolts will not exceed one inch.

Install a hook to the left of the hand hole for storing the winch control cable away from the top of the foundation. Provide a 1 inch wide hook that features rounded edges, a 1½ inch radius, and 3 inches between the low point and free end of the hook.

Fabricate tubes with walls up to ½ inch thick from the prequalified base metals listed in AWS D1.1. Fabricate elements greater than ½ inch thick from steel that conforms to ASTM A 709 and meets the Fracture Critical Impact Test requirements for zone 3.

Fabricate each tube from no more than 2 pieces of steel. When using 2 pieces, place the longitudinal welded seams directly opposite one another. Place the welded seams on adjacent segments to form continuous straight seams from the base to the top of the pole. The Department will not accept poles and mast arms made with laminated steel elements.

The Department does not allow holes made for lifting purposes in the ends of tubular segments. To add lift points, weld them at least 12 inches away from welds on the outside of female segments and on the inside of male segments. Before shipment, remove added lift points, grind the area smooth with the base metal, and hot stick repair the finish according to subsection 660-3.01.8.a.

Provide the mounting brackets needed to install the luminaire ring lowering device, including the winch assembly, associated hardware, and the masthead assembly.

Around the top of each pole, provide a stabilizer system that prevents the luminaire ring from swinging freely when the top of the ring is within 24 inches of being fully docked in the masthead fitting. The stabilizer system shall consist of at least three crooked F shaped brackets located symmetrically around each pole. The brackets shall form a tapered bottom section and a parallel top section that restricts ring movement. Bolt each bracket to two channels welded to the pole shaft. With the Eagle lowering device, locate the brackets between the wheels that line the luminaire ring. Design and fabricate the brackets from stainless steel tubing to withstand the load and wind speed used to design the poles. The installed brackets shall just fit through a circle two inches smaller in diameter than the inside diameter of the luminaire ring.

3. Welding. Perform welding to conform to subsection 504-3.01 8. Welding and the following:

a. Make welds continuous. Grind exposed welds flush with the base metal at slip joints, the length of the slip fit joint plus on half diameter of the female section.

b. Use CJP groove welds on longitudinal seams within six inches of CJP circumferential welds.

c. In the ends of those segments that form a slip type joint, provide CJP longitudinal seam welds at least 12 inches longer than the length of the slip joint plus one half times the diameter of the female section.

d. Use CJP groove welds to connect base plates to tubes. When CJP groove welds are used, the designer may use additional fillet welds when deemed necessary.

e. Use socket type joints with two fillet welds to connect the pole top plates to tubes with walls less than 5/16 inch thick.

f. Use partial joint penetration (PJP) welds in longitudinal seams between the segments of CJP welds. PJP welds must provide at least 60% penetration.

g. Use PJP and fillet welds to attach hand-hole frames to the tube.

h. On steels 5/16 inch thick and thicker, inspect 100 Percent of CJP welds by either radiography (RT) or ultrasound (UT).

j. Inspect a random 25 percent of PJP and fillet welds by magnetic particle (MT). If a defect is found, inspect 100% of the PJP and fillet welds made to fill the order.

Weld tags on the ends of segments that form slip type joints to facilitate field assembly. Locate the tags to ensure segment alignment when the tags are aligned. Attach the tags at least 12 inches away from the slip type joint. Include the shop drawing number to which the poles are fabricated and pole length on the tag.

