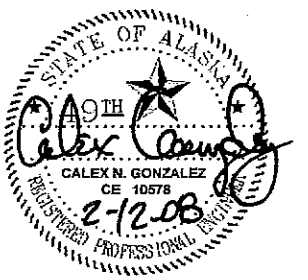
STANDARD MODIFICATION SPECIFICATIONS AND SPECIAL PROVISIONS
to the
STATE OF ALASKA
STANDARD SPECIFICATIONS
FOR
HIGHWAY CONSTRUCTION
2004 EDITION

GLENN HIGHWAY, GAMBELL STREET TO AIRPORT HEIGHTS

Project No. IM-OA1-6(35)/58800



Please do not write in this area

SECTION 101
DEFINITIONS AND TERMS

Standard Modifications

101-1.03 DEFINITIONS. Replace the definitions of SUBGRADE with the following:

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

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

Add the following definition:

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

SECTION 102
BIDDING REQUIREMENTS AND CONDITIONS

Standard 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

Add the following new subsection:

103-1.11 ESCROW OF BID DOCUMENTATION. Furnish a legible copy of the Bid documentation and an affidavit, as instructed in writing by the Contracting Officer. Bid documentation consists of written documentation of quantity takeoffs, construction schedules on which the bid is based, cost estimates, rates of production and progress, assumptions, calculations, quotes from subcontractors and suppliers, and information used to prepare the Bid for this project.

Obtain and furnish the same level of bid documentation, for each subcontractor, supplier or fabricator with a subcontract or agreement exceeding $200,000, regardless of tier. Seal each entity's documentation in separate envelopes, labeled with the entity's name and address, submission date, and project name and number. Include a cover letter or quote signed by a responsible party.

Meet the following requirements:

1. Submitting Bid Documentation. Place bid documentation in a sealed container clearly marked "Bid Documentation" and labeled with the bidder's name and address, submission date, and project name and number. Deliver the sealed container to the Department designated document depository for safekeeping.

2. Affidavit. Submit directly to the Contracting Officer a signed and certified affidavit attesting that

    a. the affiant has examined the bid documentation and that it includes all documents used to prepare the bid,
    b. the sealed container contains all bid documentation submitted,
    c. the escrow materials were relied on to prepare the bid, and
    d. should a dispute arise, the Contractor's rights to use bid preparation documentation other than those in escrow are waived.

3. Access and Use of Escrow Documents. The bid documentation will remain in escrow, without access by either party, except as otherwise provided herein. In the event the Contractor (1) provides notice of intent to claim, (2) a claim, (3) a contract change order, or (4) initiates contract related litigation, the Department may obtain copies of the bid documentation as provided herein.

Both parties will submit to the Depository and copy to each other a list of personnel that are authorized to access the escrow documents. Use forms provided by the Depository.

Upon request the Depository will set the time and place for access to escrow documents, will monitor the escrow documents review, and will arrange for a method of copying escrow documents. Access to escrow documents shall require at least 5 days advance written notice so that the other party has the opportunity to witness the escrow review, examination and use. There is no requirement that both parties witness the escrow document review, but if one party is absent then the review must occur in the presence of a neutral third party observer to be designated by the Depository.

Notwithstanding paragraph five below, the Department will be allowed: to make copies of escrow documentation (whether hard copy, electronic, or otherwise); to use and review copies consultants directly involved in the subject dispute.

Distribution is not authorized except as related to resolution of a dispute. The Department will be allowed to incorporate pertinent copies as supporting documentation in significant contract change orders, contractual disputes, and the settlement of disputed claims.

The Department is not liable for any Contractor costs associated with escrow review and use.

4. Failure to Provide Bid Documentation. Refusal or failure to provide bid documentation or affidavit renders the bid nonresponsive. Failure or refusal to provide subcontractor bid documentation will result in subcontract disapproval.

5. Confidentiality of Bid Documentation. Materials held in escrow are the Contractor's property. Except as otherwise provided herein, the escrow materials cannot be released without the Contractor's approval.

6. Cost and Escrow Instruction. The Department pays to store escrowed materials and instructs the depository regarding escrow.

7. Payment. Include within the overall Contract bid price costs to comply with this subsection.

8. Return of Escrow Documentation. The original escrow documents will be returned to the Contractor once litigation is concluded, outstanding claims are resolved, the Contractor has completed the Contract, and the Department receives an executed Contractor's Release (Form 25D-117) with no exceptions listed. ES11(1/01/06)

SECTION 105
CONTROL OF WORK

Standard Modification

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

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

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

Special Provision

105-1.06 COOPERATION WITH 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 Area 811

Statewide.....800-478-3121

who will notify the following:

Aircraft Service International Group	GCI Communications
Alaska Communications Systems (ACS)	Homer Electric Association
Alaska Fiberstar	Interior Telecom
Alaska Native Hospital	Marathon Oil
Alaska Railroad Corporation	Matanuska Electric Association
Alyeska Cable	Matanuska Telephone Association
Anchorage School District	MOA Signal & Street Maintenance Dept MFS
Anchorage Water & Wastewater Utility	Mukluk Telephone Association
AT&T Alascom, Inc.	Municipal Light & Power
Chugach Electric Association	Municipality of Anchorage
City of Wasilla	Phillips Petroleum
ConocoPhillips Alaska, Inc.	PTI
Cook Inlet Pipeline Co.	Technologies, Inc.
DOT&PF Street Lights, State of AK	Telalaska Inc. (Alyeska Cable, Interior Phone & Mukluk Telecom)
Enstar Natural Gas	Tesoro Alaska Pipeline
Eyecom TV/Interior Telephone	Unocal United Utilities, Inc.
Fairbanks Natural Gas	Yukon Telephone

Call the following utilities and agencies directly: Merrill Field Airport (343-6303) for all work on Merrill Field Airport.

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

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

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

Payment will be made as follows:

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. R3(05/24/07)

When utility company facilities are not proposed for relocation, use locate information to determine the final location of construction elements such as excavation limits, pole locations and other underground activities to avoid conflict with existing utilities.

ALASKA COMMUNICATIONS SYSTEMS TELECOMMUNICATIONS (ACS): Alaska Communication Systems (ACS) owns and operates telecommunication facilities within the project area. The ACS contact for this project will be Kelly Ward at 564-1424. It is the Contractor's responsibility to coordinate directly with ACS if Kelly Ward is unavailable.

The existing ACS manhole duct system which parallels the Glenn Highway right of way from approximate sta. 108+90 Rt. to 152+35 Rt. will be relocated out of the proposed roadway to the Merrill Field Utility Easement. This includes new duct laterals to be installed at Mountain View/Airport Heights, Wrangell, Sitka and Concrete. Advance relocation has completed installation of the mainline duct system and installation of cable along the south side.

The following crossings will be installed under Item 685 Conduit Utility Crossings and will be completed in the following order:

- Underground crossing west of Airport Heights at station 151+77.

- Underground crossing east of Wrangell Street at station 135+50.
- Underground crossing east of Sitka Street at station 122+54.
- Underground crossing at Concrete Street at station 115+00.

At all these proposed crossings, ACS will install facilities north of the Glenn Highway ROW and the conduits from the south Utility Easement to the barrier on the north side of the Frontage Road in anticipation of the Contractor's road closure and trench excavation.

The cables must be pulled and splicing completed at each of these laterals prior to any of the existing system being retired and abandoned in place.

Allow ACS sixty (60) calendar days to complete placement of the conduit, cable installation and splicing. These days are contingent on placement of the required laterals listed above. Once the complete system is cutover, the existing underground system will be abandoned in place. The existing manholes shall be removed under Item 202(6).

ENSTAR NATURAL GAS COMPANY (ENSTAR): Enstar has distribution facilities within the Glenn Highway right of way. Some of these facilities are in conflict with the proposed road and pedestrian improvements. The contact for Enstar is Wade Ellis, 334-7744. It is the Contractor's responsibility to coordinate directly with Enstar if Wade Ellis is unavailable. The following are the facilities in conflict and the proposed relocations:

The following are the facilities in conflict and the proposed relocations:

- The existing steel gas main from station 107+15 Lt. to station 124+65 Rt., including the crossing at station 115+00 is in conflict with the proposed improvements and will be relocated.

- In addition, the existing steel main from station 134+50 Rt. to station 139+75 Rt., including the crossing at station 134+95 is in conflict with the proposed improvements and will also be relocated.

The relocation will consist of placement of a new plastic gas main in a joint trench with ACS between stations 108+90 Rt. and 134+95 Rt., with crossings at Airport Heights/ Mountain View Drive and at Concrete Street. Advance relocation has completed the installation along the south side.

The following crossings will be installed under Item 685 Conduit Utility Crossings and will be completed in the following order:

- Underground crossing west of Airport Heights at station 151+77.
- Underground crossing at Concrete Street at station 115+00.

The new gas pipe must be pulled and connected to the existing mains at each of these crossings prior to any of the existing pipe being retired and abandoned in place.

Allow Enstar twenty five (25) calendar days to complete pipe installation and cutovers. These days are contingent on placement of the required crossings listed above. Once these facilities have been installed Enstar will gas up the new main and cutover all the existing services to the new main and abandon the existing facilities in place.

When working near Enstar Natural Gas facilities, adhere to the requirements set forth in "Safety Requirements for Excavation Adjacent to Natural Gas Pipelines", attached to these specifications as an appendix.

MUNICIPAL LIGHT AND POWER (ML&P): ML&P owns and operates underground and overhead power lines for distribution within the project limits. The contact for ML&P is Lance Cluff, Design Engineer, Office Phone: 263-5244. It is the Contractor's responsibility to coordinate directly with ML&P if Lance Cluff is unavailable.

ML&P has underground and overhead facilities crossing the Glenn Highway. Lateral facilities that are in conflict will be replaced at the following locations.

- Underground crossing west of Airport Heights at station 151+77. ML&P will require fourteen (14) Calendar days to complete this work once the underground crossing is in place at this location.
- Underground crossing east of Sitka Street at station 122+54. ML&P will require three (3) Calendar days to complete this work once the CPEP is in place.
- Underground crossing at Concrete Street, station 115+00. ML&P will require fourteen (14) Calendar days to complete this work once the CPEP is in place.
- Underground crossing at station 106+26. ML&P will require fourteen (14) Calendar days to complete this work once the CPEP is in place.

The above crossings will be installed under Item 685 Conduit Utility Crossings and will be completed in the order above.

The cables will be pulled and splicing completed at each of these laterals prior to any of the existing system being retired and abandoned in place. The indicated calendar days are contingent on placement of the required laterals listed above. Once the complete system is cutover, the existing underground system will be abandoned in place and all above ground facilities removed.

Work required south of the Glenn Highway:

- Underground conduit installation at end of Reeve Cul-de-Sac to adjacent

transformer. ML&P will require two (2) Calendar days to complete this work.

- New transformer will be installed at approximate station 148+55, west of Airport Heights Road. ML&P will require four (4) Calendar days to complete this work.

**Provide ML&P a notice when the load centers have been completed, inspected and tagged by ADOL&WD for compliance, once approved the Utility will schedule the hook-ups and complete the work based on their current workload. Do not top soil and seed in these locations until the trenching for the new service conductors has been completed.

When working near ML&P facilities, adhere to the requirements of "Electrical Facility Clearance Requirements" attached to these specifications in an appendix.

MERRILL FIELD AIRPORT:

The Contractor shall coordinate all work immediately adjacent to and on airport property with the Merrill Field Airport Manager. Contact the Airport Manager at 343-6303. The Contractor shall give the work the constant attention necessary for its progress, and shall fully cooperate with the Engineer, Department staff, FAA, airport staff or their representatives in every way possible.

Within the limits and duration of the project, the Contractor shall provide a secure airport property at all times. As defined in this subsection, the term "secure" shall include, but not be limited to, continuous enclosed fencing, either existing, temporary, or final, at all time precluding unintentional access to airport property, the permanently installed sidewalk retaining wall/fence asssemblies, vinyl coated chain link fence and access gates as shown in the Plans. All retaining wall/fence assemblies, fencing and access gates shall be operational and maintained continuously by the Contractor.

In addition to security, providing for and managing access is essential to the airport and its operation during construction. The Contractor shall coordinate and cooperate in every way possible with airport staff regarding access and its management. The table below lists the access points directly impacted by the construction and the proposed action.

Gate No.	Existing Location (Station)	Gate (Type)	Gate Length (ft)	Proposed Action	Proposed Location
G1	112+63 +/-	Vehicle	16	Relocate	Sta 113+94 +/-
G2	112+78 +/-	Man	4	Salvage	Merrill Field Storage Facility
G3	113+97 +/-	Man	4	Salvage	Merrill Field Storage Facility
G4	120+52 +/-	Vehicle	16	Relocate	Sta 118+28 +/-
G5	124+17 +/-	Vehicle	16	Relocate	Sta 126+97 +/-
G6	129+24 +/-	Vehicle	16	Relocate	Sta 137+53 +/-
G7	134+67 +/-	Vehicle	16	Relocate	Sta 139+15 +/-
G8	136+94 +/-	Vehicle	16	Relocate	Sta 146+28 +/-
G9	139+08 +/-	Vehicle	16	Relocate	Sta 148+39 +/-
G10	140+67 +/-	Vehicle	16	Relocate	Sta 149+43 +/-
G11	142+25 +/-	Vehicle	16	Relocate	Sta 154+06 +/-
G12	143+44 +/-	Man	4	Salvage	Merrill Field Storage Facility
G13	143+52 +/-	Vehicle	16	Salvage	Merrill Field Storage Facility
G14	144+68 +/-	Vehicle	16	Salvage	Merrill Field Storage Facility
G15	145+72 +/-	Vehicle	16	Salvage	Merrill Field Storage Facility
G16	147+30 +/-	Man	4	Salvage	Merrill Field Storage Facility
G17	148+10 +/-	Vehicle	16	Salvage	Merrill Field Storage Facility
G18	151+77 +/-	Man	4	Salvage	Merrill Field Storage Facility

Gate relocation by the Contractor shall include, but not be limited to, the cantilever gate, gate posts, gate hardware, gate operator and command post and associated hardware as shown on the Plans or as directed by the Engineer. Subsidiary to each gate relocation is a new underground power supply to the new gate location and all associated trenching, gate, operator and command post foundations and the "Operational Acceptance Inspection".

The existing vehicle access gates shall remain operational until the relocated gates are permanently installed at the new locations.

If necessary, the existing or relocated gates can be operated in a manual mode until the operator and command post controls are relocated to the new gate location. Gates operating in manual mode shall be secured with a chain and combination pad lock, with the combination the same as the four digit access code that is specific to that gate. The maximum amount of time for a gate to operate in manual mode is 24 hours. Vehicle gates operating in manual mode must have a permanent, legible sign of commercial grade posted at each gate readable from 10 feet. Sign legend shall have the following text:

OPERATE GATE MANUALLY – OPEN PAD LOCK USING GATE CODE – PLEASE CLOSE AND LOCK AFTER USING

When the gate is ready to go back into service, the Contractor shall attend an "Operational Acceptance Inspection" with the Engineer and airport staff, or their representatives. The inspection shall be in accordance with Subsection 105.1-10, Inspection of Work.

While working adjacent to and on the Merrill Field Control Tower property, additional coordination and cooperation may be required with the Federal Aviation Administration (FAA). Contact the Tower Manager at 271-2698.

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

1. Glenn Highway - Bragaw Street Interchange
   ADOT&PF Project #56559
   ADOT&PF Project Manager – Sean Holland, phone 269-0670
   ADOT&PF Resident Engineer – Brian Shumacher, phone 269-0450
   Prime Contractor – Wilder Construction, phone 344-2593

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. (02/01/00)R175M98

Standard Modification

105-1.13 MAINTENANCE DURING CONSTRUCTION. Add the following: Inspect and clean storm drain sumps and petroleum manholes during the construction season and before winter shutdowns. This inspection and maintenance of storm drain system shall not be paid for directly but shall be subsidiary to work paid under Sections 603 and 604. (02/01/00)R4M98

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)

105-1.16 FINAL ACCEPTANCE AND RECORD RETENTION. Modify the first paragraph, Item 4., after: "DOLWD" add: and State Department of Revenue. E19(6/30/04)

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. R93(03/21/01)

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

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

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

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

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

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

Take whatever steps are necessary to ensure that manufacturing processes for each covered product comply with this provision. Non-conforming products shall be replaced at no expense to the State. Failure to comply may also subject the Contractor to default and/or debarment. False statements may result in criminal penalties prescribed under Title 18 US Code Section 1001 and 1020. R13(02/07/05)

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)

Add the following new subsection:

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. In addition, for all 607(15) Remove and Relocate Automatic Drive Gate gates under Section 607 Fences, the Contractor shall submit all gate components or replacement parts to the Merrill Field Airport Manager for review and approval.

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. Alaska Department of Environmental Conservation (ADEC), Division of Water-Storm Water Disposal Non-Objection Letter dated September 5, 2007.

2. Municipality of Anchorage (MOA), Department of Health and Human Services (DHHS), Food Safety and Sanitation Noise Permit issued August 28, 2007. This permit is valid from May 1, 2008 through October 30, 2008.

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 nonmunicipal 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. R7M98(05/29/02)

Add the following new subsection:

107-1.21 FEDERAL AFFIRMATIVE ACTION. The Federal Equal Employment Opportunity, Disadvantaged Business Enterprise, and On-the-Job Training affirmative action

program requirements that are applicable to this Contract are contained in the project Special Provisions and Contract Forms, and may include:

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

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

SECTION 108
PROSECUTION AND PROGRESS

Standard Modification

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

The Contractor shall submit a Contractor Self Certification for Subcontractors and Lower Tier Subcontractors, Form 25D-042, before the Contractor or any subcontractor sublets, sells, transfers, assigns, or otherwise disposes of the Contract or any portion of the Contract. The Department has authority to review 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.

Delete paragraph four and replace with the following:

1. The Contractor shall ensure that for all subcontracts (agreements):

   a. The Department is furnished with one completed Contractor Self certification, Form 25D-042, for each subcontract;

   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 as per Subsection 107-1.04 and file certified payrolls with the Engineer and DOLWD for all 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.
   E57(10/15/07)

Special Provisions

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

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

1. A Critical Path Method (CPM) Schedule is required, in a format acceptable to the Engineer, showing the order the work will be carried out and the contemplated dates the Contractor and subcontractors will start and finish each of the salient features of the work, including scheduled periods of shutdown. Indicate anticipated periods of multiple shift work in the CPM Schedule. Revise to the proposed CPM Schedule promptly. Promptly submit a revised CPM Schedule if there are substantial changes to the schedule, or upon request of the Engineer. R261M98(12/13/02)

Alaska Department of Transportation & Public Facilities

Contractor Self Certification for Subcontractors and Lower Tier Subcontractors (Form 25D-042)

Project Name:

Project Number:	**Federal-Aid Number:**

Submission Number:

Subcontractor or Lower Tier Subcontractor:

Contractor Certification

Agreement as included herein refers to the legally binding written contract between the Contractor and Subcontractor or between the Subcontractor and Lower Tier Subcontractor and identified in items 1 or 2 below.

1. ☐ A written agreement has been executed between Contractor and the above listed subcontractor.
2. ☐ A written Agreement has been executed between (Subcontractor) and the above listed Lower Tier Subcontractor

- All Subcontractors are qualified to perform the work.
- All Subcontractors have adequate insurance as required by the Contract, or the Contractor has adequate insurance for the Subcontractor(s) as required by the contract.
- All subcontractors are included on the Bidder's Registration List.
- The "Prompt Payment" clauses (AS 36.90.210) are included in the Agreement language.
- All requirements and pertinent provisions of the Contract , including but not limited to; Form 25D-55, Required Contract Provisions for Federal Aid Construction Contracts, DBE provisions, and minimum wage rates, are included in the agreement.
- All agreements with Subcontractors and with Lower Tier Subcontractors will be in continued compliance with all provisions of the Contract.
- The Contractor remains responsible for all quality control and proper performance of all requirements of the Contract.
- The Contractor will continue to perform at least thirty percent (30%) of the Contract work with his own organization.
- This Contractor Self Certification does not relieve the Contractor and his surety, or either the Contractor or surety from any liability or responsibility under the Contract.
- The Contractor certifies firms or individuals debarred or suspended by the Department, FAA, or FHWA are not employed or subcontracted under this construction project.

Total Agreement Amount:

Total Agreement Amount is % of the Total Contract Award Amount.

Total cumulative subcontracts (including this Agreement) are % of the Total Contract Award Amount.

Subcontractor or Lower Tier Subcontractor

Federal I.D. No. (if no Federal I.D. No., use owner SSN):
Business License Number:
Contractor's License Number:
Electrical/Mechanical Administrator's License Number (if applicable):
Surveyor's License Number (if applicable):
Phone Number:
Address:
City: State:
Estimated Starting Date:

Department's Request for Information – If the Department at any time makes written request for the Agreement, licenses, proof of insurance, or any other information relating to the certifications contained herein, the Contractor will deliver an executed copy of the Agreement and /or other requested information to the Department within five calendar days. If the Contractor fails to provide the requested information within five calendar days, or if the Contractor fails to include required language and conditions in the Agreement, the Department may suspend all work relating to the Agreement. The Contractor shall not be due any additional compensation or contract time if the Department suspends work due to the Contractor's failure to provide requested information or failure to include required language and conditions in the Agreement.

False Statement or Omission – If a false statement or omission is made in connection with this Contractor Self Certification the Contractor will be excluded from participating in the self-certification process for the remainder of this Contract and for the following construction season. Contractors excluded from the self-certification process will be required to submit all necessary information for the Department's approval of proposed Subcontractors or Lower Tier Subcontractors.

Any false statement or omission made in connection with this Contractor Self Certification may be cause for suspension, a determination of non-responsibility on future bids, and may be cause for revocation of award, default, or debarment. The person or entity making the false statement or omission is subject to any and all civil and criminal penalties available pursuant to applicable state and federal law.

I certify the above information and statements are true, correct, and complete.

Contractor:

By: _____ **Date:**

Title:

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

5. Interim Completion. The Contractor shall provide three unimpeded through lanes of travel in each direction between Karluk Street and Airport Heights/Mt View Drive before September 15, 2008. Provide at least the first lift of asphalt pavement for the six lanes, with temporary striping in accordance with subsections 643-2.01, 8 and 643-3.09, *Interim Pavement Markings*. Median curbing shall be in place. Necessary regulatory signing, either final or temporary, must also be placed. Drainage shall be functional (outside curbs, gutters and inlets shall be working), and manhole (and other) lids in the roadway shall be adjusted flush with the interim surface. Additionally, either the permanent or temporary span-wire signals at the three intersections shall be operating. The new continuous lighting does not have to be operational at that time, however, pre-construction lighting levels shall be maintained throught winter shut-down. The sidewalks do not all have to be completed, but a continuous accessible route needs to be identified (eg, southside from Karluk Street to Concrete Street, and northside from Concrete Street to Mt View Drive). If on first lift paving, asphalt wedgies shall be placed at all pedestrian curb ramps.

