PART 4

STANDARD MODIFICATIONS

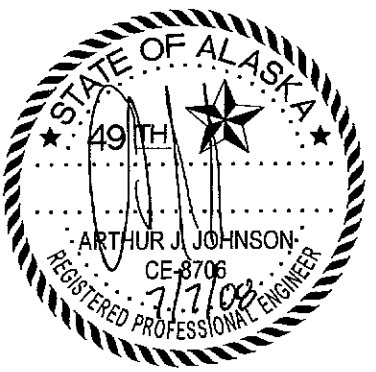
AND SPECIAL PROVISIONS

to the

STATE OF ALASKA

STANDARD
SPECIFICATIONS
FOR
HIGHWAY CONSTRUCTION

2004



SECTION 101

DEFINITIONS AND TERMS

Standard Modifications

101-1.03 DEFINITIONS. 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)

Replace the definitions of SUBGRADE with the following:

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

Replace the definition of PLANS and with the following: **PLANS.** 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)

SECTION 102

BIDDING REQUIREMENTS & CONDITIONS

Standard Modification

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)

Standard Modification

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. E18(6/30/04)

SECTION 103

AWARD AND EXECUTION OF CONTRACT

Special Provisions

103-1.01 CONSIDERATION OF BIDS. Add the following: In determination of the low bidder for state funded projects, a 5% bid preference will be given to Alaska bidders, as required under AS 36.30.170. "Alaska bidder means a person who:

1. holds a current Alaska business license;
2. submits a bid for goods, services, or construction under the name as appearing on the person's current Alaska business license;
3. has maintained a place of business within the state staffed by the bidder or an employee of the bidder for a period of six months immediately preceding the date of the bid;
4. is incorporated or qualified to do business under the laws of the state, is a sole proprietorship, and the proprietor is a resident of the state or is a partnership, and partners are residents of the state; and
5. if a joint venture, is composed entirely of ventures that qualify under 1. through 4., above.

Except for timber, lumber, and manufactured lumber products used in the construction project under AS 36.30.322(b), an Alaska products preference will be given as required under AS 36.30.326-36.30.332 when the bidder designates the use of Alaska products. The bidder shall complete the Alaska Products Preference Worksheet, according to instructions, and submits it whit the bid to indicate those Alaska products that are proposed for use. If the successful bidder/Contractor proposes to use an Alaska product and does not do so, a penalty will be assessed against the successful bidder/Contractor in an amount equal to the product preferences percentage granted to the successful bidder/Contractor plus one percent multiplied by the total declared value of the Alaska products proposed but not used.
ES09(6/30/04)

SECTION 105

CONTROL OF WORK

Standard Modifications

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 UTILITIES. Add the following: Request locates from 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: 811 who will notify the following:	
ACS	Interior Telecom.
Aircraft Service International Group	Marathon Oil
Alaska Fiberstar	Matanuska Electric Assoc
Alaska Native Hospital	MFS Technologies, Inc.
Alaska Railroad Corp	MOA Street Maintenance Department
Anchorage School District	Tesoro Alaska Pipeline
Anchorage Water & Wastewater Utilities	Mukluk Telephone Association
Alyeska Cable	Municipality of Anchorage
AT&T Alascom, Inc.	Municipal Light & Power
City of Wasilla	Phillips Petroleum
Chugach Electric Association	PTI
DOT&PF Street Lights, State of Alaska	Telalaska
ENSTAR Natural Gas	Unocal
Eyecom TV/Interior Telephone	United Utilities
GCI Communications	Yukon Telephone
Homer Electric Assoc.	

Call the following utilities and agencies directly:

Contact the DOT&PF 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:

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

2. 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 2 week work plan, or not required by the contract.

The utility shall give the Contractor, through the Engineer, 15 calendar days advance written notice for required staking. (5/24/07)R3

When utility company facilities are not proposed for relocation, use locates 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.

CHUGACH ELECTRIC ASSOCIATION (CEA): CEA owns and operates power lines for distribution within the project limits.

Chugach Electric Association (CEA) transmission lines run parallel along the south side of Tudor Road, east of Elmore Road, and turns south to run parallel along the east side of Elmore Road. At the angle point where the 115 Kilovolt (KV) transmission lines turn south, the poles are supported with guy wires. CEA distribution lines are also located south of Tudor Road and east of Elmore Road, running parallel to both roads. These lines provide the power to the MOA facilities along Elmore Road.

CEA facilities will not be affected by this project.

When working near CEA facilities, adhere to the requirements of "Electrical Facility Clearance Requirements". A copy of CEA's **Electrical Facility Clearance Requirements** is included in Appendix G to the Special Provisions to familiarize Contractors with safe excavation methods while working close to electrical facilities.

The contact for CEA is Gary Meadows, Manager, Distribution Construction (office tel. (907) 762-4618, cell (907) 242-2191).

MUNICIPAL LIGHT & POWER (ML&P): The Municipal Light and Power (ML&P) has underground facilities on the north side of Tudor Road, east and west of Elmore Road. There is an existing vault on the east side of Elmore Road north of Tudor Road.

ML&P facilities will not be affected by this project.

ENSTAR NATURAL GAS COMPANY (ENSTAR): ENSTAR Natural Gas has a 12" high-pressure transmission line crossing Tudor Road west of the Tudor Road/Elmore Road intersection. At the southwest corner of the intersection the high-pressure line connects with two 12" high-pressure transmission lines. One 12" high-pressure transmission line crosses Elmore Road just south of the intersection paralleling Tudor Road on the south side. The other 12" high-pressure transmission line crosses Elmore Road just south of the intersection and parallels Elmore Road on the east side. Enstar currently has a fenced in pigging station constructed within the southwest quadrant of the Tudor Road/Elmore Road intersection. Enstar also has an abandoned 12"pipe south of Tudor Road in the Elmore Road ROW. North of Tudor Road along the west side of Elmore Road ENSTAR has a 6-inch plastic distribution main with two 4-inch plastic distribution main crossings. South of Tudor Road along the west side of Elmore Road ENSTAR has a 4-inch plastic distribution main with two 4-inch plastic distribution main crossings. Along the south side of Tudor Road west of Elmore Road ENSTAR has a 4-inch steel distribution main with one 2-inch steel distribution main crossing at Florina Street. Along the north side of Tudor Road east of Elmore Road ENSTAR has a 4-inch plastic distribution main.

The four (4) inch steel distribution line that parallels the south side of Tudor Road will be relocated between stations 194+95 Rt. and 204+44 Rt.. The relocation of the new line must be completed before new pipe P8-4 and structures S9-2 and S9-4 can be installed. Allow ENSTAR seven (7) calendar days to complete the relocation.

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A copy of Enstar's **Safety Requirements for Excavation Adjacent to Natural Gas Pipelines** is included in Appendix F to the Special Provisions to familiarize Contractors with safe excavation methods while working close to gas pipelines.

The contact for Enstar is **Steve Cooper**, (907) **264-3730**.

ALASKA COMMUNICATIONS SYSTEMS TELECOMMUNICATIONS (ACS): Alaska Communication Systems (ACS) has underground communications cables located along the east side of Elmore Road from the north limit of the project to approximately 250 feet south of the Tudor Road/Elmore Road intersection, where they cross under Elmore Road to a vault located west of Elmore Road. In addition, another vault exists west of the north pedestrian bridge abutment, and a communications cable runs along the north side of Tudor Road east of the intersection.

If the conduits along the southeast corner of Tudor Road/Elmore Road are exposed during construction, they should be protected from construction activity. **Prior to backfilling, ACS will be provided the ability to inspect the exposed facility.**

The contact for ACS is **Jerry Snow**, (907) 564-1367.

GENERAL COMMUNICATIONS INC. (GCI): GCI has an underground fiber optic cable running the length of the project along the south side of Tudor Road, with a crossing located south of Tudor Road.

GCI facilities should not be affected by this project

The contact for GCI is Joe Whittaker, (907) 229-9176.

ANCHORAGE WATER AND WASTEWATER UTILITY (AWWU): The Municipality of Anchorage (MOA) owns and operates a water system providing service in the Tudor Road and Bragaw Street (Elmore Road) project area.

Anchorage Water and Wastewater Utility (AWWU) has a 30-inch ductile iron (DI) water line under Elmore Road on the south side of the Tudor Road/Elmore Road intersection, a 16-inch DI water line under Elmore Road on the north side of the intersection, and a 36-inch concrete water line along Tudor Road for the length of the project. These pipes meet at a large underground valve vault in the northeast corner of the intersection. In addition, AWWU has recently installed a 48-inch water main under Elmore Road from the south that terminates at a vault south of this project. AWWU is currently installing a 48-inch water main from that vault to tie in at Boniface Parkway. Finally, there is an 8-inch DI line in the southeast quadrant of the intersection along Elmore Road and a 12-inch DI line in the northwest quadrant of the intersection along Tudor Road.

Water mains will not be affected by the intersection improvements, but appurtenances such as valve boxes will require adjustment or relocation based on the final grade of the proposed improvements.

AWWU has a sewer main within the Elmore Road ROW south of Tudor Road that this project is not expected to impact.

Coordination with AWWU will be required. The AWWU contact is **Joe Sanks**, (907) **564-2717**.

USKH(05/12/08)

Special Provisions

105-1.07 COOPERATION BETWEEN CONTRACTORS. Add the following: The following other projects may be under construction concurrently with this project:

1. Abbott Loop Extension, State Project No. 56559
   ADOT&PF Resident Engineer – Mike Gault, phone 269-0450

2. Tudor Road and Lake Otis Parkway Intersection Improvements,
   Federal/State Project No. HPRL-0001(359)/58890; MOA Project No. 04-035
   MOA Project Manager – John Smith, phone 343-8422
   ADOT&PF Project Manager – Kevin Jackson, phone 269-0641

3. East Dowling Road Extension and Reconstruction, State Project No. 58592
   ADOT&PF Project Manager – Jim Childers, phone 269-0544

4. 48th Avenue/Boniface Parkway Extension, Tudor Road to Bragaw Street
   MOA Project No. 05-030
   MOA Project Manager – John Smith, phone 343-8422

Coordinate traffic control, construction, and material hauling operations with the prime Contractor of the above projects to minimize impacts on the traveling public, and to minimize conflicts with the work being performed under the other contracts.

USKH(05/12/08)

Standard Modification

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

deleted

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 FOR ADJUSTMENT AND DISPUTES. Add the following: Appeals to the superior court under AS 36.30.685 must be filed in the Third Judicial District. (03/21/01)R93

105-1.18 INTERIM COMPLETION. Add the following subsection: This project will have interim completion dates in addition to the completion date.

1. **First Interim Completion Date: Complete all work except for top lift paving (Hot Mix Asphalt Concrete Type R), final pavement markings, standing the new traffic signal poles, Pedestrian Lighting, Bus Stop Lighting, and landscaping by October 1, 2008. On this date, traffic will be in final lane configuration with associated temporary striping and signals as necessary to be operational.**

2. **Second Interim Completion Date: In addition to the work specified for the First Interim Completion Date, the Pedestrian Lighting and Bus Stop Lighting shall be installed and operational by November 21, 2008.**

3. **Final Completion Date: The final completion date will be as shown in the Invitation for Bids.**

Liquidated damages will be assessed in accordance with subsection 108-1.07 Failure to complete on Time, for failure to complete work under this contract within the interim completion dates and final completion date specified.

Maintenance of all aspects of the project construction, except routing snow removal, shall be the responsibility of the Contractor until Project Completion.

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 Provision

106-1.01 SOURCE OF SUPPLY AND QUALITY REQUIREMENTS. Add the following: Pursuant to AS 36.15.050 and AS 36.30.322, agricultural/wood products harvested in Alaska shall be used in state funded projects whenever they are priced no more than seven percent above agricultural/wood products harvested outside the state and are of a like quality as compared with agricultural/wood products harvested outside the state.

Maintain records that establish the type and extent of agricultural/wood products utilized. When such products are not utilized, document the efforts he made towards obtaining agricultural/wood products harvested in Alaska and include in this documentation a written statement that he contacted the manufacturers and suppliers identified on the Department of Commerce and Economic Development's list of suppliers of Alaska forest products concerning the availability of agricultural/wood products harvested in Alaska and, if available, the product prices. Complete this documentation at a time determined by the Contracting Officer.

The Contractor's use of agricultural/wood products that fail to meet the requirements of this subsection shall be removed and replaced according to the last paragraph of subsection 105-1.03, Conformity With Plans and Specifications. (05/07/91)S18

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: 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.

Add the following: The Department has received the following permits on the Contractor's behalf:

1. Municipality **of Anchorage** Noise Permit No. **FA0006035-2008** obtained by the Department (expires **10/31/2008**).

2. Anchorage General Permit 93-11N wetland fill Permit No. POA-2008-193 obtained by the Department (expires June 30, 2010).

Provide information to comply with the US Environmental Protection Agency National Pollutant Discharge Elimination System (NPDES) General Permit for Alaska to discharge storm water from the construction site. Refer to Section 641, Erosion, Sediment, and Pollution Control for requirements for this permit.

A Municipality of Anchorage (MOA) Right-of-Way Use permit will be required. The Municipality will require a copy of the approved Traffic Control Plan and a copy of the Notice to Proceed from the Contractor.

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.

Standard Modification

107-1.11 PROTECTION AND RESTORATION OF PROPERTY AND LANDSCAPE.
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

107-1.11 PROTECTION AND RESTORATION OF PROPERTY AND LANDSCAPE.
Add the following: If required 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

Add the following: Before work, the Contractor shall schedule a walk-thru of the project with the City Horticulturist to review potential impacts to existing landscape materials (tress, shrubs and groundcovers). The Contractor shall outline measures for physical protection, such as fencing around the tree driplines. If physical protection is not feasible, the Contractor shall provide provisions for relocation and/or replacement of impacted landscape materials. No payment will be made for protection of existing landscape materials. This work will be considered a subsidiary contract obligation.

SECTION 108

PROSECUTION AND PROGRESS

Special Provision

108-1.01 SUBLETTING OF CONTRACT. Delete paragraph four and replace with the following:

Submit the Contractor Self Certification for SubContractors and Lower Tier SubContractors, Form 25D-042, before the Contractor or a subContractor sublets any portion of the Contract. The certification will be accepted by the Department in lieu of written approval of subcontracts. The Department maintains the authority to review subcontracts, require prior written approval of subcontracts, and to deny permission to sublet work. The Department may penalize the Contractor for false statements or omissions made in connection with Form 25D-042.

1. The Contractor shall ensure the following for each subcontract (agreement):

    a. The Department is furnished with one completed Contractor Self certification, Form 25D-042, and two copies of the subcontract signed by both parties and including item descriptions and prices of subcontracted work before the subcontracted work begins;

    b. The subContractors have submitted a Bidder Registration, Form 25D-6;

    c. The required prompt payment provisions of AS 36.90.210, as well as other items listed in Form 25D-042, are included in the subcontracts;

    d. The subContractors pay current prevailing rate of wages according to subsection 107-1.04 and file certified payrolls with the Engineer and DOLWD for work performed on the project; and

    e. Upon receipt of a request for more information regarding subcontracts, the requested information is provided to the Department within 5 calendar days. R57(01/02/08)

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 the last sentence of the first paragraph in 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.

R261(12/13/02)

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 order(s) for poles and luminaires for the pedestrian and bus stop lighting systems 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 pedestrian lighting system items, the Contractor shall provide a copy of the delivery order to the Engineer. The Contractor has until December 5, 2008 to complete associated pedestrian lighting work. If the pedestrian and bus stop lighting work is not completed within the allotted time-period, 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.

108-1.07 FAILURE TO COMPLETE ON TIME. Delete the first sentence of the first paragraph and substitute the following: For each calendar day that the work remains incomplete after the expiration of the contract time or the interim completion date as set forth in subsection 105-1.18 Interim Completion, the liquidated damages per day given in the table below shall be deducted from any monies due the Contractor. For the purposes of computing liquidated damages calendar days will be counted between November 1st and April 30th as well as between May 1st and October 31st.

Delete Table 108-1 and replace with the following:

TABLE 108-1
DAILY CHARGE FOR LIQUIDATED DAMAGES FOR EACH CALENDAR DAY OF DELAY

Completion Date	Daily Charge
Interim Completion Date	$1,750
Second Interim Completion Date	$2,175
Contract Completion Date	$2,600

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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

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.

E11(6/30/04)

SECTION 202

REMOVAL OF STRUCTURES AND OBSTRUCTIONS

Special Provisions

202-1.01 DESCRIPTION. Add the following: This work also consists of pavement planing as specified in this section. (02/28/01)R143USC

Special Provisions

202-3.05 REMOVAL OF PAVEMENT, SIDEWALKS, AND CURBS. Add the following: Pavement removed may be used for embankment construction if it is not exposed at the completed embankment surface. The maximum allowable dimension of the broken asphalt pieces is 6 inches.

Obtain a solid waste disposal permit from DEC or use a site previously approved by DEC for disposal of removed asphalt if not using it in the embankment. A DEC permitting officer in Anchorage may be contacted at (907) 269-7590. (03/29/01)R84

202-3.06 PAVEMENT PLANING. Add the following subsection: Remove existing asphalt concrete pavement by cold planing at locations shown on the Plans. The surface of the pavement after planing shall be uniformly rough grooved or ridged.