4. Miscellaneous. Finish poles to meet the following requirements. Before they are galvanized, neatly round the following features to the radius specified

a. On holes through which electrical conductors pass, provide a 1/16-inch radius on both edges,

b. On pole base plates, provide a 1/8 inch radius on edges along which plate thickness is measured and a smooth finish on all other exposed edges,

c. On the ends of tubes that form slip type joints, complete the following tasks on the two surfaces that contact one another. First, provide 1/16 inch radii on the inside and outside edges of the female and male segments,

respectively. Then for the length of the joint plus six inches do two things: grind down welds until a radius concentric is feature with the mating surface and remove material protruding from the two surfaces, and

5. Rejection. The Department will reject poles containing segments that
   a. Are not fabricated according to these specifications and the approved shop drawings,

   b. Are bowed with sweeps exceeding ¾ inch throughout the length of the segment,

   c. Are out of round. Segments are out of round when the diameters of round members or the dimension across the flats of multisided members exceed 2 percent of the dimension specified on the shop drawings.

   d. Do not provide the minimum overlap of 24 inches or 1.5 times the inside diameter of the female section, whichever is larger, in the slip type field splices when the pole is assembled.

6. Galvanization. Hot dip galvanize pole segments and attachments to meet AASHTO M 111 and these specifications. Completely submerge pole segments in one dip in a kettle of concentrated zinc ammonium chloride flux solution heated to 130 °F, then completely submerge in one dip in a separate kettle of prime western grade zinc heated to approximately 825 °F. Galvanize bolts and fasteners to meet AASHTO M 232.

   After the poles and mast arms are galvanized, remove excess zinc from drip lines and points and the surfaces of tube ends that form slip type joints to provide a smooth finish.

740-2.05 CONDUCTORS. Replace Table 740-2 with the following:

TABLE 740-2
CONDUCTOR TERMINATION TABLE

CONDUCTORS PER CABLE	CIRCUIT	WIRE COLOR	AWG. NO.	BAND LEGEND
7	Vehicle Red Vehicle Yellow Vehicle Green Common Neutral Spare Spare Spare	Red Orange Green White White/Black Black Blue	14	Head No.
7	Vehicle Red Arrow Vehicle Yellow Arrow Vehicle Green Arrow Common Neutral Spare Spare Spare	Red Orange Green White White/Black Black Blue	14	Head No.
7	Vehicle Red Vehicle Yellow Vehicle Green Common Neutral Spare Vehicle Yellow Arrow Vehicle Green Arrow	Red Orange Green White White/Black Black Blue	14	Head No.
4	Pedestrian Don't Walk Pedestrian Walk Common Neutral Spare	Red Green White Black	14	Head No.
4	Pedestrian Pushbutton Neutral Spare Spare	Black White Red Green	14	Head No.
5	Photo Electric Control Load to Contactor Neutral Spare Spare	Black Red White Orange Green	14	PEC
3	Flashing Beacon Neutral Spare	Black White Red	14	Head No.

TABLE 740-2
CONDUCTOR TERMINATION TABLE

CONDUCTORS PER CABLE	CIRCUIT	WIRE COLOR	AWG. NO.	BAND LEGEND
3	Preemption Neutral Spare	Black White Red	20	"PRE"
3	Preemption Confirmation Neutral Spare	Black White Red	14	"PRECON"
3	Highway Luminaire Highway Luminaire Highway Luminaire Spare	Black Red White	8 or 6	Circuit No. Circuit No.
3	Service to Controller Neutral Spare	Black White Red	6 or 4	"SIG" No Band No Band
3	Sign Luminaire Sign Luminaire Sign Spare	Black Red White	8	SIGN SIGN

Replace Item 7. with the following:

7. Detector Loops. Use No. 14 AWG conductors for detector inductive loops that meet IMSA Specification 51-3, Type RHW/USE, or IMSA Specification 51-5, when called for on the Plans or specified in the Special Provisions.

Replace subsection 740-2.06 with the following:

740-2.06 ELECTRICAL CONDUIT AND FITTINGS. Unless specified otherwise, use rigid metal conduit and fittings for raceways. Furnish galvanized rigid type conduit and elbows that conform to UL-6 and are manufactured of mild steel according to ANSI C80.1. Furnish third party certified fittings designed for rigid metal conduit.

For loop detectors, use Schedule 80 polyvinyl chloride (PVC) conduit that conforms to UL-651. Use PVC fittings meeting NEMA TC 3.