Failure to achieve this prior to September 15, 2008, will result in the assessment of liquidated damages set at 70 percent of the daily charge amount shown on Table 108-1, *Daily Charge for Liquidated Damages for Each Calendar Day of Delay*, for each day between this date and until this work is completed.

SECTION 109
MEASUREMENT AND PAYMENT

Special Provisions

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

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

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, Final Acceptance and Record Retention.
E11(6/30/04)

Add the following new Section:

SECTION 120
DISADVANTAGED BUSINESS ENTERPRISE (DBE) PROGRAM

Special Provisions

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

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

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

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

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

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

performance of the work. Other relevant factors will be considered. The determination of CUF is made by the Engineer after evaluating the way in which the work was performed during the execution of the Contract.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

120-3.01 DETERMINATION OF COMPLIANCE

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

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

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

      1) A description of the work that each DBE will perform;
      2) The dollar amount of participation by the DBE firm;

3) Written documentation of the bidder/offeror's commitment to use a DBE subcontractor whose participation it submits to meet a contract goal; and
4) Written confirmation from the DBE that it is participating in the Contract as provided in the prime Contractor's commitment.

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

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

3. Phase III - Construction.

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

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

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

1) The Contractor has not committed any discriminatory practice in its exercise of good business judgment to replace a DBE.
2) If the Contractor is unable to find replacement DBE participation and has adequately performed and documented the Good Faith Effort expended in accordance with subsection 120-3.02.

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

120-3.02 GOOD FAITH EFFORT

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

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

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

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

   c. Notification to all active DBEs listed for a given region in the Department's most current DBE Directory at least 7 calendar days prior to bid opening. The bidder must give the DBEs no less than 5 days to respond. The bidder may reject DBE quotes received after the deadline. Such a deadline for bid submission by DBEs will be consistently applied. DBEs certified to perform work items identified on Form 25A324 must be contacted to solicit their interest in participating in the execution of work with the Contractor. Each contact with a DBE firm will be logged on a Contact Report (Form 25A321A).

   d. Non-competitive DBE quotes may be rejected by the bidder. Allegations of non-competitive DBE quotes must be documented and verifiable. A DBE quote that is more than 10 percent higher than the accepted non-DBE quote will be deemed non-competitive, provided the DBE and non-DBE subcontractor quotes are for the exact same work or service. Bidders must have a non-DBE subcontractor quote for comparison purposes. Such evidence shall be provided in support of the bidder's allegation. Where the bidder rejects a DBE quote as being non-competitive under this condition, the work must be performed by the non-DBE subcontractor and payments received by the non-DBE subcontractor during the execution of the Contract shall be consistent with the non-DBE's accepted quote. This does not preclude increases as a result of Change documents issued by the Department.

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

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

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

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

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

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

a. The decision on reconsideration will be made by the DBE Liaison Officer.

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

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

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

120-3.03 COMMERCIALLY USEFUL FUNCTION (CUF)

1. **Creditable Work**. Measurement of attainment of the DBE Utilization Goal will be based upon the actual amount of money received by the DBEs for creditable CUF work on this project as determined by the Engineer in accordance with this Section. CUF is limited to that of a:

   a. regular dealer;
   b. manufacturer;
   c. broker;
   d. subcontractor;
   e. joint-venture; or
   f. prime contractor.

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

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

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

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

      1) the Engineer's approval of the DBE subcontract, consistent with the written DBE commitment; and
      2) the issuance of a purchase order or service agreement by the Contractor to a DBE performing as either a manufacturer, regular dealer, or broker (with a copy to the Engineer).

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

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

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

1) The work performed will be necessary and useful work required for the execution of the Contract.
2) The scope of work will be distinct and identifiable with specific contract items of work, bonding, or insurance requirements.
3) The work will be performed, controlled, managed, and supervised by employees normally employed by and under the control of the certified DBE. The work will be performed with the DBE's own equipment. Either the DBE owner or DBE key employee will be at the work site and responsible for the work.
4) The manner in which the work is sublet or performed will conform to standard, statewide industry practice within Alaska, as determined by the Department. The work or provision of goods or services will have a market outside of the DBE program (must also be performed by non-DBE firms within the Alaskan construction industry). Otherwise, the work or service will be deemed an unnecessary step in the contracting or purchasing process and no DBE credit will be allowed.

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

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

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

6) Subcontract work, with the exception of truck hauling, will be sublet by the same unit of measure as is contained in the Bid Schedule unless prior written approval of the Engineer is obtained.

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

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

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

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

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

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

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

4. **DBE Rebuttal of a Finding of No CUF.** Consistent with the provisions of 49 CFR, Part 26.55(c)(4)&(5), before the Engineer makes a final finding that no CUF has been

performed by a DBE firm the Engineer will coordinate notification of the presumptive finding through the Civil Rights Office to the Contractor, who will notify the DBE firm.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

If the Contractor fails to utilize the DBEs listed on Form 25A325C as scheduled or fails to submit required documentation to verify proof of payment or documentation requested by the Department to help in the determination of CUF, the Department will consider this to be unsatisfactory work. If the Contractor fails to utilize Good Faith Efforts to replace a DBE, regardless of fault (except for subsection 120-3.04 item 3), the Department will also consider this unsatisfactory work. Unsatisfactory work may result in disqualification of the Contractor from future bidding under subsection 102-1.13 and withholding of progress payments consistent with subsection 109-1.06. S33 (11/17/00)

SECTION 202
REMOVAL OF STRUCTURES AND OBSTRUCTIONS

Special Provisions

202-1.01 DESCRIPTION. Add the following: This work shall also include the removal of gas pipe, removal of storage tanks (either fuel or septic), and the abandonment of ground water wells.

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

202-3.01 GENERAL. Add the following: The removal of buildings, foundations, and structures shall include removal of utility lines, sidewalks, existing lighting, and other attached appurtenances.

Cut the ends of retaining walls to remain after partial removal neat and true with no shatter outside the removal area.

Remove septic or fuel tanks according to the Department of Environmental Conservation (DEC) regulations. Remove or abandon wells according to DEC regulations.

Removal of the existing buildings shall include removal of all existing structures located within the building parcel as shown on the Plans.

The Contractor shall not remove the Stoddard's building until after January 1, 2009. The Stoddard's building being removed on this contract has been found to contain asbestos. The Contractor shall dispose of any and all hazardous materials in accordance with the Department of Environmental Conservation (DEC) regulations and requirements.

Twenty days prior to building removal, the Contractor shall notify the Jeff Dobson (267-5066) of the Anchorage Fire Department that the buildings are about to be demolished and are available for Fire Department Training exercises. The Contractor shall make the buildings available for the twenty day period.

Carefully salvage fences designated by the Engineer to the limits shown on the Plans. Materials belong to the Merrill Field Airport. Dispose of all fence posts at the Contractor's expense. Salvage fencing and then roll, stack on pallets and deliver to the Merrill Field storage facility. Delivery of salvaged materials must be coordinated with Merrill Field Airport before the actual delivery to the storage facility can take place. Use salvaged fencing to fill possible fencing gaps as needed. Use salvaged fencing according to Section 607 for reconstructed fences.

202-3.04 REMOVAL OF PIPE. Delete "Culvert" from the first sentence.

202-3.05 REMOVAL OF PAVEMENT, SIDEWALKS, AND CURBS. Add the following: Pavement removed becomes the property of the Contractor. 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. R84USC(03/29/01)

Add the following new subsections:

202-3.06 REMOVAL OF JERSEY BARRIER WALL. Remove and dispose of the concrete barrier wall shown on the Plans, including concrete, timber, planter boxes not specifically called out under Subsection 202-3.10, Removal and Relocation of Planter Boxes, and reinforcing steel as directed by the Engineer.

202-3.07 ABANDON STORMDRAIN MANHOLE. Do not abandon storm drain manholes until the new storm drain system is in operation or suitable arrangements have been made for the diversion, interruption, or a temporary system has been installed.

Excavate to the bottom of the top cone on each manhole or to a depth of 36 inches, if no cone exists. Remove and dispose of the top cone and fill in and around the remaining structure with suitable material as directed by the Engineer. Once the manhole has been filled, place further material according to subsection 203-304, Compaction With Moisture and Density Control.

Support and protect existing conduits or utilities which are not scheduled for removal or abandonment when encountered in the excavation.

202-3.08 PAVEMENT PLANING. Remove existing asphalt concrete pavement by cold planing to the depths designated below the final finished elevations 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 State maintenance yard located at 5300 E. Tudor. Coordinate with Tom Gruman maintenance chief (338-1432) for acceptance of material and desired location of stockpile. Planed material not acceptable to the maintenance chief will be disposed of in an acceptable manner or incorporated into the road structural prism as directed by the Engineer. Disposal areas shall be outside the project limits and according to 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. (02/28/01)R143USC

202-3.09 REMOVAL OF ACS MANHOLE. Do not abandon ACS manholes until the new ACS utility duct is in operation. Coordinate with ACS and the Engineer on the timing and removal of the existing ACS manholes.

Excavate to the bottom of each manhole and remove and dispose of all concrete, steel, manhole lids, wiring and any other appurtenances located within the manhole. Cut any existing ducting from the outer edge of each manhole and abandon remaining duct lines in place. Fill in the remaining hole with suitable fill material approved by the Engineer to the bottom of the pavement structural section or as directed by the Engineer. Once the remaining hole has been filled, place further material according to subsection 203-3.04.

Support and protect existing conduits or utilities, which are not scheduled for removal or abandonment, when encountered in the excavation.

202-3.10 REMOVAL AND RELOCATION OF PLANTER BOXES. Remove and relocate existing planter boxes as shown on the Plans or as directed by the Engineer. Ensure planter boxes are not damaged during the removal or relocation operation.

202-5.01 BASIS OF PAYMENT. 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 202-3.08.

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)R143USC

Item 202(45). At the Contract unit price for the actual length of pipe removed. Payment includes full compensation for all labor, materials and equipment to remove and dispose of all pipe as shown on the Plans or as directed by the Engineer.

Item 202(46). At the Contract unit price for each ACS manhole removed. Payment includes full compensation for all labor, materials and equipment required to remove and dispose each of the ACS manholes as shown on the Plans or as directed by the Engineer.

Item 202(47). At the Contract unit price for the actual length of fence taken down rolled, stacked on pallets, and delivered to the Merrill Field Storage Facility, regardless of the type or height. Payment includes full compensation for labor and materials required to perform this work.

Item 202(48). At the Contract unit price for actual length of jersey barrier wall removed. Payment includes full compensation for labor, materials, and equipment required to remove and dispose of the wall as shown in the Plans.

Item 202(49). At the Contract unit price for each abandoned manhole, regardless of size. Payment includes full compensation for labor, materials, and equipment required to abandon storm drain manholes as shown in the Plans.

Item 202(50). At the Contract unit price specified per each relocated planter box regardless of size. Payment is full compensation for labor, materials and equipment required to remove and relocate planter boxes as shown in the Plans.

Payment will be made under:

Pay Item Number	Pay Item	Pay Unit
202(15)	Pavement Planing	Square Yard
202(45)	Removal of Pipe	Linear Foot
202(46)	Removal of ACS Manhole	Each
202(47)	Salvage Fence	Linear Foot
202(48)	Removal of Jersey Barrier Wall	Linear Foot
202(49)	Abandon Storm Drain Manhole	Each
202(50)	Removal and Relocation of Planter Boxes	Each

SECTION 301
AGGREGATE BASE AND SURFACE COURSE

Special Provisions

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

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

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

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

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

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. R26(09/01/89)

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

1. Density acceptance will be based determined by control strip method ATM 412. Use a test strip with a vibratory compactor with a minimum dynamic force of 40,000 pounds. The optimum density will be determined by the Engineer using a nuclear densometer gauge to monitor the test strip. Adequate water shall be added to aid compaction.

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

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

SECTION 306
ASPHALT TREATED BASE COURSE

Special Provisions

306-2.01 MATERIALS. Delete items 1 and 2 and replace with the following.

1. Aggregate. Conform to subsection 703-2.04.

2. Asphalt. The total residual asphalt cement may be a combination of PG 52-28 and the asphalt binder in the existing asphalt or only PG 52-28. Documentation and conformance is only required for PG 52-28. The Engineer may conditionally accept asphalt cement at the source. Provide a manufacture's certificate of compliance, according to subsection 106-1.05, and test results of applicable quality requirements of Section 702 before shipping the material.

Add the following:

4. Recycled Asphalt Pavement (RAP). Process existing pavement removed under subsection 202-3.05 so material passes the 1-½ inch sieve. Stockpile the material separately from the crushed aggregates for pavement aggregates. Perform one gradation and one asphalt content test for every 1000 tons of RAP or a minimum of 10 sets of tests which ever is greater.

CONSTRUCTION REQUIREMENTS

306-3.01 COMPOSITION OF MIXES. Replace this subsection with the following: If recycled materials are used, submit process control data of the RAP and of the asphalt concrete aggregates supporting proposed job mix design gradations.

At least 15 calendar days before the production, submit the following to the Engineer:

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 control information, and the blend ratio of each aggregate stockpile and RAP. The proposed gradation of the virgin aggregate must meet the requirements of Table 703-3, Type II. Submit gradation and asphalt content process control data of RAP for the Job Mix Design.

2. Provide representative samples of each of the aggregates in the blend. Sample sizes: 45 kilograms of each intermediate and/or coarse aggregate, 200 lbs. of fine aggregate, 25 lbs. of blend sand, and 200 lbs. of RAP.

3. A minimum of three 1 gallon samples of asphalt cement proposed for use in the mixture, including the name of the product, the manufacturer, test results as required in Section 702, manufacturer's certificate of compliance according to Section 106, and a temperature viscosity curve for the asphalt cement.

4. A 0.5 pint sample of the anti strip additive proposed, including the name of product, manufacturer, and manufacturer's data sheet, and current Materials Safety Data Sheet (MSDS).

From this information, the Engineer will establish the Job Mix Design using ATM T-417, which will become a part of the Contract. The Job Mix Design shall meet the requirements of Type II, Class B in Table 401-1, Asphalt Concrete Mix Design Requirements, except Voids in Mineral Aggregate (VMA) and Dust/Asphalt ratio specifications do not apply. RAP may be used in the mixture. The design minimum residual asphalt content (RAP residual plus PG 52-28) is 5 percent by weight of total mix and with 1/4 percent antistrip by weight of PG 52-28. The Job Mix Design will specify the design aggregate gradation, gradation of virgin aggregate blend, percent of residual asphalt cement, percentage of RAP, and mixing and compaction temperature ranges.

Submit changes in the Job Mix design warranted by changes in the source of asphalt cement, the source of aggregates, aggregate quality, aggregate gradations, or blend ratios, in the same manner as the original submittal. A new Job Mix Design will only apply to asphalt concrete mixture produced after submitting the new aggregate gradation.

Approved Job Mix Designs will have the full tolerances shown in Table 401-2 applied and will not be limited to the broad band listed in Table 703-3.

306-3.02 WEATHER LIMITATIONS. Delete the requirements of this subsection and substitute the following: Apply the requirements of subsection 401-3.01.

306-3.03 STOCKPILING. Delete this subsection in its entirety.

306-3.04 EQUIPMENT. Add the following: Apply the requirements of subsection 401-3.02 to equipment.

Add the following to item 1.:

1. If recycled materials are used, the asphalt plant shall combine RAP with asphalt concrete aggregates to produce a hot recycled asphalt treated base mixture.

Delete subsections 306-3.05 and 306-3.06 and substitute the requirements of subsections 401-3.08 and 401-3.09.

Delete subsections 306-3.08 and 306-3.09 and substitute the requirements of subsections 401-3.12 and 401-3.13.

Apply the requirements of subsections 401-3.07, 401-3.10, and 401-3.11.

Add the following subsection:

306-3.12 PATCHING DEFECTIVE AREAS. Remove ATB that becomes contaminated with foreign material, is segregated, or is determined to be defective. Do not skin patch. Remove defective materials 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 conforming to Section 402 and allow to cure. Place and compact fresh ATB to grade and smoothness requirements. (02/05/03)R226M98

Standard Modification

306-4.01 METHOD OF MEASUREMENT. In the second paragraph, change "Asphalt material" to "Asphalt cement". (06/25/99)M72

Special Provisions

306-4.01 METHOD OF MEASUREMENT. Change the third paragraph to read:

Antistrip additive. Will not be measured for payment, the cost of the antistrip additive will be subsidiary to Item 306(2).

306-4.02 ACCEPTANCE SAMPLING AND TESTING. The Department has the exclusive right and responsibility for determining the acceptability of materials incorporated into the project. The Engineer will perform acceptance sampling and testing. The Engineer will make the results of the acceptance testing available to the Contractor within seven working days from the date of sampling. Sample the blended virgin aggregate at the cold feed. The Contractor may select the sample location of mix to determine the asphalt content. Within 24 hours of final rolling, cut one 6 inches diameter core, full depth, from the finished mat to determine density according to WAQTC FOP for AASHTO T166/T275. Neatly cut the sample using a core drill at the randomly selected location marked by the Engineer. Use a core extractor to prevent damage to the core. Do not cut a sample over a bridge deck.

Apply Tolerances shown in Table 401-2 to test results to determine compliance with mix design.

The Engineer will test for density, gradation, and asphalt content as specified in subsection 401-4.02; however, the price adjustments of Section 401 will not apply. (02/05/03)R226M98

Standard Modification

306-5.01 BASIS OF PAYMENT. In the Pay Item table, change "Asphalt Material" to "Asphalt Cement". (06/25/99)M72

306-5.01 BASIS OF PAYMENT. Add the following: Antistrip shall not be paid separately but shall be subsidiary to and included in the **Item 306 (1)** Asphalt Treated Base. If the Mix Design requires more than 5% asphalt cement, only the quantity in excess of 5% shall be paid for at the Contract unit price for **Item 401(2) Asphalt Cement, PG 52-28 or Item 409 (2) Asphalt Cement, PG 64-34**.

Patching defective areas shall be subsidiary to Item 306(1). (02/05/03)R226M98

Replace Section 401 with the following:

SECTION 401
HOT MIX ASPHALT AND SURFACE TREATMENTS

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

MATERIALS

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

TABLE 401-1
HOT MIX ASPHALT DESIGN REQUIREMENTS

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

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

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

Target values for gradation in the Job Mix Design must be within the broad band limits shown in Table 703-3, for the type of hot mix asphalt specified. For acceptance testing, hot mix asphalt concrete mixture will have the full tolerances in Table 401-2 applied. Except the tolerances for the No. 200 sieve, the tolerance limits will apply even if they fall outside the broad band limits shown in Table 703-3. The tolerance limits for the No. 200 sieve will be confined by the broad band shown in Table 703-3. Tolerance limits will not be applied to the largest sieve specified.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Furnish the following documents at delivery:

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

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

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

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

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

CONSTRUCTION REQUIREMENTS

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

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

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

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

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

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

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

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

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

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

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

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

The following specific requirements apply to the identified bituminous pavers:

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

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

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

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

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

Preparation of a milled surface,

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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.

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

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

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

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

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

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

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

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

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

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

2. Aggregate Gradation.

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

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

3. Density. Cut full depth core samples from the finished hot mix asphalt within 24 hours after final rolling. Neatly cut one 6 inch diameter core sample with a core drill at each location marked by the Engineer. Use a core extractor to prevent damage to the core. The Engineer will determine the density of the core samples 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 in accordance with this subsection. Quantities of asphalt cement less than 85 tons will be accepted based on manufacturer's certified test reports and certification of compliance.

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

   The total asphalt cement price adjustment is the sum of the individual lot price adjustments and will be subtracted under Item 401(6) Asphalt Price Adjustment - 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	Type II	Type III
	Factor "f"	Factor "f"	Factor "f"
1 inch sieve	4		
3/4 inch sieve	4	4	
1/2 inch sieve	4	5	4
3/8 inch sieve	4	5	5
No. 4 sieve	4	4	5
No. 8 sieve	4	4	5
No. 16 sieve	4	4	5
No. 30 sieve	4	5	6
No. 50 sieve	4	5	6
No. 100 sieve	4	4	4
No. 200 sieve	20	20	20
Asphalt Cement Content, %	40	40	40

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

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

* CPF or DPF, whichever is lower.

PAB = Price Adjustment Base = $52.75 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 - Quality.

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	<0.50
Toughness	>110 in-lbs	>93.5	90.0-93.4	85.0-89.9	80.0-84.9	75.0-79.9	70.0-74.9			<70.0
Tenacity	>75 in-lbs	>63.8	61.0-63.7	58.0-60.9	55.0-57.9	52.0-54.9	48.0-51.9			<48.0
Tests On RTFO										
Mass Loss	<1.00 %	<1.00		1.001-1.092				1.093-1.184	1.185-1.276	>1.276
Dynamic Shear	>2.20 kPa	>2.20		1.816-2.199				1.432-1.815	1.048-1.431	<1.048
Test On PAV										
Dynamic Shear	<5000 kPa	<5000		5001-5289				5290-5578	5579-5867	>5867
Creep Stiffness, S	<300 MPa	<300		301-338				339-388	389-450	>450
Creep Stiffness, m-value	>0.300	>0.300		0.287-0.299				0.274-0.286	0.261-0.273	<0.261
Direct Tension	>1.0 %	>1.0		0.86-0.99				0.71-0.85	0.56-0.70	<0.56

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

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

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

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

EVALUATION OF PAVEMENT SMOOTHNESS. (Note to the Designer, delete this portion of the specifications on projects that are remote, low volume, gravel to pave, and ownership transfers, also in 401-3.15)

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

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

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

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

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 - Quality.
   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 - Quality.

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

401-4.04 ASPHALT MATERIAL PRICE ADUSTMENT – UNIT PRICE. This subsection provides a price adjustment for asphalt material by:

(a) additional compensation to the Contractor or
(b) a deduction from the Contract amount.

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

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

3. The asphalt material price adjustment will only apply when:
   a. There is more than 500 tons of asphalt material in the bid schedule of Sections described in Item 1; and
   b. There is more than a 7.5% increase or decrease in the Alaska Asphalt Material Price Index, from the date of bid opening to the date the asphalt material is incorporated into the project.

4. As used in this subsection, the Alaska asphalt material price index is calculated bimonthly on the first and third Friday of each month, and will remain in effect from the day of calculation until the next bimonthly calculation. The Alaska asphalt material price index is posted on the Department's Statewide Materials website, and calculated according to the formula posted there.

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

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

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

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

Where:

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

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

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

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. Asphalt cement, anti-strip additives for temporary paving, or for hot mix asphalt for leveling course is subsidiary to item 401(1A).

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

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

Price adjustments will not apply to:

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

Payment for furnishing and installing joint adhesive will be paid as 401(9) Longitudinal Joint Adhesive and Sealing.

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 - Quality.