Remove planed material from the project immediately after planing. Stockpile planed material at the Anchorage maintenance yard located at Tudor Road Coordinate with Jon Mendenhall, Maintenance Station Manager at (907) 338-1426 for acceptance of material and desired location of stockpile. Planed material not acceptable to the maintenance station manager 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 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. ADEC permitting officer in Anchorage may be contacted at (907) 269-7590.

During the planing operation, sweep the streets with mechanical sweepers equipped with vacuum and water sprinkling devices to control dust and remove loose 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 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 gutters.

Maintain a tolerance of 0.1 inch 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. Damage caused by the planing operation shall be removed and replaced by the Contractor at the Contractor's 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 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(15) At the contract price per unit specified. Payment is full compensation for mechanical sweepers during planing operations, removal of pavement from the gutter and stockpile of planed material according to subsection 202-3.06.

Replace 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 subsection 109-1.05, Compensation For Extra Work). (02/28/01)R143

Payment will be made under:

Pay Item No.	Pay Item	Pay Unit
202(15)	Pavement Planing	Square Yard

SECTION 203

EXCAVATION AND EMBANKMENT

Special Provisions

203-4.01 METHOD OF MEASUREMENT.

1. **Within item 1, delete the first sentence and replace with: Items 203(1) through 203(3), 203(4), 203(5) and 203(8).**

Add the following:

8. **Item 203(3A). By lump sum.**

203-5.01 BASIS OF PAYMENT. Add the following:

Payment will be made under:

Pay Item No.	Pay Item	Pay Unit
203(3A)	Unclassified Excavation	Lump Sum

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SECTION 204

STRUCTURE EXCAVATION FOR CONDUITS AND MINOR STRUCTURES

Standard Modification

204-3.01 CONSTRUCTION REQUIREMENTS. In the first sentence of paragraph four, delete: "bedding and"
E37(01/27/07)

Special Provisions

204-3.01 CONSTRUCTION REQUIREMENTS. Add the following after the third paragraph: Excavation, bedding, backfill, and compaction for culverts outside the roadbed may be visually inspected and approved by the Engineer. R204(2/6/08)

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)R176

Special Provisions

301-3.01 PLACING. Add the following: Base course material used for the 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)R26

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)R176

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.

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. ***deleted***

Longitudinal joints will be evaluated for acceptance according to subsection 401-4.03.

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 401-4.03)

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.

deleted

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 (also for approaches and 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 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 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 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 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 - Quality.

401-4.03 EVALUATION OF MATERIALS FOR ACCEPTANCE. The following method of price adjustment will be applied to each type of Hot Mix Asphalt when 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 - Quality. 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 = $70 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 - Quality.

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	<0.5(
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.(
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.(
Tests On RTFO										
Mass Loss	<1.00 %	<1.00		1.001-1.092				1.093-1.184	1.185-1.276	>1.27
Dynamic Shear	>2.20 kPa	>2.20		1.816-2.199				1.432-1.815	1.048-1.431	
Test On PAV										
Dynamic Shear	<5000 kPa	<5000		5001-5289				5290-5578	5579-5867	>586
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	<0.26
Direct Tension	>1.0 %	>1.0		0.86-0.99				0.71-0.85	0.56-0.70	<0.5(

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 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, and 401 through 409.

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 = $[(IPP - IB) - (0.075 \times IB)] \times Q$

   For a decrease exceeding 7.5%, deduction from contract = $[(IB - IPP) - (0.075 \times IB)] \times Q$

   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

6. 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.

*****deleted*****

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.

*****deleted*****

Furnishing and installing joint adhesive, and sealing the surface of longitudinal joints according to subsection 401-3.12 will be subsidiary to 401 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.

Payment will be made under:

Pay Item No.	Pay Item	Pay Unit
401(1)	**Hot Mix Asphalt, Type II; Class A**	Ton
401(2)	**Asphalt Cement, 52-28**	Ton
401(6)	Asphalt Price Adjustment	Contingent Sum

*****deleted*****

R199 (01/02/08)

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 for payment.

402-5.01 BASIS OF PAYMENT. Add the following: Furnishing and applying STE-1 Asphalt for Tack Coat shall be subsidiary to Section 401 and Section 409 pay items that are listed in the Bid Schedule.

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Add the following Section:

SECTION 409

HOT MIX ASPHALT WITH CRUMB RUBBER

409-1.01 DESCRIPTION. Construct one or more layers of plant-mixed Hot Mix Asphalt (HMA) with Crumb Rubber (Type R) on an approved surface, to the lines, grades, and depths shown on the Plans. In this specification/special hot mix asphalt with crumb rubber may be noted as HMA, HMA Type R, and HMA-R.

MATERIALS

409-2.01 COMPOSITION OF MIXTURE - JOB MIX DESIGN (JMD). Meet the requirements of Table 409-1 for the Job Mix Design performed in accordance with ATM 417.

TABLE 409-1
HMA DESIGN REQUIREMENTS
(TYPE R)

DESIGN PARAMETERS	
Stability, pounds	900 min
Voids in Total Mix, %	2 – 4
Compaction, number of blows each side of test specimen	75
Voids in Mineral Aggregate, % min. Type R	18.0
Asphalt Content, Min. %	6.0
Dust – Asphalt ratio *	0.6 – 1.2
Rut Index **ATM 419**	6 max

* 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 mix, 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 Subsection 409-2.02 for the type of HMA specified but asphalt concrete mixture will have the full tolerances in Table 409-2 applied for evaluation in accordance with 409-4.03 except the tolerances for the largest sieve specified will be plus 0% and minus 2%, and the No. 200 sieve is limited by the broad band limits.

Do not produce HMA for payment until the Engineer approves the Job Mix Design.

Do not mix HMA produced from different plants.

Submit the following to the Engineer at least 15 days before the production of HMA:

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 aggregate requirements for each type of HMA specified in the Contract.

2. Representative samples of each aggregate (coarse and/or intermediate, fine, and natural blend material) 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 mixture. Include name of product, manufacturer, test results of the applicable quality requirements of Subsection 702-2.01, manufacturer's certificate of compliance per 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.

5. Samples of crumb rubber (20 pounds) proposed for use with a manufacturer's certification of composition.

The Engineer will then evaluate the material and the proposed gradation using ATM 417 and the requirements of Table 409-1 for the appropriate type of HMA specified and establish the approved Job Mix Design which will become a part of the Contract.

The Engineer will assess a fee of $2,500.00 under Item 409(6), Asphalt Price Adjustment, for each mix design subsequent to the approved Job Mix Design for each Type and Class (where applicable) of HMA specified.

No payment for HMA will be made until the new Job Mix Design is approved. Approved changes apply only to HMA produced after the submittal of the changes.

Changes. Failure to achieve results conforming to Table 409-1 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.

409-2.02 AGGREGATES. Use a minimum of three stockpiles for crushed HMA aggregate (coarse, intermediate, and fine). Place the natural blend material in a separate pile.

Before Crushing Aggregate: Aggregate shall not be coated with dirt or other finely divided mineral matter. Remove all natural fines passing the No. 4 sieve. Remove all clay balls, organic material and other deleterious material.

Coarse Aggregate (retained on the No. 4 sieve). Crushed stone or crushed gravel consisting of sound, tough, durable rock of uniform quality. Remove all natural fines passing a No. 4 sieve before crushing aggregates. Free from clay balls, organic matter, and other deleterious material. Not coated with dirt or other finely divided mineral matter. Meet the following requirements:

LA Wear, % max	AASHTO T 96	45
Degradation Value, min	ATM 313	30
Sodium Sulfate Loss % max (5 cycles)	AASHTO T 104	9
Fracture, min %	WAQTC FOP for AASHTO TP61	98, 2-face
Flat-Elongated Pieces, max %	ATM 306	
1:5		3
1:3		8
Nordic Abrasion, max.%	ATM 312	12
Absorption, max. %	AASHTO T85	2.0

BROAD BAND GRADATIONS FOR HMA AGGREGATE
(Type R)
Percent Passing by Weight

Sieve	Type R
¾ inch	100
½ inch	65-80
3/8 inch	45-60
1/4 inch	-
No. 4	30-45
No. 8	20-35
No. 16	≤ 25
No. 30	≤ 20
No. 50	≤ 15
No. 100	≤ 12
No. 200	4.0-10.0

deleted

Note: The JMF gradation must provide a minimum of 8 percent difference of percent passing the No. 4 sieve and the No. 8 sieve. No tolerance is allowed beyond the Broad Band limits of the #200 sieve.

Fine Aggregate (passing the #4 sieve). Consist entirely of aggregate produced from aggregate crushing process and be non-plastic as determined by WAQTC FOP for AASHTO T 90. Meet the quality requirements of AASHTO M 29, including S1.1, Sulfate Soundness and Type R shall meet the following:

Property	Test Method	Requirement
Fine Aggregate Angularity	AASHTO T 304	45% min.

409-2.03 ASPHALT CEMENT. Provide the grade of asphalt cement specified in the contract meeting the applicable requirements of Section 702. Use PG 64-34 if none is specified.

Provide test reports for each batch of asphalt cement showing conformance to the specifications prior to delivery to the project. Document the storage tanks used for each batch on the test report, the anti-strip additives required by the mix design to 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.
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.

409-2.04 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. A minimum of 0.25 percent by weight of asphalt cement is required.

409-2.05 GRANULATED TIRE RUBBER (Crumb Rubber). The granulated rubber shall be produced from ambient ground whole passenger or truck tires (heavy equipment tires shall not be used). The ground rubber shall be free of wire and cord, free flowing. Calcium carbonate or talc (meeting ASTM M 17) may be added, up to a maximum of 4% by weight, to maintain the free flowing condition of the rubber. Add rubber during the mixing process in the asphalt plant. **The crumb rubber supplier shall provide certification listing the test results of the gradation and chemical analysis of the crumb rubber supplied.**

Meet the following gradation requirements determined in accordance with WAQTC FOP for AASHTO T 27/T 11.

Gradation Requirements:

Sieve Size	Percent Passing
1/4 inch	100
No. 4	80-100
No. 8	25-45
No. 16	0-4

Chemical and Physical Properties **(ASTM 297)**:

Natural Rubber	14-30%
Carbon Black	20-35%
Ash	8% max
Acetone Extract	10-18%
Specific Gravity	1.15 ± 0.05
Moisture Content	$\leq 0.75\%$
Contaminates, Fiber & Steel	$\leq 0.5\%$ fiber + metal particles
Contaminates, Mineral	$\leq 0.25\%$

Estimated addition rate of crumb rubber is 2 –3% of total mix weight as determined by Engineer.

409-2.06 PROCESS QUALITY CONTROL. Sample and test materials for quality control of the HMA according to Subsection 106-1.03. Provide copies of these test results to the Engineer within 24 hours.

Failure to perform quality control forfeits your right to a retest under Subsection 409-4.02.

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 HMA. Include a proposed quality control testing frequency for gradation, asphalt cement content, crumb rubber content, and compaction.

CONSTRUCTION REQUIREMENTS

409-3.01 WEATHER LIMITATIONS. Do not place the HMA Type R on a wet surface, on an unstable/yielding roadbed, when the base material is frozen, or when weather conditions prevent proper handling or compaction of the mix. Do not place HMA Type R on a surface that has a temperature less than 50° F. Place the top layer of paving/surface course between May 1 and August 15th **unless approved by the engineer in writing.**

409-3.02 EQUIPMENT, GENERAL. Use equipment in good working order and free of HMA buildup. Make all equipment available for inspection and demonstration of operation a minimum of 24 hours before placement of HMA.

409-3.03 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 HMA production.

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

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 systems to uniformly blend in cellulose and granulated rubber into the mix.

409-3.04 HAULING EQUIPMENT. Haul asphalt mixtures 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 HMA in the hauling vehicle, when directed.

Provide a truck cleaning station on the project where the following work is performed.

- Spray truck tires with an environmental degradable release agent if mix adheres to tires before dumping in front of the paver.
- Clean off loose mix from gates, chains, tires, etc. that would fall on the pavement of the haul route.
- Daily inspect and clean the pavement surface of the haul route of mix that has fallen on it.

409-3.05 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 a 30-foot minimum 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.

Use a screed assembly that produces a finished surface of the required smoothness, thickness and texture without tearing, shoving or displacing the HMA. Heat and vibrate screed extensions. Place auger extensions within 20 inches of the screed extensions or per written manufacturer's recommendations.

Equip the paver with a means of preventing the segregation of the coarse aggregate particles from the remainder of the HMA 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 asphalt pavers shall be equipped with the Blaw-Knox Materials Management Kit (MMK).

(2) Cedarapids asphalt pavers must have been manufactured in 1989 or later.

(3) Caterpillar asphalt pavers shall be equipped with deflector plates as identified in the December 2000 Service Magazine – entitled: New Asphalt Deflector Kit {6630, 6631, 6640}.

The Contractor shall supply a Certificate of Compliance that verifies the required means and methods used to prevent bituminous paver segregation have been implemented.

The Engineer shall approve all means and methods used to prevent bituminous paver segregation before placing HMA on the project.

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

409-3.06 ROLLERS. Use steel-wheel (static or vibratory) rollers, pneumatic rollers are not recommended. With drive drum towards the paver, operate rollers according to manufacturer's instructions. Avoid crushing or fracturing of aggregate. Use rollers designed to compact HMA, and reverse without backlash. Release agent may be required on the drum to prevent adhesion of the mix.

409-3.07 PREPARATION OF EXISTING SURFACE. Prepare existing surfaces in conformance with the Plans and Specifications. Clean, wash, and sweep existing paved surfaces of loose material. Prior to 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.

Preparation of a milled surface,

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

- If planing breaks through existing pavement remove 2 inches of existing base and fill with HMA, Type II, Class B. 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.

Prior to placing the HMA, 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 HMA on these surfaces.

409-3.08 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. Maintain temperature at or not greater than 25° F of the mix temperature.

409-3.09 PREPARATION OF AGGREGATES. Dry the aggregate so the moisture content of the asphalt concrete mixture, 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 HMA to the temperature specified in the mix design.

Adjust the burner on the dryer to avoid damage to the aggregate and to prevent the presence of unburned fuel on the aggregate. HMA containing soot or fuel is considered unacceptable per Subsection 105-1.11.

409-3.10 MIXING. Combine the aggregate, asphalt cement, crumb rubber, 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.
*****deleted*****

For drum plants, add crumb rubber at a location prior to the injection of asphalt cement.

409-3.11 TEMPORARY STORAGE. Silo type storage bins may be used, provided that the characteristics of the HMA are not altered. Signs of visible segregation, heat loss, changes from the Job Mix Design, changes in the characteristics of asphalt cement, lumpiness, or stiffness of the mixture are causes for rejection.

409-3.12 PLACING AND SPREADING. Place the HMA upon the approved surface, spread, strike off, and adjust surface irregularities. Use asphalt pavers to distribute HMA, including leveling courses. The maximum compacted lift thickness allowed is 2 inches. Layout the paving widths so that longitudinal joints are not in the driving lanes of the top/surface layer.

Use hand tools to spread, rake, and lute the HMA 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 HMA over bridge deck membranes according to Section 508 and the membrane manufacturer's specifications.

Mix temperature behind the screed shall not be less than 300°F

409-3.13 COMPACTION. Thoroughly and uniformly compact the HMA by rolling.

During placement, the Engineer may evaluate the HMA surface immediately behind the paver for cyclic low density using an infrared camera. The real time thermal images and thermal profile data will become part of the project records shared with the Contractor. The Contractor shall immediately adjust his laydown procedures to correct any mat thermal differentials greater than 25°F.

The target value for density is 96% of the maximum specific gravity (MSG), as determined by WAQTC FOP for AASHTO T 209. For the first lot of each type of HMA, the MSG will be determined by the Job Mix Design. 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 accordance with 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 pavement that has not cooled sufficiently to prevent indentation.

Continue rolling the mat until the temperature drops below 140° F.

After compaction is competed, apply a solution of hydrated lime mixed with water to the surface of the pavement before allowing traffic on it.

409-3.14 JOINTS. Minimize the number of joints to ensure a continuous bond, texture, and smoothness between adjacent sections of the pavement.

Remove to full depth improperly formed joints resulting in surface irregularities. Replace with new HMA, and thoroughly compact.

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.

Seal the vertical edge of all longitudinal joints with Crafco 34524 Joint Adhesive or approved equal before paving against it. Apply a 1/8 inch thick band of joint adhesive over the entire face of the longitudinal edges according to manufacturer's recommendations.

For the top layer of HMA, 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 in accordance with WAQTC FOP for AASHTO T 166/T 275.

If the average project longitudinal joint density is less than 91% in the top layer, seal all the longitudinal joints with Asphalt Systems GSB-78, or approved equal. Apply sealant while the HMA is clean, free of moisture, and before traffic marking. Longitudinal joint sealing shall be per 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.

409-3.15 SURFACE TOLERANCE. The Engineer will test the finished surface after final rolling at selected locations using a 16-foot straightedge. Correct variations from the testing edge, between any two contacts of more than 1/4 inch.

The Engineer will measure the pavement surface in the driving lanes 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.

409-3.16 PATCHING DEFECTIVE AREAS. Remove any HMA that becomes contaminated with foreign material, is segregated, or is in any way determined to be defective. Do not skin

patch. Remove defective materials for the full thickness of the course. Cut the pavement so that all 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 tack to cure. Place and compact fresh HMA per Subsection 409-3.12, 3.13 to grade and smoothness requirements.