When polyethylene conduits are specified in the Plans, use a smooth wall, schedule 40, high-density polyethylene (HDPE) pipe that conforms to UL 651 B.

Furnish insulated throat grounding bushings made of malleable iron or steel with a mechanically galvanized or zinc plated finish. Grounding lugs shall either be an integral

part of the bushing or consist of an attached tin plated copper saddle. Grounding lugs shall feature a stainless steel screw, the centerline of which falls within 20 degrees of conduit centerline. The bushings furnished shall also feature a stainless steel or brass mounting screw that locks the bushing onto the conduit end.

Furnish conduit outlet bodies and their covers with a hot dip galvanized finish and stainless steel screws. For loop detectors, furnish type X bodies and, for photoelectric control installation, furnish types C and LB conduit bodies.

When Myers hubs are specified, furnish rain tight, grounding type hubs made of malleable iron with a hot dip or mechanically galvanized finish.

At expansion joints, provide watertight expansion fittings capable of the following movements without damaging the conduits attached to it or the conductors that pass through it. The movements include: axial expansion or contraction to ¾ inch, angular misalignments in any direction to 30 degrees, and parallel misalignment of the conduits to ¾ inch. The fittings shall also include a braided copper bonding jumper equal to an 8 AWG conductor, bushings to prevent scraping the conductors, and a smooth inner sleeve that maintains a constant diameter regardless of conduit alignment.

740-2.11 CONTROLLER CABINET. Add the following to the first paragraph of subpart (1) of subitem c. Cabinet Wiring. of item 1. Standard Features. : Furnish controller cabinets wired to accommodate five 4 channel inductive loop detector units and two 2 channel inductive loop detector units.

Replace bullet (e) of subpart (3) Field Terminal Blocks of subitem c. Cabinet Wiring. of item 1. Standard Features. : On the right side of controller cabinets, install two 16 position bus bars, for terminating the equipment grounding and neutral conductors used inside the cabinets. On the left side of the controller cabinets, install two 32 position bus bars, for terminating the equipment grounding and neutral conductors from field wiring.

Replace the first three sentences of subpart (5) Light Fixture. of subitem D. Cabinet Accessories. of item 1. Standard Features. with the following : Mount a third party certified, incandescent luminaire on the inside of each cabinet near the top edge of the door opening. Install white porcelain, surface mounted lamp holders that fit medium base lamps and are rated for a minimum 600 watts and 250 volts ac. Furnish each lamp holder with a 100 watt soft white incandescent lamp.

740-2.12 STANDARD AUXILIARY EQUIPMENT. Under item 3. Conflict Monitors, add the following:

d. Supply conflict monitors with an RS-232 serial port that allows the monitor to download information through an external dial up modem or to a personal computer using the Microsoft Windows NT operating system.

740-2.13 SPECIAL AUXILIARY EQUIPMENT. Add the following items:

6. Opticom Priority Control System. Install the following components of the 3M Company's Opticom Priority Control System according to 3M's written installation instructions at the signalized intersections listed on the Plans.

Install the quantity of model 711, 721, and 722 optical detectors on the signal pole mast arms shown on the Plans. Before installing the detectors, gain approval of their final lateral location from the Engineer. See the Plans for installation details.

Install Model 138 Optical detector lead in cable between the end of each signal mast arm and the controller cabinet. Furnish enough slack in these cables for them to extend 2 feet beyond the end of each signal mast arm and to leave 10 feet of slack in the controller cabinet. Seal both ends of each lead in cable with mastic lined, heat shrink tubing end caps.

Before attaching the conductors to the optical detectors, strip the insulation for the conductors and attach four conductors to ground in the controller cabinet. Attach the signal cable to the confirmation light. The Municipality of Anchorage Signal Maintenance Section (MOA Signal Maintenance) will tie down the conductors in the controller cabinet under Item 660(26) Signal Timings and Adjustments.