The Engineer will assess a fee of $2,500.00 under Item 401(6) Asphalt Price Adjustment - Quality, 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(1A)	Hot Mix Asphalt, Type II; Class A	Ton
401(2)	Asphalt Cement, Grade PG 52-28	Ton
401(6)	Asphalt Price Adjustment - Quality	Contingent Sum
401(9)	Longitudinal Joint Adhesive and Sealing	Linear Foot
401(10)	Asphalt Material Price Adjustment – Unit Price	Contingent Sum

R199USC04(05/01/07)

Special Provisions

402-5.01 BASIS OF PAYMENT. Delete the pay item and replace with the following:

Payment for Tack Coat shall be subsidiary to Section 401, Asphalt Concrete Pavement.

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 on an approved surface, to the lines, grades, and depths shown on the Plans.

MATERIALS

409-2.01 COMPOSITION OF MIXTURE - JOB MIX DESIGN. Meet the requirements of Table 409-1 for the Job Mix Design performed according to ATM 417 and the rut test according to ATM 419.

TABLE 409-1
HMA DESIGN REQUIREMENTS

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.	18.0
Asphalt Content, Min. %	6.0
Dust – Asphalt ratio *	0.6 – 1.2
Rut Index, mm	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 hot mix asphalt specified but asphalt concrete mixture will have the full tolerances in Table 409-2 applied for evaluation according to 409-4.03 except the tolerances for the largest sieve specified will be plus 0% and minus 1%, and the #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 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 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 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.

5. Samples of 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.

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 3 stockpiles for crushed HMA aggregate (coarse, intermediate, and fine). Place blend material in a separate pile.

Conform to subsection 703-2.04

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 in before 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 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 CRUMB RUBBER. Produce the crumb rubber from ambient ground whole passenger or truck tires (do not use heavy equipment tires). The ground rubber shall be free of wire and cord, free flowing (moisture content as specified). Calcium carbonate or talc (meeting ASTM M 17) may be added, up to a maximum of 4% by weigh, to maintain the free flowing condition of the rubber. Add crumb rubber into the hot aggregate during the mixing process in the asphalt plant. The crumb rubber supplier shall provide certification listing test results of the gradation and chemical properties.

Provide crumb rubber conforming to the following gradation requirements determined according to 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 determined by ASTM 297 shall conform to the following:

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% to 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 the Contractor's right to a retest under subsection 409-4.02.

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

CONSTRUCTION REQUIREMENTS

409-3.01 WEATHER LIMITATIONS. Place the HMA on a dry surface not 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 on surface that has a temperature less than 50° F.

409-3.02 EQUIPMENT, GENERAL. Use equipment in good working order and free of HMA buildup. Make 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 measure and 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 asphalt concrete mixture 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 that would fall on the pavement of the haul route.
- Daily inspect and clean the pavement surface of the haul route of any 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 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 HMA when that mix is carried from the paver hopper back to the paver augers. The paver manufacture shall approve the means and methods used and may consist of chain curtains, deflector plates, or other devices and any combination of these.

The following specific requirements apply to the identified bituminous pavers:

(1) Blaw-Knox bituminous pavers 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 equipped with deflector plates as identified in the December 2000 Service Magazine – entitled: New Asphalt Deflector Kit {6630, 6631, 6640}.

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 the means and methods used to prevent paver segregation before it is used to place 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 both steel-wheel (static or vibratory) rollers, pneumatic rollers are not recommended. Operate rollers according to manufacturer's instructions with drive drum towards the paver. Avoid crushing or fracturing of aggregate. Use rollers designed to compact HMA mixtures 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 to conform to the Plans and Specifications. Before applying tack coat to the existing surface, clean out loose material from cracks in existing pavement wider than 1 inch in width full depth then fill using asphalt concrete tamp in place. Clean, wash, and sweep existing paved surfaces of loose material.

Preparation of a milled surface,

- Prelevel remaining ruts, pavement delaminations, or depressions having a depth greater than ½-inch with HMA, Type IV or as approved by the Engineer. 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 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.

Before 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 emulsion tack coat to break before placement of asphalt concrete mixture 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 324.

Heat the aggregate for the HMA to a 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 according to subsection 105-1.11.

409-3.10 MIXING. Combine the aggregate, asphalt cement, 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. For drum plants, add crumb rubber through the RAP collar.

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, and 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 3 inches. Layout the paving widths so that no longitudinal joints are in the driving lanes.

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.

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 manufacturer's specifications.

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 laydown procedures to correct 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 asphalt concrete pavement, 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.

Perform acceptance testing for density 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 pavement that has not cooled sufficiently to prevent indentation.

After compaction, the Engineer may require an application of saturated solution of the hydrated lime mixed with water to the surface of the pavement before allowing traffic on it if the pavement surface adheres to vehicle tires.

409-3.14 JOINTS. Minimize the number of joints to ensure a continuous bond, texture, and smoothness between adjacent sections of the pavement. Do not construct longitudinal joints in the driving lanes.

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 surface 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 according to WAQTC FOP for AASHTO T 166/T 275.

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

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 measured lanes, calculated to the nearest 0.1 inch.

409-3.16 PATCHING DEFECTIVE AREAS. Remove HMA that becomes contaminated with foreign material, is segregated, or is determined to be defective. Do not skin patch. Remove defective materials 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 tack to cure. Place and compact fresh HMA according to subsection 409-3.13 to grade and smoothness requirements.

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. Use this procedure on projects where deliveries are made in tankers and the asphalt plant has one asphalt tank dedicated only to the project.

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 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. Hot mix asphalt quantities of less than 300 tons remaining after dividing the lot 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 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 hot mix asphalt to the specified depth and finished surface requirements and tolerances. Remove and replace any HMA that does not conform to the approved JMD.

An area of finished surfacing that is visibly segregated, fails to meet surface tolerance requirements is considered unacceptable according to subsection 105-1.11.

1. Asphalt Cement. 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 before 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 / rubber content determine according to ATM 405 or WAQTC FOP for AASHTO T 308. The average of two tests from the same sample will be used to compute result.

2. Asphalt Cement Quality. 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 according to WAQTC FOP for AASHTO T 40 and tested to conform 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. Determine the gradation 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. The average of two tests from the same sample will be used to compute result.

4. 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 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 HMA within 24 hours.

5. 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, 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 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 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 test results are within specification limits, payment will be made for the mixture. If a 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. 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 a sieve size on a gradation test or the asphalt cement content is an outlier, then the gradation test results and the asphalt cement content results for that sublot will not be included in the price adjustment. The density test result for that sublot will be included in the price adjustment provided it is not an outlier.

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

Quality Level Analysis. Pay factors are computed as follows:

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

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

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

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

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

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

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

The sample standard deviation (s) is rounded to the nearest hundredth for density and sieve sizes except the No. 200 sieve. The sample standard deviation (s) is rounded to the nearest 0.001 for asphalt cement / 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 sieves except the No. 200. Use s = 0.020 for asphalt cement / 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-5.0	TV+5.0
No. 16 sieve	TV-5.0	TV+5.0
No. 30 sieve	TV-4.0	TV+4.0

Measured Characteristics	LSL	USL
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 + 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 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 / 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 409-3 gives the weight factor (f) for each sieve size and asphalt cement 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 +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 = $96.12 per ton

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	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 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 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 to base a price reduction. If this final value incurs a price adjustment, the Contractor under Item 409(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.

EVALUATION OF PAVEMENT SMOOTHNESS.
The top layer of HMA will be measured according to 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.

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

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:

   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 401(6) Asphalt Price Adjustment.

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

   Joint sealer is not required and applies longitudinal joint density price adjustment equal to $1.50 per lineal foot added under Item 401(6) Asphalt Price Adjustment.

409-4.04 ASPHALT MATERIAL PRICE ADUSTMENT – UNIT PRICE.

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

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

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.

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 409(6) Asphalt Price Adjustment.

Separate payment will not be made for asphalt cement or anti-strip additives for Item 409(3) Temporary Pavement or HMA for leveling course.

Asphalt cement, anti-stripping additives, tack coat, hydrated lime flushing, truck cleaning, longitudinal joint sealer, and crack sealing (409-3.07) are subsidiary to the HMA unless specified as pay items.

Price adjustments will not apply to HMA for leveling course.

Payment for furnishing and installing joint adhesive the pavement will be paid as 409(9) Longitudinal Joint Adhesive.

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 – Quality	Contingent Sum
409(10)	Asphalt Material Price Adjustment – Unit Price	Contingent Sum

SECTION 501
STRUCTURAL CONCRETE

Special Provisions

501-1.01 DESCRIPTION. Add the following: This work shall also consist of providing aesthetic treatment of concrete surfaces as shown on the plans and described in this special provision, including treatment of concrete faces with stenciled airplane silhouettes.

501-2.01 MATERIALS. Add the following: Templates for images to be stenciled onto concrete shall be furnished by the Engineer in .jpeg file format. Other formats are also available including .psd, and .tif.

501-3.09 FINISHING CONCRETE SURFACES. Add the following:

5. Stencils on concrete face. Contractor shall provide a test panel for decorative airplane finish to indicate his ability to achieve a finished and precise image of the airplane silhouettes shown on the drawings. Contractor may not start work until such time that the Owner's Representative approves the panel.

   After concrete has cured for 28 days, Contractor shall stencil airplane silhouettes on concrete face with durable black spray paint to achieve shapes and their spacing and sequencing as shown on the Landscape Detail drawings.

   Prior to beginning work, Contractor shall provide a sample panel to illustrate his ability to achieve the desired effect. Upon acceptance of the test panel, the Work shall be compared against the accepted test panel and the finished work shall be a close approximation of the quality of the accepted test panel or may be rejected.

501-4.01-METHOD OF MEASUREMENT. Add the following: Stenciled silhouettes shall be measured by each.

501-5.01 BASIS OF PAYMENT. Add the following:

Pay Item No.	Pay Item	Pay Unit
501(40)	Aircraft Silhouette	Each

SECTION 503
REINFORCING STEEL

Special Provisions

503-1.01 DESCRIPTION. Add the following: This work will also include the epoxy coating of appropriate reinforcing steel bars. The reinforcing steel in the exposed vertical face of a retaining wall facing the roadway and as noted on the Plans shall be epoxy coated. (02/08/96)R38

503-5.01 BASIS OF PAYMENT. Add the following: If epoxy coating the reinforcing steel is required, it will be a subsidiary obligation and no separate payment will be made. (02/08/96)R38

SECTION 505
PILING

505-4.01 METHOD OF MEASUREMENT. Replace the "Sheet Piles" paragraph with the following:

Sheet Piles. The projected area of furnished and driven sheet piles from pile tip to pile cutoff elevation remaining in place in the permanent structure as called for on the Plans, measured in final position.

505-5.01 BASIS OF PAYMENT. Add the following to the item "Sheet Piles.": The contract price for "Structural Steel Sheet Piles" shall include payment for all items (furnishing and installing) necessary to construct the sheet pile wall as shown on the Plans (sheet piles, wales, hardware, tiebacks, tieback sleeves, deadmen, caps, etc.). No additional payments shall be made for this item.

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 (RCP). Corrugated Polyethylene Pipe (CPP) is also allowed. 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.

603-3.02 LAYING PIPE. Add the following: If any existing abandoned utilities are encountered while laying pipe, the Contractor shall cut through the existing utility lines is such a way as to allow sufficient room for the new pipe to be installed.

Add the following new subsection:

603-3.06 CULVERT MARKER POSTS. Install culvert marker posts 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. (08/27/03)R42USC

Delete the second paragraph and replace with the following:
Excavation, bedding, and backfill will not be paid for directly, but will be subsidiary to pipe items. No additional payment will be made for cutting through abandoned utility lines or ducts.

Add the following pay items:

Pay Item No.	Pay Item	Pay Unit
603(21-12)	12-Inch Corrugated Polyethylene Pipe	Linear Foot
603(21-18)	18-Inch Corrugated Polyethylene Pipe	Linear Foot
603(21-24)	24-Inch Corrugated Polyethylene Pipe	Linear Foot

SECTION 604
MANHOLES AND INLETS

Special Provisions

604-3.01 CONSTRUCTION REQUIREMENTS. Add the following: All new concrete curb inlet boxes shall be formed with a 3-inch hole approximately 12-inches below the top on the side facing the roadway. All curb inlet castings shall have a 2-inch hole drilled on the roadway side, 3-inches below the top of the frame. These holes are to provide for direct drainage during subgrade construction to avoid embankment saturation and runoff sedimentation. The contractor shall be responsible for keeping these openings functional and connected to the inlet protection system bag, which may require monitoring for blockage and cleaning, temporary dikes, RMC extensions and clamps, etc, as necessary. These holes shall be filled with grout upon final paving. The cost of this effort shall be subsidiary to item 604(5) Inlet, Type A.

Add the following to the 13th paragraph: Adjust existing manhole includes inspecting the insides of all manholes remaining, aligning the manhole by rotating the cone so that the casting is not in the driving lane wheel path (see item 5 below) or in the gutter pan flow line.

Add the following subsection:

604-3.02 REPLACE MANHOLE FRAME AND LID. Remove and replace the existing manhole lid with the size and type specified on the Plans.

604-5.01 BASIS OF PAYMENT. Add the following pay items:

Pay Item No.	Pay Item	Pay Unit
604(1A)	Storm Sewer Manhole, Type I	Each
604(13A)	Replace Manhole Frame and Lid	Each

SECTION 606
GUARDRAIL

Special Provisions

606-2.01 MATERIALS. Delete "Flexible Markers" in its entirety and substitute the following:

Flexible Markers. Use flexible markers with an overall length of 72 inches. The marker shaft shall have a coil spring at the bottom and a flag at the top. The shaft and spring shall be one piece and made from galvanized spring steel. The flexible marker shall have an orange HDPE flag which provides approximately 20 square inches of surface area. Use stainless or galvanized steel attaching hardware. The following is an example of an acceptable flexible marker:

Model:	FF2
Manufacturer:	Nordic Fiberglass, Inc. P.O. Box 27 Highway 75 South Warren, MN 56762
Phone:	(218) 745-5095
Fax:	(218) 745-4990
website:	www.nordicfiberglass.com

If using another brand, submit specifications to the Engineer for approval prior to ordering the markers.

Special Provisions

606-3.01 GENERAL. Replace the second sentence of the first paragraph with the following:
Conform to these Specifications and the Standard Drawings with the following exception. Modify Standard Drawing G-20.10 to only allow an offset of 1.5 feet for the ET-2000.
(05/12/04)R266

606-3.02 POSTS. Delete the first two numbered items in this subsection and substitute the following:

1. Exclusive of end treatments, use one type of post in each run of guardrail.

606-3.06 REMOVAL AND RECONSTRUCTION OF GUARDRAIL. Add the following: Guardrail removed and to be replaced with new guardrail shall have the entire new run installed within 14 calendar days after removal.

606-3.07 REMOVAL AND DISPOSAL OF EXISTING GUARDRAIL. Delete the last sentence and substitute the following: Notify the Engineer a minimum of 5 days before removing guardrail for disposal. The Engineer will notify ADOT&PF M&O (907-338-1466) and have an M&O representative physically identify portions of guardrail to be salvaged. Deliver guardrail and associated hardware designated for salvage to the ADOT&PF M&O yard located at 5300 East Tudor Road. Remaining items removed becomes the Contractor's property.
R259M98(06/12/03)

Add the following new subsections:

606-3.09 FLEXIBLE MARKERS. For each guardrail terminal, a flexible marker shall be attached to the extreme piece of rail. The flexible markers shall be attached using hardware and attachment methods recommended by the manufacturer.

606-3.10 LENGTH OF NEED VERIFICATION. After shaping the slopes and staking the proposed guardrail locations, notify the Engineer to field verify the beginning and ends. The Engineer will approve the staked location of the guardrail before installation. The Engineer may determine additional guardrail is necessary and the Contractor shall comply without delay.
R45aUSC(4/06/06)

SECTION 607
FENCES

Special Provisions

607-1.01 DESCRIPTION. Add the following: Vinyl-coated chain link fence consists of chain link fence fabric, metal posts, and all fittings and hardware. The height of vinyl-coated chain link fencing must conform to the Plans.

This work shall include salvaging walk gates from the Merrill Field security fencing.

This work shall also include relocation and installation of automatic drive gates as part of the Security Access Control Systems on Merrill Field. The basic components of the existing Security Access Control System include the gate unit, entry/exit system, gate accessories, and the command post.

607-2.01 MATERIALS. Add the following: Existing access control equipment and components consist of the following:

a. Existing Access Control Unit (ACU): Control board, 120VAC heater, Lantronics card, CAT 5E cable, and a back-up 12V 7AH battery. GE Model No. ACURSO2-E0005A, and GE Model No. ACU-5APWR power supply.

b. Wireless Local Area Network. The wireless network consists of wireless transmitters at each gate and 3 base station units at the FAA control tower to communicate to the existing access control system. The wireless network includes the following capabilities and features:

    1) Existing wireless network is unlicensed 5HGz band. System is operable with the existing security system.

    2) Wireless network operates via direct line of sight to communicate direct and continuously with all vehicle gates.

    3) Wireless network antennas shall be relocated as required to operate the network. Contractor shall be responsible for locating the equipment as needed for proper operation.

c. Existing Card Readers (long range). Card Readers are manufactured by Transcore, Model No. AI 10-1620-100. A separate pole mounted card reader shall be relocated with each access gate with a dedicated reader provided for ingress.

d. Vehicle Motion Detectors. Vehicle motion detectors are designed and manufactured by Protech Technologies, Inc., Model Number SDI-77XL-MW-VD with housing unit Model

No. Hi-tech 100 AC/DC. The vehicle motion detectors shall be installed at each relocated gate as shown on the drawings. The Contractor shall install and adjust the vehicle motion detectors to avoid unintended gate openings. Connect each relocated vehicle motion sensor to control the gate operation.

e. Wireless Antenna: Proxim P/N 5054-SUR-US, 23dbi with CAT 5e cable, base station radio, and lightning arrestor.

f. Photoelectric Beam detector: Optex, Inc. Model No. AX-350 MKII with HU-1.

g. Safety Edge Sensor: MillerEdge, Inc. Model No. MGR20 for round frame.

h. Entry Manual Keypad: Essex, Inc. Model No. KTP-103-SN with No. SH-034S housing unit.

i. Request to exit manual pushbutton: Square D Model No. SKR2RH13.

j. Operator: Crown Model 'E' 1295.

Add the following subsections:

607-2.02 CONDITION. All new products and materials are to be free of defects, damage and corrosion. Contractor shall be careful to not damage existing equipment when removing and shall store relocated equipment in a secure dry space until reinstallation in the new location.

607-2.03 WIRE AND CABLE. All wiring and cabling shall be new and per the manufacturers' recommendations. Unauthorized deviations thereof may result in the voiding of the manufacturer's warranty. Mount equipment in a neat professional manner. Rigidly anchor to channel iron. Allow adequate clearance for maintenance and as required by the NEC.

607-2.04 SUPPORTS AND HARDWARE. Provide galvanized channel supports for exterior equipment. All exterior hardware shall be stainless steel.

607-3.01 CONSTRUCTION REQUREMENTS. Add the following: Contractor shall provide all equipment, materials, labor, documentation and services necessary to relocate components of a complete and operational Integrated Security System. The system consists of a fully automated and integrated computer-based Security System, including, but not limited to the following functions and capabilities:

1. Automated Access Control at designated field access gates.

2. Security Alarm Monitoring and Reporting of alarm and trouble conditions detected by devices in local and remote locations.

The system equipment and installation shall comply with all provisions and requirements of this specification, as well as any and all applicable national, state and local codes and standards.

The security access control system shall be relocated by the contractor to provide access to relocated gates as shown on the plans. System includes gate unit, entry/exit system, gate accessories, and command post.

Gates shall be reconnected to existing wireless local area network with relocated base and field transceiver units, power supplies, enclosures and all mounting hardware including poles and bases as required. All existing computer equipment includes software customized for Merrill Field.

Contractor shall be responsible for locating and adjusting relocated access equipment at each gate to operate as specified to the owner's satisfaction and to relocate LAN equipment as required for efficient operation. Follow manufacturer's instructions for equipment installation.

Add the following subsections:

607-3.02 PERFORMANCE REQUIREMENTS. Card Access Control: The Security Access Control System shall provide controlled entry, via access card readers, of only authorized personnel to secured areas based on cardholder information entered and stored in the system database.

607-3.03 SALVAGING AND REMOVING AND RELOCATING VEHICLE GATES. 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. Within 15 days of the Notice to Proceed schedule a walk through with the Engineer and Merrill Field Airport Maintenance Supervisor and perform a detailed survey of all gates identified for removal. Provide a signed inventory which includes the condition, operation, quantities, and configuration of all associated vehicle gate electrical equipment and controls. When material specified for reuse is found in an unserviceable condition, the Engineer will determine whether to repair 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 deliver the original documents to the Engineer. Deliver removed equipment not scheduled for reuse to Merrill Field as directed by the Engineer. Coordinate salvageable gates and components with Merrill Field Airport by telephone a minimum of one week prior to planned delivery date.

Salvage the gate operator, controller assembly, disconnects, transformers, command post, antennas, lightning arrestor, network switch, subscriber unit, keypad, card reader, push button, motion detector, access control unit, power supply, edge sensor, AC connector, heater and all associated appurtenances at each gate. The Contractor shall replace at the Contractor's expense salvaged equipment damaged or destroyed before or during the delivery or reinstallation.

When reinstalling existing equipment at new locations, complete the following work at the Contractor's expense:

a. For operators, install new foundations, furnish new mounting hardware, and conduits needed to complete the installation.

b. For command posts, install new foundations, furnishing new nuts, bolts, washers and conduits to complete the installation.

The Engineer will pay for repairing damaged finishes on existing equipment that has not been deemed the Contractor's fault as part of the salvaging, storage, and transport effort, according to subsection 660-3.01 General Construction Requirements as extra work.

If the Engineer allows the Contractor to use new equipment, on an as needed basis, rather than reusing the equipment specified, the Contractor shall include a submittal according to subsection 660-2.01, Materials.

607-3.04 FIELD TESTS. After the specified gates have been relocated, the gate 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.

The Contractor shall replace or repair at his expense equipment or material found to be faulty 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 conduit ends, command posts, foundations, and controller cabinets to ensure the grounding system required by subsection 660-3.06 Grounding and Bonding has been installed and splices and connections are mechanically firm.

b. 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.

After re-installation, and before termination, all wiring shall be checked and tested to ensure there are no grounds, opens, or shorts on any conductors or shields. The Contractor shall maintain a complete log of all such quality assurance tests and make them available for inspection to the Engineer any time during the construction phase. At the completion of the installation, all test results shall become part of the maintenance documentation.

The Contractor shall carry out the inspection requirements of the contract and shall provide the Engineer with documentation to the effect that off-site work is being properly fabricated in accordance with the contract documents.

The Contractor shall notify the Engineer sufficiently in advance of the time when quality control tests are to be performed so that the Engineer or their designee may witness such tests, if desired. The presence or absence of the Engineer from these tests shall not relieve the Contractor from completing the tests in accordance with the contract documents.