Areas where the surface is flushing or bleeding asphalt cement after compaction is completed are defective and not acceptable. They shall be removed by milling to a depth of 2 inches and replaced at no cost to the State.

All costs associated with patching defective areas are subsidiary to the HMA pay item.

409-4.01 METHOD OF MEASUREMENT. Section 109 and the following:

Hot Mix Asphalt (HMA). By weighing, no deduction will be made for the weight of asphalt cement or anti-stripping additive, cutting back joints, or by the area of final pavement surface.

Asphalt Price Adjustment. Calculated by quality level analysis under Subsection 409-4.03.

Asphalt Cement. By the ton from supplier's invoices minus waste, diversion and remnant. This procedure shall be used on projects where deliveries are made in tankers and the asphalt plant has one asphalt tank dedicated only to the project, or using a method approved by the Engineer.

The Engineer may direct, at any time, tankers to 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 or a method approved by the Engineer. The weight of asphalt cement in waste HMA will be calculated using the target value for asphalt cement as 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.

Longitudinal Joint. By the lineal foot of longitudinal joint.

409-4.02 ACCEPTANCE SAMPLING AND TESTING. The quantity of each type of HMA 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 409-4.03, 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. HMA quantities of less than 300 tons remaining after dividing the lot into sublots will be included in the last sublot. HMA quantities of 300 tons or greater will be treated as an individual sublot. The lot will be evaluated for price adjustment according to Subsection 409-4.03 except as noted.

For contract quantity of less than 1,500 tons (and for temporary pavement), HMA will be accepted for payment based on the Engineer's approval of a Job Mix Design, a field sample of the mix, and acceptable placement and compaction of the HMA to the specified depth and finished surface requirements and tolerances. Remove and replace any HMA that does not conform to the approved JMD.

Any area of finished surfacing that is visibly segregated, fails to meet surface tolerance requirements or is flushing asphalt cement is considered unacceptable per Subsection 105-1.11.

1. Asphalt Cement / Crumb Rubber Content. Samples for the determination of asphalt cement content will be taken from either the windrow in front of the paver or at the end of the auger, or behind the screed prior to initial compaction. 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 / crumb rubber content will be determined in accordance with ATM 405 or WAQTC FOP for AASHTO T 308. ***deleted*** **The Engineer may require the average of two tests from the same sample to be used to compute the result**.

2. Asphalt Cement ***deleted***. The Contractor shall sample asphalt cement from the asphalt cement supply line when requested, witnessed by the Engineer's representative. After purging residual asphalt cement, take 3 one-quart samples into wide mouth one-quart metal containers. Asphalt cement will be sampled for acceptance testing in accordance with WAQTC FOP for AASHTO T 40 and tested for conformance to the specifications in Section 702. Three separate samples will be taken, one for acceptance testing, one for Contractor retesting, and one held in reserve for referee testing.

3. Aggregate Gradation. Samples taken for the determination of aggregate gradation will be from the same location as samples for the determination of asphalt cement / crumb rubber content. Two separate samples will be taken, one for acceptance testing and one held in reserve for retesting if applicable. The gradation will be determined in accordance with 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. ***deleted*** **The Engineer may require the average of two tests from the same sample to be used to compute result.**

1. Density. Cut full depth core samples from the finished HMA within 24 hours after final rolling. Neatly cut one 6-inch diameter core sample with a core drill from each sublot at the randomly selected 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 HMA on bridge decks. Backfill and compact all voids left by coring with new HMA within 24 hours.

   Failure to cut core samples within the specified period will result in a deduct as specified in subsection 409-5.01.

2. Retesting. A retest of any sample outside the limits specified in Table 409-2 may be requested provided the quality control requirements of 409-2.05 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. The original test results for gradation, asphalt cement content / crumb rubber content, or density 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 or asphalt cement content retesting of the sample from the first sublot of a lot will include retesting for the MSG.

409-4.03 EVALUATION OF MATERIALS FOR ACCEPTANCE. The following method of price adjustment will be applied to each type of HMA for which the contract quantity equals or exceeds 1,500 tons, except as specified in Subsection 409-4.02.

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. Asphalt cement / crumb rubber content results will be reported to the nearest 0.1 percent.

The price adjustment is based on the lower of two pay factors. The first factor is a composite pay factor for HMA, which includes gradation and asphalt cement / crumb rubber content. The second factor is for density.

A lot containing HMA 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 HMA 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 HMA that appears to be defective based on visual inspection. A minimum of two samples will be collected from the rejected mixture and tested if requested. If all test results are within specification limits, payment will be made for the mixture. 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 409(6), Asphalt Price Adjustment. All costs associated with removal and disposal of the rejected HMA are subsidiary to the HMA 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.

If any sieve size on a gradation test or the asphalt cement / crumb rubber content is an outlier, then the gradation test results and the asphalt cement / crumb rubber 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 / crumb rubber content results for that sublot 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 / crumb rubber 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 / crumb rubber 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 / crumb rubber 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 409-2. 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 for Quality Level Analysis purposes.

TABLE 409-2

LOWER SPECIFICATION LIMIT (LSL) & UPPER SPECIFICATION LIMIT (USL)

Measured Characteristics	LSL	USL
3/4 inch sieve	TV-1.0	TV
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 + Crumb Rubber %	TV-0.7	TV+0.7
Mat Density %	**94**	99

Note 1.Tolerance of No. #200 sieve may not exceed the broad band limits in 409-2.02

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 / crumb rubber 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 / crumb rubber 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:

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

The CPF is rounded to the nearest hundredth.

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

TABLE 409-3
WEIGHT FACTORS

Gradation	Factor "f"
3/4 inch sieve	**4**
1/2 inch sieve	5
3/8 inch sieve	5
No. 4 sieve	4
No. 8 sieve	4
No. 16 sieve	4
No. 30 sieve	5
No. 50 sieve	5

No. 100 sieve	4
No. 200 sieve	20
Asphalt + Crumb Rubber %	**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 = $165 per ton (Engineer's estimated unit price for mix + 7% Engineer's estimated unit price for PG 64-34)

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 409-4.

The total asphalt cement price adjustment is the sum of the individual sample price adjustments and will be subtracted under Item 409(6), Asphalt Price Adjustment.

Table 409-4
ASPHALT CEMENT PAY REDUCTION FACTORS
(Use the single, highest pay reduction factor)

	Spec	Pay Reduction Factor (PRF)								
		0.00	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		0.99-0.88				0.87-0.71	0.70-0.50	<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		2.199-1.816				1.815-1.432	1.431-1.048	<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		0.299-0.287				0.286-0.274	0.273-0.261	<0.261
Direct Tension	>1.0 %	>1.0		0.99-0.86				0.85-0.71	0.70-0.56	<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 409-4

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 409(6), 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.

EVALUATION OF PAVEMENT SMOOTHNESS.
The top layer of HMA will be measured in accordance with 409-3.15 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 (409-4.03)

PQ = Final quantity of HMA, tons

PrI = Final measured pavement 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 = 0.1166 – (0.01666 x PrI)

If the PQ is greater than 5,000 tons, the SF = 0.0583 – (0.0083 x PrI)

The smoothness price adjustment will be applied under Item 409(6), Asphalt Price Adjustment.

No pavement smoothness disincentive will be assessed on this project

EVALUATION OF LONGITUDINAL JOINT DENSITY.
Longitudinal joint density price adjustments apply when HMA 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 the joint densities for the project and determined as follows:

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

   a. Apply the joint sealer specified in 409-3.14 and apply a longitudinal joint density price adjustment equal to $3.00 per lineal foot that is deducted under Item 409(6), Asphalt Price Adjustment.

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

   a. Joint sealer is not required. Apply longitudinal joint density price adjustment equal to $1.50 per lineal foot added under Item 409(6), Asphalt Price Adjustment.

409-4.04 ASPHALT MATERIAL PRICE ADJUSTMENT – 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, 409, 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 percent 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 percent, additional compensation = [(IPP-IB) – (0.075 x IB)] x Q

   For a decrease exceeding 7.5 percent, 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

6. 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.

409-5.01 BASIS OF PAYMENT. The Engineer will assess a fee of $2,500.00 under Item 409(6) Asphalt Price Adjustment, for each mix design subsequent to the approved Job Mix Design for each Type and Class of HMA specified.

Separate payment will not be made for asphalt cement or anti-strip additives for Item 409(1), Temporary Pavement, or HMA for leveling course.

Asphalt cement, **crumb rubber,** anti-stripping additives, tack coat, and crack sealing (409-3.07) are subsidiary to 409(1) **Hot Mix Asphalt***deleted*****.

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.

Price adjustments will not apply to:

1. HMA for leveling course
2. Temporary Pavement

Furnishing and installing joint adhesive to the joints according to subsection 409-3.14 will be subsidiary to 409 items.

Payment will be made under:

Pay Item No.	Pay Item	Pay Unit
409(1)	Hot Mix Asphalt, Type R	Ton
409(2)	Asphalt Cement, PG 64-34	Ton
409(6)	Asphalt Price Adjustment	Contingent Sum
409(10)	Asphalt Price Adjustment – Unit Price	Contingent Sum

SECTION 501

STRUCTURAL CONCRETE

Special Provisions

501-3.02 ACCEPTANCE OF CONCRETE. Paragraph No. 4 Test Methods, change "Alaska Test Method T-12 or AASHTO T 180" to "Alaska Test Method T 212 or WAQTC FOP for T 180".

Paragraph No. 4 Test Methods, change "Alaska Test Method T-3 or T-11" to "WAQTC FOP for AASHTO T 310".

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 505

PILING

Special Provisions

505-3.03 PILE BEARING VALUES. Delete the first paragraph of this subsection and substitute the following: Drive piles, except piles for lighting standards, to the required ultimate bearing capacity. For lighting standards, install piles of sufficient length to cut the pile at the required cut off elevation and to provide the minimum installed length shown on the Plans.

505-3.09 DRIVING PILES. Add the following: Sites for the lighting standard foundations can contain subsurface soils that consist of very dense sandy gravel with cobbles and boulders.

When the minimum pile length shown on the Plans for a lighting standard foundation can not be achieved, install the pile tip to an elevation established by the Engineer.

505-3.13 COATING OF STEEL PILES AND SHELLS. Delete this section.

505-4.01 METHOD OF MEASUREMENT.

Add the following to the second paragraph:

Do not measure piles for lighting standards for payment.

505-5.01 BASIS OF PAYMENT. Add the following to the second paragraph: Include costs of furnishing and installing piles for lighting standards in Item 660(3) Highway Lighting System Complete.

(04/15/05)R65

SECTION 507

BRIDGE RAILING

Special Provisions

505-3.01 CONSTRUCTION REQUIREMENTS. Add the following: Backfill posts with Class A concrete. Top edge of foundation shall match finish grade. Slope top of foundation so that water will drain away from foundation. (07/03/08)USKH

Replace Section 511 with the following section:

SECTION 511

MODULAR CONCRETE BLOCK RETAINING WALLS

511-1.01 DESCRIPTION. The Modular Concrete Block Retaining Walls shall be constructed at the locations shown on the plans as provided in these specifications. The following is the list of acceptable modular block systems for this project:

Keystone Retaining Wall Systems Inc.
444 West 78th Street
Minneapolis, Minnesota 55435
1-800-747-8971

Mesa Retaining Wall Systems
Tensar Earth Technologies, Inc.
5883 Glenridge Drive, Suite 200
Atlanta GA 30328
1-800-836-7271

"Pyramid"
The Reinforced Earth Company
20381 Lake Forest Drive, Suite B-2
Lake Forest, CA 92630
(949) 587-3060

Use only one system for the entire project. The existing retaining wall is a Keystone Retaining Wall System, and it is preferred that the new wall be constructed of Keystone modular blocks matching the existing wall. If another modular block system is found to match the color and size of the existing blocks, provide samples of the alternate block for approval by the Engineer.

Appearance of Constructed Walls
The wall shall present the appearance of a running bond pattern. The color and texture of the blocks shall be as chosen by the Engineer and will match the existing retaining wall. The blocks shall be arranged so that all exposed surfaces whether on the front, sides, or back, match the standard block face in shape, texture, and color.

Wall caps shall be provided in conformance to the details shown on the drawings, and will match the existing wall caps. Precast concrete wall caps are intended to provide a finished appearance at the top of walls. The wall caps will be attached to the top block using a manufacturer approved adhesive.

Modular Block Units
The color and surfaces of the wall shall be as selected to match the existing wall.

The minimum allowable modular block unit length is sixteen (18") inches. The maximum allowable modular block unit length is twenty-four (24") inches. The minimum allowable block height is six (8") inches. The wall will be constructed with a 1" setback between wall courses.

511-1.02 REFERENCE STANDARDS.

Engineering Design

- Design Manual for Segmental Retaining Walls, 2nd edition, National Concrete Masonry Association. (NCMA)
- NCMA TEK 2-4 - Specifications for Segmental Retaining Wall Units.
- NCMA SRWU-1 - Determination of Connection Strength between Geosynthetics and Segmental Concrete Units.
- NCMA SRWU-2 - Determination of Shear Strength between Segmental Concrete Units.

Modular Block Retaining Wall Units

- ASTM C 140 - Sampling and Testing Concrete Masonry Units
- ASTM C 1262 - Evaluating the Freeze - Thaw Durability of Manufactured Concrete Masonry Units and Related Concrete Units.
- ASTM C 1372 – Standard Specification for Segmental Retaining Wall Units

Geogrid

- ASTM D 4595 - Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method.
- ASTM D 5262 - Test Method for Evaluating the Unconfined Creep Behavior of Geosynthetics.
- ASTM D 6637 - Test Method for Determining Tensile Properties of Geogrids by the Single or Multi-Rib Tensile Method.
- ASTM D 6638 - Test Method for Determining Connection Strength Between Geogrid and Segmental Concrete Units.
- ASTM D 6706 - Test Method for Measuring Geosynthetic Pullout Resistance in Soil.
- Geosynthetic Research Institute (GRI)
  - GG1 Standard Test Method for Geogrid Rib Tensile Strength
  - GG2 Standard Test Method for Geogrid Junction Strength
  - GG3 Standard Test Method for Tension Creep Testing of Geogrids
  - GG4 Standard Practice for Determination of the Long Term Design Strength of Geogrids
  - GG5 Standard Practice for Evaluating Geogrid Pullout Behavior

Soils
- Infill Soil – Section 205 Excavation, Backfill and Foundation Fill for Structures
- Foundation – Section 205 Excavation, Backfill and Foundation Fill for Structures
- Unit Drainage Fill – Section 205 Excavation, Backfill and Foundation Fill for Structures
- Leveling Pad – Section 301 Aggregate Base and Surface Course (if crushed stone leveling pads are used)
- ASTM D G51 - Soil pH

Concrete
- Wall and Pilaster Caps – Section 501 Structural Concrete
- Leveling Pad – Section 501 Structural Concrete (if concrete leveling pads are used)

Drainage Pipe
- Section 605 Underdrains

Where specifications and reference documents conflict, the Engineer shall make the final determination of applicable document.

511-1.03 SUBMITTALS.
In addition to other submittals described in other sections of these specifications, submit the following information for approval a minimum of fourteen (14) days prior to starting construction of the segmental retaining wall.

General
Demonstrate that the modular block units, adhesive(s), geogrid, unit drainage fill, and infill soil are compatible with each other and together these materials will meet the requirements of the plans, specifications, and the structure design.

Provide the engineer with two (2) copies of the design manual and four (4) copies of the installation manual as published by the geogrid and modular block manufacturers.

Modular Blocks
If necessary, supplement the manufacturer's guide(s) to demonstrate that the product you will supply will meet the requirements for construction.

Submit Modular Block samples for approval of colors, textures and shapes.

Submit manufacturer's certifications for modular block units including: dimension tolerances, unit weight, compressive strength, freeze/thaw protection, inter-unit mechanical interlock shear strength, and the connection strength between the modular blocks and the geogrid.

Submit documentation for approval for the adhesive(s) to be used. The submittal shall demonstrate that the adhesives meet the Modular Block Manufacturer's specifications and

recommendations and that the adhesives are suitable for the application shown on the drawings. Weather restrictions shall be included. The submittal shall also demonstrate that the uncured adhesive will not have an adverse effect where it comes into contact with the geogrid.

To be approved the submittal shall document that, once properly applied and cured, the adhesives will be suitable for local temperature extremes, applications below grade, and occasional exposure to ground water.

Geogrid

Submit manufacturer's certifications for geogrid including:

- Documentation of manufacturing quality control.
- Testing and documentation required to establish the Soil Interaction Coefficient, (C_I), and the Coefficient of Direct Sliding (C_{DS}).
- Detailed test data including tensile strength (ASTM D 4595 or ASTM D 6637), creep potential (ASTM D 5262), site damage and durability (GRI GG-4), pullout resistance (ASTM D 6706) and connection strength (ADTM D 6638). You shall complete all testing and documentation required to establish the design value of the long-term allow tensile load (T_a), and submit the result to the Engineer for approval. The submittal shall include specific evaluation documenting the relationship between the actual infill soil the Contractor will supply for this project and the geogrid to be used.

Retaining Wall Design Submittal - Except as provided in the subsection entitled *Pre-Approved Engineering Design* presented on the following page, provide four (4) sets of stamped construction drawings and detailed design calculations, completed and sealed by an Engineer who is registered as a Civil Engineer in the State of Alaska. A detailed explanation of the design properties for the geogrids shall be submitted with the design. Allow the Engineer three (3) weeks to review the working drawings and calculations.