Furnish each controller cabinet with a Model 754 phase selector, a Model 760 card rack, and an Opticom Panel Assembly, U.S. Traffic Corporation part number 103303. The panel assembly interfaces the card rack to the controller cabinet. Furnish new controller assemblies with these parts installed by the controller assembly manufacturer. To retrofit existing controller assemblies, deliver the parts to MOA Signal Maintenance, who will install the parts under Item 660(26) Signal Timings and Adjustments.

7. Traffic Logging System. Furnish, and others will install in the controller cabinet, a stand alone unit that collects, time stamps, and stores data in an unattended manner. The traffic logging system shall conform to the following:

a. Operation. The unit shall accept a new operating program, operational parameters, and the date and time stamp from a personal computer, downloaded through an RS-232 cable. The use of replaceable proms to change the operational program is unacceptable. Data collection shall be automatic and not require an operator to reset or start operation.

In the event of a power interruption, data collection shall automatically restart at the proper time. Other than, the current sample being collected, the unit shall not lose stored data because of the power interruption. At power up or at the restoration of power after an outage, the unit shall log the date and time at the start of data collection.

The unit shall maintain the operating program, data storage, and date/time

for a minimum of 5 years from when power is removed from the unit. The internal program/data size shall be a minimum of 32,000 bytes.

b. Input Interface. The unit shall have a minimum of 28 inputs. Furnish new and existing controller cabinet only with a loose Detector Systems TLS-1-C1 interface cable to connect the unit to the output of the loop detector units. The Municipality of Anchorage's Signal Maintenance Section will install the interface cable in the controller cabinets under Item 660(26) Signal System Timing and Adjustments. Do not furnish new controller cabinets with a built in interface panel.

c. Output Interface. Furnish units with an RS-232 serial port that allows a user to download and upload directly between the unit and a personal computer using the Microsoft Windows NT operating system or the external dial-up multi-port modem.

740-2.14 VEHICULAR SIGNAL HEADS. Replace the first sentence of Item 1. b. with the following:

Use red, yellow, and green LED signal modules that meet the requirements of Chapter 2a of *Equipment and Material Standards of the ITE* (Publication ST-0017A), Vehicle Traffic Control Signal Heads (VTCHS2), and the following:

Replace item 4 with the following and add item 5:

4. Backplates. Backplates shall not be louvered. Install backplates around vehicular signal faces except post-mounted flashers. Furnish backplates constructed of 0.063 inch minimum thickness aluminum alloy sheet meeting ASTM B 209, alloy 3003-H14. For those backplates fabricated from 2 or more pieces of sheeting, furnish them fastened together with 3/16" aluminum rivets or bolts peened after assembly.

   For traffic signals that consist of all 8 inch or all 12 inch signal sections, furnish 5 or 5½ inch wide backplates regardless of where the signals are installed, i.e. on mast arms, on top of posts, or on the sides of poles.

   For traffic signals that consist of combinations of vertically stacked 8 and 12 inch signal sections, furnish backplates with nominal borders of 8 inch for the 8 inch sections and 5 inch for 12 inch sections.

   Furnish backplates with the back and front faces factory finished with 2 coats of dark olive green enamel and 2 coats of flat black enamel, respectively.

5. Signal Mounting Hardware: Furnish elevator plumbizers, elbow pipe fittings, and post top adapters (without a terminal compartment) with integral serrated contacts that feature 72 teeth.

Provide signal heads that will be mounted on mast arms or pipe tenons with ferrous or bronze elevator plumbizers.

For signal faces installed on the sides of poles, furnish signal frames that consist of watertight assemblies of 1½ inch nominal diameter standard steel pipe, malleable iron or brass pipe fittings, and bronze terminal compartments. The side of the terminal compartment opposite the door shall feature a saddle shape for wobble free mounting on round poles and include a cable guide and two holes for mounting the compartment.