Perform all electrical and mechanical tests required. In addition, measure and adjust each of the equipment's operating ranges for stable sensitivity setting. These tests shall be performed with the equipment in its operational environmental conditions in appropriate areas. Bench settings are not acceptable. A checkout report shall be prepared by the installation technician and submitted in triplicate, one copy of which will be registered with the equipment manufacturer. The report shall include, but not limited to the following:

a. A complete list of equipment installed and wired.

b. Indication that all equipment is properly installed and functional and conforms with these specifications.

c. Tests of individual devices.

d. Serial numbers, locations by address and model number for each installed detector.

e. Technicians name and date.

607-3.05 EXECUTION. Prior to beginning equipment installation, examine areas to receive access control equipment. Verify that all conditions are acceptable. Inspect the site and determine optimum locations for access control equipment and wireless network equipment. Coordinate with Merrill Field Airport Director for all gate relocation work. Relocation of wireless network equipment shall be the responsibility of the Contractor. Locations shall be subject to Merrill Field approval and acceptance. If additional equipment is required for proper operation due to Contractor mishandling, such equipment shall be furnished and installed at the Contractor's expense.

Install access control equipment in accordance with the manufacturer's instructions and drawings. Coordinate locations to provide optimum performance for each gate. Transmitter/receivers and vehicle motion sensors shall be adjusted and aimed as required to allow vehicle access and proper operation with access tags without the inadvertent triggering of gates from passing vehicles or planes.

All work shall conform to the National Electrical Contractor's Association "Standard of Installation".

All wiring shall be in accordance with the requirements of the National Electrical Code and Sections 660 Signals and Lighting, and 661 Electrical Load Centers. Low voltage and power (120 volts and above) circuits shall be routed in separate raceways as per manufacturer's written instructions. The system's wiring shall be completely installed with wiring properly sized, tagged and color-coded.

No wiring other than that directly associated with Security Access Control System shall be permitted in Security Access Control System conduits. Wiring splices are to be avoided to the extent possible, and if needed they must be made only in junction boxes and shall be crimp connected. Wire nut-type connections are not acceptable. Transposing or changing color-coding of wires shall not be permitted. All conductors in conduit containing more than one wire shall be labeled on each end and harness so that each drops off directly opposite to each terminal. Cabinet terminals shall be numbered and labeled. All controls, function switches, etc., shall be labeled on all equipment panels.

All conduits emerging from below grade shall be provided with seal-off fittings in accordance with NEC Article 500.

607-3.06 GUARANTEE. All new components, parts and assemblies supplies by the manufacturer shall be guaranteed against defects in materials and workmanship for a minimum period of two years commencing upon final acceptance by the Engineer.

The systems shall operate without inadvertent opening or failures to open gates by leaseholders or Merrill Field Airport. The Contractor shall be responsible for providing qualified personnel to adjust gate transmitters/receivers and vehicle motion sensors within a period of 24 hours. All corrections and adjustments made to the system shall be made at no cost to the Department.

607-3.07 SALVAGE WALK GATE. Salvage and remove all walk gates from within the existing fencing as shown on the Plans, including gates and all connecting hardware. Deliver all salvaged material to the Merrill Field storage facility. The Contractor shall dispose of all fence or gate posts at the Contractor's expense. The Contractor shall ensure that the remaining fencing is in the same condition after the gate removal as prior to the beginning of the gate removal in order to allow the gap in fencing to be replaced under 607(3A) Vinyl Coated Chain Link Fence as shown on the Plans or as directed by the Engineer. Fencing damaged during the gate removal shall be replaced at the Contractor's expense.

607-4.01 METHOD OF MEASUREMENT. Delete the third paragraph beginning with "Barbed Wire".

Add the following:

607(15): The number of units relocated, installed and accepted in place

607(16): The number of units salvaged and delivered to the Merrill Field storage facility

607(17): The number of units salvaged and delivered to the Merrill Field storage facility

607-5.01 BASIS OF PAYMENT. Add "barbed wire" to the first sentence after "connections".

Add the following:
Remove and relocate automatic drive gate shall include all work and labor necessary to salvage and install each automatic drive gate and all associated signs and hardware at the location indicated on the Plans and as directed by the Engineer. All concrete, wiring, connections, signs and appurtenances shall be subsidiary to the gate relocation.

Salvage automatic drive gate shall include all work and labor necessary to salvage each automatic drive gate as directed by the Engineer at the location indicated on the Plans and deliver to the Merrill Field storage facility.

Salvage walk gate shall include all work and labor necessary to salvage each walk gate as directed by the Engineer at the location indicated on the Plans and deliver to the Merrill Field storage facility.

Add the following pay items:

Pay Item No.	Pay Item	Pay Unit
607(3A)	Vinyl Coated Chain Link Fence	Linear Foot
607(15)	Remove and Relocate Automatic Drive Gate	Each
607(16)	Salvage Automatic Drive Gate	Each
607(17)	Salvage Walk Gate	Each

SECTION 608
SIDEWALKS

Special Provisions

608-1.01 DESCRIPTION. This work also consists of providing all equipment, materials and labor necessary to install cast-in-place Patterned Concrete, the cast-in-place Sidewalk Retaining Walls and Barrier Rail Sidewalk. Patterned Concrete shall be imprinted concrete as shown on the Plans.

This work also consists of providing all equipment, materials and labor necessary to modify existing curb ramps to meet current ADA standards by concrete grinding any protruding edges at the ramp termination or paving as needed behind the curb ramp as directed by the Engineer.

608-2.01 MATERIALS. Add the following: For Sidewalk Retaining Wall (Type I, II, or III) and Barrier Rail Sidewalk, concrete shall conform to Section 501, Structural Concrete, Class A, without the deletions stated in 608-2.01, Materials.

Railing shall be installed on the Barrier Rail Sidewalk as indicated on the Plans.

Fencing shall be installed on Sidewalk Retaining Wall, Type II and Type III, as indicated on the Plans. Permissible fence type shall be that which is manufactured by:

SpecRail
333 Welton Street
Hamden, CT 06517
(203) 248-6346
www.specrail.com

Fence style shall be the SR1-Bennington and shall be fabricated of high strength aluminum alloy. Fence materials shall be black in color and coated with a high solids acrylic finish meeting AAMA 603.8 specifications. Assembly of the fence shall be with #302 stainless steel Tek screws painted to match the finish on the fence. Aluminum castings shall be used for all post caps, wall brackets, scrolls, finials and other miscellaneous hardware. For the Sidewalk Retaining Wall, Type III, the Contractor shall furnish fence pickets bent at a 45-degree angle, as shown on the Plans. Alternate fence types may be permissible for use on the Project. Any requests for substitutions of fence types should be submitted to the Engineer for approval. The Engineer shall have final authority on substitution of fence types and/or suppliers.

Patterned Concrete shall conform to Section 501, Structural Concrete, Class A, except that subsection 501-3.02, Batching, is modified as follows:

Under item 3. Aggregates, delete the third paragraph.

Add the following: For Patterned Concrete, concrete shall be Class A with the following modification:

1. Air Entrainment - 7 percent. Air entraining agents complying with ASTM C 260 may be used.

2. Imprint the Patterned Concrete using one of the following imprinting systems and patterns:
   a. "Flagstone" pattern, Bomanite, Bomanite Corporation, 232 Schnoor Avenue, Madera, CA, 93637, (559-673-2411) (www.bomanite.com)
   b. "California Fieldstone" pattern, Stampcrete, Stampcrete International, Ltd. 325 commerce Blvd., Liverpool NY 13088, (800-233-3298); (www.stampcrete.com)
   c. "Flagstone" pattern, Design-Crete by Symons Corporation, 200 E. Touhy Avenue, Des Plaines, Il, 60018; (847-298-3200)

608-3.01 CONCRETE SIDEWALKS. Add the following: Contractor shall provide a 4-foot by 1.2-foot sample of the proposed finish for approval by the Engineer before beginning Patterned Concrete work. Other Patterned Concrete shall match the approved panel.

Final groove dimensions in the stamped pattern shall be no deeper than ¼ inch and no wider than ½ inch. Place Patterned Concrete to maintain uniform pattern appearance and texture along the length of the sidewalk. Significant difference in pattern, appearance or texture, between two adjacent concrete panels, or from the sample panel, will result in the removal and replacement of concrete panels by the Contractor at no additional cost.

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, Concrete Sidewalks. Give the exposed concrete surface a coarse broom finish. Install detectable warnings.

Add the following new subsections:

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 any of 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 current Americans with Disabilities Act Accessibility Guidelines. (06/11/02)R256USC

608-3.05 PATTERNED CONCRETE. In addition to meeting the requirements of Section 501, Structural Concrete, the Patterned Concrete shall include excavation, compaction, steel reinforcement, dowels, construction, and expansion joint materials, patterned concrete, coloring, and incidental work required to complete work per the Plans.

Protection of Patterned Concrete.

When asphalt paving, observe the following requirements:

1. Do not place the asphalt pavement until the concrete has cured enough to prevent damage from the paving operation.

2. When crossing over the concrete surface with vibratory rollers, turn the vibrator off.

3. Place, spread, and roll the asphalt so that the concrete will not be damaged.

4. Cover the concrete surface with craft paper or other approved material, suitable to withstand high asphalt temperatures and vehicle traffic to protect the concrete surface from contaminants.

5. Before final acceptance, repair damaged concrete and clean surface contamination at the Contractor's expense, to the satisfaction and approval by the Engineer.

608-3.06 SIDEWALK RETAINING WALL. In addition to meeting the requirements of Section 501, Structural Concrete, the Sidewalk Retaining Wall (Types I, II, and III) shall include excavation, compaction, steel reinforcement, dowels, construction, expansion joint materials, fencing (for Types II and III) and incidental work required to complete the work per the Plans.

608-3.07 BARRIER RAIL SIDEWALK. In addition to meeting the requirements of Section 501, Structural Concrete, Barrier Rail Sidewalk shall include excavation, compaction, steel reinforcement, dowels, construction, and expansion joint materials, metal railing and incidental work required to complete the work per the Plans.

608-3.08 CURB RAMP CORRECTIVE ACTION. Concrete grind any protruding edge or lip on existing curb ramps so that no edge or lip remains at the interface between the ramp and the crosswalk location. Pave as directed behind the existing curb ramp to meet current ADA requirements. Work shall be performed on curb ramps locations shown on the plans or as directed by the Engineer.

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)

Add the following:

Patterned Concrete. Will be measured by the square yard of finished surface.

Sidewalk Retaining Wall. Will be measured by the linear foot along the wall face.

Barrier Rail Sidewalk. Will be measured by the linear foot along the wall face.

Curb Ramp Corrective Action. As specified in the contract or directive authorizing the work

Special Provisions

608-5.01 BASIS OF PAYMENT. Add the following: Backing curb will be subsidiary to Item 608(6) Curb Ramp.

The composite detectable warning tiles are subsidiary to Item 608(6) Curb Ramp.
(06/11/02)R256USC

Payment for Patterned Concrete will be full compensation for work to complete the item. No separate payment will be made for surface preparation, or the test panel, these items will be considered subsidiary to Item 608(17B) Patterned Concrete.

Payment for Sidewalk Retaining Wall will be full compensation for work to complete the item, including the footing (sidewalk) and fencing (Types II and III).

Payment for Curb Ramp Corrective Action shall be at the prices specified in the Contract to remove protruding edges or lips from existing curb ramps or to provide paving and regrading behind the ramp to meet ADA.

Payment for Barrier Rail Sidewalk will be full compensation for work to complete the item, including the footing (sidewalk) and metal railing.

Add the following pay items:

Pay Item No.	Pay Item	Pay Unit
608(17B)	Patterned Concrete	Square Yard
608(30-I)	Sidewalk Retaining Wall, Type I	Linear Foot
608(30-II)	Sidewalk Retaining Wall, Type II	Linear Foot
608(30-III)	Sidewalk Retaining Wall, Type III	Linear Foot
608 (31)	Barrier Rail Sidewalk	Linear Foot
608(32)	Curb Ramp Corrective Action	Contingent Sum

SECTION 609
CURBING

Special Provisions

609-4.01 METHOD OF MEASUREMENT. Add the following to the first paragraph: Both Curb and Curb and Gutter shall be the same term used interchangeably for all curbing types. See the Plans for the type of curb to be utilized.

604-5.01 BASIS OF PAYMENT. Add the following pay items:

Pay Item No.	Pay Item	Pay Unit
609(2)	Curb and Gutter	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)

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)

Replace Section 618 with the following:

SECTION 618
SEEDING

618-1.01 DESCRIPTION. This work shall consist of preparing the ground followed by application of seed, fertilizer and mulch in conformance with the plans and specifications.

A living vegetative cover shall be provided in the areas indicated on the plans or directed by the Engineer and shall be maintained for the term of the contract.

A one-year maintenance of seeded areas is required by this section.

618-2.01 MATERIALS

Seed:
Meet the applicable requirements of the State of Alaska Seed regulations, 11 AAC 34, Article 1 and Article 4.

Furnish certification that each lot of seed has been tested by an approved laboratory within 9 months of date of application. Include: name and address of laboratory, date of test, lot number for each kind of seed, and results of test as to name, percentages or purity and germination, and percentage of weed content for each kind of seed furnished.

General Seed Mix:

General Seed Mix shall be applied at a rate of 1 lbs/1000 sf conforming to the following:

MATERIALS	TYPE	APPLICATION RATE PER ACRE
Seed* Schedule A	Alene Bluegrass Denali Bluegrass Arctared Fescue Annual Ryegrass	12.0 lb 12.0 lb 12.0 lb 4.0 lb
		Total *40.0 lb*
Seed* Schedule B	Arctared Fescue Blue Wildrye Tufted Hairgrass Polargrass	14 lb 14 lb 10 lb 2 lb
		Total *20.0 lb*
Fertilizer	20-20-10	450.0 lb
Mulch**	Natural Wood or Wood Cellulose	14.0 lb

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

Mulch:
Mulch is required when utilizing hydraulic method only.

Mulch shall be Weyerhaeuser Soil Guard wood fiber or approved equal.

Fertilizer:
Fertilizer shall be of standard commercial type supplied separately or in mixtures and furnished in moisture-proof containers. Each container shall be marked with the weight and with the manufacturer's guaranteed analysis of the contents showing the percentage of each ingredient contained therein.

Type and application rate:

10-20-20	8 lbs. per 1000 sf
45-0-0 (Urea)	4 lbs. per 1000 sf

The fertilizer shall contain slow release nitrogen and shall be supplied in the form of inorganic chemicals to the amount of at least 75% of the nitrogen carrying agents.

Tolerances of the chemical ingredients shall be plus or minus 2%.

No cyanamid compounds or hydrated lime will be permitted in mixed fertilizers.

Herbicide:
Herbicide shall be a type recommended by the Contractor, compatible with desired grasses and plants, and approved by the Engineer.

CONSTRUCTION REQUIREMENTS

618-3.01 SOIL PREPARATION. After grading of topsoil areas has been completed in conformity with the lines and grades shown on the Plans or as directed by the Engineer, and before beginning seeding operations, the areas to be seeded shall be cultivated to provide a reasonably firm but friable seedbed, or by other means of compaction as approved by the Engineer. All cultivated areas shall be hand raked and cleared of stones 1-inch in diameter and larger, and all weeds, plant growth, sticks, stumps, and other debris or irregularities which might interfere with the seeding operations, growth of grass, or subsequent maintenance of the grass covered areas removed. The final topsoil surface shall be approved by the Engineer prior to application of seed. Place seed the same season as topsoil is placed.

618-3.02 SEEDING SEASONS. All seeding shall be performed between May 15 and September 1. Seeding at other than the specified dates will only be allowed upon written permission of the Engineer.

No seeding shall be done during windy conditions or when climatic conditions or ground conditions would hinder placement or proper growth.

618-3.03 APPLICATION METHODS. Apply seeding mixture specified under 618-2.01 of these specifications at a rate required for the specific application. Seed, fertilizer, and mulch materials may be placed by the following methods:

1. Hydraulic Method. Seeding by hydraulic methods shall consist of furnishing and placing a slurry made of seed, fertilizer, mulch and water.

   The mulch shall be added to the water slurry in the hydraulic seeder after the proportionate amounts of seed and fertilizer have been added. The slurry mixture shall then be combined and applied in such a manner that the rate of application will result in an even distribution of all materials.

   Hydraulic seeding equipment shall be capable of maintaining a continuous agitation so that a homogeneous mixture can be applied through a spray nozzle. The pump shall be capable of producing sufficient pressure to maintain a continuous, non-fluctuating spray capable of reaching the extremities of the seeding area with the pump unit located on the roadbed.

   Sufficient hose shall be provided to reach areas not practical to seed from the nozzle unit situated on the roadbed. Seed shall be sprayed from at least two different directions, 90 degrees a part minimum, to assure full coverage.

2. Dry Method. Mechanical spreaders, seed drills, landscape seeders, cultipacker seeders, fertilizer spreaders or other approved mechanical spreading equipment may be used when seed and fertilizer are to be applied in dry form.

   Fertilizer shall be spread separately at the specified rates and then incorporated in one operation to a minimum depth of 2-inches. Seeded areas shall be compacted within twenty-four hours from the time the seeding is completed, weather and soil conditions permitting, by cultipacker, roller or other equipment satisfactory to the Engineer. Compacting equipment shall be operated at right angles to the slope.

   Compaction shall not be performed when the soils is in such condition that it will be picked up by the equipment. Compaction shall be accomplished, but by a method that does not "track" or by waiting until weather allows for compaction without tracking.

618-3.04 WATERING. Watering of the seeded areas shall be accomplished for 21 watering days. This means that the seeded areas shall be watered by the Contractor twenty-one (21) different days. The Engineer may waive watering on days when it rains. Example: It may take 25 total days made up of 4 rain days and 21 watering days to satisfy the watering item.

The Contractor shall thoroughly water the entire seeded area once a day. The method and amount of water per application shall be approved by the Engineer. During hot, dry weather, watering may be required more than once per day. The Contractor may request the additional watering or the Engineer may direct him; in either case, additional watering shall be approved by the Engineer. The response time for additional watering shall be no longer than two hours from the time the Engineer directs the extra watering to be accomplished.

618-3.05 ONE-YEAR SEEDED AREA MAINTENANCE. The seeded area maintenance shall start upon the substantial completion of the project and shall be complete one year later. This maintenance period will run concurrently with the warranty period.

A minimum of two additional applications of fertilizer are required during the maintenance period. Apply the first application of maintenance fertilizer on May 15 and the second application on June 15 unless otherwise directed by the Engineer.

Maintenance application mixture of fertilizer for seeded areas:

Fertilizer shall be 20-10-10 applied at 8 lbs. per 1,000 sf application rate per each application.

During the maintenance period, water the seeded area as required to assure a continuously healthy, thick, even, solid, green stand of grass.

The Contractor shall protect seeded areas against traffic by approved warning signs or barricades. Surfaces gullied or otherwise damaged following seeding shall be repaired by regrading, reseeding, and re-mulching, as directed, and the Contractor shall otherwise maintain seeded areas in a satisfactory condition until final inspection and acceptance of the work (one year after substantial completion).

Seeded areas not showing evidence or satisfactory growth as determined by the Engineer shall be reseeded and re-fertilized at Contractor's expense.

Herbicide shall be applied only on an owner-requested basis; the application rate shall be as specified by the manufacturer. Each application of herbicide shall be approved by the Engineer prior to application. No herbicide shall be applied under windy conditions or when conditions would create runoff from the treated areas. **All herbicide applications shall be made by a certified pesticide applicator per DEC regulations and all posting requirements shall adhere to the MOA pesticide ordinance.**

Maintenance Instructions

The Contractor shall supply the Engineer with a set of instructions for maintenance and care of installed landscaping through a full growing season.

618-3.06 WARRANTY. A one-year warranty period shall be provided as part of this specification.

The intent of this specification is to assure a solid deep green color, well-sodded, dense, uniform-growth grass containing less than five weeds per 100 square feet throughout the entire maintenance period.

The Contractor shall be required to reseed areas larger than ½ square foot not uniformly covered with grass. If the Engineer directs reseeding, the reseeding shall be accomplished within five (5) days of notice and within the planting season.

Reseeding shall be accomplished at the Contractor's expense.

If reseeding is required, those areas that are reseeded will have a 1-year warranty starting from the day that area was reseeded.

618-4.01 METHOD OF MEASUREMENT. The quantity of seeding to be paid for shall be pounds of seed measured to the nearest 0.1 unit on the ground surface and as staked or directed in the field prior to seeding.

The quantity of seeding specified shall include all cultivating, seed, fertilizer, mulch material, water and other incidentals required to properly apply the seeding mixture.

The Contractor shall establish a satisfactory growth of 3 inches minimum of each type of seed specified, complete and accepted.

Lawn maintenance is subsidiary to seeding and shall include such items as mowing, watering, herbicide application, reseeding and all other work and/or materials necessary to assure proper growth of the seeded area during the maintenance period. Maintenance is subsidiary to Seeding.

No measurement for watering shall be made.

618-5.01 BASIS OF PAYMENT. The accepted quantity of seeding shall be paid for at the Contract price per unit specified, complete and acceptably installed and/or performed.

The Seeding bid item shall be paid in two equal payments. These payments are intended to represent the beginning and the end of the year payments for the growing season. One-half of the contract lump sum payment will be paid at the completion of seeding and the remaining reserved until the one-year maintenance period has elapsed and the maintenance has been accepted.

All watering is subsidiary to Seeding.

Pay Item No.	Pay Item	Pay Unit
618(1A)	Seeding, Schedule A	Acre
618(1B)	Seeding, Schedule B	Acre

Replace Section 620 with the following:

SECTION 620
TOPSOIL

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 Seeding Seasons. 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.

Payment will be made under:

Pay Item No.	Pay Item	Pay Unit
620(1A)	Topsoil 4" depth	Square Yard
620(1B)	Topsoil 18" depth	Square Yard
620(1C)	Topsoil 24" depth	Square Yard

SECTION 621
PLANTING TREES AND SHRUBS

621-2.08 EDGING, LANDSCAPE. Landscape edging shall consist of medium density UV stabilized polyethylene strips, five inches in height with a 1" tubular top and a double "V" lip on the bottom. Average wall thickness shall be between 95/1,000 and 105/1,000 of an inch. Edging shall be anchored in the soil with stakes at two-foot intervals, maximum.

Oly-Ola or approved equal
124 East St. Charles Road
Villa Park, IL 60181, Phone: (800) 334-4647

621-5.01 BASIS OF PAYMENT. Add the following:

Mulch, water for maintenance, and topsoil shall be subsidiary. Delete reference to payment for water for maintenance.

Payment for trees shall be by individual size as noted on the bid schedules in the 621(1) pay item.

Pay Item No.	Pay Item	Pay Unit
621(1)	Trees (by size)	Each
621(5)	Edging, Landscape, 5" depth, double V-lip	Linear Foot

SECTION 622
REST AREA FACILITIES

Add the following:

622-1.01 DESCRIPTION. This work item shall include a "Welcome to Anchorage" Structure, all lighting to light the structure and the load center for power requirements.