Your Engineer will perform at least the following tasks:

- Produce sealed construction drawings and detailed design calculations, completed in accordance with the design requirements outlined in the plan set and these specifications.
- Review the site soil and geometric conditions to ensure the designed wall is compatible with the site prior to construction.
- Inspect the site conditions, materials incorporated into the retaining wall, and the construction practices used during the construction.
- Provide a letter after completion, certifying the design meets the requirements of this specification, the design was compatible with the site and the wall was constructed according to the design.

Design Requirements –

- The engineering designs, techniques, and material evaluations shall be in accordance with the Manufacturer's Design Manual, and/or the NCMA Design manual.
- The minimum embedment shall be 1 foot.

- The maximum backslope is 2H:1V for infill soil and retained soil. The design may recognize the load characteristics of the actual slope -- a "broken back slope" (slope that levels off within the distance of 2*H behind the wall) may be used in calculations at the specific locations where the slope condition is known to apply.
- No additional surcharge loading beyond the weight of the backslopes is required.

Meet or exceed the Safety Factor values established in the NCMA design manual.

Pre-Approved Engineering Design –

You may construct the design presented in the plan set without separate stamped engineering drawings subject to all the conditions listed below:

Submittals

You must submit all items listed in Subsection 511-1.03 Submittals except the "Retaining Wall Design Submittal."

Materials

All materials shall conform to the plans and Subsection 511-2.01 Materials. In order to adopt the design shown in the plan set without a separate engineering seal and certification, the following additional requirements must also be met:

Modular Block Units

- Modular block units, including infill soil, shall weigh a minimum of 114 pounds per square foot of wall face.
- The inter-unit shear strength of mechanical interlock between units shall be a minimum of 600 pounds per linear foot (plf).
- The connection strength between the modular block units and the geogrid shall be a minimum of 600 plf.

Structural Geogrid

In order to adopt the design shown in the plan set without a separate engineering seal and certification, you shall submit testing certifications described in Subsection 511-1.03 Submittals for the values of long-term allowable tensile strength (T_a) Coefficient of Interaction (C_I), and Coefficient of Direct Sliding (C_{DS}) based on the infill soil and geogrid materials you will use and construction methods you will employ.

- The minimum T_a required to adopt the design shown in the plan set is 1000 plf, as T_a is defined in Subsection 511-2.01 Materials.
- The Coefficient of Direct Sliding (C_{DS}) shall be a minimum of 0.95.
- The Coefficient of Interaction (C_I) value shall be a minimum of 0.85.

Construction

All construction shall conform to Subsection 511-3.01 Construction. In order to adopt the design shown in the plan set without a separate engineering seal and certification, the following additional requirements must also be met:

- You must comply with all construction requirements of the "*Design Manual for Segmental Retaining Walls, 2nd Edition*" published by the National Concrete Masonry Association. (NCMA)
- You must follow all recommendations of both the geogrid and modular block wall manufacturers. Geogrid overlap requirements at curves shall comply with NCMA details or manufacturer's recommendations whichever is the most stringent.

511-1.04 DELIVERY, STORAGE, AND HANDLING.

All units shall be handled, stored, and shipped in such a manner to protect them from chipping, discoloration, cracks, and fractures. Check materials upon delivery to assure that specified type and grade of materials have been received and proper color and texture of the modular block units have been received. Prevent excessive mud, wet concrete, epoxies, and like materials that may affix themselves from coming in contact with materials. Store and handle materials in accordance with manufacturer's recommendations.

Rejection: Units shall be rejected because of failure to meet any of the requirements specified above. In addition, any of the following defects shall be sufficient cause for rejection:

- Defects caused by faulty casting.
- Defects indicating honeycombed or open-texture concrete.
- Cracked or severely chipped units.
- Unreasonable color variation, staining, or calcification on front face of unit.

Protect materials from damage. Carefully inspect all reinforcing and attachment devices to ensure they are true to size and free from defects that may impair strength and durability.

Do not incorporate damaged or defective materials into the retaining wall.

511-2.01 MATERIALS.

Modular Concrete Retaining Wall Units

Architectural Requirements are as listed in Subsection 511-1.01 Appearance Standards.

Modular concrete materials shall conform to the requirements of ASTM C1372 - Standard Specifications for Segmental Retaining Wall Units. Modular block units shall have a minimum 28-day compressive strength of 4000 psi. The concrete in modular block units shall have adequate freeze/thaw protection and meet the requirements of ASTM C 1262. The maximum absorption rate shall be six (6%) percent.

The dimensions of the modular block units shall have a maximum tolerance of one-eighth (1/8"±) inch (not including rough split face) for each dimension. All units shall be free from cracks or other defects that would interfere with the proper placing of the unit or significantly impair the strength or permanence of the construction. Exposed surfaces of units shall be free of chips, cracks or other imperfections when viewed from a distance of ten (10') feet under diffused lighting.

Modular block units shall lock together vertically. In addition to core fill and friction, there shall be a mechanical interlock between units. Shear connectors shall consist of a non-degrading polymer or galvanized steel and shall be made for the express use with the modular block units supplied. Shear connectors shall be suitable for cold weather applications. Shear connectors shall be capable of holding the geogrid in the proper design position during grid pre-tensioning and backfilling.

Modular Block Adhesives

Adhesives shall comply with the Modular Block manufacturer's specifications and recommendations.

Select adhesives with suitable weather restrictions such that the local weather will not adversely affect proper application and curing of the adhesives. Once properly applied and cured the adhesives shall be suitable for local temperature extremes, applications below grade, and occasional exposure to ground water.

Precast Concrete Elements

Precast concrete elements shall comply with the requirements for Class W concrete as specified in Section 501 Structural Concrete. Reinforcing for Precast Wall Caps shall be as specified in Section 501 Structural Concrete as described in these special provisions.

Geosynthetic Reinforcement

Where "Geogrid" appears in the plan set or specifications, these "Geosynthetic Reinforcement" specifications shall apply.

Geosynthetic Reinforcements shall consist of high-tenacity geogrids or geotextiles manufactured for soil reinforcement applications. The location of the reinforcing geosynthetic shall be as shown on the plans. The design properties of the reinforcement shall be determined according to the procedures outlined in this specification and the NCMA Design Manual for Segmental Retaining Walls. Detailed test data shall be submitted as described in Subsection 511-1.03 Submittals.

Included with the raw test data shall be a report that will show that the proposed geosynthetic reinforcements meet all of the design requirements. At a minimum, the following is required:

a) Documentation of Manufacturing Quality Control. The geogrid manufacturer shall have a manufacturing quality control program that includes QC testing by an independent laboratory. The QC testing shall include:
   Tensile Strength Testing
   Melt Flow Index (HDPE)
   Molecular Weight (Polyester)

b) Testing and documentation required to establish the Soil Interaction Coefficient, (C_I), and the Coefficient of Direct Sliding (C_{DS}). C_I values shall be determined per GRI:GG5 at a maximum 0.75 inch displacement.

c) Detailed test data including tensile strength (ASTM D 4595 or ASTM D 6637), creep potential (ASTM D 5262), site damage and durability (GRI GG-4) and pullout resistance (ASTM D 6706) and connection strength (ADTM D 6638). You shall complete all testing and documentation required to establish the design value of the long-term allow tensile load (T_a). T_a is defined as follows:
   $T_a = T_{ult} / (RF_{CR}*RF_D*RF_{ID}*FS_{unc})$
   Ta shall be evaluated based on a 75-year design life.

   T_{ult}, Short Term Ultimate Tensile Strength
   T_{ult} is based on the minimum average roll values (MARV)

   RF_{CR}, Reduction Factor for Long Term Tension Creep
   RF_{CR} shall be determined from 10,000-hour creep testing performed in accordance with ASTM D5262. $RF_{CR} = 1.60$ minimum.

   RF_D, Reduction Factor for Durability
   RF_D shall be determined from polymer-specific durability testing covering the range of expected soil environments. $RF_D = 1.10$ minimum.

   RF_{ID}, Reduction Factor for Installation Damage
   RF_{ID} shall be determined from product specific construction damage testing performed in accordance with GRI-GG4. Test results shall be provided for each product to be used with project specific or more severe soil type. $RF_{ID} = 1.10$ minimum.

   FS_{unc}, Factor of Safety for Uncertainties
   FS_{unc} shall be 1.5.

In no case shall the product $RF_{CR}*RF_D*RF_{ID}$ be less than 2.0.

The maximum design tensile load of the geogrid shall not exceed the laboratory-tested ultimate strength of the geogrid/facing unit connection as limited by the "Hinge Height" divided by a

factor of safety of 1.5. The connection strength testing and computation procedures shall be in accordance with NCMA SRWU-1 Test Method for Determining Connection Strength of SRW.

Leveling Pad Material
If the Contractor elects to use crushed stone, the Leveling Pad Material shall conform to the requirements of Porous Backfill Material. If the Contractor elects to use unreinforced concrete, the Leveling Pad Material shall conform to the requirements for Class W concrete as specified in Section 501 Structural Concrete.

Foundation Material
Foundation material shall consist of undisturbed native material. Where the native material is disturbed, it shall be removed and replaced with Borrow, Type A installed in accordance with Section 205, Excavation, Backfill and Foundation Fill for Structures.

511-3.01 CONSTRUCTION.

Foundation Preparation
The foundation for the modular block retaining wall structure shall be graded level for the width shown on the plans or shop drawings. Any foundation soils found to be unsuitable shall be removed and replaced with backfill in accordance with Section 205, Excavation, Backfill and Foundation Fill for Structures.

Leveling Pad
The minimum thickness of the leveling pad shall be twelve (12") inches. At the Contractor's option, the leveling pad material may be crushed stone compacted as required by Section 301 Aggregate Base and Surface Course, or unreinforced concrete meeting the requirements for Class W concrete as specified in Section 501 Structural Concrete.

Installing Drainage System
Furnish and install a drainage system when shown or specified on the retaining wall plans. The drainage pipe shall be placed behind the leveling pad, or lower course of facing units as shown on the plans or as directed by the Engineer. The pipe shall be laid at a minimum gradient of two (2%) percent unless otherwise approved by the Engineer. Route pipes to inlets as shown on the drawings.

Wall Erection
A field representative from the proprietary modular block wall system being used shall be available during the erection of the wall. The services of the representative shall be at no additional cost to the Department.

Modular Block Retaining Wall Units
Install modular block units according to the modular block manufacturers recommendations and specifications. Place modular block units so that their final position allows room for the 1 inch setback between courses.

Construction Tolerances

The following tolerances are the maximum allowable deviation from the planned construction:

- Vertical Control: Deviation shall be limited to one-quarter (1/4" ±) inch over a ten (10') foot distance. Total deviation shall not exceed three (3") inches total
- Horizontal Control: Deviation shall be limited to one-quarter (1/4" ±) inch over a ten (10') foot distance. Total deviation shall not exceed three (3") inches total
- Rotation: final wall batter may vary between one-half (0.5°) and two (2.0°) degrees.
- Bulging: Deviation shall be limited to one (1") inch over a ten (10') foot distance (not counting variations in split-face surfaces).

Unit Drainage Fill

One (1) cubic foot, minimum, of drainage fill shall be used for each square foot of wall face. Place unit drainage fill in lifts a maximum of eight (8") inches thick. Fill within the cores of, between, and behind each unit. Compact to the manufacturer's specifications.

Geogrid Reinforcement at Obstructions

Construct the reinforcement in accordance with the details shown in the plans and the recommendations of the geogrid manufacturer.

Infill Soil and Geogrid

Place infill soil in the locations shown on the plans as described below. Complete all backfill operations according to the modular block manufacturers recommendations and specifications.

Place infill soil in such a manner as to avoid any damage or disturbances of the wall materials or misalignment of the facing panels. Remove and replace any wall materials that become damaged during any backfill placement and correct any misalignment or distortion of the masonry block units at your expense.

Do not operate ride-on mechanical compaction equipment closer than three (3') feet from the back of the modular block units during the placement of Unit Drainage Fill, Infill Soil, or Retained Soil. Compact within three (3') feet of the back face of the wall facing using a lightweight mechanical tamper, roller or vibratory system.

Compact infill soil to 95 percent of the maximum density as determined by Alaska Test Method T-12 or AASHTO T 180. The maximum lift thickness after compaction shall not exceed eight (8") inches. Decrease the lift thickness if necessary to obtain the specified density. Field density will be determined using Alaska Test Method T-3 or T-11 by the Engineer.

The Engineer shall take a minimum of one density test after every three levels of blocks are placed. Soil tests shall be taken no closer than three (3') feet from the back surface of the masonry modular block units.

At the specified elevations, place geogrid, as described below. Place the infill soil and compact level with the top of the wall modules at the specified geogrid elevations prior to placing the geogrid. Take care to ensure that the geogrid lays flat and taut during placement of the infill soil. This is best achieved by placing fill on top of the geogrid near the wall fascia and spreading toward the back of the infill soil zone.

Do not operate tracked construction equipment directly on top of the geogrid until a minimum thickness of six (6") inches of fill has been placed. Rubber-tired equipment may drive on top of the geogrid at slow speeds but should exercise care not to stop suddenly or make sharp turns.

Place pre-cut sections of geogrid horizontally at each specified elevations. Assure that the longitudinal axis is perpendicular to the wall face (i.e. machine direction). Connect the geogrid to the wall facing units as specified by the manufacturer. Take care to ensure that the wall modules are swept clean and that the geogrid is in complete contact with the top and bottom faces of the adjacent wall modules. Carefully place the next course of wall modules on top of the lower modules to ensure that no pieces of concrete are chipped off and become lodged between unit layers.

Pull the geogrid taut away from the wall modules during placement of infill soil. Alternatively, suitable anchoring pins or staples can be used to ensure that there are no wrinkles or slackness prior to placement of the infill soil. The geogrid shall lay perfectly flat when pulled back perpendicular to the back of the wall fascia.

Finishing Wall

Construct caps as shown on the drawings. Secure cap units to the top of the wall with the approved adhesive as specified by the modular block manufacturer according to the drawings and the manufacturer's recommendations.

Finish grading above the wall to direct surface runoff water away from the segmental retaining wall. Place topsoil as required to restrict the rate of water infiltration into the retaining wall structure.

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

The standard block and cap units located at the beginning and end of each contiguous wall segment shall be mitered or returned into the retained slope to provide a finished appearance. The unfinished side of a standard block unit shall not be viewable.

511-4.01 METHOD OF MEASUREMENT.

The face of the walls will be measured for payment by the square foot. For the purposes of payment, the face of the walls is defined as the block surface or wall cap surface opposite the retained earth. By this definition, the face of the walls does not include any top, bottom, back, or side surfaces.

The length measurement will be recorded along the modular blocks below the wall caps and will include the vertical portions of the wall cap. The length measured for payment will not include any surface perpendicular to the face of the wall.

The height measurement shall be vertical, not parallel to the batter angle. Measurement shall take place prior to backfill. The wall below grade will be measured for payment. The height measurement will be recorded from the top of the leveling pad to the top of the wall cap.

If the Engineer determines that the wall embedment or wall height exceeds both the dimensions shown on the plans or working drawings and the height of wall needed to match the backslope requirements at a specific location, the wall area that exceeds the requirements may be deducted from the area measured for payment.

511-5.01 BASIS OF PAYMENT.

Payment for Modular Block Retaining Walls will be full compensation for all labor, tools, equipment and materials required to complete the walls in accordance with the plans, working drawings, specifications, manufacturer's recommendations, and the directions of the Engineer.

The pay item for Modular Block Retaining Walls will include modular block units, precast concrete wall caps, geogrid, shear connectors, adhesives, geogrid reinforcement at obstructions, and all other appurtenances required to construct a complete modular block earth reinforcement system.

The following items are subsidiary to the pay item for Modular Block Retaining Walls: all excavation required to construct the retaining walls, concrete bumper curb to protect wall face from snow removal operations, preparing the retaining wall foundations, selected material required for foundation, leveling pads, drainage pipe, mitering (cutting modular block with a saw equipped with diamond or masonry blade), infill soil, and unit drainage fill material. Also, preparing submittals will be subsidiary, and there shall be no increase in the bid price based on the color, texture, or block shape selected by the Engineer.

Payment will be made under:

Pay Item No.	Pay Item	Pay Unit
511(2)	Modular Block Retaining Wall	Square Foot

SECTION 603

CULVERTS AND STORM DRAINS

Special Provisions

603-1.01 DESCRIPTION. Add the following: This work shall also consist of installing culvert marker posts.

603-2.01 MATERIALS. Delete the second paragraph and substitute the following: When Item 603(17-xx), Pipe, is listed in the bid schedule, furnish either Corrugated Steel Pipe (CSP) or Reinforced Concrete Pipe. Corrugated Polyethylene Pipe is only allowed under separated pathways. End Sections for Metal Pipe must be of the same material as the pipe.

Add the following: Culvert marker posts shall meet the requirements of subsection 730-2.05, Flexible Delineator Posts. The color shall be blue with no other markings. The 2.5 inch by 6-foot post shall be rectangular in cross section with reinforcing ribs capable of a minimum bending radius of 9 inches.