Furnish vehicular signal frames with a horizontal dimension between the center of the terminal compartment and the axis of the adjacent signal face of 22 inches in side mounted frames and 11 inches in post top installations.

Post top adapters shall slip fit over 4 inch nominal standard pipe and feature two rows of three cadmium plated steel setscrews. Furnish post top adapters with terminal compartments, except one way signal heads may be installed on adapters without a terminal compartment provided the adapters include offset openings. Provide post top adapters without a terminal compartment made of cast iron.

Furnish terminal compartments with a terminal block containing 12 poles, each with two screw type terminals. Each terminal must accommodate at least three 14 AWG conductors. Provide terminal compartments with a rain tight door that provide ready access to the terminal block.

For mounting each terminal compartment, furnish two ½" x 13 hot dip galvanized bolts that conform to ASTM A 325 and two ½" hot dip galvanized washers that conform to ASTM F 436.

740-2.15 PEDESTRIAN SIGNALS. Add the following as item 12: Furnish pedestrian signals side mounted on poles with a 2 piece, hinge connected, cast aluminum clamshell bracket that mounts directly between the pole and the side of the housing. The bracket shall fit round poles with outside diameters of 4.5 inches and greater without wobbling and allow a minimum rotation of ±15 degrees when mounted on a 4.5 inch O.D. pole. The bracket shall feature a rain-tight terminal compartment and include a 12 position terminal block. Installed, the bracket shall take less than three inches of space between the housing and pole.

For mounting each clamshell bracket, furnish two ½" x 13 hot dip galvanized bolts that conform to ASTM A 325 and two spacers provided by the bracket manufacturer to keep the bolt head clear of the recess that holds the nut in a through bolted installation.

Replace subsection 740-2.17 with the following:

740-2.17 FLASHING BEACONS. Furnish beacons that consist of one or more traffic signal sections meeting the requirements of subsection 740-2.14 Vehicular Signal Heads. See the Plans for the number, size and color of the signal sections required for each beacon.

Use the flasher in signal controller cabinets to energize beacons that flash continuously and are installed near traffic signals. Otherwise, each flashing beacon controller assembly consists of the following 120 volt ac equipment housed in a NEMA 3R enclosure: a circuit breaker, a radio interference suppressor, a transient voltage suppressor, a NEMA type 3 flasher, neutral and ground busses, and terminal blocks.

Controller assemblies for school zone speed limit sign beacons shall also include a time switch and a second 120 volt ac circuit breaker that protects a thermostat and heater.

The NEMA 3R enclosure shall feature a single shelf and a top hinged cover with a hasp and staple for sealing and locking the cabinet door.

The radio interference and transient voltage suppressors shall meet the requirements of subsections 740-2.11.1.d.(3) and (4), respectively.

Use a solid state NEMA Type 3 flasher meeting the requirements of NEMA Standard TS 1-1989, Traffic Control Systems.

Use 20 ampere, 600 volt barrier type phenolic terminal blocks with plated brass screw type terminals and integral strips can be marked with a pen or pencil.

Furnish an RTC Manufacturing model AP41-L time switch complete with wiring harness, or an approved, calendar programmable, solid-state time switch with liquid crystal display, keyboard, input/output port, and wiring harness. The approved time switch shall:

1. Operate on line voltages from 95 to 135 volts ac, operate in temperatures from -22° F to 165° F, and include a capacitor that provides 48 hours of back up power to retain programming and time when the unit is disconnected from ac voltage.
2. Include a backlit display and provide 2 lines of alphanumeric legend with 16 characters per line. The display shall automatically prompt the operator while programming the device through the keyboard for ease of use.
3. Include an input/output port and keyboard activated special functions that transfer the program to other units and download the program to a printer for a hard copy record of the program.
4. Automatically compensate for changes in Daylight Savings Time and leap years and include a keyboard activated special function to quickly change the dates for the begin and end of Daylight Savings Time.
5. Provide at least 10 basic plans for daily and/or weekly use and at least 200 program steps that are equally divided amongst the actual number of basic plans.