622-2.01 MATERIALS. Add the following:

The "Anchorage Welcomes You" letters shall be removed from the existing structure and placed with the new Structure at the location shown on the Drawings.

622-4.01 METHOD OF MEASUREMENT

Anchorage Welcomes You Structure: Shall be measured by each, including foundation, structure, load center, lights, wiring, conduit and all appurtenances accepted in place.

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 this item, will be considered completely covered by the contract unit price.

Add the following pay item:

Pay Item No.	Pay Item	Pay Unit
622(16)	Anchorage Welcomes You Structure	Each

SECTION 627
WATER SYSTEM

627-1.01 DESCRIPTION. Add the following:

The Work under this Section consists of furnishing and installing water pipe, fittings, straps, and tie rods. The Contractor shall install them in accordance with these Specifications and in conformity with the lines and grades as shown on the Plans, unless otherwise approved. The use of pipe containing asbestos materials shall be prohibited.

The Work under this Section also includes all labor, materials, transportation, testing, maintenance, and service necessary to furnish and install all irrigation components, water, connections, meter, valves, and other improvements as shown on the Plans and specified herein.

The Contractor is responsible for the verification of all existing utilities and irrigation system components and securing necessary permits, payment of utility connection fees, or requesting locates of underground utility lines.

The terms "conduit" and "pipe" are used interchangeably in this section.

627-2.01 MATERIALS. Delete the following:

HDPE Pipe	Subsection 706-2.08

Add the following:

Material for irrigation system installation shall include the following.

1. Irrigation pipe: Irrigation pipe for all main lines shall be High Density Polyethylene pipe (HDPE) SDR-11 Pressure Rated Tube suitable for installation in frozen ground applications. Pipe sizes shall be as shown on Plans.

2. Metal cage: Metal cage shall be constructed as shown on Plans. Cage shall receive two coats of enamel paint on primer in green color approved by the Engineer. Contractor shall provide lockable devices for cage as shown on Plans with 2 sets of keys for each furnished to the Engineer.

3. Valve boxes: Valve boxes shall be sized as approved by the Engineer to allow the convenient operation and maintenance of the equipment they contain. The boxes shall be low-pressure structural foam molded plastic enclosures with twist lock lids in green color.

4. Backflow unit: Unit shall be reduced pressure principle 50mm bronze consisting of a pressure differential relief valve located between two independently operated spring-

loaded "Y" type center guided check valves. Complete with two full port resilient seated ball valves for shut-off and four resilient seated ball valve test cocks. All backflow prevention devices shall be installed in accordance with Anchorage Water and Wastewater Utility (AWWU) specifications.

5. Quick Couplers: Shall be Hunter HQ-4LRC with HK-44 Key or approved equal.

6. Furnished Equipment: At the conclusion of all work and upon acceptance of the irrigation system the Contractor shall supply to the Owner 2 sets each metal cage keys for locking cover.

CONSTRUCTION REQUIREMENTS

627-3.01 GENERAL. Add the following:

Material Delivery. Pipe and appurtenances shall be handled in such a manner as to insure delivery to the trench in a sound, undamaged condition. Particular care shall be taken not to injure the pipe, pipe coating, or lining. Before installation, the pipe and appurtenances may be examined by the Engineer for defects. The pipe shall not be strung out along the shoulders of the road for long distances if it causes inconvenience to the public. The amount of pipe strung at the job site shall be at the discretion of the Engineer. Rubber gaskets shall be stored in a cool, dark place to prevent damage from the direct rays of the sun.

Final Acceptance. The Contractor shall, upon completion of all work involved, notify the Engineer in writing of completion and request a pre-final inspection of the project. This inspection will be performed in the presence of the Engineer, the Water Utility, and the Contractor. Copies of a list of deficiencies, if any, indicated by this inspection will be furnished to the Contractor for remedial action. When all corrective action has been completed, the Contractor shall notify the Engineer, and an acceptance inspection will be performed.

Abandonment. Abandon water services and water mains in accordance with the latest edition of the AWWU Design and Construction Practices Manual. Abandonment of water mains shall include the removal of valves and other appurtenances and the installation of caps and concrete plugs and thrust blocks.

627-3.02 INSTALLATION OF CONDUIT. Delete this subsection and substitute the following:

Installation shall be in accordance with the requirements of ANSI/AWWA C600. The interior of the pipe and accessories shall be thoroughly cleaned of foreign matter before being lowered into the trench. The pipe shall be kept clean during laying operation by plugging.

Pipe and appurtenances shall be carefully lowered into the trench by means of derrick, ropes, belt slings, or other suitable equipment. Under no circumstances shall any of the pipe or appurtenances be dropped or dumped into the trench. Care shall be taken to avoid abrasion of the pipe coating. Poles used as levers or skids shall be of wood and shall have broad, flat faces to prevent damage to the pipe and coating.

The trench bottom shall be graded to provide uniform support for the pipe barrel. Water shall be kept out of the trench by pumping, if necessary, until the jointing is completed. When Work is not in progress, open ends of the pipe, fittings, and valves shall be securely plugged so that no trench water, earth or other substances will enter the pipes or fittings. Where any part of the coating or lining is damaged, the repair shall be made by the Contractor at his expense and in a manner satisfactory to the Engineer. At a sufficient distance, prior to encountering a known obstacle or tie into an existing pipe, the Contractor shall expose and verify the exact location of the obstacle or pipe so that proper alignment and/or grade may be determined before the pipe sections are laid in the trench and backfilled. The connections shall be made by using specials and/or fittings to suit actual conditions.

Pipe ends left for future connections shall be plugged, or capped, and anchored as shown on the Plans or as directed by the Engineer. The Contractor shall install vertically an 8' long 2"x4" wood post, directly over the end of pipe.

Cutting of pipe shall be done in a neat and workmanlike manner without damage to the pipe.

Concrete thrust blocks or tie back rods of the type shown on the current edition of the Municipality of Anchorage Standard Specifications (MASS) Standard Details shall be installed where the pipe line terminates or changes alignment, utilizing a tee, cross, bend, or similar fitting. Either poured-in-place or pre-cast thrust blocks are acceptable if the minimum base area is sufficient as shown in the Standard Details. Concrete for the thrust blocks shall be Class W as described in section 501, Structural Concrete.

If the Contractor elects to use poured-in-place thrust blocks, all pipe and fittings exposed to concrete will be double wrapped with 4 mil polyethylene film prior to placement of the concrete.

The pipe shall be so laid in the trench that after the line is completed, the bottom of the pipe conforms accurately to the grades and alignment given by the Engineer. A maximum two-tenths (0.2) foot deviation from design elevation and alignment will be allowed. The pipe shall be generally straight to visual observation as determined by the Engineer.

Both line and grade shall be checked and recorded in a field book for each piece of pipe and appurtenances laid. The Contractor shall have instruments such as a transit and level for transferring alignment and grades from offset hubs. He also shall have in his employ a person who is qualified to use such instruments and who shall have the responsibility of placing and maintaining such construction guides. The Contractor will furnish to the Engineer a copy of the

surveyor's notes for the newly-installed pipe and appurtenances. The practice of placing backfill over a section of pipe to provide a platform for instruments shall be subject to the approval of the Engineer and shall be accomplished in accordance with Section 204, Structure Excavation for Conduits and Minor Structures.

All adjustments to line and grade shall be done by scraping away or filling the earth under the body of the pipe and not by blocking or wedging up. Deflections from a straight line or grade, as required by vertical curves, horizontal curves, or off-sets shall not exceed the manufacturer's recommendations.

If the alignment requires deflection in excess of the above limitations, the Contractor shall furnish special bends to provide angular deflections within the limits allowable. Short-radius curves and closures shall be formed by shorter lengths of pipe, bevels, or fabricated specials.

The Contractor has the option of using either mechanical or push-on joints. All joints shall conform to the requirements of ANSI/AWWA C600.

The Contractor will be required to use mechanical joints on all hydrant leads. The Engineer has the option of checking any or all mechanical joints to assure proper torque as specified by the manufacturer.

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

Whenever flange connections are shown on the Plans, called for in the Specifications, or required in the Work, the flange and fittings shall conform to the requirements of AWWA C110/ANSI A21.10 for 250 pound pressure ratings.

627-3.03 FIRE HYDRANTS. Delete the first sentence of the third paragraph and replace with:

Unless shown otherwise on the Plans, connect single-pumper hydrants to the main with 6-inch ductile iron conduit and connect double-pumper hydrants to the main with 8-inch ductile iron conduit.

Delete the first sentence of the fourth paragraph.

Add the following:
The Contractor shall install the hydrant assemblies and the steam thaw pipe in accordance with the MASS Standard Details.

All fire hydrant legs shall be installed level. The fire hydrant barrel shall be installed plumb.

Hydrants installed but not available for use shall be covered with burlap and securely tied.

In lieu of valve box markers for the auxiliary gate valves, the Contractor shall paint in 2-inch black lettered stencils, the direction and distances to the nearest 0.1 foot the distance to the valve box on the face of the fire hydrant directly below the bonnet flange.

Existing fire hydrants to be removed shall be returned to AWWU.

627-3.04 VALVES. Add the following:

Valves or valve boxes shall be installed where shown on the Plans. The valve operator shall be placed on the side of the water main away from the center line of the street or easement. On fire line installations a valve shall be placed outside the building so that all fire hydrants will remain in service in the event water service to the building must be shut off for any reason.

Valves shall have the interiors cleaned of all foreign matter before installation. If the valve is at the end of the line, it shall be plugged prior to backfilling. The valve shall be inspected by the Engineer in the open and closed positions to insure that all parts are in working condition.

627-3.05 VALVE BOXES. Delete the second paragraph.

Add the following:
Provisions shall be made to restrict the soils from entering the bottom section of the valve box. Wrap burlap inside bottom section under the packing gland and wrap three (3) layers of non-woven geotextile fabric around the outside of the valve and base section of the valve box and secure the fabric at the top and bottom with wire or tape.

Valve boxes shall be marked with markers consisting of two and one-half (2-1/2) inch O.D. galvanized steel pipe sections, seven (7) feet in length, with three (3) feet buried in the ground. Markers shall be shop painted "Caterpillar Yellow" and painted with stenciled two (2) inch black numerals, showing the appropriate references. Markers shall be located on the nearest property line, due north, south, east or west of the valve at a maximum distance of 50 feet, unless otherwise directed by the Engineer. Markers shall not be required where valve boxes are located in paved areas. Markers shall carry the notation: VB (feet) (direction).

The Contractor shall expose all valve boxes for pre-final and final inspection. After final inspection of the valves located in unpaved areas, sawdust shall be poured directly over the valve box lid and covered with gravel to facilitate location in the future.

Delete subsection 627-3.06, Testing Water Systems, and substitute the following:

627-3.06 FLUSHING, TESTING, AND DISINFECTION.

Prior to any tests performed, all newly installed water facilities, including fire lines, shall be open-bore flushed. The Contractor, at his option, shall perform the disinfection, hydrostatic testing and continuity testing in any order of sequence. The Contractor is made aware that in the event the disinfection has been performed and repairs are made on the system in order to pass the hydrostatic test, then the open bore flush, and the disinfection will be null and void and shall be repeated to the satisfaction of the Engineer after the repairs are made. Disinfection will not be allowed until all open bore flush pipes are removed and the water system is sealed.

Continuity tests will not be performed until all excavation has been completed and backfilled. AWWU's representative must be present for all testing and flushing.

A. Flushing

All newly installed water facilities shall be "Open-Bore" flushed to remove any foreign matter. "Open-Bore" flushing shall be accomplished prior to hydrostatic testing and disinfection at each extremity of the main, including all stub-outs and dead-ends. The Contractor shall furnish, install and remove all fittings and pipes necessary to perform the flushing, at no additional cost. Under no circumstances will open-bore flushing through hydrants or reduced outlets be permitted.

It will be the Contractor's responsibility to notify the Engineer and AWWU 48 hours in advance of any flushing operations. Flushing of newly-constructed mains may be required between the hours of 1:00 a.m. and 6:00 a.m. depending upon the availability of water, as authorized by AWWU. Neither the Owner nor the Municipality will be responsible for any cost incurred by the Contractor for flushing.

B. Hydrostatic Testing

A hydrostatic test will be conducted on all newly constructed water mains, fire hydrant leads and stub-outs after "Open-Bore" flushing in the presence of an AWWU representative in accordance with the requirements of ANSI/AWWA C600 unless hereinafter modified. The Contractor, at his option, can either use a pressure test or a leakage test.

The Contractor shall furnish all necessary assistance, equipment, labor, materials, and supplies (except the test pressure gauge) necessary to complete the test to the satisfaction of the Engineer. The Contractor shall suitably valve-off or plug the outlet to the existing or previously-tested water main at his expense, prior to making the required hydrostatic test. Prior to testing, all air shall be expelled from the pipe. If permanent air vents are not located at all high points, the Contractor shall, at his expense, install corporation cocks at such points so the air can be expelled as the line is slowly filled with water.

All main valves, fire hydrant auxiliary valves, fire hydrant main valves, and plugs shall be tested. All intermediate valves within the section being tested will be closed and reopened as directed by

the Engineer during the actual test. Only static pressure will be allowed on the opposite side of the end valves of the section being tested.

All hydrostatic testing will be performed through test copper. Use of fire hydrant and service connections for testing will not be allowed.

The hydrostatic pressure shall be 150 psi. The duration of each hydrostatic pressure test shall be 30 minutes. After the required test pressure has been reached, the pumping will be terminated. If the pressure remains constant for 30 minutes without the aid of a pump, that section of line will not be subject to any future hydrostatic test.

If a hydrostatic pressure test fails on any section, the Contractor has the option to perform a leakage test on that section. AWWU will furnish the test gauge and measuring device; the Contractor shall furnish all other necessary assistance, equipment, labor, tools, materials and supplies necessary to conduct the test.

Leakage for a newly-installed main is determined by the following formula:

$$L = \frac{ND(P)^{0.5}}{7400}$$

Where: L = Allowable leakage in gallons per hour.
N = Summation of mechanical and push-on joints in length of pipe tested.
D = Diameter of pipe in inches.
P = Test pressure in pounds per square inch.

The duration of each leakage test shall be 2 hours, and during the test the main shall be subjected to the constant test pressure as defined above. The test pump shall be valved to ensure that constant test pressure is maintained throughout the test and all excess water returned to the supply tank.

If the pressure decreases below the required test pressure during the 2-hour period, the preceeding portion of that test will be declared void. Cracked or defective pipe, gaskets, mechanical joints, fittings, valves, or hydrants discovered as a consequence of the hydrostatic tests shall be removed and replaced with sound material at the Contractor's expense. The test shall then be repeated until the results are satisfactory.

The Contractor shall notify AWWU and the Engineer 48 hours, (2 working days) prior to any test and shall notify AWWU and the Engineer two (2) hours in advance of the scheduled time if the test is to be canceled. In the event that AWWU and/or the Engineer has not been notified of cancellation and the Contractor is not prepared for the test as scheduled, the Contractor shall reimburse AWWU and/or the Engineer for all expenses incurred. These will include, but not be limited to, salaries, transportation and administrative costs.

C. Disinfection

Chlorine shall be used for disinfection. Chlorine shall be applied by one of the following methods: (1) liquid chlorine gas-water mixture, (2) direct chlorine gas feed, or (3) calcium hypochlorite and water mixture. Calcium hypochlorite shall be comparable to commercial products known as HTH, Perchloren or Machochlor. The chlorinating agent shall be applied at the beginning of the section adjacent to the feeder connection, insuring treatment of the entire line. Water shall be fed slowly into the new line with chlorine applied in amounts to produce a dosage of 40 to 50 ppm. Application of the chlorine solution shall continue until the required dosage is evident at all extremities of the newly laid line.

Chlorine gas-water mixture shall be applied by means of a solution-feed chlorinating device. Chlorine gas shall be fed directly from a chlorine cylinder equipped with a suitable device for regulating the rate of flow and the effective diffusion of gas within the pipe. Calcium hypochlorite shall be injected or pumped into the water main. During the chlorination process, all intermediate valves and accessories shall be operated. Valves shall be manipulated so that the strong chlorine solution in the line being treated will not flow back into the line supplying the water. Hydrostatic testing of a water line containing the chlorine mixture will not be allowed.

A residual of not less than 5 ppm chlorine shall be produced in all parts of the water main and retained for a minimum period of 24 hours. After which this residual shall be flushed from the line at its extremities until the replacement water tests are equal chemically and bacteriologically to those of the permanent source of supply. In no instance shall a water main be chlorinated before "Open-Bore" flushing.

CHLORINATION

Pipe Diameter	Dosage (oz.) per 100 feet
4"	0.60 oz.
6"	1.35 oz.
8"	2.75 oz.
10"	4.30 oz.
12"	6.19 oz.
16"	11.00 oz.
20"	17.00 oz.

The above table is to be used as a guide for chlorinating mains by the calcium hypochlorite and water mixture method. The given dosage per 100 feet results in a chlorine solution of 40 to 50 ppm.

This dosage takes into account that Contractors most frequently used granular HTH, which is 65% pure. If another chlorinating agent is used, the dosage must be adjusted. Caution should be exercised against producing too high a concentration of chlorine in the line.

D. Continuity Tests

The Contractor shall perform electrical conductivity tests on all mains under 12 inches in diameter in the presence of a representative of the Engineer.

The Contractor shall maintain a circuit of 600 amperes DC current for a period of 15 minutes. Input current shall not exceed 10% of the return circuit. All equipment necessary to maintain the circuit shall be supplied by the Contractor.

All continuity tests will be through wires brought to the surface or through 3/4 inch, minimum, copper pipe connected to the main. The use of fire hydrants and valves as substitutes for wires will not be accepted. All wires brought to the surface to complete the continuity test shall be removed to a depth of 2 feet below finished street grade upon completion of the tests.

E. Test and Air Vent Copper Pipe Removal

After completion of testing, all test and air vent copper pipe shall be removed and the stop closed at the main, in the presence of the Engineer.

Delete subsection 627-3.07.

627-3.08 IRRIGATION SYSTEM INSTALLATION. Add the following new subsection:

Water Supply: Irrigation system water service shall be established at locations shown on plans. It will be the Contractor's responsibility to arrange with AWWU to tap the existing water main. This includes securing and paying for any required permits or deposits. The Contractor shall execute and provide all necessary work to complete the connections and irrigation system as shown on the plans.

Workmanship and Procedure: The routing of the irrigation supply line on the Plans is diagrammatic. The contractor shall install lines in such a manner so as to conform to the various details. Minor changes caused by actual site conditions shall be made without additional cost.

Line Clearance: All lines shall have a minimum clearance of 6 inches from each other unless otherwise approved by the Engineer.

Trenching: Trenches shall be dug straight and shall conform to the requirements of Section 204, Structure Excavation for Conduits and Minor Structures. Trenching excavation shall follow the general layout indicated on the Plans.

Backfill: Backfill shall consist of excavated native material. Compaction of backfill shall be completed through hand, water, or mechanical methods in 6-inch layers to conform to the desired grades without dips, sunken areas, humps, or other irregularities. Prior to backfilling of pipe (at all joints and connections) inspection for leakage shall be completed through the charging and pressure testing of the system unless otherwise approved by the Engineer.

Pressure Test: A pressure and leakage test will be conducted in the presence of the engineer following a 24-hour curing period for all heat weld joints. The irrigation lines shall be tested under hydrostatic pressure to 8 bars. Pressure shall be sustained in the lines for not less than four (4) hours. If leaks develop, the joints shall be replaced and the test repeated until the entire system is proven water tight. Tests shall be observed and approved by the Engineer prior to completion of backfill.

Guarantee: The Contractor shall inform the owner about the layout, operations, maintenance, and winterization procedures of the irrigation system. The Contractor shall perform a full shutdown of the system demonstrating each step of the winterization procedures to help MOA Parks and Beautification maintenance personnel to become familiar with it. The Contractor shall guarantee the system against defects in materials and installation for (30) days after acceptance of the system. The guarantee period shall start on the first day of operation of the system and end after 30 days of use. The guarantee period ends on September 25 of the year and restarts in the spring of next year if the full 30 days cannot be completed continuously before winter. The Contractor shall reactivate the system as early as prudent in the spring and continue the guarantee period.

Winterization: The Contractor shall perform full winterization of the system if it falls within the guarantee period. Winterization shall occur between September 20 and September 30.

As-Built Drawings: Upon completion of the irrigation system, the Contractor will supply the Engineer with a reproducible copy certified as being an as-built of the system.

627-4.01 METHOD OF MEASUREMENT. Add the following:

6. The irrigation system will not be measured for payment. Acceptance by the Engineer of the completed and tested system shall constitute measurement of the system.

7. Abandon water main. By each section of water main to be abandoned, including branches and services off the main and removal of valves.

627-5.01 BASIS OF PAYMENT. Replace the fourth paragraph with the following:

Excavation, bedding, and backfill are subsidiary.

Delete the last paragraph

Add the following: Payment for Item 627(11), Irrigation System Complete, shall be on based on the Lump Sum contract price. Payment for this item will include all labor, equipment, and material to install the irrigation system including excavation, backfill, water service connection, meter/backflow preventer, metal cage, and all work to provide any irrigation power service connections. Permit and AWWU hook-up fees, individual small fittings and other minor components are subsidiary to the item 624(11) Irrigation System and will not be paid for separately. All items and operations necessary for connection to existing water system and repair of existing ground or pavement are subsidiary to the Irrigation system and will not be measured separately. The maintenance and operation demonstration provided for, and the manual prepared for MOA Parks and Beautification is incidental to item 627(11) Irrigation System and will not be paid for separately.

Payment will be made under:

Pay Item No.	Pay Item	Pay Unit
627(1-6)	**6-Inch Ductile Iron Water Conduit, Class 52**	**Linear Foot**
627(1-8)	8-Inch Ductile Iron Water Conduit, Class 52	Linear Foot
627(5)	Fire Hydrant Installation	Each
627(6)	Removal of Fire Hydrant	Each
627(8)	Water Service Connection	Each
627(9-8)	Install 8-Inch Gate Valve	Each
627(10)	Adjust Valve Box	Each
627(11)	Irrigation System Complete	Lump Sum
627(12)	Disconnect Water Service	Each
627(15)	Remove Water Valve	Each
627(23)	Abandon Water Main	Each
627(23B)	Abandon And Replace Existing Water Service	Each

Delete Section 641 in its entirety and substitute the following:

SECTION 641
EROSION, SEDIMENT, AND POLLUTION CONTROL

641-1.01 DESCRIPTION. Plan, provide, inspect, and maintain control of erosion, sedimentation, water pollution, and hazardous materials contamination.

641-1.02 DEFINITIONS.