Add the following subsection:

603-3.06 CULVERT MARKER POSTS. Culvert marker posts shall be installed on the approach side of storm drain outfalls 30 inches and smaller, field inlets not in paved parking lots, all end sections to cross culverts, or as directed by the Engineer. Forty two inches of post shall remain above the ground after driving.

603-4.01 METHOD OF MEASUREMENT. Add the following: Culvert marker posts will not be measured for payment.

603-5.01 BASIS OF PAYMENT. Add the following: Culvert marker posts will not be paid for directly, but will be subsidiary to pipe items. (05/14/08)USKH

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 State of Alaska Tudor Road 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.

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

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

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

Pay Item No.	Pay Item	Pay Unit
604(1A)	Storm Drain Manhole, Type I	Each
604(3A)	Reconstruct Existing Inlet	Each

SECTION 606

GUARDRAIL

Special Provisions

606-1.01 DESCRIPTION. This work shall consist of furnishing, constructing and placing Fixed Wood Bollards and Removable Steel Bollards to conform to the Plans and Special Provisions.

606-2.01 MATERIALS. Add the following:

Fixed Wood Bollard	Posts	subsection 710-2.06
	Preservatives	subsection 714-2.01
Removable Steel Bollard	Posts	subsection 710-2.06

Padlocks for removable bollards shall be American Lock, WWE Series 3560 to be purchased from Action Locksmith, 243 W. 5th Avenue, Anchorage. Telephone: (907) 279-7050. Cores are to be keyed to Municipality of Anchorage cores matched to a 645 key. Installation of the cores must be authorized by Michael Swenson with MOA, phone (907) 343-8270.

606-3.01 GENERAL. Add the following:

Bollards and wood trail markers shall be set plumb, level and true to line.

Bollards and wood trail markers shall be embedded in concrete.

Contractor shall exercise care not damaged trail signs that are secured to the wood trail marker.

606-4.01 METHOD OF MEASUREMENT. Add the following:

Fixed Wooden Bollard. Measured by each unit installed and accepted. Excavation, concrete backfill, reflectors/object markers, and incidental work required to complete work according to the Plans will not be measured for payment but will be subsidiary.

Removable Steel Bollard. Measured by each unit installed and accepted. Hardware, fittings, reflectors/object markers, concrete backfill, steel reinforcement, and padlocks will not be measured for payment but will be subsidiary.

Relocate Wood Trail Marker. Measured by each unit removed, relocated, installed and accepted. Excavation, removing existing concrete backfill from trail marker by chipping, concrete

backfill, backfilling void left by the removed trail marker, and all incidental work required to complete work according to the Plans will not be measured for payment but will be subsidiary.

606-5.01 BASIS OF PAYMENT. Add the following:

Padlocks for removable bollards are subsidiary to Item 606(17B) Removable Steel Bollard and no separate payment shall be made.

Pay Item No.	Pay Item	Pay Unit
606(17A)	Fixed Wood Bollard	Each
606(17B)	Removable Steel Bollard	Each
606(17C)	Relocate Wood Trail Marker	Each

SECTION 608

SIDEWALKS

Special Provisions

608-1.01 DESCRIPTION. Add the following: This work also consists of constructing asphalt pathway(s) and median(s) to conform to the Plans. (05/22/07)R47

608-1.01 DESCRIPTION:
Add the following: This work also includes the installation of colored concrete in medians and for bus stop pads. (06/26/08)USKH

Special Provisions

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

(05/22/07)R47

Standard Modification

608-3.03 CURB RAMPS. Delete subsection in its entirety and replace 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 new subsection:

608-3.04 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 inch or horizontal gaps exceeding 0.5 inch. Align pattern on a square grid in the predominant direction of travel. Install the same type of detectable warning tile throughout the project. Install the following:

1. 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;
2. Cast iron, yellow polymer soaked or black asphalt dip finish, with slip resistant surface, with handle or flange on bottom, and with truncated dome pattern; or
3. Approved equal.

Detectable warnings shall be manufactured and installed according to the Americans with Disabilities Act Accessibility Guidelines. E40(01/27/07)

Special Provisions

Add following subsections:

608-3.05 ASPHALT PATHWAY. Construct asphalt pathway according to subsection 608-3.02, Asphalt Sidewalks.

608-3.08 COLORED CONCRETE MEDIANS AND BUS STOP PADS:
The colored concrete in the medians and bus stop pads shall be a cast-in-place colored full depth with a color specified herein.

1. Description. Patterned concrete includes:
   a. Materials: Welded wire fabric (WWF), concrete, color and sealer.
   b. Concrete placement and finish.
   c. Sealer application.

2. References and Standards. Install colored concrete per 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 membrane forming sealer.

4. Quality Assurance.
   a. The concrete Contractor shall provide a qualified foreman or supervisor, who has a minimum of 3 years experience with colored concrete, and who has successfully completed at least 5 colored 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. The concrete 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 integral colored admixture.

6. Coloring Curing and Sealing Materials.
   a. Integral Color: The concrete shall be colored full depth with the following integral color:
   Palomino 5447 by Davis or approved equivelant.
   b. Reinforcement: Use 6x6 W14xW1.4 steel welded wire fabric.
   c. Sealer: Concrete slabs shall be sealed in accordance with the manufacturer's recommendations.

7. Installation Procedures.
   a. The area to receive integrally colored 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. Decorative dummy joints for bus stop pads shall be provided for on a 2'x2' square grid pattern.
   e. The concrete shall be placed and screeded to the finish grade, and floated to a uniform surface using standard finishing technique.
   f. 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 the slab shall later be sealed 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

g. Protect adjacent 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 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. E40(01/27/07)

Bumper curb installed for protection of modular block retaining wall face from snow removal operations will not be measured for payment and is subsidiary to 511(2) Modular Block Retaining Wall.

Special Provisions

608-4.01 METHOD OF MEASUREMENT. Add the following:

Asphalt Pathway. By the ton of asphalt concrete according to Section 109, Measurement and Payment. Asphalt cement will not be measured for payment.

Colored Concrete. Exclusive of curb, by the square yard of finished surface, complete in place, including reinforcement. Colored concrete for use in medians shall be measured as 4 Inches Thick Colored Concrete. Colored concrete for use in bus stop pads shall be measured as 6 Inches Thick Colored Concrete. (06/26/08)USKH

608-5.01 BASIS OF PAYMENT. Add the following: Asphalt cement for Asphalt Pathway will not be paid for separately, but will be subsidiary to respective pay items.

Welded wire fabric for installation with colored concrete will not be paid separately, but will be subsidiary to their respective pay items.

Embankment and bed course materials will be furnished, placed and paid under Sections 203 and 301, respectively. (05/22/07)R47

Add the following pay items:

Pay Item No.	Pay Item	Pay Unit
608(7)	Asphalt Pathway	Ton
608(28)	Colored Concrete, 4 Inches Thick	Square Yard
608(29)	Colored Concrete, 6 Inches Thick	Square Yard

SECTION 609

CURBING

Special Provisions

609-3.01 GENERAL. Add the following after the last paragraph: When casting curbs on top of rutted asphalt or asphalt with depressions, the tops of the curb shall be straight line in an appearance, except when crossing grade changes.

Non-conforming curbs shall be subject to rejection by the Engineer.

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

609-4.01 METHOD OF MEASUREMENT. Add the following:

Doweled Curb. By the linear foot along the front face of the curb at the finished grade elevation, complete in place.

609-5.01 BASIS OF PAYMENT. Add the following: No separate payment will be made for rebar pins or other materials required to install the doweled curb.

Add the following pay item:

Pay Item No.	Pay Item	Pay Unit
609(8)	609(8) Doweled Curb	Linear Foot

SECTION 615

STANDARD SIGNS

Standard Modification

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 paragraph:

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)

Standard Modification

615-2.01 MATERIALS. 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)

Special Provisions

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

SECTION 618

SEEDING

Special Provisions
Substitute the entire section with the following:

618-1.01 DESCRIPTION:

It is the intent of this work that a living vegetative cover be established over all ground disturbed on this project. Maintain the cover for the term of the Contract. This work consists of soil preparation, of applying seed, fertilizer, water, mulch (if hydroseeding) and green dye (if hydroseeding), and of maintenance of the seeded areas.

618-2.01 MATERIALS:

Use materials that conform to the following:

Seed	Section 724
Fertilizer	Section 725
Mulch	Subsection 727-2.01
Water	Subsection 712-2.01

CONSTRUCTION REQUIREMENTS

618-3.01 SOIL PREPARATION:

Clear all areas to be seeded of stones 4" and larger in diameter and of all weeds, plant growth, sticks, stumps and other debris or irregularities which may interfere with the seeding operation, growth of grass, or subsequent maintenance of grass-covered areas.

Prior to the application of seed, prepare slopes using one or more of the following methods:

1. Manual Raking – Requires manual labor with landscaping rakes to produce a uniform pattern of grooves perpendicular to the fall of the slope.
2. Mechanical Raking - Requires the use of a scarifying slope board to produce grooves with an approximate width of 1" and no more than 6" apart. The resultant indentations shall leave a uniform pattern of grooves perpendicular to the fall of the slope.
3. Mechanical Track Walking - Requires operating tracked equipment in such a manner as to leave a uniform pattern of grooves perpendicular to the fall of the slope.

The top and bottom of slopes may be rounded to facilitate tracking or raking, and to create a pleasing appearance. Do not disrupt drainage flow lines.

618-3.02 SEEDING SEASONS:
Perform seeding after the ground is free of snow and no sooner than May 15 and no later than July 1. Do not seed during windy conditions or when climatic conditions or ground conditions would hinder placement or growth.

618-3.03 APPLICATION:
Apply seed, fertilizer, and mulch at the rates specified in the table below. Place seed, fertilizer, water, mulch, and green dye using one of the methods detailed below.

MATERIALS	TYPE	APPLICATION RATE PER ACRE
Seed* Schedule A	Alene Bluegrass	12.0 lb
	Denali Bluegrass	12.0 lb
	Arctared Fescue	12.0 lb
	Annual Ryegrass	4.0 lb
		Total 40.0 lb
Fertilizer	20-20-10	450.0 lb
Mulch**	cellulose wood or paper fiber	14.0 lb
Seed* Schedule B	Alyeska Polargrass	4.0 lb
	Arctared Fescue	8.0 lb
	Icelandic Poppy	4.0 lb
	Nootka Lupine	8.0 lb
	Shirely Poppy	4.0 lb
	Fleabane Daisy	8.0 lb
	Yarrow, White	4.0 lb
		Total: 40.0 lb
Fertilizer	20-20-10	450.0 lb
Mulch **	Cellulose wood or paper fiber	14.0 lb

*Do not remove the required tags from the seed containers.
**Mulch is required only for hydroseeding, not for mechanical seeding.

Hydraulic Method:

1. Seeding by the hydraulic method consists of furnishing and placing a slurry of green dye, seed, fertilizer, mulch and water.
2. Do not place seed in the slurry prior to 30 minutes before application.
3. Add the proportionate amount of mulch to the water slurry in the hydraulic seeder after the proportionate amounts of seed and fertilizer have been added. Apply the slurry mixture in such a manner, and at a rate of application, that results in an even distribution of all materials. Apply seed, fertilizer, and mulch together in one application.
4. Hydraulic seeding equipment must be capable of maintaining continuous slurry agitation so that a homogeneous mixture is applied through a spray nozzle. The pump must be capable of producing sufficient pressure to maintain a continuous, nonfluctuating spray capable of reaching the extremities of the seeding area with the pump & nozzle unit located on the roadbed. Provide sufficient hose to reach areas not practical to seed from the pump & nozzle unit situated on the road bed.

Mechanical Method:

1. Use mechanical spreaders, seed drills or other approved mechanical seeding equipment when seed and fertilizer are to be applied in dry form.
2. Water seeding area both prior to and after the application of fertilizer.
3. Spread fertilizer separately from seed.

618-3.04 MAINTENANCE OF SEEDED AREAS:

Protect seeded areas against erosion. Protect seeded areas against traffic by approved warning signs or barricades. Provide adequate water throughout the seeded are to establish a living vegetative cover. Be responsible for identifying, re-tracking, reseeding, re-fertilizing and re-mulching gullied or otherwise damaged areas. Maintain seeded areas in satisfactory condition until final inspection at no additional cost to the Department. A second application of fertilizer is not required.

618-4.01 METHOD OF MEASUREMENT:

Section 109 and as follows:

deleted

618-5.01 BASIS OF PAYMENT:

*****deleted*****

Seeding by the Lump Sum. Payment includes full compensation for loading, hauling, stockpiling, placing, seed, fertilizer, mulch, green dye, water, labor, tools, equipment, maintenance, supplies, transportation, repair, and incidentals necessary to fulfill the requirements of the pay item in accordance with the Plans and Specifications. This work includes identifying, re-tracking, re-seeding, re-fertilizing and re-mulching damaged areas. No payment will be made until a uniform perennial vegetative cover has been established per Specifications.

Payment will be made under:

Pay Item No.	Pay Item	Pay Unit
*****deleted*****		
618 (6)	**Seeding**	**Lump Sum**

SECTION 620

TOPSOIL

Substitute the entire section with the following:

620-1.01 DESCRIPTION:
This work shall consist of smoothing out the subgrade and furnishing and spreading topsoil in conformance with the plans or as directed by the Engineer.

620-2.01 MATERIALS:
Topsoil shall be natural materials, fertile, friable, surface soil without admixtures of subsoil, refuse, foreign materials, roots, noxious or invasive plant species, brush, sticks, stubble, litter, debris, gravel or stones over 1-inch in diameter. Topsoil shall be indicated by a healthy growing crop of grass, or other desired plants and vegetation that it is free draining and non-toxic. Topsoil shall contain from 10% to 20% by weight organic matter and conform to USDA texture classification for sandy loam, loam, or silt loam as determined by mechanical analysis.

Topsoil shall be considered weed-free when found to contain less than five objectionable weeds per 100 square feet.

Topsoil shall be screened and conform to the following grading requirements:

Sieve	Percent Passing
2-inch	100%
No. 4	75-100
No. 10	60-100
No. 200	10-70

The topsoil shall be approved by the Engineer prior to placing on the project.

620-3.01 TESTING:
Notify the Engineer of the source of topsoil at least 30 days prior to delivery of topsoil to the project from that location. The Engineer will inspect and test the topsoil and its source before approval will be granted for its use. Delivery of topsoil may begin after test results confirm that topsoil conforms to specifications.

620-3.02 PLACING:
Topsoil shall be laid to depths and in areas as indicated in the drawings. Prior to placing topsoil, the subgrade shall be:

1) graded smooth;
2) lightly compacted;

3) graded to allow for at least final depth of topsoil; and
4) approved by the Engineer.

The topsoil shall be spread evenly to a minimum depth as indicated after settlement and consolidation.

Spreading shall not be done when the ground or topsoil is frozen, excessively wet, or otherwise in a condition detrimental to the work. The subgrade shall be smooth and evenly compacted prior to placement of topsoil. Contractor shall obtain written approval of subgrade from the Engineer for areas to be seeded prior to placement of topsoil. Topsoil and seeding will not be paid for if written approval of subgrade is not obtained.

Roadway surfaces shall be kept clean during topsoil, spreading and compaction operations. The roadway surface shall be cleaned, swept and washed at Contractor's expense if they are not kept clean during topsoil/seeding placement operations.

After grading of topsoil areas has been completed in conformity with the lines and grades shown on the plans or directed by the Engineer, and before beginning seeding operation, the areas to be seeded shall be compacted and cultivated to provide a reasonably firm but friable seedbed. Cultivation shall be carried to a depth of 2-inches or as directed by the Engineer. On slopes steeper than 1v:3h, slopes shall be track walked perpendicular to the contours and depth of cultivation may be reduced as directed. All cultivated areas shall be hand-raked and cleared of stones one inch in diameter and larger, and all weeds, plant growth, sticks, stumps and other debris or irregularities which might interfere with the seeding operation, growth of grass, or subsequent maintenance of the grass covered areas.

Topsoil shall only be placed if the subsequent seeding can be completed in the same season, that is before September 1st, as stated in 618-3.02. The Contractor shall maintain the areas covered by topsoil until seeding is completed and accepted. All repair or replacement of topsoil shall be done at the Contractor's expense.

620-4.01 MAINTENANCE AND REPAIR:
Maintain the areas covered by topsoil until subsequent seeding or landscaping is accomplished. Complete any repairs or topsoil replacement, including damage or loss resulting from winter shutdown, without extra compensation.

620-5.01 METHOD OF MEASUREMENT:
Section 109, measured on the slope of the ground surface. Measurement of topsoil shall be only for areas to be seeded. For areas of beds where shrub and tree plantings are shown on plans, there shall be no measurement of topsoil. Topsoil shall be subsidiary to plant materials for those areas.

620-6.01 BASIS OF PAYMENT:
Topsoil repair, maintenance, and replacement are subsidiary.

Pay Item No.	Pay Item	Pay Unit
620(1A)	Topsoil (4" Depth)	Square Yard
620(1B)	Topsoil (18" Depth)	Square Yard

SECTION 621

PLANTING TREES AND SHRUBS

Special Provisions

621-1.01 DESCRIPTION. Add the following: Work in this section also includes the placement landscape edging and mulch as shown in the Plans.