Each program step shall be assignable to a single day, weekend, weekday, or every day. The time switch shall also include 20 plans that activate the basic plans to provide one year of time based control.

6. Include at least 4 single pole double throw, relay controlled outputs rated for 15 amperes of resistive load at 115 volts ac. Each pole shall be independently activated for steady on or momentary on and be manually switched on through the keyboard.

When a signal controller cabinet flasher is used to energize a beacon, furnish a two pole, fused block with built in fuse pullers to protect the flasher. Furnish third party certified blocks that hold 13/32" x 1-1/2" midget ferrule fuses, are rated for 30 amperes, and feature tubular screw terminals that accommodate conductors to 8 AWG. Furnish blocks with two fast acting, 3 ampere (BAF-3) fuses and flat bases that can be directly mounted on a dead panel.

Replace subsection 740-2.18 with the following:

740-2.18 ROADWAY LUMINAIRES. Furnish luminaires that conform the following specifications and provide the light distributions specified. When luminaire performance criteria are specified, luminaires shall also:

- Meet or exceed the minimum initial light levels indicated.
- Provide light distribution uniformity ratios and veiling luminance ratios equal to or less than the maximums indicated.

When luminaire performance criteria are specified, submit the following information for each luminaire type and light distribution type specified: luminaire specifications, the lumen output of the lamps that will be furnished, and current electronic photometric data to the Engineer for approval. Furnish the photometric data in Illuminating Engineering Society (I.E.S.) format. The Engineer will use software that calculates light levels and uniformity ratios according to the American National Standard Practice for Roadway Lighting, A.N.S.I./I.E.S RP-8 to verify each luminaire provides the light levels, uniformities, and veiling luminance ratios specified.

When cut off distributions are specified, furnish luminaires with flat glass lenses and a full cutoff light distribution as defined in the American National Standard Practice for Roadway Lighting, A.N.S.I./I.E.S RP-8, dated 2000.

Furnish each luminaire with a high pressure sodium lamp of the wattage specified and matching ballast with an input voltage equal to circuit voltage. Furnish lamps that feature a rated life of 24,000 hours based on 10 hours per start and ballasts that conform to subsection 740-2.21.

Luminaries General

Install luminaires that feature:

1. Corrosion resistant enclosures with gray paint finish and space for the ballast.

2. Third party certification for use in wet locations.
3. Glass lenses, unless polycarbonate resin refractors are specified.
4. Terminal blocks for attaching the illumination tap conductors.
5. Aluminum reflectors with an ALZAK or ALGLAS finish.
6. Optical components free of substances that affect photometric performance, e.g. paint.
7. Housings cast with no provision for a photoelectric control receptacle.
8. Airtight reflector and lens units that breathe through activated charcoal filters and include elastomer gaskets to seal the gap between the two components. Gasket material must withstand the temperatures involved and be securely held in place.
9. Plug in starting aids in fixtures with lamps through 400 watts.

Luminaries – Cobrahead

Each cobrahead luminaire shall also include:

1. An easily removed hinged door used exclusively for mounting the ballast.
2. A second door that frames the lens, hinges on the house side, and fastens on the street side with an automatic type latch.
3. A four bolt mounting brackets that fit 2 inch nominal diameter standard pipe and feature a center pivot for leveling the luminaire.

Offset luminaires shall also include knuckle style pole top adapters that are sized to fit 2 inch nominal diameter standard pipe and feature a wire way meeting NEC requirements for installing three size 10 AWG conductors between the pole and the terminal block located in the luminaire.

High Tower Luminaire.