1. BMP (Best Management Practices). A wide range of project management practices, schedules, activities, or prohibition of practices, that when used alone or in combination, prevent or reduce erosion, sedimentation, and/or pollution of adjacent water bodies and wetlands. BMP include temporary or permanent structural and nonstructural devices and practices. Common BMP can be found on the EPA website: *National Menu of Storm Water Best Management Practices.* [www.epa.gov/npdes/stormwater/menuofbmps]

2. ESCP (Erosion and Sediment Control Plan). The ESCP is a project specific document that illustrates measures to control erosion and sediment problems on a project. The ESCP normally consists of a general narrative and a map or site plan. It is developed by the Department and included in the project plans and specifications. It serves as a resource for bid estimation and a framework from which the Contractor develops the project SWPPP.

3. Final Stabilization. A point in time when ground disturbing activities are complete and permanent erosion and sediment controls are established and functional. The stabilized site is protected from erosive forces of raindrop impact and water flow. Typically, unpaved areas except graveled shoulders, crushed aggregate base course, or other areas not covered by permanent structures are protected by either a uniform blanket of perennial vegetation (at least 70% cover density) or equivalent permanent stabilization measures such as riprap, gabions or geotextiles.

4. HMCP (Hazardous Material Control Plan). The Contractor's detailed plan for prevention of pollution that stems from the use, containment, cleanup, and disposal of hazardous material, including petroleum products generated by construction activities and equipment.

5. eNOI. Electronic Notice of Intent to begin construction activities under the NPDES General Permit. Use EPA Form 3510-9 found at www.epa.gov/npdes/stormwater/enoi

6. eNOT. Electronic Notice of Termination of coverage under the NPDES General Permit. Use EPA Form 3510-13 found at www.epa.gov/npdes/stormwater/cgp

7. NPDES General Permit. The Storm Water General Permit for Large and Small Construction Activities, issued by the Environmental Protection Agency (EPA) under the National Pollutant Discharge Elimination System (NPDES). It requires an approved SWPPP and NOIs listed as active status by the EPA before ground disturbing activities for the project.

8. SPCC Plan (Spill Prevention, Control and Countermeasure). The Contractor's detailed plan for oil spill prevention and control measures that meets the requirements of 40 CFR 112.

9. SWPPP (Storm Water Pollution Prevention Plan). The Contractor's plan for erosion and sediment control and storm water management. The SWPPP is developed by the Contractor and identifies specific areas where erosion may occur, describes site specific controls to prevent erosion and manage sediment and establishes a record of the installation and removal of these controls. The approved SWPPP replaces the ESCP.

641-1.03 REFERENCES. The following websites have up to date information about erosion, sediment and pollution control.

Developing the SWPPP. EPA. January 2007. Includes a SWPPP template in WORD [www.epa.gov/npdes/swpppguide]

National Menu of Storm Water Best Management Practices. EPA. [www.epa.gov/npdes/stormwater/menuofbmps]

International Erosion Control Association website [www.ieca.org/Resources/Resources.asp]

Construction Industry Compliance Assistance Center website [www.CICAcenter.org/bmps.html]

641-1.04 SUBMITTALS. Submit two copies each of the SWPPP and HMCP to the Engineer for approval. Submit one copy of the SPCC Plan (if required under subsection 641-2.03) to the Engineer. Sign submittals. Deliver these documents to the Engineer.

The Department will review the SWPPP and HMCP submittals within 14 calendar days. Submittals will be returned to the Contractor as either requiring modification, or as approved by the Department. The approved SWPPP must contain certifications, and be signed according to the Standard Permit Conditions of the NPDES General Permit. You must receive approval of your SWPPP before you submit you eNOI to the EPA.

For projects that disturb five acres or more of ground, submit a copy of the approved and signed SWPPP, with the required permit fee to the Alaska Department of Environmental Conservation (ADEC) Storm Water Coordinator. Transmit proof of this submission to the Engineer.

For projects that disturb one acre or more, submit the signed eNOI to EPA. Submit copies of the signed eNOI receipt to the Engineer and to ADEC. Transmit proof of the ADEC submission to the Engineer. The Department will transmit the Department's NOI to the EPA. Allow adequate time for state and federal processing, before beginning ground disturbing activities.

The active status NOIs, approved SWPPP, approved HMCP, and submitted SPCC Plan (when required) become the basis of the work required for the project's erosion, sediment, and pollution control.

Submit the signed eNOT to EPA with a copy to the Engineer when notified by the Engineer that the Project is stabilized. The Department will transmit the Department's eNOT to the EPA.

641-2.01 STORM WATER POLLUTION PREVENTION PLAN (SWPPP) REQUIREMENTS. Prepare a Storm Water Pollution Prevention Plan. Use the Department's ESCP to develop a SWPPP based on scheduling, equipment, and use of alternative BMPs. The SWPPP Preparer must visit the project site before preparing the SWPPP. The plan must include both erosion control and sediment control measures. The plan must address first preventing erosion, then minimizing erosion, and finally trapping sediment before it leaves the project site.

The SWPPP must follow the format presented in Appendix A of *Developing Your Storm Water Pollution Prevention Plan* (EPA, January 2007) found at http://cfpub.epa.gov/npdes/stormwater/swppp.cfm.

The plan must address site specific controls and management plan for the construction site as well as for material sites, waste disposal sites, haul roads, and other affected areas, public or private. The plan must also incorporate the requirements of the project permits.

Specify the line of authority and designate a field representative for implementing SWPPP compliance.

641-2.02 HAZARDOUS MATERIAL CONTROL PLAN (HMCP) REQUIREMENTS. Prepare a HMCP for the handling, storage, cleanup, and disposal of petroleum products and other hazardous substances. (See 40 CFR 117 and 302 for listing of hazardous materials.)

List and give the location of hazardous materials, including office materials, to be used and/or stored on site, and estimated quantities. Detail a plan for storing these materials as well as disposing of waste petroleum products and other hazardous materials generated by the project.

Identify the locations where storage, fueling, and maintenance activities will take place, describe the maintenance activities, and list controls to prevent the accidental spillage of oil, petroleum products, and other hazardous materials.

Detail procedures for containment and cleanup of hazardous substances, including a list of the types and quantities of equipment and materials available on site to be used.

Detail a plan for the prevention, containment, cleanup, and disposal of soil and water contaminated by accidental spills. Detail a plan for dealing with unexpected contaminated soil and water encountered during construction.

Specify the line of authority and designate a field representative for spill response and one representative for each subcontractor.

641-2.03 SPILL PREVENTION, CONTROL AND COUNTERMEASURE (SPCC) PLAN REQUIREMENTS. Prepare and implement a SPCC Plan when required by 40 CFR 112, including:

Control

Prepare and implement a SPCC Plan when required by 40 CFR 112, including:

1. When oil spills may reach navigable waters; and
2. Total above ground oil storage capacity is greater than 1,320 gallons.

Prevention and Countermeasures

Comply with 40 CFR 112 and address the following issues in the SPCC Plan:

1. Operating procedures that prevent oil spills;
2. Control measures installed to prevent a spill from reaching navigable waters; and
3. Countermeasures to contain, clean up, and mitigate the effects of an oil spill.

Self certify the SPCC Plan if the total above ground oil storage capacity is 10,000 gallons or less, and the requirements for self certification in 40 CFR 112 is met. Otherwise the SPCC Plan must be certified, stamped with the seal of, dated by, and signed by a Professional Engineer currently registered in the State of Alaska.

641-3.01 CONSTRUCTION REQUIREMENTS. On projects with 1 acre or more of ground disturbing activity, do not begin construction activities until the EPA has acknowledged receipt of the Contractor's NOI and Department's NOI, and has listed both as active status. The EPA will post the status of the NOIs on the EPA website. On projects with less than 1 acre of ground disturbing activity, where submittal of an eNOI to EPA is not required, do not begin construction activities until authorized by the Engineer.

Postings

Post at the construction site:

1. NPDES Permit number, if available, and a copy of the NOI,
2. Name and phone number of the Contractor's local contact person, and
3. Location of a SWPPP available for viewing by the public.

The above notices must be posted at publicly accessible locations. At a minimum post notices at the BOP, EOP, near the intersection of the highway with a major side street, and the Project Office.

Comply with requirements of the approved HMCP, the submitted SPCC Plan, and state and federal regulations that pertain to the handling, storage, cleanup, and disposal of petroleum products or other hazardous substances. Contain, clean up, and dispose of discharges of petroleum products and other materials hazardous to the land, air, water, and organic life forms. Perform fueling operations in a safe and environmentally responsible manner. Comply with the requirements of 18 AAC 75 and AS 46, Oil and Hazardous Substances Pollution Control. Report oil spills as required by federal, state and local law, and as described in the SPCC Plan.

Comply with requirements of the NPDES General Permit, implement temporary and permanent erosion and sediment control measures identified in the SWPPP, and ensure that the SWPPP remains current. Maintain temporary and permanent erosion and sediment control measures in effective operating condition.

Coordinate BMPs with Utility Companies doing work in the project area.

Inspections

Perform inspections and prepare inspection reports to comply with the project SWPPP and the NPDES General Permit.

1. Joint Inspections. Before start of construction, conduct a joint on site inspection with the Engineer, the SWPPP Preparer, and the Contractor's field representative to discuss the implementation of the SWPPP.

   Conduct the following additional joint on site inspections with the Engineer:

   a. During construction, inspect the following at least once every seven days and within 24 hours of the end of a storm exceeding ½ inch in 24 hours (as recorded at or near the project site):
      (1) Disturbed areas that have not been finally stabilized
      (2) Areas used for storage of erodible materials that are exposed to precipitation
      (3) Sediment and erosion control measures
      (4) Locations where vehicles enter or exit the site
      (5) Offsite materials sources and waste sites
      (6) Staging and equipment storage areas.

   b. During construction, the SWPPP preparer shall review the Project Site, Materials Sites, Waste Sites, and the SWPPP for conformance with the NPDES General

Permit at least once per month and after every major change in earth disturbing activities for compliance with the General Permit.

c. Before winter shutdown, to ensure that the site has been adequately stabilized and devices are functional.

d. At project completion, to ensure final stabilization of the project.

2. Winter Inspections. During winter shutdown, conduct inspections at least once every month and within 24 hours of a storm resulting in rainfall of ½-inch or greater. The Engineer may waive monthly inspection requirements until one month before thawing conditions are expected to result in a discharge, if all of the following requirements are met:
   a. Below freezing conditions are anticipated to continue for more than one month.
   b. Land disturbance activities have been suspended.
   c. The beginning and ending dates of the waiver period are documented in the SWPPP.

3. Inspection Reports. Prepare and submit, within three working days of each inspection, a report on the DOT&PF SWPPP Inspection Report Form (April 2007). At a minimum the report will contain the following information:
   a. A summary of the scope of the inspection
   b. Name(s) of personnel making the inspection
   c. The date of the inspection
   d. Observations relating to the implementation of the SWPPP
   e. Any actions taken as the result of the inspection
   f. Incidents of noncompliance

   Where a report does not identify any incidents of noncompliance, certify that the facility is in compliance with the SWPPP and NPDES General Permit. The Contractor and the Engineer will sign the report according to the Standard Permit Conditions of the NPDES General Permit. Include reports as an appendix to the SWPPP.

Record Retention

Keep the SWPPP up to date at all times. The SWPPP shall denote the location, date of installation, date maintenance was performed, and the date of removal for BMPs. It shall also contain copies of inspection reports and amendments.

Maintain the following records as part of the SWPPP:

1. Dates when major grading activities occur;
2. Dates when construction activities temporarily or permanently cease on a portion of the site; and

3. Dates when stabilization measures are initiated.
4. Daily precipitation as measured from an on site rain gauge.

Provide the Engineer with copies of SWPPP revisions, up dates, records, and inspection reports at least weekly.

Retain copies of the SWPPP and other records required by the NPDES General Permit for at least three years from the date of final stabilization.

If unanticipated or emergency conditions threaten water quality, take immediate suitable action to preclude erosion and pollution.

Amendments

Submit amendments to the SWPPP to correct problems identified as a result of:

1. Storm or other circumstance that threatens water quality, and
2. Inspection that identifies existing or potential problems.

Submit SWPPP amendments to the Engineer within seven days following the storm or inspection. Detail additional emergency measures required and taken, to include additional or modified measures. If modifications to existing measures are necessary, complete implementation within seven days.

Stabilize areas disturbed after the seeding deadline within seven days of the temporary or permanent cessation of ground disturbing activities.

Notice of Termination

For projects that disturb one acre or more of land, submit the signed eNOT to EPA with a copy to the Engineer when the Engineer notifies that:

1. The Project site (including material sources, and disposal sites) has been finally stabilized and that storm water discharges from construction activities authorized by this permit have ceased, or

2. The construction activity operator (as defined in the NPDES General Permit) has changed.

641-4.01 METHOD OF MEASUREMENT. Section 109 and as follows:

Items 641(2) and (4) will be measured as specified in the Contract or directive authorizing the work.

641-5.01 BASIS OF PAYMENT. The Bid Schedule will include either items 641(1), (2), and (5) or items 641(1), (3), (4), and (5).

1. Item 641(1) Erosion and Pollution Control Administration. At the Contract lump sum price for administration of work under this Section. Includes, but is not limited to, plan preparation, plan amendments and updates, inspections, monitoring, reporting, and record keeping.

2. Item 641(2) Temporary Erosion and Pollution Control. At the prices specified in the Contract or as provided in the Directive authorizing the work to install and maintain temporary erosion, sedimentation, and pollution control measures.

3. Item 641(3) Temporary Erosion and Pollution Control. At the lump sum price shown on the bid schedule to install and maintain temporary erosion, sedimentation, and pollution control measures required to complete the project according to Plan and with the BMP, the ESCP, and the original approved SWPPP and HMCP.

4. Item 641(4) Temporary Erosion and Pollution Control Amendments. At the prices specified in the Directive for extra, additional, or unanticipated work to install and maintain temporary erosion, sedimentation, and pollution control measures. Work paid under this Item will be shown as amendments to the original approved SWPPP or HMCP.

5. Item 641(5) Erosion and Pollution Control Price Adjustment. The total value of this Contract will be adjusted as specified in 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 nonaction, under Item 641(5) Erosion and Pollution Control Price Adjustment. In addition, the Engineer may, after giving written notice, proceed to perform the work and deduct the cost thereof, including project engineering costs, from progress payments under Item 641(5).

Payment will be made under:

Pay Item No.	Pay Item	Pay Unit
641(1)	Erosion and Pollution Control Administration	Lump Sum
641(2)	Temporary Erosion and Pollution Control	Contingent Sum
641(5)	Erosion and Pollution Control Price Adjustment	Contingent Sum

(04/19/07)R272USC04

SECTION 643
TRAFFIC MAINTENANCE

Special Provisions

643-1.01 DESCRIPTION. Add the following as a third paragraph:
Illuminate construction activities listed in Table 643-3 during hours of night work on roads open to the public within project limits.

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

Balloon Light: Light surrounding by a balloon-like enclosure kept inflated by pressurized air or helium, and producing uniform light through 360 horizontal degrees. The top half of the balloon enclosure shall be constructed of an opaque material.

Night Work: Work occurring between sunset and sunrise on all days except the "No Lighting Required" period shown in the table below:

Latitude	No Lighting Required		Nearby
(degrees)	Start	End	Cities
< 61	Lighting Required All Year		Everything S of Hope
61	June 11	July 1	Anchorage, Valdez, Girdwood
62	June 2	July 13	Wasilla, Palmer, Glennallen, Talkeetna
63	May 27	July 17	Cantwell, Paxson, McGrath
64	May 22	July 21	Delta Junction, Nome, Tok
65	May 18	July 25	Fairbanks
66	May 14	July 29	Circle City
67	May 10	August 2	Coldfoot, Kotzebue
68	May 7	August 6	Galbraith Lake
69	May 3	August 9	Happy Valley
70	April 30	August 12	Deadhorse
71	April 27	August 15	Barrow
72	April 24	August 19	

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

i. Supervise lighting of Night Work. ES14(03/15/06)

643-1.03 TRAFFIC CONTROL PLAN. Replace the last paragraph with the following: A waiver may be requested of regulation 17 AAC 25 regarding oversize and overweight vehicle movements within this project in writing. If the waiver is approved, movements of oversize and overweight vehicles in or near traffic within the project limits will be done according to the provisions of an approved Traffic Control Plan. Maintain a minimum 12-foot lateral separation between the nonstreet legal vehicles and the motoring public. The Traffic Control plan shall specify the traffic control devices required for these operations.

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. E56(5/01/07)

Special Provisions

643-2.01 MATERIALS. Replace Item 12 Portable Changeable Message Board Signs with the following:

1. Portable Changeable Message Board Signs. Use truck or trailer mounted portable changeable message board signs with a self contained power supply for the sign and with the following features:

    a. Message sign panel large enough to display 3 lines of 18 inch high characters.

    b. Ten character display per message line

    c. Fully programmable message module.

    d. Remote control Cellular, Wireless RF, Landline

    e. A waterproof, lockable cover for the controller keyboard.

    f. Capacity for electric/hydraulic sign raising or lowering.

    g. Radar over speed detection.

    h. Variable flash and sequence rates.

    i. LED display, using ITE Amber/Yellow.

    j. The capacity for a minimum of 150 pre-programmed messages.

k. Operate with a battery pack a minimum of 55 hours under full load.

Add the following:

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.

Standard Modification

643-3.04 TRAFFIC CONTROL DEVICES.

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

Special Provisions

643-3.04 TRAFFIC CONTROL DEVICES.
Delete the first sentence of the eighth paragraph and substitute the following: Items paid under this Section remain the Contractor's property unless stated otherwise.

Add the following to item 1. Embankments.: Close trenches and excavations at the end of each continuous work shift.

Add the following to item 3. Fixed Objects.: Remove obstructions greater than 4 inches above the nominal foreslope grade at the end of each continuous work shift.

Delete item 4.b. and replace with the following: Flagger Certification by ATSSA

Delete item 6 and replace with the following:

6. Street Sweeping. Keep free of loose material paved portions of the roadway and haul routes open to the public, including sections of roadway off the project where the Contractor's operations have deposited loose material using a street sweeper that can collect materials rather than eject them to the shoulder of the road.

7. Power Brooming. Keep free of loose material paved portions of the roadway and haul routes open to the public, including sections of roadway off the project where the Contractor's operations have deposited loose material using a power broom that can eject them to the shoulder of the road.

Change items 7 and 8 to 8 and 9, respectively.

Add the following:

10. ET-2000 LET. The price listed in the Traffic Control Rate Schedule will be full compensation for the purchase, installation, maintenance during construction, removal and salvaging the ET-2000 LET unit(s). Deliver the salvaged unit(s) to the nearest DOT &PF Maintenance and Operations' district office, or as directed by the Engineer.

11. Temporary Security Fence. Install, maintain, and remove temporary security fencing, as directed by the Engineer, to maintain Merrill Field Airport security under subsection 105-1.06, Coordination With Utilities. Fencing types may be either continuous 7-foot high minimum, chain link fabric fence installed on embedded posts that is stable enough to prevent entry, or salvaged fencing under item 202(13) that meets the approval of the Engineer. At no time will there be unattended openings in this security fencing during the removal or installation of any permanent fencing or gate relocations. Specific locations for temporary security fencing shall be coordinated with the Merrill Field Airport Manager before beginning work on a particular section.

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: No through lane restrictions are allowed between the hours of 0600 and 2000 daily on the Glenn Highway. The Contractor shall maintain two through lanes of traffic in each direction during this time period.

No left turns shall be allowed except at signalized intersections throughout the life of the Project.

Four full weekend road closures for the entire project will be allowed beginning on Friday at 2000 and ending on Monday 0600. Obtain approval for weekend closures from the Engineer. Full road closures will not be authorized if the Contractor is not scheduled to work continuously. Coordinate with the Glenn Bragaw Interchange Contractor as defined in subsection 105-1.07, Cooperation Between Contractors, for the timing of the road closures. All utility crossings and all water line abandonments/installations shall be completed.

The Contractor shall have three through lanes of traffic in each direction open and operational according to subsection 108-1.06, Contract Time, Extension of Contract Time, And Suspension of Work, 5. Interim Completion.

Obtain the local school bus schedule and coordinate work efforts to ensure the school buses are not delayed through the construction zone. Coordinate restrictions and closures with the Postal Service and the People Mover system. This coordination effort shall be submitted to the Engineer for approval before the implementation of any TCP.

The Contractor's superintendent, together with the Engineer, shall make personal visits to all of the businesses along the corridor to explain the overall construction sequencing plan.

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.

Table 643-3 does not provide a comprehensive list of operations that require lighting. Provide lighting for other operations when necessary.

Table 643-3 Night Work Illumination Level and Area of Coverage

Type of Work/ Equipment	Lighting Configuration
Paving, Milling, Striping, Pavement Marking Removal, Rumble Strip Installation	At least 2 machine mounted balloon lights with a cumulative wattage of at least 4000 watts. Provide additional lights or wattage if necessary to provide complete coverage.
Rolling, pavement sweeping	At least 4 sealed beam halogen lamps in the front and four in the back. Each should be at least 55 watts.
Flagging	Two balloon lights of at least 2000 watts each located within 30 feet of the normal flagger location. Locate one on the right side of the road beyond the flagger and the other on the left side of the road in front of the flagger.
Truck Crossings (meaning where haul vehicles cross or enter a road):	Two balloon lights of at least 2000 watts each, located on the main road, one on the far right side of the intersection, the other on the near left. Locate lights within 30 feet of the edges of the side street. If there is a flagger at the crossing, locate the lights to also meet the requirements for flagging.
1) with roads with ADTs over 10,000 or	
2) that are controlled by portable signals or flaggers	

Use balloon lighting as the main light sources. Do not use floodlights without prior approval by the Engineer. When approved, install floodlighting in a manner that minimizes glare for

motorists, workers, and residents living along the roadway. Locate, aim, louver, and/or shield light sources to achieve this goal.

The Engineer shall be the sole judge of when glare is unacceptable, either for traffic or for adjoining residences. When notified of unacceptable glare, modify the lighting system to eliminate it.

If the Contractor fails to meet required lighting equipment or provides lighting that creates unacceptable glare at any time, the Contractor shall cease the operations that require illumination 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. Locate mounting brackets and fixtures so they do not interfere with the equipment operator or overhead structures. Connect fixtures securely in a manner that minimizes vibration.

Ensure ground, trailer, and equipment mounted light towers are sturdy and freestanding without the aid of guy wires. Towers shall be capable of being moved to keep pace with the construction operation. Position ground and trailer mounted towers and trailers to minimize the risk of being impacted by traffic on the roadway or by construction traffic or equipment.

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

Furnish each side of nonstreet legal equipment with a minimum of 75 square inches high intensity retroreflective sheeting in each corner, so at least 150 square inches of sheeting is visible from each direction. Provide red sheeting on the rear of the equipment and yellow sheeting elsewhere.

Existing street and highway lighting and conventional vehicle headlights do not eliminate the need for the Contractor to provide lighting meeting the requirements of Table 643-2.