Special Provisions

Add the following subsections:

621-2.09 LANDSCAPE EDGING:
Landscape Edging shall be fabricated of Aluminum and have finished dimensions of 3/16" x 5-1/2" x 16' Size and Mill Finish (Natural Aluminum as manufactured. Sections to include (8) 12" aluminum stakes. Sections to include a 4" (102cm) stakeless snapdown connection system to interlock adjacent sections. Aluminum to be 6063 – T6 alloy.

Permaloc Corporation Cleanline Aluminum Edging or accepted equal
13505 Barry Street
Holland, Michigan 49424 USA

Special Provisions

621-3.03 PLANTING. Delete item 1. Plant Season, and substitute the following:

1. Plant Season.

    a. Locally Grown: When locally grown seedlings and shrubs are furnished for the project, plant them between June 1 and September 15.

    b. Imported: Handle plants shipped in from out of state according to the nursery recommendations. Place plants imported from out of state between June 1 and August 15.

Delete paragraph c. under item 2. Excavation and substitute the following:

    c. Construct planting pits for trees and shrubs as shown on the Plans.

Add the following to item 5. Placing Plants:

    d. Plant trees and shrubs as shown on the Plans.

Add the following to item 6. Backfilling: Backfill trees and shrubs with topsoil mixed with fertilizer at the manufacturer's recommended application rate. (10/01/91)R133

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

621-3.04 PERIOD OF ESTABLISHMENT. Add the following: The Period of Establishment for trees and shrubs shall extend from May 1 to September 30.

Provide a reapplication of fertilizer to seedlings and shrubs by driving a 1 ½ ounce fertilizer spike of the same chemical proportions as the initial application into the ground at the drip line of each plant. Perform the reapplication between May 15 and May 31.

Provide a reapplication of fertilizer as described above for shrubs between June 15 and June 30.

621-3.06 PLANT REPLACEMENTS. Delete this subsection and substitute the following: In 2009, before June 30, the Engineer and the Contractor's representative shall inventory seedlings and shrubs planted on the project to determine the number of dead or unhealthy plants. If the number of dead or unhealthy seedlings and shrubs is lower than 25 percent of the quantities originally planted, then no plant replacements shall be required.

If the number of dead or unhealthy seedlings and shrubs is higher than 25 percent of the quantities originally planted, replace a sufficient number of plants to increase the number of healthy seedlings and shrubs to 75 percent of the quantities originally planted.

Provide healthy replacement seedlings and shrubs of the same species and size as the original plantings. Perform replacement planting between July 1 and July 15, according to the original planting procedures. The Engineer will select which of the dead or unhealthy plants to be replaced.

The Contractor shall reset seedlings or shrubs to an upright position, or to the proper grade, and for removing dead seedlings or shrubs.

621-3.07 MAINTENANCE. Add the following: Deep water seedlings and shrubs immediately after planting. Deep watering shall provide water penetration throughout the entire root zone to the total depth of the planting pits with a minimum of runoff. Rain will not be considered a substitute for deep watering unless permitted by the Engineer.

Deep water seedlings and shrubs according to the following maintenance schedule:

1. Deep water seedlings and shrubs at least twice a week during the first 45 days after planting. If these 45 days extend past September 30, cease the twice weekly deep watering after that date and resume on May 1 of the following calendar year. If the 45 days does not extend past September 30, additional deep watering in the planting year after the 45 days expire shall be as follows:

    a. Once a week in June and July.
    b. Once between August 10 and August 20.
    c. Once during the last week in September.

2. Deep water seedlings and shrubs during the Period of Establishment as follows:

    a. Once a week during May, June and July.
    b. Once between August 10 and August 20.
    c. Once during the last week in September.

3. The Engineer may direct the Contractor to deep water seedlings and shrubs past September 30th or provide supplemental waterings any time during the life of the project if weather conditions are excessively warm or dry.

4. The Engineer may direct the Contractor to deep water conifer tree seedlings and shrubs before freeze-up in order to minimize over-wintering desiccation.

Watering equipment shall be equipped with, or followed by a vehicle equipped with a Type B advance warning arrow panel using caution mode according to Part VI of the Alaska Traffic Manual.

621-4.01 METHOD OF MEASUREMENT. Delete this subsection in its entirety and substitute the following: The quantity to be paid for shall be the actual number of trees and shrubs furnished, planted and maintained according to the Plans, Specifications, and as accepted by the Engineer.

Water for maintenance of trees and shrubs will not be measured for payment.

621-5.01 BASIS OF PAYMENT. Add the following: Use of a Type B advance warning arrow panel for watering under this section will not be paid for directly, but will be subsidiary to Section 643 pay Items.

Fertilization as indicated in Subsection 621-3.04, Period of Establishment will not be paid for directly, but will be subsidiary to 621 pay Items.

Water for maintenance of trees and shrubs will not be paid for directly, but will be subsidiary to 621 pay Items.

Transportation and delivery are subsidiary. Trees and shrubs shall be measured by the heights and sizes indicated on the Drawings, and reflected in the Planting Legend/Schedule.

Add the following pay items:

Pay Item No.	Pay Item	Pay Unit
621(1)	Tree	Each
621(2)	Shrub	Each
621(10)	Landscape Edging	Linear Foot

SECTION 622

REST AREA FACILITIES

Add the following:

622-2.01 MATERIALS

Replace contents of:

622-2.11 LITTER BARRELS:
With:
Landscape Forms "plainwell" surface mounted with ipe side panels, bronze powder coat or approved equal.

Add the following:

622-2.13 BENCHES: Landscape Forms "Austin Backed Bench with Arms" (surface mount, bronze powdercoat, ipe seat) or approved equal.

622-4.01 METHOD OF MEASUREMENT:

Litter Barrels: Shall be measured by each, installed in place and accepted by the Engineer.

Benches: Shall be measured by each, installed in place and accepted by the Engineer.

622- 5.01 BASIS OF PAYMENT:
Payment for the above described work, including all material, equipment, labor and any other incidental work necessary to complete these items, will be considered completely covered by the contract unit price.

Add the following pay item:

Pay Item No.	Pay Item	Pay Unit
622(14)	Litter Barrel	Each
622(15)	Bench	Each

SECTION 627

WATER SYSTEM

Special Provisions

627-1.01 DESCRIPTION. Add the following: The Contractor shall coordinate a pre inspection of the AWWU facilities located within the limits the project before pavement removal begins and a post inspection after paving operations are complete. Any deficiencies found during the pre-inspection of the AWWU facilities and prior to the Contractor beginning work on the project will be AWWU responsibility to correct.

627-3.01 GENERAL. Add the following: Contact Joe Sanks at AWWU in writing a minimum of three working days before removing any pavement to schedule a pre inspection of the valves and valve boxes. Provide the Engineer a copy of the written notice. The Contractor shall be responsible for furnishing the required traffic control and personnel to assist AWWU while locating valve boxes and performing the pre-construction 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 will forfeit all right to deny damages done by the Contractor or the Contractor's 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 all valves and valve boxes in an operable condition during all phases of construction. If AWWU finds any valves or valve boxes damaged or rendered inoperable after the pre inspection and before the post inspection, the Contractor shall repair the valves and/or valve boxes at the Contractor's expense.

627-5.01 BASIS OF PAYMENT Add the following: The pre and post inspections are subsidiary to Section 627 pay items listed in the bid schedule and no separate payment shall be made. Traffic control required for the pre and post inspections shall be paid under the specific Section 643 pay items.

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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)R58

Payment will be made under:

Pay Item No.	Pay Item	Pay Unit
639(4)	Driveway	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.

Utilities will be relocated by others concurrently with the construction of this project. A utility company performing ground disturbing activity on the project shall be identified in the SWPPP. The Contractor will be responsible for controlling sediment and erosion and stabilizing areas disturbed during underground utility relocation.

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.appendixf.pdf.

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 enjoy 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, to include underground utility staging areas and relocation work, 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 are 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.

Coordinate BMP's with Utility companies doing work for the project.

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 Construction Site Inspection Report (Form 25D-100 - 4/08). 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 the 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 the following Failure section. 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 non-action, 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).

Payment will be made under:

Pay Item No.	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

(05/08/08)R272

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.

643-1.02 DEFINITIONS. Add the following paragraphs after paragraph titled "Construction Phasing Plan":

Night Work: Work occurring between sunset and sunrise.

Night Work Lighting Plan (NWLP). A drawing or drawings indicating the method of illuminating night work areas. The NWLP depicts the lighting equipment, sources of power, and their placement. Use in conjunction with a night work traffic control plan. (02/05/04)ES06

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 non-street legal vehicles and the motoring public. The Traffic Control plan shall specify the traffic control devices required for these operations. R222 (5/25/07)

643-1.04. WORKSITE SUPERVISOR. Add the following to item 2. Duties:

i. Supervise the implementation of the Night Work Lighting Plan. (02/05/04)ES06

643-1.05 CONSTRUCTION PHASING PLAN.

*****deleted*****

Special Provisions

Add the following new subsections:

643-1.07 NIGHT WORK LIGHTING PLAN (NWLP). Submit a NWLP to the Engineer with the Traffic Control Plan or 30 days before starting of night work for projects where night work is planned. Allow 7 days for review. Make necessary modifications in response to the Engineer's comments. Do not begin night work before plan approval.

The NWLP shall be submitted on 11 inches by 17 inch paper at an appropriate scale for displaying the work. The NWLP shall include:

1. Layout plan showing light location and configuration, including both typical spacing and lateral placement.
2. Description of light towers to be used.
3. Description of electrical power source.
4. Description of lighting provided by mobile equipment.
5. Specific technical details, including lamp type and wattage, on all lighting fixtures to be provided.
6. Details on any hoods, louvers, shields, or other means to be used to control glare.
7. A document sealed by a professional engineer that certifies the lighting shown on the plan will provide the required illuminance and uniformity.

643-1.08 STATIC FIELD LIGHTING TEST. Before work begins, do a static layout of the proposed construction and lighting equipment. Tell the Engineer when the test will be conducted. Wait until after dark and turn on all the lights. Measure the resulting average and minimum horizontal illuminance levels in each 5, 10, or 20-foot-candle area. The Engineer may verify readings with light measuring equipment. In addition, the Engineer will determine whether the system produces too much glare. Modify the system as necessary to provide the required illuminance level, uniformity, and glare mitigation. After final modifications, have the

same professional engineer that certified the NWLP certify the static layout complies with applicable illuminance level and uniformity requirements. Submit the certification (sealed by the professional engineer) and the data to the Engineer.

Take meter readings on the roadway surface. Determine average horizontal illuminance levels by measuring illuminance at each point in a uniform grid pattern, as defined below, across the area required to be illuminated (from Table 643-2). Determine uniformity ratios by dividing the average of all measurements by the measurement at the dimmest point.

Locate the grid of measurement points as follows:

Maximum longitudinal spacing: 5 feet for lengths of 50 feet or less. 10 feet for longer areas
Maximum lateral spacing: 5 feet for widths of 50 feet or less. 10 feet for wider areas
Longitudinal offset from perimeter of illuminated area: One half the longitudinal spacing.
Lateral offset from perimeter of illuminated area: One half the lateral spacing. (02/05/04)ES06

Standard Modifications

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. (5/01/07) E56

Special Provisions

643-2.01 MATERIALS. Add the following:

12. l. Power cords shall comply with the National Electrical Code Article 600.10 Portable and Mobile Signs, paragraph 600.10(c) (2) ground fault circuit interrupter. The cord must have an integral GFCI Protection located either in the attachment plug or within 12 inches of the plug.

Under item 16. Flagger Paddles, add the following last sentence: During night work use flagger paddles that meet the criteria of this paragraph, except use reflective sheeting that is "diamond grade" sheeting or approved equivalent. (02/05/04)ES06

17. Flexible Markers. Refer to subsection 606-2.01 Materials.

Standard Modifications

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.

643-3.02 ROADWAY CHARACTERISTICS DURING CONSTRUCTION. Add the following: Traffic may be maintained on a continuous gravel surface for 1,000 feet.

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.

Standard Modification

643-3.04 TRAFFIC CONTROL DEVICES.

In the sixth paragraph and also in Item 4.b., delete: "ATTSA" and replace with: ATSSA (American Traffic Safety Services Association). (5/01/07) E56

Special Provisions

643-3.04 TRAFFIC CONTROL DEVICES. Add the following paragraph after the first paragraph: The Contractor shall furnish and erect four special permanent construction public information signs. Place these signs near the approaches to the Tudor Road and Elmore Road intersection. Get location approval from the Engineer before erecting these signs. At a minimum, these signs shall contain:

- the project name
- estimated completion date
- phone numbers for: the project hotline, resident engineer, and the Contractor
- the "Navigator" web address: www.alaskanavigator.org

These signs shall be a minimum of 48" x 96" in size. Submit sign layout for approval by the Engineer before fabricating.

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.

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: 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
0-5,000	$30
5,001+	$40

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. From 0600 hours to 2000 hours daily.

2. Minimum lane widths shall be 11 feet from face of curb and 10 feet without curb.

3. The Contractor shall keep open the eastbound left turn lane into West Tudor Centre Drive until the dual eastbound left lanes at Tudor Road and Elmore Road intersection are operational.

School Coordination Plan

Obtain the local school bus schedule and coordinate 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. The Contractor shall contact Steve Kalmes or Marty Elkins with Anchorage School District Pupil Transportation at (907) 742-1200.

Hospital Coordination Plan

Coordinate work efforts to ensure that emergency vehicles are not delayed through the construction zone.

The Contractor shall contact the area hospitals the fire department directly to inform them of upcoming intersection closures and options they may have for access. The hospital coordination plan should include covering existing "H" symbols and placing temporary "H" symbols for routing traffic to the Providence Hospital and the Alaska Native Medical Center during area closures. This plan shall be submitted, as part of the TCP, to the Engineer for approval before the implementation of the hospital coordination plan.

Closures:

The Contractor will be allowed two weekend closures for the Tudor Road and Elmore Road intersection for milling and paving, median, curb and gutter, and electrical work.

The intersection of Elmore Road and Ambassador Drive shall not be closed at the same time as the intersection of Tudor Road and Elmore Road in order to provide public and emergency access to area hospitals and medical centers.

Weekend closures will require public notification, establishment of detour routes, and coordination with utility companies to accomplish all required work. Access to local businesses, public facilities, hospitals and universities must be maintained during any weekend closure.

The closures shall be from Friday at 2200 hours to Monday at 0500 hours.

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.

Add the following new subsection:

643-3.10 LIGHTING OF NIGHT WORK.

Illuminate the night work areas specified in Table 643-2 to the light levels specified.

This specification only covers lighting within project limits for the activities described in Table 643-2. However, the Contractor is responsible for lighting all operations in all locations according to federal regulation 29 CFR 1926.56 and in a manner that meets task lighting needs.

Maintain a uniformity ratio no greater than 5:1 over illuminated areas. Uniformity ratio is the ratio of average to minimum horizontal illuminance within the illuminated area.

Table 643-2 Minimum Night Work Illumination Levels and Area of Coverage

Type of Work/ Equipment	Illumination Level (horizontal footcandles)		Area of Illumination	
	Average	Minimum	Length (along road)	Width (across road)
Paving	10	2	25' beyond front and back of paving machine	Lane(s) being paved plus 5' beyond both sides of paving machine
	5	1	50' beyond front and back of paving machine	Lane(s) being paved plus 15' beyond both sides of paving machine

Table 643-2 Minimum Night Work Illumination Levels and Area of Coverage				
Type of Work/ Equipment	**Illumination Level (horizontal footcandles)**		**Area of Illumination**	
	Average	**Minimum**	**Length (along road)**	**Width (across road)**
Milling	10	2	25' beyond front and back of milling machine	Lane(s) being milled plus 5' beyond both sides of milling machine
	5	1	50' beyond front and back of milling machine	Lane(s) being milled plus 15' beyond both sides of milling machine
Rolling	10	2	15' beyond front and back of roller	5' beyond both sides of the roller
	n/a	1	50' beyond front and back of roller	5' beyond both sides of the roller
Flagging	20	4	The area where the flagger normally stands when waiting for the first car in a queue to approach plus 15' in each direction.	
Truck/Equipment Crossings and Entry Points on roads with speed limits over 40 MPH and average daily traffic during the construction season over 750.	5	1	Width of the cross road, including shoulders, plus 15' both directions	Width of the main road, including shoulders

Provide the required light level and quality with any combination of equipment mounted, trailer mounted, ground-mounted, or tethered balloon lights.

The Engineer may verify illuminance levels and uniformity at any time using a handheld light meter.

Install lighting in a manner that minimizes glare for motorists, workers, and annoyance or discomfort for 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 meet required illuminance levels, uniformity ratios, or provides lighting that creates unacceptable glare at any time, the Contractor shall cease nighttime operations in that area until the condition is corrected.

Lighting equipment shall be in good operating condition and in compliance 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 and to provide the required illuminance. 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.

Ground, trailer, and equipment-mounted light towers shall be 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.

Ensure trailer or equipment mounted light towers do not exceed the height of overhead objects such as trees, aerial utilities, or bridges. Aim and adjust lights to provide the required light levels and uniformity. Provide uniform illumination on the hopper, auger, and screed areas of pavers. Illuminate the operator's controls on the machines uniformly.

Conventional vehicle headlights do not eliminate the need for the Contractor to provide lighting. Furnish each side of non-street 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.
Existing street and highway lighting do not eliminate the need for the Contractor to provide lighting. Consideration may be given to the amount of illumination provided by existing lights in determining the wattage and/or quantity of additional light to be provided.