1. A 1,000 watt, high pressure sodium lamp that provide 140,000 minimum initial lumens.
2. A side entry 4 bolt mounting bracket designed for 2 inch nominal diameter pipe with provision for leveling the luminaire.
3. A die cast aluminum housing attached to the mounting bracket, which provides a weather tight enclosure for the ballast and terminal block and is readily removable without removing the luminaire from the bracket arm.
4. A cover and reflector that readily detaches from the mounting bracket without removing the luminaire from the bracket arm.
5. A double fused 480 volt ballast with fuses sized by the luminaire manufacturer.
6. A hinged lens compatible with add on light shields.
7. A stainless steel lamp clamp to prevent lamps from loosening, which is separate from the socket.

When the Plans specify shielding areas from illumination, install light shields on luminaires on high tower poles whose templates touch the shielded areas. Provide shields that limit light levels to 0.1 footcandle or less at the right of way line. Whenever

stock shields fail to limit light levels to the 0.1 footcandle level, hire the luminaire manufacturer to custom design and fabricate shields. If the first generation of custom fabricated shields fail to limit light levels to the 0.1 footcandle level, the Engineer may waive the 0.1 footcandle requirement.

Lenses.

When polycarbonate resin lenses are specified, furnish lenses the fabricator certifies conforms to the following criteria.

1. The lenses are molded in a single piece from virgin polycarbonate resin.
2. The lenses are free from cracks, blisters, burns, and flow lines, and furnished with the natural molded surface.
3. The lenses are of uniform density throughout and free from air, gas, or moisture pockets, and uncured areas.
4. The lenses are transparent with a clear bluish tint, produced from ultraviolet stabilized resin to reduce the effects of ultraviolet radiation on their color properties.
5. The resins used meet the requirements for the self extinguishing classification of ASTM D 635 and feature a minimum impact strength, Izod notched of 12 foot pounds per inch when tested according to ASTM D 256, Method A, using a 1/8 inch by ½ inch bar molded according to ASTM recommended practice.

Delete subsection 740-2.20, Illumination Control, in its entirety.

740-2.22 HIGH TOWER LUMINAIRE LOWERING SYSTEM. Delete this subsection in its entirety and substitute the following: Furnish an integral luminaire lowering device that is compatible with the high tower design and consists of a head frame assembly, luminaire ring assembly, and winch assembly complete with electric motor.

Provide a technician employed by the lowering device manufacturer, who has a minimum three years experience installing the lowering device, to

1. Teach each crew that assembles the lowering device how to complete the work on the first pole,
2. Oversee the assembly work on the next three poles or until the technician can assure the Engineer the crew can correctly assemble the lowering devices,
3. Teach each crew how to initially adjust each lowering device on the first pole installed,
4. Oversee the adjustment work on the next three installed poles or until the technician can assure the Engineer the crew can correctly adjust the lowering devices,
5. Come back to teach each new crew how to assemble and adjust the lowering system components, if the installation crews change, and

6. Make intermediate and final adjustments to all lowering devices installed under the contract at three, six, and twelve month intervals after the State has accepted the high tower poles.

Furnish a complete service manual with instructions on installation, operation, and maintenance for each lowering device, winch assembly, and power drive system furnished on the project.

Install one of the following high mast lowering devices wired for a single circuit, rated 480 VAC single phase, on each high tower pole shown on the Plans. Furnish power cords with four #8 AWG conductors.

Furnish each luminaire ring assembly with guide cones (Millerbernd) or tapered positioning pins (Eagle) painted a safety orange color for their full length. Use a 2 component; water borne epoxy paint with gloss finish that can be applied to galvanized steel and provides a tough, abrasion resistant coating rated for exterior use. Complete work according to the paint manufacturer's written instructions, including: preparing the surfaces and tinting, mixing, and applying the paint.

Manufacturer	Model No.	Options to be furnished
Eagle High Mast Lighting Co.	ELC-XX-GV	Hot dip galvanized masthead assembly and transition plate, and integral motor
Millerbernd Manufacturing	SSLD-2	Integral winch and motor assembly

The Plans will indicate the number of luminaires on each pole, each pole's height, and whether FAA approved obstruction lights are required. (4/05/07)R98USC04