Provide sufficient fuel, spare lamps, spare generators, and qualified personnel to ensure that required lights operate continuously during nighttime operations. Ensure generators have fuel tanks of sufficient capacity to permit operation of the lighting system for a minimum of 12 hours. In the event of failure of the lighting system, discontinue the operation until the required level and quality of illumination is restored.

Maintain a supply of at least 20 emergency flares for use in the event of emergency or unanticipated situations. Comply with local noise ordinances.

Provide NCHRP 350-compliant breakaway bases for post mounted electroliers located within the clear zone. ES14(03/15/06)

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, High Visibility Clothing.

1. Exceptions.
   When workers are inside an enclosed compartment of a vehicle, they are not required to wear high visibility clothing.

2. Condition.
   Furnish and maintain vests, jackets, coveralls, rain gear, hard hats, and other apparel in a neat, clean, and presentable condition. Maintain retroreflective material to Level 2 standards. (5/07/07)E56

643-3.12 TEMPORARY ELECTROLIERS.

Location. When the Contract includes item 643(41), 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 then 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.

Lighting Plan. 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 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 AASHTOYs "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.

Poles. 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 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 clew 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 643(41) Temporary Electrolier. Replace fixed base poles that are located within the clear zone and that will remain in service after October 1 with yielding base poles at no expense to the State.

Load Centers

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 the Plan location.
2. Existing load centers scheduled to remain intact until completion of the project.
3. Relocate and reuse existing load centers only if approved.

4. 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 appwved load centers are unavailable.

643-3.13 TEMPRORARY SIGNAL SYSTEMS. Provide temporary traffic signals at the intersections of 5th Avenue and Concrete; 5th Avenue and Reeve Blvd; and 5th Avenue and Airport Heights/Mt. View Drive. Move traffic through these intersections with fully functional traffic signals, 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 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 Systems. May consist of a combination of the existing systems, relocated components of the existing systems, guyed wood poles, and parts of the permanent signal system.

1. 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 at each pole to provide for drip loops and to allow realignment of each signal head
3. Use 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.

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

15. Temporary Security Fence. Measurement shall be for each foot of fencing, installed, maintained and removed.

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

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

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.

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
Temporary Security Fence	Foot	$10.00

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. (05/25/07)R222USC04

Payment for temporary security fence shall be on a contingent sum basis as specified in the table above to install, maintain, and remove temporary security fence as required under subsection 105-1.06 Coordination with Utilities.

Delete Item 643(15) and substitute the following:

Pay Item No.	Pay Item	Pay Unit
643(15) (05/25/07)R222USC04	Flagging	Contingent Sum

Add the following pay item:

Pay Item No.	Pay Item	Pay Unit
643(40)	Temporary Security Fence	Contingent Sum
643(41)	Temporary Electrolier	Contingent Sum
643(42)	Temporary Signal System	Contingent Sum

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 30 days before beginning work, through 30 days after issuance of the notice of project completion as defined in subsection 105-1.15, Project Completion. The Contractor shall maintain the office throughout the winter shutdown period for file and record retention.

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 current 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. Provide a high-speed DSL or cable internet connection.

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.

Standard Modification

644-2.02 FIELD LABORATORY. Add the following to the end of the second sentence of the first paragraph: through one week after Project Completion.

Delete subitem g of item 2 and substitute the following:

g. 500-gallon capacity tank with a pressure pump or a commercial pressurized system.

Replace item 6. a. with the following:

a. Supply 240-volt, 60 hertz power, a 100-pound propane bottle, and a 500-gallon capacity water tank with a pressure pump or a commercial pressurized system for a State provided portable asphalt lab at a location designated by the Engineer.

Add the following:

7. Provide one mobilization and one demobilization of the Engineer's laboratory equipment from Anchorage.

644-3.01 METHOD OF MEASUREMENT. .

Delete the third paragraph and substitute the following:

Vehicle. For each vehicle provided. If a replacement vehicle is necessary, no additional measurement will be made. (02/03/03)R245USC

644-4.01 BASIS OF PAYMENT. Add the following items:

Lump Sum Items. Payment for lump sum items will be made as follows:

1. A percentage of the lump sum amount, to be determined by the Engineer, will be paid as full compensation for furnishing the facility at the site.

2. The balance of the lump sum amount will be prorated over the anticipated active construction period with a portion included as part of each interim payment, for maintenance, repairs, providing all utilities, and for removing it from the site. If anticipated construction period changes, the final increment will be held until final 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.

Electricity, propane, and water supplied for the State provided portable asphalt lab will not be paid for separately, but will be subsidiary to Item 644(2), Field Laboratory. (01/11/07)R63USC

Add the following new Section:

SECTION 645
TRAINING PROGRAM

Special Provisions

645-1.01 DESCRIPTION. This Training Special Provision implements 23 CFR 230, Subpart A, Appendix B.

As part of the Equal Employment Opportunity Affirmative Action Program, provide on-the-job training aimed at developing full journey status in the type of trade or job classification involved. The number of individuals to be trained and the number of hours of training to be provided under this contract will be as shown on the bid schedule.

645-2.01 OBJECTIVE. Training and upgrading of minorities and women toward journey status is the primary objective of this program. Enroll minorities and/or women, where possible, and document good faith efforts prior to the hire of non-minority males in order to demonstrate compliance with this Training Special Provision. Specific good faith efforts required under this Section for the recruitment and employment of minorities and women are found in the Federal EEO Bid Conditions, Form 25A-301, items 7.b, 7.c, 7.d, 7.e, 7.i, 7.j and 7.l, located in the "yellow pages" of this document.

645-3.01 GENERAL. Determine the distribution of the required number of apprentices/trainees and the required number of hours of training among the various work classifications based upon the type of work to be performed, the size of the workforce in each trade or job classification, and the shortage of minority and female journey workers within a reasonable area of recruitment.

Training will be provided in the skilled construction crafts unless the Contractor can establish before contract award that training in the skilled classifications is not possible on a project; if so, the Department may then approve training either in lower level management positions such as office engineers, estimators, and timekeepers, where the training is oriented toward construction applications, or in the unskilled classifications, provided that significant and meaningful training can be provided. Some offsite training is permissible as long as the training is an integral part of an approved training program and does not comprise a significant part of the overall training.

Credit for offsite training hours indicated above may only be made to the Contractor where the apprentices/trainees are concurrently employed on the project and one or more of the following occurs: contribute to the cost of the training, provide the instruction to the apprentice/trainee, or pay the apprentice's/trainee's wages during the offsite training period.

Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training.

Prior to award of the Contract, submit Form 25A-311, Training Utilization Report, indicating the training program to be used, the number of apprentices/trainees to be trained in each selected classification, the number of hours of training to be provided, and the anticipated starting time for training in each of the classifications.

Training must begin within 2 weeks of the anticipated start date(s); unless otherwise authorized by a Directive. Such authorization will be made only after submission of documentation by the Contractor, and approval by the Engineer, of efforts made in good faith which substantiate the necessity for a change.

Contractors may use a training program approved by the U.S. Department of Labor, Bureau of Apprenticeship & Training (USDOL/BAT), or one developed by the Contractor and approved prior to contract award by the Alaska Department of Transportation and Public facilities (ADOT&PF) Training Program Representative, using Form 25A-310.

The minimum length and type of training for each classification will be established in the training program selected by the Contractor. Training program approval by the Department for use under this Section is on a project by project basis.

It is expected that each apprentice/trainee will begin training on the project as soon as feasible after start of work utilizing the skill involved and remain on the project as long as training opportunities exist or until training has been completed. It is not required that apprentices/trainees be continuously employed for the duration of the Contract.

If, in the Contractor's judgment, an apprentice/trainee becomes proficient enough to qualify as a journey worker before the end of the prescribed training period and the Contractor employs that individual as a journey worker in that classification for as long as work in that area remains, the individual's training program will be considered completed and the balance of training hours required for that apprentice/trainee shall be waived.

Furnish each ADOT&PF training program trainee a copy of the program (Form 25A-310) to be followed during training on the project, and with a written certification showing the type and length of training completed on the project. Existing USDOL/BAT apprentices should already have a copy of their program. No employee shall be employed for credit as an apprentice/trainee in a classification in which that employee has previously worked at journey status or has previously completed a training course leading to journey status.

Periodically review the training and promotion potential of minority and women employees and shall encourage eligible employees to apply for such training and promotion.

Provide for the maintenance of records and the furnishing of periodic reports documenting the progress of each apprentice/trainee. Submit Form 25A-313 by the 15th of each month and provide each ADOT&PF trainee written evaluation reports for each unit of training provided as established on Form 25A-310.

645-3.02 WAGES. Trainees in ADOT&PF approved training programs will be paid prevailing Davis-Bacon fringe benefits plus at least 60 (but less than 100) percent of the appropriate minimum journey rate specified in the Contract for the first half of the training period, at least 75 (but less than 100) percent for the third quarter of the training period, and at least 90 (but less than 100) percent for the last quarter of the training period. Trainee wages shall be identified on Form 25A-310. Apprentices in USDOL/BAT training programs shall be paid in accordance with their approved program. Beginning wages of each trainee/apprentice enrolled in a Section 645 Training Program on the project shall be identified on Form 25A-312.

645-3.03 SUBCONTRACTS. In the event a portion of the work is subcontracted, the Engineer shall determine how many, if any, of the apprentices/trainees are to be trained by the subcontractor. Any such subcontracts shall include this Section 645, Form 25A-311 and Form 25A-310, where appropriate. However, the responsibility for meeting these training requirements remains with the Contractor; compliance or non-compliance with these provisions rests with the Contractor and sanctions and/or damages, if any, shall be applied to the Contractor according to subsection 645-5.01, Basis of Payment.

645-4.01 METHOD OF MEASUREMENT. The Contractor will be credited for each approved apprentice/trainee employed on the project and reimbursed on the basis of hours worked, as listed in the certified payrolls. There shall be no credit for training provided under this Section before the Contractor's submittal and approval by the Engineer of Form 25A-312 for each apprentice/trainee trained under this Section. Upon completion of each individual training program, no further measurement for payment shall be made.

645-5.01 BASIS OF PAYMENT. Payment will be made at the contract unit price for each hour of training credited. Where a trainee or apprentice, at the Contractor's discretion, graduates early and is employed as a journey worker according to the provisions of subsection 645-3.01, the Contractor will receive payment only for those hours of training actually provided.

This payment will be made regardless of other training program funds the Contractor may receive, unless such other funding sources specifically prohibits the Contractor from receiving other reimbursement.

Payment for training in excess of the number of hours specified on the approved Form 25A-311, may be made only when approved by the Engineer through Change Order.

Noncompliance with these specifications shall result in the withholding of progress payments until good faith efforts documentation has been submitted and acceptable remedial action has

been taken.

Payment will be at the end of the project following the completion of training programs approved for the project. No payment or partial payment will be made if the Contractor fails to do the following and where such failure indicates a lack of good faith in meeting these requirements:

1. provide the required hours of training (as shown on the approved Form 25A-311),
2. train the required number of trainees/apprentices in each training program (as shown on the approved Form 25A-311), or
3. hire the apprentice/trainee as a journey worker in that classification upon completion of the training program for as long as work in that area remains.

Failure to provide the required training damages the effectiveness and integrity of this affirmative action program and thwarts the Department's federal mandate to bring women and minorities into the construction industry. Although precise damages to the program are impractical to calculate, they are at a minimum, equivalent to the loss to the individuals who were the intended beneficiaries of the program. Therefore, where the Contractor has failed, by the end of the project, to provide the required number of hours of training and has failed to submit acceptable good faith efforts documentation which establishes why the Contractor was unable to do so, the Contractor will be assessed an amount equal to the following damages to be deducted from the final progress payment:

Number of hours of training not provided, times the journey worker hourly scale plus benefits. The journey worker scale is that for the classification identified in the approved programs.
S16(10/29/91)

Payment will be made under:

Pay Item No.	Pay Item	Pay Unit
645(1)	Training Program, __ Trainees/Apprentices	Labor Hour

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. R261M98(12/13/02)

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 your operations shall at all times be in accordance with the Engineer's instructions. These instructions by the Engineer shall be to your 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, 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 all 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 each 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.

All 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.

All equipment shall be fully operated, which shall be understood to include the operators, oilers, tenders, fuel, oil, air hose, lubrication, repairs, maintenance, insurance, and all 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. All personnel furnished by you shall be, and shall remain during the work hereunder, employees solely of you.

Furnish, without direct compensation, a job superintendent or your 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 you and involved in the performance of the work. Also, 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 in accordance with the instructions of the Engineer, and with recognized standards and efficient methods.

Furnish equipment, tools, labor, and materials in the kinds, number, and at times directed by the Engineer and shall commence, 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, six (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 your representative at the end of each shift, and a copy will be provided to your 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 hours paid must also be supported by Certified Payroll. 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 for Item 647(5), Rubber-Tired Backhoe, 45-hp Minimum shall be full compensation for furnishing, operating, maintaining, servicing and repairing the equipment, and for all incidental costs related to the equipment. Furnishing and operating of equipment of heavier type, larger capacity, or higher wattage than specified shall not entitle you to any extra compensation.

Payment will be made under:

Pay Item Number	Pay Item	Pay Unit

647(5)	Rubber-Tired Backhoe, 45-hp Minimum	Hour

SECTION 660
SIGNALS AND LIGHTING

Special Provisions

660-1.01 DESCRIPTION. Add the following: This work shall also include furnishing and installing a wireless intercom as detailed on the plans.

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.

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 2-½ inches around 2-inch conduits and at least 2 inches

around conduits larger than 2 inches, and to compact the bedding and backfill materials according to these specifications.

To install conduits, excavate trenches deep enough to allow for 6 inches of bedding material, the depth of the largest conduit, and the minimum burial depth specified between the top of the conduit and finished grade of the ground above the conduit. Keep the longitudinal profile of trench bottoms free of irregularities that would prevent the assembled conduit run from continuously contacting the top of the bedding material.

Dispose of, according to subsection 203-3.01, excavated materials that remains after completing backfill work and excavated material not meeting the requirements of Selected Material, Type C, as defined in subsection 703-2.07.

Dewater 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 Department's Maintenance Station located at 5300 East Tudor Road. Notify the district superintendent at 338-1436 one-week before planned delivery date.

Salvage the controller assemblies, signal heads, mounting brackets, luminaires, lighting standards, signal posts and poles, mast arms, optical detectors, load centers, light emitting diode optical units, and the lids of junction boxes scheduled for removal and other materials scheduled for relocation. The Contractor shall replace at the Contractor's expense salvaged equipment damaged or destroyed before or during delivery or reinstallation.

Controller assemblies and load centers include the cabinet and equipment contained in the cabinet before Contract award.

Remove from the highway right-of-way materials associated with the equipment removed or relocated and not scheduled for reuse, including conduits, junction boxes, conductors, and foundations. Raze the tops of foundations abandoned in place according to subsection 660-3.02. Fill the holes left by removing junction boxes and foundations with selected material type A and compact as directed.

With approval, after removing conductors, buried conduits that do not interfere with other construction may be abandoned in place with a credit taken by the Department. Remove the ends of abandoned conduits from the junction boxes that will remain in service.

Within 15 days of the Notice to Proceed, complete an inventory of the materials that will be salvaged in the presence of the Engineer. Note the location and condition of the materials. When material specified for reuse is found in an unserviceable condition, the Engineer will determine whether to repair it or replace it with new material, which will be paid for as extra work under subsection 109-1.05. Retain a copy of the inventory and give the original documents to the Engineer.

When the Plans specify reinstalling existing equipment at new locations and installing State furnished equipment, complete the following work at the Contractor's expense.

a. For poles, install new foundations, furnishing the new nuts, bolts, washers, and conduits needed to complete the installations.
b. For lighting poles, install new illumination tap wires and fused disconnect kits.
c. For luminaires, clean the luminaires inside and out and install new lamps of the same wattage.

d. For signal heads, furnish and install the mounting brackets needed to complete the relocation, and clean the signal heads inside and out.

e. For poles and undisturbed poles from which the Plans specify removing equipment, repair the holes that were made to mount equipment according to subsection 660-3.01.4. Welding and repair the finishes according to subsection 660-3.01.8.

When ordered, the Engineer will pay for repairing damaged finishes on existing equipment according to subsection 660-3.01.8 as extra work.

If deciding to use new equipment rather than reusing the equipment specified, notify the Engineer of the change and include a submittal according to subsection 660-2.01.1.

7. Field Tests. Electrical circuits must pass the following tests before the Engineer will accept the work for payment. Perform these tests in the presence of the Engineer, and document the results of each test on a per circuit basis. Retain a copy of test results and give the original documents to the Engineer. Furnish equipment needed to perform these tests.

Replace or repair at the Contractor's expense, and in an approved manner, faulty materials and work revealed by these tests. After making repairs, repeat tests on the repaired circuit and continue this process until circuits have passed required tests. The Department reserves the right to have the Contractor retest circuits, and to use the retest results to accept or reject individual circuits.

a. Grounds. Before completing the circuitry and functional tests, physically examine conduits ends, junction box lids, load centers, and the foundations for signal posts and poles, lighting poles, and controller cabinets to ensure the grounding system required by subsections 660-3.06 and 661-3.01 has been installed and splices and connections are mechanically firm.

b. Continuity. Test each loop detector circuit for continuity at the roadside junction box before splicing the loop detector to the lead-in cable. Each loop detector must have a resistance less than 0.5 ohms.

After splicing the loop detectors to the lead-in cables, test each pair at the controller or detector cabinet. Each pair must have a value less than 5 ohms for single pair lead-in cables and 10 ohms for multipair lead-in cables. The continuity test ohm reading at the cabinet must be greater than the ohm reading measured for the loop detector at the junction box.

c. Insulation Resistance (megohm) Test. Complete this test to verify the integrity of each conductor's insulation after pulling the conductors and cables into position

and before terminating the conductors. At 500 volts DC, each conductor's insulation shall measure a minimum resistance of 100 megohms or the minimum specified by the manufacturer. With single conductors, complete the test between each conductor and ground. In each multiconductor cable, complete the test between conductors and between each conductor and ground.

After splicing the loops to the shielded pairs in the lead-in cables, measure each pair in the lead-in cables at the controller or detector cabinet between one conductor and the cabinet ground rod.

d. Inductance Test. Measure each detector loop and lead-in cable system at the controller or detector cabinet. The inductance must be in the range of 50 to 500 microhenries.

e. Circuit. Energize every signal indication circuit with lamps installed before installing the load switches.

f. Functional. Perform the following tests on each signal and lighting system after the component circuits have satisfactorily passed the tests for continuity, grounding, insulation integrity, and circuitry.

1) For each new traffic signal system, complete at least 24 hours of flashing operation, followed by not less than 5 days of continuous, satisfactory operation. The Engineer may decide to omit the flashing portion of the test for modified signal systems and for new signals that replaced existing signals that remained in operation during the construction phase.

If the Engineer omits flashing operation and the system performs unsatisfactorily, correct the condition and repeat the test until the system runs for five days with continuous, satisfactory operation.

Begin the signal functional tests between 9:00 a.m. and 2:00 p.m. on any day, except a Friday, Saturday, Sunday, a legal holiday, or the day before the legal holiday.

Before each system turn on, aim signal faces according to subsection 660-3.08 and ensure equipment specified in the Plans is installed and operable, including: pedestrian signals and push buttons; signal backplates and visors; vehicle detectors; highway lighting; and regulatory, warning, and guide signs.

2) Perform the functional test for each highway lighting system and sign illumination system until the systems burn continuously 5 days without the

photocell, followed by a 5-day operational test using the photocell.

3) Perform the functional test for each flashing beacon system for not less than 5 days of continuous, satisfactory operation.

4) Perform a continuous 5 day burning test on each pedestrian overpass and underpass lighting system before final acceptance.

A shut down of the electrical system due to a power interruption does not constitute discontinuity of the functional test if the system functions normally when power is returned.

8. Repairing Damaged Finishes. Examine new, reused, and State furnished equipment for damage to its finish before putting the equipment into service. Repair the damaged finishes found according to the following:

a. Galvanized. Repair damaged areas more than 12 inches away from welds and slip fit areas, by applying a minimum 7.8 mils of zinc based alloy applied according to ASTM A780.

If the damaged areas are within 12 inches of welds and slip fit areas, make the repair by applying a minimum 7.8 mils of zinc rich paint applied according to ASTM A780.

b. Painted. Repair damage to painted finishes according to the following:

1) Wash the equipment with a stiff bristle brush using a solution containing two tablespoons of heavy-duty detergent powder per gallon of water. After rinsing, wire brush surfaces to remove poorly bonded paint, rust, scale, corrosion, grease, or dirt. Remove dust or residue remaining after wire brushing before priming.

2) Factory or shop cleaning methods may be used for metals if equal to the methods specified herein.

3) Immediately after cleaning, coat bare metal with pretreatment, vinyl wash primer, followed by 2 prime coats of zinc chromate primer for metal.

4) Give signal equipment, excluding standards, a spot finishing coat on newly primed areas, followed by 1 finishing coat over the entire surface.

5) Give nongalvanized standards 2 spot finish coats on newly primed areas.

Paint coats may be applied either by hand brushing or by approved spraying machines. Perform the work in a neat and workmanlike manner. The Engineer reserves the right to require the use of brushes for the application of paint, should the work done by the paint spraying machine prove unacceptable.

Add the following new item 9:

9. Regulations and Code. Complete work according to the standards of the NEC, the NESC, and local safety codes as adopted and amended by the authority having jurisdiction.

660-3.02 FOUNDATIONS. Under item 1. Cast-in-Place Foundations., add the following to the first paragraph: Locate the tops of traffic signal post and pole foundations flush with the adjacent finished: walkway, shoulder, or surrounding ground.

1. Cast-in-Place Foundations. In subparagraph f, revise the second sentence to read: Before placing the form or reinforcing steel cage, remove loose material from the bottom of the hole to ensure the foundation rests on firm, undisturbed ground.

In the second sentence of sub-item i delete "prior to grouting." and substitute "before attaching the skirt."

In the first sentence of sub-item j, delete "concrete pile caps" and substitute "foundations"

Delete item k and add the following new items k and l:

k. Install the bottoms of the bottom leveling nuts in a level plane within 1 inch of the top of foundations. Adjust all nuts until their tops form a level plane. Install one washer on top of all leveling nuts and, after setting the pole on these washers, install one washer under all top nuts.

Bring 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 2-½ 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 1-¼ 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 2 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-inch 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 1,000 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-foot 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 and combination, standard controller phasing, pedestrian pushbutton isolation, MMU, circuit breaker/fuse operation, telemetry operation, loop panel/detector rack operation, EVP operation and, proper police and 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(1X) Traffic Signal System Complete and/or 660(XX) Traffic Signal System Modifications.

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-inch x 13 bolts, with washers, threaded into holes tapped into the side of the pole at the location shown on Standard Drawing T-30. Install the vertical pipe members plumb.

   When installing 5-section vertically stacked signal heads on the sides of poles, secure the vertical pipe to the pole using a steel conduit hanger mounted 6 inches below the top horizontal pipe.