Provide sufficient fuel, spare lamps, generators, and qualified personnel to ensure the 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 failure of the lighting system, discontinue the operation until the required level and quality of illumination is restored.

Maintain a supply of emergency flares for use in the event of emergency or unanticipated situations. (02/05/04)ES06

Standard Modification

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 retro-reflective material to Level 2 standards.

(5/07/07)E56

Special Provision

643-3.12 TEMPORARY ELECTROLIERS. When the Contract includes Item 643(40) Temporary Electrolier, install temporary electroliers at the following locations:

1. Along roadway segments that are illuminated when beginning work and the following conditions apply:
   a. Maintaining traffic on the subgrade, portions of the new pavement structure, or on the existing pavement.
   b. The permanent lighting system cannot be operational beforehand.
   c. When, because of grading operations, a vehicle is within 4 inches of ground clearance and 5 feet between the tires would snag on the existing foundations, or the tops of the existing foundations are more than 8 inches below the grade of the surrounding embankment.
2. At locations specified by the Engineer, including:
   a. Along detours and diversions, and
   b. Along traveled ways that transition from one typical section to another, and
3. At temporary traffic signals.
4. At the locations shown in the Plans.

The Department will not require lighting from midnight June 7 to midnight July 5. Make temporary electroliers operational by sunset on the day replacing or retiring the existing system, or open a roadway and/or detour to traffic.

Submit a lighting plan for each temporary electrolier system to the Engineer for review and approval before implementing. Allow at least two weeks for review. Provide temporary electroliers on the far right side of approaches at signalized intersections. Luminaires and mast arms may be installed on the signal poles when they do not conflict with other overhead utilities. Along roadways, choose one of the following options for temporary lighting plan:

1. When one is included, use the temporary lighting plan detailed in the Plans.
2. On roadways with existing lighting, provide new foundations and install poles and mast arms sized to keep the existing luminaires in their existing positions horizontally and vertically over the roadway. In this case, no lighting design is required.

3. Design temporary lighting system using the Contractor's choice of luminaires, including the luminaires of the permanent lighting system. Use a layout pattern, mounting height, and luminaire offset and spacing that provide a light distribution that conforms to AASHTO's "An Informational Guide for Roadway Lighting" illuminance method of design. Design the system for the roadway's functional class as specified in the Department's Annual Traffic Volume Report.

Furnish and install materials and miscellaneous hardware required to provide a functional lighting system, including foundations, branch circuitry, and electrical load centers. Size the branch conductors to provide a maximum 5% voltage drop at the most remote luminaire. Materials shall conform to the Specifications. The illumination cables may only be directly buried if the cables are listed for direct burial.

Use any of the following poles.

1. Existing light poles found within the project limits that are in suitable condition for reuse as determined by the Engineer and scheduled to be removed.
2. Poles from the permanent lighting system.
3. The following new poles may be furnished, if a minimum of 30 feet in elevation between a luminaire and the edge of traveled way is maintained.
   a. ANSI Class 4 wood poles. Installed outside the clear zone during winter shutdown. To determine the clear zone, see subsection 1130.02 of the Alaska DOT/PF Highway Preconstruction Manual.
   b. Steel, aluminum, or fiberglass poles that meet design criteria for 80 mile per hour wind speeds according to AASHTO's 1994 edition of the "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals".
   c. Poles that are part of the temporary signal systems.

Furnish temporary electrolier service between October 1 through May 15 and located within the clear zone, with an approved yielding type base. Approved yielding bases consist of FHWA approved slip bases, transformer bases, or frangible couplings. Install wood poles and other fixed base poles outside the clear zone or behind guardrail or portable concrete barrier that protects against another hazard.

Install temporary electroliers, in service at any time from May 15 through September and located within the clear zone, with approved yielding bases or with fixed bases shielded by 30 feet of barrier and an FHWA approved end treatment. Provide 2 feet of clearance between the barrier and pole. Consider the costs of furnishing the barrier and an end treatment a subsidiary obligation of Item 660(14) Temporary Electrolier. Replace fixed base poles that are located within the clear zone and which will remain in service after October 1 with yielding base poles at no expense to the State.

Use any of the following load centers to energize the temporary lighting and signal systems. Provide work needed to modify load centers to provide functional temporary lighting and signal systems according to the NEC.

1. Permanent load centers installed in their plan location.
2. Existing load centers scheduled to remain intact until completion of the project. Relocate and reuse existing load centers only if approved.
3. Approved temporary load centers with photoelectrical controlled lighting circuits. Provide a temporary load center when retiring an existing load center that is not approved, and when approved load centers are unavailable.

Approved load centers include load centers UL labeled as Service Equipment, or UL labeled as Industrial Control Equipment and marked "Suitable for use as service equipment".

643-3.13 TEMPORARY SIGNAL SYSTEMS. Provide a temporary traffic signal at the intersection of Tudor and Elmore Roads. Move traffic through this intersection with fully functional traffic signal system, except during shutdowns to change from one system to another. The Engineer will limit temporary signal system shutdowns to the times when traffic restrictions are allowed in subsection 643-3.08, Construction Sequencing. Use flag-control to control the flow of traffic during these shutdowns.

Traffic Control Plan. Submit a Traffic Control Plan for each temporary signal system switchover to the Engineer for approval before implementation. Include the same number of signal heads, signal phases, pedestrian pushbuttons, signs, pavement markings, etc. found in the signal system being replaced or modified in the Plan, plus the following details.

1. A scale drawing of the intersection that includes lanes, their widths, and auxiliary lane pocket lengths.
2. The location of signal poles, controller cabinet, and the load center that will feed the temporary signal system.
3. The location, sizes, and type of each signal head.

Temporary Signal System. May consist of a combination of the existing system, relocated components of the existing system, guyed wood poles, and parts of the permanent signal system.

1. If necessary to use temporary controller assemblies, install temporary controller assemblies on Type III junction boxes.
2. Suspend traffic signals from messenger cables provided mounted with standard span wire hangers and secure them with a second cable to prevent misalignment in a wind. Leave sufficient signal cable slack at each pole to provide for drip loops and to allow realignment of each signal head.
3. Use a minimum of two circuits to energize the signals of each phase that include two or more signal faces. The Engineer will allow splices only at the terminal blocks in the signal faces.

Whenever temporary signals include a span wire attached to a permanent signal pole, install a guy on the permanent pole and provide protective collars to prevent chafe damage. Exclude poles with breakaway bases in span wire supported signal systems.

Maintain fully actuated traffic signals during the normal course of construction by installing loop detectors or a video detection system.

The Engineer will use Municipality of Anchorage (MOA) signal maintenance personnel for certain work inside controller cabinets. Prepare the controller cabinet in accordance with Subsection 660-3.11 Signal System Timing and Adjustments.

Special Provision

643-4.01 METHOD OF MEASUREMENT.

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. (05/25/07)R222USC04

Standard Modification

643-5.01 BASIS OF PAYMENT. Add the following: Payment for high visibility garments for workers is subsidiary to other items. (5/01/07)E56

Special Provision

643-5.01 BASIS OF PAYMENT. Add the following: The Engineer does not require a change order/directive for Item 643(25) Traffic Control.

Temporary Signal System Complete will be paid for under Pay Item 660(7***deleted***). Pay Item 660(7***deleted***) Temporary Signal System Complete will not include payment 660(25) Controller Cabinet Preparation and 660(26) Signal System Timing and Adjustments. This work will be paid for under their respective items.

16. Work Zone Illumination. Payment for work zone illumination and any required adjustments to work zone illumination is subsidiary to other items. (03/15/06)ES14

17. Road Closures: The lump sum payment for Items 643(21_) Road Closures will consist of all planning, preparation of an approved TCP, public notices, signage, pavement markings, traffic control devices, flaggers, pilot cars, 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.

TRAFFIC CONTROL RATE SCHEDULE

Traffic Control Device	Pay Unit	Unit Rate
Construction Signs	Each/Day	$5.00
Special Construction Sign	Square Foot	$24.00
Type II Barricade	Each/Day	$ 3.00
Type III Barricade	Each/Day	$ 10.00
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
Interim Pavement Markings		
Painted Markings	Foot	$0.30
Removable Preformed Markings	Foot	$0.65
Temporary Raised Pavement Markings	Each	$0.90
Word or Symbol Markings	Each	$40.00
Preformed Marking Tape	4 Inch x 1 Foot	$1.50

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. (05/05/08)R222

Delete Item 643(15) and substitute the following:

Pay Item No.	Pay Item	Pay Unit
643(15)	Flagging	Contingent Sum

(05/05/08)R222

Add the following pay items:

Pay Item No.	Pay Item	Pay Unit
643(21A)	Road Closure No. 1 – Tudor/Elmore Intersection	Lump Sum
643(21B)	Road Closure No. 2 – Tudor/Elmore Intersection	Lump Sum
643(40)	Temporary Electrolier	Each

(05/12/08)USKH

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)R63 and (05/14/08)USKH

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 the purpose of updating the CPM Schedule. Meet with the Engineer monthly or as deemed necessary by the Engineer.

(12/13/02)R261M98

Add the following Section:

SECTION 647

EQUIPMENT RENTAL

Special Provisions

647-1.01 DESCRIPTION. This item consists of furnishing construction equipment, operated, fueled and maintained, on a rental basis for use in construction of extra or unanticipated work at the direction of the Engineer. Construction equipment is defined as that equipment actually used for performing the items of work specified and shall not include support equipment such as, but not limited to, hand tools, power tools, electric power generators, welders, small air compressors and other shop equipment needed for maintenance of the construction equipment.

The work is to be accomplished under the direction of the Engineer, and the Contractor's operations shall at all times be in accordance with the Engineer's instructions. These instructions by the Engineer shall be to the Contractor's supervisory personnel only, not to the operators or laborers. In no case shall these instructions by the Engineer be construed as making the Department liable for the Contractor's responsibility to prosecute the work in the safest and most expeditious manner.

647-2.01 EQUIPMENT FURNISHED. In the performance of this work, the Contractor shall furnish, operate, maintain, service, and repair equipment of the numbers, kinds, sizes, and capacities set forth on the Bid Schedule or as directed by the Engineer. The operation of equipment shall be by skilled, experienced operators familiar with the equipment.

The kinds, sizes, capacities, and other requirements set forth shall be understood to be minimum requirements. The number of pieces of equipment to be furnished and used shall be, as the Engineer considers necessary for economical and expeditious performance of the work. The equipment shall be used only at such times and places as the Engineer may direct.

Equipment shall be in first class working condition and capable of full output and production. The minimum ratings of various types of equipment shall be as manufactured and based on manufacturer's specifications. Alterations will not be considered acceptable in achieving the minimum rating. Equipment shall be replaced at any time when, in the opinion of the Engineer, their condition is below that normal for efficient output and production.

Equipment shall be fully operated, which shall be understood to include the operators, oilers, tenders, fuel, oil, air hose, lubrication, repairs, maintenance, insurance, and incidental items and expenses.

647-2.02 EQUIPMENT OPERATORS AND SUPERVISION PERSONNEL. Equipment operators shall be competent and experienced and shall be capable of operating the equipment to its capacity. Personnel furnished by the Contractor shall be, and shall remain during the work hereunder, employees solely of the Contractor.

The Contractor shall furnish, without direct compensation, a job superintendent or Contractor's representative together with such other personnel as are needed for Union, State, or Federal requirements and in servicing, maintaining, repairing and caring for the equipment, tools, supplies, and materials provided by the Contractor and involved in the performance of the work. Also, the Contractor shall furnish, without direct compensation, such transportation as may be appropriate for the personnel.

647-3.01 CONSTRUCTION REQUIREMENTS. The performance of the work shall be according to the instructions of the Engineer, and with recognized standards and efficient methods.

The Contractor shall furnish equipment, tools, labor, and materials in the kinds, number, and at times directed by the Engineer and shall begin, continue, and stop any of the several operations involved in the work only as directed by the Engineer.

Normally, the work is to be done when weather conditions are reasonably favorable, 6 days per week, Mondays through Saturdays, holidays excepted.

The Engineer will begin recording time for payment each shift when the equipment begins work on the project. The serial number and brief description of each item of equipment listing in the bid schedule and the number of hours, or fractions thereof to the nearest one quarter hour, during which equipment is actively engaged in construction of the project shall be recorded by the Engineer. Each day's activity will be recorded on a separate sheet or sheets, which shall be verified and signed by the Contractor's representative at the end of each shift, and a copy will be provided to the Contractor's representative.

647-4.01 METHOD OF MEASUREMENT. The number of hours of equipment operation to be paid for shall be the actual number of hours each fully operated specified unit of equipment, or each fully operated specified combination of units of equipment, is actually engaged in the performance of the specified work on the designated areas in accordance with the instruction of the Engineer. The pay time will not include idle periods, and no payment will be made for time used in oiling, servicing, or repairing of equipment, or in making changeovers of parts to the equipment. Travel time to or from the project, will not be authorized for payment.

647-5.01 BASIS OF PAYMENT.

Payment will be made under:

Pay Item No.	Pay Item	Pay Unit
647(5)	Backhoe, 4WD, 1 cy Bucket, 75 hp, 15 foot Depth	Contingent Sum

(08/24/05)R15

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 *Approved Products List*: The Approved 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.

   (4/17/07)R66 and (6/19/08)USKH

Standard Modification

660-2.01 MATERIALS. Under Item 1.a. change title by removing: "Materials on the *Approved Products List*:" and replace with: Materials on the *Qualified Products List*: E36(01/27/07)

Standard Modification

660-2.01 MATERIALS. Under Item 1.b. change title by removing: "Materials Not on the *Approved Products List*:" and replace with: Materials Not on the *Qualified Products List*: E36(01/27/07)

Add the following subsection:

660-2.02 OWNER FURNISHED MATERIALS.

The State of Alaska Department of Transportation and Public Facilities (DOT&PF) will provide the following materials for installation:

1. Highway Lighting System
   1 each – 35-40' Luminaire Pole
   1 each – 12'-15' Luminaire Mast Arm

The Contractor shall provide all equipment, labor and materials necessary to pick-up the DOT&PF furnished luminaire pole and luminaire mast arm from the Central Region DOT&PF Maintenance Yard located on Tudor Road in Anchorage, Alaska, and transport these items to the project location. The Contractor shall contact Ed Caress, DOT&PF Maintenance at 907-440-8461 to arrange for pick-up. (07/03/08)USKH

CONSTRUCTION REQUIREMENTS

Special Provisions

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 remain after completing backfill work and excavated material not meeting the requirements of Selected Material, Type C, as defined in subsection 703-2.07.

   Dewater foundation and conduit excavations immediately before and during embedding and backfilling operations. Backfill excavations with materials that meet the following requirements:

a. Backfill foundations with 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.

All traffic signal system items shall be delivered to the MOA Traffic Signal warehouse at 5923 Rowan Street. Signal poles and mast arms shall be delivered to the MOA Traffic Signal Pole Yard at 3rd Ave. & Orca Street. Allow MOA maintenance personnel to select equipment and pole items they would like to salvage and Contractor to dispose of all remaining equipment and pole items.

Contact Bill Sosnowski, Foreman, at 343-8355 one week before your tentative 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 and bus stop 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 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.

2. Pile Foundations. Add the following new item g:

   g. Use no more than one splice per foundation. Locate the splice at least 10 feet from the top of pile.

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, 3-M Dynatel EMS ball marker model no 1402-xr or equal. Markers shall respond to locator devices up to 5 feet away, work at all temperatures, and contain no internal power source.

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 liner 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.

20. Cap spare lighting conductors in the pole bases and load centers by cutting the wire flush with the end of the insulation and bending the conductor back against itself and securing with 3 layers of electrical tape to prevent a possibility of making contact with ground or current carrying conductors.

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 grounding 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 5 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.

When routing a new conduit into an existing junction box or replacing an existing junction box, improve groundings in new and existing conduits to current specifications.

660-3.07 TRAFFIC CONTROLLER ASSEMBLIES. In the 2nd subparagraph revise the first sentence to read: At the time the controller assembly is delivered submit the following for each assembly: and add the following to the last sentence (1 paper copy and 1 electronic copy in Adobe pdf format).

In the 3rd subparagraph replace "3.5 inch floppy" with "compact"

Delete 1. Shop Tests. entirely and replace with the following:

1. Shop Tests. The Controller Assembly manufacturer shall conduct a pre-test of the cabinet and controller assembly. The pre-test includes but is not limited to:

    a. Ensure the cabinet is free of paint scratches, dents, sharp edges, and any other physical defect.
    b. Ensure cabinet hinges, heater, ventilation system, lighting and door locking mechanism function properly.
    c. Ensure that there are no shorts between AC+, AC- and GND anywhere in the cabinet.
    d. Check that there is no continuity between AC+ and DC+.

e. Check for continuity between any green wire connection point and GND.
f. Ensure devices within the cabinet are labeled properly.

The Controller Assembly manufacturer shall conduct a final test of the cabinet and controller assembly. Qualified Cabinet Test Technicians shall conduct the final test. The final test includes but is not limited to ensuring proper operation of; flash colors & combination, standard controller phasing, pedestrian pushbutton isolation, MMU, circuit breaker/fuse operation, telemetry operation, loop panel/detector rack operation, EVP operation and, proper police & auxiliary panel operation.

Upon completing the final test the cabinet shall be run, "burned-in", under full loads for a period of not less than 48-hours with a test timing plan in effect that utilizes full cabinet phases and functionality.

In the course of testing, a component found to function incorrectly or exhibit a physical damage must be replaced with an equivalent new component before delivery. Should the cabinet fail in any manner during burn-in, the cause of the failure must be remedied and the test restarted with another 48-hours of burn-in. The intent of this specification is to meet or exceed the requirements of Econolite test procedure MWI-10-28 Rev. C. With prior approval of the Engineer, other equivalent test procedures may be substituted.

Upon completion of the pre-test, final test and burn-in, the Controller Assembly manufacturer shall issue a letter of certification stating that the required tests have been completed, note any defects found and the remedial action taken. Further, the certification shall state assembly conformance with the NEMA TS 2-2003 v02.06, *Traffic Controller Assemblies with NTCIP Requirements*, Section 2 Environmental Requirements. Submit the certification letter and copies of the test results to the Engineer.

The work required in this section shall not be paid for separately but shall be considered subsidiary to item 660(17A) Traffic Signal System Modifications at Tudor Road and Elmore Road.

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	
85^{th} 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. Wood Pole Installation. Use only for temporary signal system, 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.

Add the following: The Contractor shall provide flagger assistance, including arrow board truck(s) to MOA Signal Maintenance for over head inspections of signalization work. This work shall be coordinated through the Engineer.

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 and lighting systems 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.

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: The Contractor shall provide flagger assistance, including arrow board truck(s) to MOA Signal Maintenance for over head inspections of signalization work. This work shall be coordinated through the Engineer.

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 and interconnect 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.

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 and will perform splices on interconnect cables.

660-4.01 METHOD OF MEASUREMENT. Add the following:

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(17A) Traffic Signal Modifications at Tudor Rd. and Elmore Rd will not include payment for 660(11) Traffic Loop, and 660(26) Signal System Timing and Adjustments. This work will be paid under their respective items.

Payment for 660(3A) Highway Lighting System Complete include: removing and reusing existing light poles and mast arms from within the project area and the State of Alaska Maintenance Yard; new concrete and/or steel pile foundations with new bolts, nuts and washers; removal of existing lighting foundations to at least 1 foot below finish grade; new luminaires and lamps of the type specified in the plans; new ballast tap conductors; and fused disconnect kits with fuses.

Payment for 660(17A) Traffic Signal Modifications at Tudor Rd. and Elmore Rd. includes all labor, equipment and materials required to provide a fully functional traffic signal including but not limited to:

> general construction requirements, new foundations, removal of existing signal pole foundations to at least 1 foot below finish grade, conduits, junction boxes, wiring, bonding and grounding, removing and relocating signal/lighting pole structures, maintaining temporary and existing electrical systems, traffic controller assemblies, vehicle and pedestrian indications, pushbutton assemblies, emergency vehicle preemption systems, and auxiliary & test equipment.

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.

Payment for 660(7) Temporary Signal System Complete includes all labor, equipment and materials required to implement a functioning temporary signal system necessary to construct modifications to an existing traffic signal. This item includes work described under Subsection 643-3.13, Temporary Signal Systems. Work necessary to implement and maintain a temporary interconnect system will be measured and paid for under Item 662(3), Temporary Signal Interconnect System Complete.

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 surplus and unusable excavation and for imported backfill and bedding material at respective contract unit prices, or as extra work if the contract does not include these items.

The cost of repairing damage to finishes on new equipment is subsidiary.

The cost of providing flagger assistance, arrow board trucks and other traffic control work necessary for MOA Signal Maintenance to perform their over head inspections of signalization work shall be a subsidiary to 643 items that are included in the Contract.

The cost of maintaining the existing and keeping the temporary electrical system fully operational is subsidiary to 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 $1,275.00 per day from the payments due the Contractor.

Payment will be made under:

Pay Item No.	Pay Item	Pay Unit
660(3A)	Highway Lighting System Complete	Lump Sum
660(3B)	Bus Stop Lighting System Complete	Lump Sum
660(3C)	Pedestrian Lighting System Complete	Lump Sum
660(7)	Temporary Signal System Complete at Tudor Rd. and Elmore Rd.	Lump Sum
660(17A)	Traffic Signal Modifications at Tudor Rd. and Elmore Rd.	Lump Sum
660(22)	Illumination Price Adjustment	Contingent Sum
660(26)	Signal System Timing and Adjustments	Contingent Sum

R66(4/17/07)

SECTION 661

ELECTRICAL LOAD CENTERS

Standard Modification

661-2.01 MATERIALS. Under Item 1. change title by removing: "Materials on the *Approved Products List*:" and replace with: Materials on the *Qualified Products List*: E36(01/27/07)

Standard Modification

661-2.01 MATERIALS. Under Item 2. change title by removing: "Materials Not on the *Approved Products List*:" and replace with: Materials Not on the *Qualified Products List*: E36(01/27/07)

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 permanent and temporary signal interconnect in conduit, cor-flo, and aerial between the system interconnect cabinet on Tudor Road and junction boxes 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 according to these Specifications and Section 660, Signals and Lighting. The Department requires third party certification for high density polyethylene conduit. Equal to or exceeding UL 651 B and NEMA TC-7.

662-2.01 MATERIALS. Submit the materials for review and approval according to 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 RMC conduit of the size specified in the plans. Use polyethylene duct (HDPE) when extending an existing polyethylene duct to a junction box and/or interconnect cabinet.

Encapsulate completed splices in waterproof reenterable 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. Use if specified in the plans or required to extend an existing polyethylene duct system to a junction box and/or interconnect cabinet.

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 extra high molecular weight, high density, polyethylene (PE) pipe, with a cell classification equal to or exceeding 335444C when tested according to ASTM D 3350.

Furnish fittings used in the duct system such as elbows, made from the same type polyethylene as the duct. Fuse connections using the manufacturer's recommended procedure and equipment. Except elbows weeping into junction boxes shall be rigid

metal conduit. Join the rigid metal conduit to the HDPE with Electrofusion Type Coupler.

Keep junction boxes and ends of conduit covered unless 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 precast, 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 conduits at least 30 inches below finished grade. When intercepting existing conduit and extending into new junction boxes, the maximum horizontal angle shall be 45 degrees.

Install junction boxes at all abrupt changes in conduit alignment and on 300 foot maximum centers. Angle points and curves with delta angles greater than 45 degrees constitute an abrupt change. Install Type II junction boxes, except when splicing 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. The Contractor shall 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. Maintain 10 feet of slack cable in existing cable at locations where new cable is spliced to existing.

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 conduit with a 6-inch lift of material free of rocks exceeding a 1-inch maximum dimension.

662-3.03 MAINTAINING EXISTING AND TEMPORARY SIGNAL INTERCONNECT SYSTEMS. This work consists of protecting and maintaining the existing and temporary interconnect systems during the life of the contract. The work includes: locating, repairing, replacing, adjusting, cleaning, and relocating components of signal interconnect system(s) to keep them operational according to the following specifications.

Unless specified otherwise in the Plans, maintain a minimum of two 25 pair interconnect cable between the existing interconnect cabinet on Tudor Road and the existing interconnect system west of the project area. Unless specified otherwise in the Plans, Maintain a minimum of one 25 pair interconnect cable between the existing interconnect cabinet on Tudor Road and the existing interconnect system east of the project area. The temporary system to the east shall also connect to the traffic controller for the Tudor Road and Elmore Road intersection.

Interconnect shut downs shall be no longer than 48 hours and will only be allowed Monday through Wednesday. Coordinate interconnect shut downs and splicing requirements with the Municipality of Anchorage Traffic Signal Electronics Shop. The MOA will be reimbursed for their work under Item 660(26) Signal System Timing and Adjustments. See Section 660-3.11 Signal System Timing and Adjustments for work that the MOA will perform.

Obtain approval of the Engineer for temporary support post location and installation details. Temporary interconnect cables shall not be run on the ground surface for more than 50 feet and may not cross pathways or roads at grade. Install above ground temporary interconnect that is within 8 feet of the existing grade in flexible plastic conduit.

662-4.01 METHOD OF MEASUREMENT. See Section 109.

662-5.01 BASIS OF PAYMENT. The lump sum contract price for signal interconnect constitutes full compensation for furnishing work required to complete the work specified. (06/21/06)R67

Adjusting new and existing interconnect junction boxes to grade will not be measured and shall be subsidiary to 662 items.

The lump sum contract price for temporary signal interconnect system shall include full payment for furnishing, installing, and disposing of the materials necessary to implement and maintain the interconnect system to the level specified during the life of the project.

Payment will be made under:

Pay Item No.	Pay Item	Pay Unit
662(2)	Signal Interconnect System Complete	Lump Sum
662(3)	Temporary Signal Interconnect System Complete	Lump Sum

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.

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 and compatible beads 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 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. Aggregate additives are required per the manufacturer to achieve skid resistance. 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.

(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. 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. Groove the area for inlaid marking to a depth of 250 mils.

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, 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.

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 is 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. 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.

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.

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 interim markings shall be paid under specific Section 643 pay items.

Interim pavement markings required for all phases of the construction of the roadway is subsidiary to Section 643 items of work.

Payment will be made under:

Pay Item No.	Pay Item	Pay Unit
670(10E)	MMA Pavement Markings Longitudinal Inlaid	Linear Foot
670(10G)	MMA Pavement Markings Only and Arrow Inlaid	Each
670(10H)	MMA Transverse Markings Inlaid	Square Foot

(03/18/08)R246

SECTION 701

HYDRAULIC CEMENT

701-2.03 GROUT. Add to end of last sentence: from specimens made according to ATM 507.E30(3/15/06)

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

(01/02/08)R199

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

(01/02/08)R199

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 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.

(01/27/07) E46

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.

(03/18/08)R246

SECTION 719

STEEL, GRAY-IRON AND MALLEABLE- IRON CASTINGS

Standard Modification

719-2.02 GENERAL REQUIREMENTS. In Gray-Iron Castings, delete text and replace with: AASHTO M 306 and AASHTO M 105, Class 35B.

(01/27/07) E47

SECTION 724

SEED

Special Provisions

724-2-02. MATERIALS. Delete Table 724-1 and substitute with the following:

TABLE 724-1

SEED 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)R52

Delete this Section, except for Table 726-1 and substitute the following:

SECTION 726

TOPSOIL

Special Provisions

726-2.01 TOPSOIL. Furnish topsoil that is representative of the existing, natural organic blanket of the project area. Perform a quality test, as defined by ATM 203, on the soil to determine the organic content of the soil. Supply the results to the Engineer.

Soil with an organic content of 5 percent or more may be reused and spread on the finished slopes where topsoil is noted on the plans. Remove roots, stumps, unnatural material, and rocks greater than 3 inch in diameter from the organic material before it is graded onto the finished slope.

Soil with an organic content of less than 5 percent cannot be used as topsoil for the project. In this case, furnish topsoil consisting of a natural friable surface soil without admixtures of undesirable subsoil, refuse, or foreign materials having an organic content of 5 percent or more, as determined by ATM 203. The material shall be reasonably free from roots, clods, hard clay, rocks greater than 3 inches in diameter, noxious weeds, tall grass, brush, sticks, stubble or other litter, and shall be free draining and nontoxic. Notify the Engineer of the location topsoil is to be furnished at least 30 calendar days before delivery of topsoil to the project from that location. The Engineer will inspect the topsoil and its sources before approval will be granted for its use.

(11/27/07)R208

SECTION 727

SOIL STABILIZATION MATERIAL

727-2.01 MULCH: Add the following:

3. Mulch. Mulch for planting beds and basins shall consist of shredded bark and wood. Maximum length of any individual component shall be 2-inches and a minimum of 75% of the mulch shall pass through a 1-inch screen. Mulch shall be free of growth or germination-inhibiting ingredients. The bark mulch shall have the characteristics of retaining moisture, forming a mat not susceptible to spreading by wind or rain, and providing a good growth medium for plants. Shredded bark may contain up to 50% shredded wood material. Wood chips are not acceptable. Bark mulch containing shredded wood shall be aged for one-year minimum prior to installation.

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)R81

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.

   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 oF, then completely submerge in one dip in a separate kettle of prime western grade zinc heated to approximately 825o 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*

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**
f) Design wind speed	100 mph	DWS 100
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

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	Red Orange Green White	14	Head No.

TABLE 740-2
CONDUCTOR TERMINATION TABLE

CONDUCTORS PER CABLE	CIRCUIT	WIRE COLOR	AWG. NO.	BAND LEGEND
	Spare Vehicle Yellow Arrow Vehicle Green Arrow	White/Black Black Blue		
5	Pedestrian Don't Walk Pedestrian Walk Common Neutral Spare Spare	Red Green White Orange Black	14	Head No.
5	Photo Electric Control Load to Contactor Neutral Spare Spare	Black Red White Orange Green	14	PEC
3	Pedestrian Pushbutton Neutral Spare	Black White Red	14	Head No.
3	Flashing Beacon Neutral Spare	Black White Red	14	Head No.
3	Preemption Neutral Spare	Black White Red	20	"PRE"
3	Preemption Confirmation Neutral Spare	Per Mfg. Installation Instructions	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.

Add the following to the first paragraph of item 2. Special Features.: Provide a "Remote/Time of Day/Free" switch.

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.

Provide the following special auxiliary equipment with each controller unit/cabinet:

1. Inductive Loop Detectors. Provide 5-four channel amps and 2-two channel amps with each controller cabinet.

2. System Modem/Interface Unit. Provide integral modem compatible with the MOA computerized traffic control system.

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, for example 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 3 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 740-2.18 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.

Highway 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.

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.

Add the following subsection:

740-2.24 BUS STOP LIGHTING SYSTEM. Furnish and install electroliers that conform the following specifications:

1. Globe: Made of clear polycarbonate.
2. Reflector: Made of spun Aluminum, mechanically secured.
3. Lamp: 100watt, metal halide, ED ½ bulb, mogul base.
4. Optics: A round prismatic borosilicate thermo resistant refractor.
5. Guard: Made of aluminum rods, .840" (21mm) O.D. mechanically secured c/w clear acrylic louvers.

6. Locking System: "Rotomatic" made of cast aluminum, quarter turn system c/w independent pressure points, providing secure anchorage.
7. Ballast: 100 watt MH, high power factor of 90% or better, primary voltage 240, -30F (-34C) lamp starting capacity, c/w quick disconnect plug.
8. Housing: Made of cast aluminum, mechanically secured.
9. Arm: Made of bent aluminum tubing, 2 3/6" (60mm) O.D. welded to the adaptor.
10. Block Adaptor: Made of cast aluminum, welded to the central tubing.
11. Central Tubing: Made of aluminum, 4" (120mm) O. D. c/w a tenon penetrating 12" (305mm) inside the pole, mechanically secured.
12. Pole: Made of aluminum, 4" (102mm) O.D., .220" (5mm) wall thickness, welded to the anchor plate.
13. Access Door: Made of aluminum, covering an opening of 4" x 6", giving access to a ground lug and fused splice connectors.
14. Base Cover: Made of a two-piece cast aluminum component, mechanically secured.
15: Wiring: Included from luminaire to the top of the bracket, exceeding the latter by a minimum of 6" (152mm).
16. Gasketing: Neoprene and/or silicone gasketing applied.
17. Hardware: All exposed screws will be stainless steel.
18. Finish: An application of a thermosetting polyester powder coat paint applied by means of an electrostatic process, color Turquoise Green (RAL 6016).

Bus stop electrolier shall include the following components, as manufactured by Lumec, or approved equal.

Component	Model No.
Luminaire	100MH-CAND5L-PC-C-RR5-240-COLTX-LMS11701A
Bracket	LMS1170A-1A-COLTX
Pole	APR4U-12-LBC1-COLTX-LMS1170A

Add the following subsection:

740-2.25 PEDESTRIAN LIGHTING SYSTEM. Furnish and install electroliers that conform the following specifications:

1. Globe: Made of clear acrylic.
2. Reflector: Hydroformed and anodized, mechanically secured.
3. Lamp: 100 watt, metal halide, ED ½ bulb, mogul base.
4. Optics: Sealsafe optical system (IP66).
5. Locking System: Toolfree access to lamp and electrical components.
6. Ballast: 100 watt MH, high power factor of 90% or better, primary voltage 240, -30F (-34C) lamp starting capacity, c/w quick disconnect plug.
7. Housing: Made of cast aluminum, mechanically secured.

8. Provide stainless steel accents.
9. Arm: none.
10. Pole: Use material made of steel.
11. Access Door: Made of aluminum or steel, covering an opening of 4" x 9", giving access to a ground lug and fused splice connectors.
12. Base Cover: Made of a two-piece cast aluminum component, mechanically secured.
13: Wiring: Included from luminaire to the top of the bracket, exceeding the latter by a minimum of 6".
14. Gasketing: Neoprene and/or silicone gasketing applied.
15. Hardware: All exposed screws will be stainless steel.
16. Finish: An application of a thermosetting polyester powder coat paint applied by means of an electrostatic process over hot dipped galvanizing, color Blue Green (GN4TX).

Pedestrian electrolier shall include the following components, as manufactured by Lumec, or approved equal.

Component	Model No.
Luminaire	100MH-2V-240-ST-6N4TX
Pole	CAL6-12-S

The plans will indicate the number of electroliers, pole height, and operating voltage.

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Remove the text: "*Approved Products List*" and replace with: *Qualified Products List*
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