   Aim through phase vehicular signal faces at a point located a distance from the face as shown in Table 660-2. If two through signal faces are not visible from this point at a height of 42 inches above finished grade, consult the Engineer for corrective measures.

TABLE 660-2

THROUGH PHASE SIGNAL FACE AIMING POINTS

85th Percentile Speed (mph)	Minimum Visibility Distance (feet)
20	175
25	215
30	270
35	325
40	390
45	460
50	540
55	625
60	715

4. Pedestrian Signal and Push Button Installation. Orient pedestrian signal faces at the center of the crosswalk on the opposite side of the street. Attach each clamshell bracket with two ½-inch 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.

660-3.09 MAINTAINING EXISTING AND TEMPORARY ELECTRICAL SYSTEMS. Delete this subsection in its entirety and substitute the following: This work consists of protecting and maintaining the existing and temporary electrical systems during the life of the contract. The work includes: locating, repairing, replacing, adjusting, realigning, cleaning, and relocating components of traffic signals, lighting systems, and flashing beacons to keep them wholly operational and positioned according to the following specifications.

If the existing lighting system 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.

Furnish photoelectric control units that consist of a light sensitive element connected directly to a normally closed, single-pole, single-throw, control relay free of intermediate amplification. For highway lighting, use horizontal or zenith type sensing units that:

a. Operate at voltages between 120 and 277 volts AC, 60 Hz,
b. Handle loads up to 1,800 volt-amperes
c. Operate at temperatures from -40 °F to +150 °F
d. Consume less than 10 watts of power
e. Feature a 3-prong, EEI-NEMA standard, twist-lock plug
f. Turn-on between 1 and 5 footcandles and turn-off at light levels between 1.5 and 5 times those at turn-on.

Measurements must meet the procedures in EEI-NEMA *Standards for Physical and Electrical Interchangeability of Light-Sensitive Control Devices Used in the Control of Roadway Lighting.*

Receptacles. Furnish twist lock type, phenolic resin receptacles set in one of the following cast-aluminum adapters.

a. For photoelectric controls installed on signal poles and load centers, furnish a mounting adapter with a threaded connection that fits conduit outlet bodies threaded for ½ inch rigid metal conduit, General Electric model MB-PECTL or approved equal.

b. For photoelectric controls installed atop lighting poles (with mast arms), furnish a pole top adapter: equipped with a terminal block, made to slip over the ends of poles 3½ to 4½ inches in outside diameter, and secured by set-screws, General Electric model PTA-PECTL or approved equal.

Furnish 3-inch wide screens that reach the top of photoelectric control units to prevent artificial light from interfering with normal photoelectric control operation. Furnish screens constructed of 0.063-inch minimum thick aluminum meeting ASTM B 209, alloy 3003-H14.

Under Equipment List(s) and Drawings, replace item 1 and the last sentence in item 3 with the following:

1. Materials on the *Approved Products List*: The Approved Products List does not apply to the 661 items. Provide catalog cuts of materials to the Engineer for review and approval.

3. Materials Not Requiring Certification: Only submit these materials for review and approval if they are included on the Materials Certification List (MCL).

661-3.01 CONSTRUCTION REQUIREMENTS. Delete the 11th paragraph, and substitute the following: Install two ground rods at least 6 feet apart at each load center. Connect the neutral

bus to the ground rods with a soft drawn bare copper conductor sized per the NEC, 6 AWG minimum. Bond non-current carrying metal parts in each load center to the ground bus. At Type 1 load centers, install one ground rod inside the base, readily accessible though the removable cover, and the second ground rod outside the base. Route the grounding electrode conductor to the second ground rod through one of the knockouts.

Delete the 12th paragraph, and substitute the following: Install photoelectric controls at the locations indicated. Orient photoelectric control units to face the north sky. Install a screen to prevent artificial light from interfering with normal photoelectric control operation.

For photoelectric controls installed on load centers, install a Myers hub in a cabinet wall shielded from traffic. To the hub, attach an assembly that consists of a type LB conduit body, a length of conduit, and a type C conduit body. Fabricate the conduit at least 3 feet long and locate the photoelectric control a foot above the top of the load center. Mount the photoelectric control adapter on the type C conduit body. Install a conduit hanger to brace the top of the conduit.

For photoelectric controls installed on signal poles, install a Myers hub in the center of the rain cap. Attach a type C conduit body to the hub with a close nipple. Mount the photoelectric control adapter on the conduit body. Use five conductor 14 AWG wire to connect the photoelectric control to the load center.

For photoelectric controls installed on electroliers, install a pole top adapter. When the photoelectric control is on a lighting standard with a slip base or frangible coupling style base, use an approved breakaway disconnect in the base of the light standard. Restrain the cable in a similar manner as the illumination cable in the pole base. Use five conductor 14 AWG wire to connect the photoelectric control to the load center.

661-5.01 BASIS OF PAYMENT. Add the following:

Payment of fees required by the local authority for an electrical inspection and the costs of correcting the deficiencies noted during the inspection shall be considered incidental to the Section 661 items.

Payment for Item 661(3) Load Center, Type 2, shall be subsidiary to Item 622(16) Anchorage Welcomes You Structure.

Add the following new Section:

SECTION 662
SIGNAL INTERCONNECT

Special Provisions

662-1.01 DESCRIPTION. This item consists of the work required to furnish and install signal interconnect in conduit between the controller assemblies shown on the Plans along the route indicated or on a route as directed by the Engineer.

662-1.02 REGULATIONS AND CODE. Complete the work according to these Specifications and Section 660, Signals and Lighting. The Department requires third party certification for high density polyethylene conduit that is 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 a 2-inch polyethylene conduit.

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. 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, etc. 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 polyethylene conduits at least 30 inches below finished grade.

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 1A 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.

Furnish the controller cabinets with terminal blocks for the interconnect cable.

662-3.02 EXCAVATING AND BACKFILLING. Backfill the excavations according to Section 204, Structure Excavation for Conduits and Minor Structures.

The Engineer will not allow ripping or plowing for installation of conduit. Backfill around the polyethylene conduit with a 6-inch lift of material free of rocks exceeding a 1 inch maximum dimension.

662-4.01 METHOD OF MEASUREMENT. The Engineer will measure signal interconnect by the linear foot from the center of junction box to center of the next junction box, following the slopes of the existing ground.

662-5.01 BASIS OF PAYMENT. The contract unit price paid per linear foot for signal interconnect constitutes full compensation for furnishing work required to complete the work specified. Terminal blocks for the interconnect cable shall be paid under Item 660(1) Traffic Signal System Complete. (06/21/06)R67USC02

Payment will be made under:

Pay Item No.	Pay Item	Pay Unit
662(1)	Signal Interconnect	Linear Foot

Add the following new Section:

SECTION 669
AUTOMATED TRAFFIC RECORDERS

Special Provisions

669-1.01 DESCRIPTION. This work shall consist of furnishing and installing eleven automated traffic recorder stations.

An Automated Traffic Recorder (ATR) station is a vehicle detection system and may contain a traffic volume counter, an Automated Vehicle Classifier (AVC), and/or other equipment. ATRs are operated and maintained by personnel of the Highway Data Section (HDS); main office located at 2200 E. 42nd Ave., Anchorage, phone (907) 269-0876.

A simple form of ATR consists of inductive loop sensors connected to a traffic counter. In each traffic lane, an inductive loop is buried beneath the pavement. Lead wires run from the sensors to a type CBA1 cabinet located at the side of the road. At the type CBA1 cabinet, the lead wires connect to the traffic counter. A portable, battery-operated traffic counter that detects passage of vehicles and stores the data for later retrieval collects traffic volume information.

A typical AVC consists of inductive loop and piezoelectric sensors connected to a traffic counter. In each traffic lane, two inductive loops are separated by a specific travel distance and buried beneath the pavement. A single piezoelectric sensor is located between them, embedded in the pavement surface. Lead wires run in underground conduit from the sensors to a type CBA2 cabinet located at the side of the road. Inside the type CBA2 cabinet, the lead wires connect to the traffic counter. The traffic counter detects the presence and speed of passing vehicles from inductive loop signals. The traffic counter detects axle number and center-to-center axle spacing from piezoelectric signals. Presence, speed and axle passage information is processed by the traffic counter to classify the number and type of vehicles, which is stored for later retrieval.

ATR stations may be equipped with a Temperature Data Recorder (TDR), which consists of temperature sensors connected to a datalogger. Sampled conditions may include air temperature, pavement profile temperatures and subgrade profile temperatures. Temperature sensors send voltage signals to the datalogger. Sensor voltage levels are processed by the datalogger to yield temperature information that is stored for later retrieval.

The locations of traffic detection sensors and cabinets, shown on the plans are approximate and the Engineer shall establish the exact locations in the field.

669-1.02 REGULATIONS AND CODE. Materials and workmanship shall conform to the standards of the Underwriter's Laboratories, Inc. and the National Electrical Safety Code and local safety code requirements, where applicable.

Electrical equipment shall conform to the standards of the National Electrical Manufacturer's Association, where applicable.

669-2.01 MATERIALS. Materials provided shall be new, unless otherwise stated, and shall meet the following requirements:

1. Wiring. Wiring shall be according to subsection 660-3.05, Wiring. Single wire conductors and cables shall have clear, distinctive and permanent markings on the outer surface throughout the entire length giving the manufacturer's name or trademark, the insulation type-letter designation, the conductor size, voltage rating and the number of conductors if a cable. Wires and cables must be home run labeled in each junction box and cabinet; for example, W1SLA (for wire) and GaSLA (for cable) as shown on the plans.

2. Conduit. Conduit shall be according to subsection 660-3.03, Conduit. Conduit, except for PVC conduit forming the inductive loops, shall be galvanized rigid metal. Grounding bushings shall be plastic-sleeved to minimize the potential for insulation damage during wire pulls.

3. Junction Boxes. Junction boxes shall be according to subsection 660-3.04, Junction Boxes. The covers of junction boxes used for loops or sensor wires shall be labeled 'TRAFFIC'. The covers of all junction boxes used to provide electrical service to ATR installations shall be labeled 'ELECTRIC'. Junction boxes for 120V/240V electrical service shall be kept completely separate from junction boxes containing loop or sensor wiring

4. Terminal Blocks. Terminal blocks shall have nickel, silver or cadmium plated brass binder-head screw terminals. Terminal blocks shall be a barrier type, rated 600 VAC at 20 Amps, sized for 12-18 AWG wire with removable shorting bars in each position and with integral type marking strips.

5. Presence Loops. Presence loops shall be according to subsection 740-2.05, Conductors. Conductors used for detector presence loops shall be UL listed as IMSA specification #51-5-1984 single conductor PVC nylon with tube jacket, type THHN, #14 AWG.

   Multiple pair loop lead-in cable shall consist of twisted pairs of 18AWG stranded tinned copper wire. Each twisted pair shall have its own 20AWG tinned copper drain wire. An aluminum foil shield shall surround each individual bundle of twisted pair and drain wire. Multiple pair loop lead-in cable shall have an overall PVC or PE outer jacket.

6. Electrical Load Centers. Electrical Load Centers shall be NEMA Type 3R and provide a 120/240V 2.5KVA single-phase, three-wire-circuit electrical service.

7. Style CBA1 Cabinets. Cabinets shall meet or exceed a NEMA Type 3R rating. Style CBA1 cabinets shall meet the following requirements:

   Cabinet Construction. The cabinet and hinged door shall be constructed from sheet aluminum alloy, and shall be unpainted with a smooth exterior finish. Welds shall be neatly formed and free of irregularities. Inside and outside edges of the cabinet shall be free of burrs. Provide cabinet with aluminum mounting plate as shown on the plans.

8. Style CBA2 Cabinets. Cabinets shall meet or exceed a NEMA Type 3R rating. Cabinets shall be third party certified as an assembly. Style CBA2 cabinets shall meet the following requirements:

   a. Cabinet Dimensions. Unless otherwise shown on the plans, the cabinet shall be 48-in high, 27-in wide, and 16-in deep.

   b. Cabinet Construction. The cabinet and door shall be constructed from 5052-H32 or better sheet aluminum alloy with a minimum thickness of 1/8-in. The cabinet shall be unpainted, with a smooth grain finish on the exterior. Welds shall be neatly formed and free of cracks, blow holes and other irregularities. Inside and outside edges of the cabinet shall be free of burrs. The cabinet shall be designed with a sloped top to prevent the accumulation of water on its top surface.

   c. Door. The door opening shall be double flanged on all four sides to prevent dirt and liquids from entering the enclosure when the door is opened. A door restraint shall be provided to prevent door movement in windy conditions. The cabinet door shall be a minimum of 80% of the front surface area and shall be hinged on the right side when facing the cabinet. The door shall be furnished with a gasket that satisfies the physical properties found in UL508 table 21.1 and shall form a weather tight seal between the cabinet and the door. The hinge shall be continuous and made either of stainless steel or of minimum of 1/10-in thick aluminum. The hinge shall either be securely welded along a quarter or more of its length, or bolted to the cabinet utilizing stainless steel bolts and non-slip nuts.

   d. Latch/Lock. The latching mechanism shall be a 3-point draw roller type. The center catch and pushrods shall be either stainless steel or cadmium plated, Type II Class 1, equal or better. Rollers shall have a minimum

diameter of 3/4-in and will be made of nylon. A stainless steel operating handle shall be furnished with a 3/4-in shank. The lock shall be a Corbin #2 lock keyed to match existing Highway Data Section (HDS) cabinets. Two keys shall be furnished with each lock.

e. Ventilation. Ventilation shall be provided with louvered vents in the front door with a removable air filter. Louvers shall satisfy the NEMA rod entry test for 3R ventilated cabinets. The filter shall cover the vents and shall be held firmly in place with bottom and top brackets and a spring-loaded top clamp. Exhaust air shall be vented out between the top of the cabinet and the door.

f. Shelves. Adjustable equipment shelves shall be mounted on "C" mounting channels inside of cabinet and be supported on both sides. There shall be 2 vertical channels mounted on both sides of the cabinet and on the back, for a total of 6 inside each CBA2 cabinet. Shelves shall be constructed from 5052-H32 or better sheet aluminum alloy with a minimum thickness of 1/8 inches. The shelf depth shall be a minimum of 10.5 inches. Shelves shall be adjustable to within 4 inch of the bottom and to within 8 inches of the top of the cabinet.

g. Keyboard Tray. A retractable tray shall be mounted as shown in the plans.

h. Terminal Blocks. Terminal Blocks shall be mounted horizontally as shown in the plans.

Style CBA2 cabinets which include electrical service shall also meet the following requirements:

i. Circuit Breaker Panel. The circuit breaker panel shall conform to the UL67 and NEMA PB1 standards. The circuit breaker panel shall be an MLO, Two-Pole, 3 wire configuration, rated 40 Amp (minimum) 120/240 Volts, in a NEMA Type 2 enclosure with separate neutral and ground buses. Circuit breakers shall consist of two 20 amp single-pole types with a minimum short-circuit interrupting rating of 10,000 AIC. Circuit breaker #1 will serve the utility and equipment receptacles, and circuit breaker #2 will serve the thermostatically controlled outlet, cooling fan, and cabinet light.

j. Transient Voltage Surge Protection. Transient voltage surge protection, rated minimum 500 Volts at 3000 Amps, shall be integral to the circuit breaker panel, or integral to each individual circuit breaker.

k. Interior Light. The interior light fixture shall be a fluorescent, 120 volt single-tube lamp rated 13 watts minimum with ballast that will start the lamp at temperatures of 0°F. A single pole, illuminated toggle switch, mounted inside of the cabinet door, will control the light.

l. Cooling Fan. A thermostatically controlled fan in the top of the cabinet shall operate at a settable high temperature limit and exhaust air through a filtered and hooded vent at the top front of the cabinet. Any integral Thermostat will be set at a temperature lower than the thermostat noted in item 0 below so that the auxiliary thermostat controls the fan, and not any integral thermostat.

m. Thermostatically Controlled Outlet. A thermostatically controlled single duplex outlet shall operate at a settable low temperature limit.

n. Thermostats. Thermostats for the thermostatically controlled outlet and cooling fan shall be remote bulb types with SPDT contacts rated for 16 amps @ 120 VAC for combined motor and resistive loads. Thermostats shall be Tradeline T6031A1029 (equal or better), White-Rogers, Johnson Controls, or Sunne brands. Thermostats for the "Thermostatically Controlled Outlet" shall have a contact that closes on lowering temperature and set at 35°F. The thermostat for the "Cooling Fan" shall have a contact that closes on rising temperature and set at 90°F. Mount sensing bulbs as shown on the Plans.

o. Conduit, Raceway and Layup. Wiring for 120V equipment including circuit breaker panelboard, light, vent fan, and power receptacles shall be in EMT, liquid tight metal flex conduit or metal clad. Other low voltage wiring shall be terminated on terminal blocks and neatly trained within cabinet using wiring duct or ties.

p. Certification. The Cabinet Assembly consists of the cabinet itself and high voltage (greater than 24 volts) components that are permanently installed, including the circuit breaker panel, receptacles, light and fan as shown on the drawings or described herein. The Contractor shall obtain certification that the cabinet and associated permanently installed equipment, as a unit, complies with recognized applicable national standards through an authorized local or national testing agency or fabrication shop that complies with ANSI Z34.1-1987 "Third-Party Certification Programs for Products, Processes, and Services", including but not limited to; Electrical Testing Laboratories (ETL), Underwriters Laboratories (UL), Canadian Standards Association (CSA), Electro Test Incorporated (ETI), or other

certified testing agency recognized by the Labor Standards & Safety Division of the State of Alaska Department of Labor.

9. Pavement. Pavement materials shall meet the following requirements:

   a. Asphalt Pavement. Materials used for asphalt pavement shall conform to Section 401, Asphalt Concrete Pavement, Type II and shall be approved by the Engineer.

   b. Concrete Pavement. Materials used for concrete pavement shall conform to Section 501, Structural Concrete, and the amendments contained herein.

10. Environmental Sensors. The Contractor shall provide environmental sensors.

   a. Road Temperature Thermocouple. The Datalogger Road Temperature Thermocouples shall be equal to or better than a Campbell Scientific Model 105-L100 Road Temperature Thermocouple.

   b. Air Temperature Thermocouple. The Datalogger Air Temperature Thermocouple shall be equal to or better than a Campbell Scientific Model 107-L50 Air Temperature Thermocouple.

   c. Radiation Shield. The Datalogger Air Temperature Thermocouple Radiation Shield shall be equal to or better than a Campbell Scientific Model No. 41301 6-Plate Gill Radiation Shield.

   Environmental Sensors are available from:

   Campbell Scientific, Inc.
   815 W. 1800 N
   Logan, Utah 84321-1784

   http://www.campbellsci.com

   voice: (801) 753-2342
   fax: (801) 752-3268

11. Vertical Temperature Probes. The vertical temperature probes shall be equal to or better than an MRC Model TP101 temperature probe. The temperature probes shall meet the following requirements:

   a. Thermistors. Total of 16 thermistors. Each thermistor shall be accurate to ± 0.2 °F.

b. Top Thermistor. Thermistor number one shall function at the end of a 1-ft lead connected to the top of the temperature probe.

c. Thermistor Placement. Thermistors shall be placed along the length of the probe at 3" spacing for first 12". Thermistors shall be placed along the length of the probe at 6" spacing from 12" to 72".

d. Connection Cable. The interface cable shall project radially from the top of the temperature probe. The interface cable shall have sufficient length (minimum of 100') to reach the cabinet without splices (does not require 4-prong plug)

Vertical Temperature Probes are available from:

Measurement Research Corporation
4126 4th Street NW
Gig Harbor, WA 98335

voice: (206) 851-3200

669-3.01 CONSTRUCTION REQUIREMENTS.

1. Wiring.

   a. Referenced Requirements. Wiring shall be installed according to subsection 660-3.05, Wiring.

   b. Termination. At junction boxes, unused pairs shall be terminated within splices. At cabinets, unused pairs shall be terminated to a terminal block. At terminal blocks, conductors, including unused spares, shall terminate and be soldered to "spade" type terminal lugs.

   c. Relief. Wiring shall have at least 2-ft of slack cable in each junction box and at least 6-ft of slack cable available in the equipment cabinet before the terminal block.

   d. Labeling. Wiring shall be labeled in junction boxes and at terminal blocks.

2. Conduit.

   a. Referenced Requirements. Conduit shall be installed according to subsection 660-3.03, Conduit, or as indicated on the plans.

b. Pull Cords. Nylon pull cords shall be left in conduits larger than 1 inch and in spare conduits.

c. Bushings. Plastic or plastic-sleeved bushings shall be in place before wire pulls are performed.

3. Junction Boxes.

a. Referenced Requirements. Junction boxes shall be installed according to subsection 660-3.04, Junction Boxes, or as indicated on the Plans.

b. Voltage Limitation. Junction boxes used for ATR installations shall not contain any wiring of systems at or greater than 24 V or conduits carrying wiring of systems at or greater than 24 V.

4. Terminal Blocks.

a. Terminal Block Placement. Terminal blocks within cabinets shall be mounted so that terminals are easily accessible from the front of the cabinet.

b. Labeling. Terminal blocks and wire pairs shall be clearly labeled on the block.

c. Termination. Conductors, including unused spares, shall terminate and be soldered to "spade" type terminal lugs.

5. Presence Loops.

a. Referenced Requirements. Presence loops shall be installed and constructed according to subsection 660-3.05, Wiring, unless otherwise specified on the Plans.

b. Placement Design Adherence. The plans are not schematics; installation of the presence loops shall closely conform to the location and layout of conduit runs shown in the Plans.

c. Presence Loop Dimensions. Unless otherwise noted, presence loops shall be formed of four turns of wire, and shall be 6 ft square with plus-or-minus 1 inch (± 1 inch) tolerance.

d. Presence Loop Dimensions for On-Ramps and Off-Ramps. Presence loops in On-Ramps and Off-Ramps shall be formed of four turns of wire, and shall be rectangular 8 ft. wide and 6 ft. long with plus or minus 1 inch (± 1 inch) tolerance.

e. Lead-in Conduit. Lead-in conduit from edge of pavement to the presence loops shall be straight and perpendicular to the centerline of the road.

f. Presence Loop Alignment. Presence detector loops shall be centered in the traffic lane plus or minus 1 inch (± 1 inch) tolerance.

g. Presence Loops in Asphalt.

1) Presence Loop Interval. Unless otherwise noted on the plans, presence loops in a lane shall be located 16-ft from leading edge to leading edge with plus or minus 1 inch (± 1 inch) tolerance. Presence loops located in adjacent lanes shall be aligned within plus or minus 1 inch (± 1 inch) tolerance.

2) Presence Loops In Existing Asphalt. Presence loops installed through existing asphalt pavement shall be installed using full lane width cuts a minimum of 8 ft. length. Inductive loops shall be centered in the 8 ft. cut and spaced a minimum distance of 1 ft. from the edge of the cut. Edges of the cuts shall be heated and tack coated during patching to ensure full adhesion. Full-width patches shall be rolled sufficiently to ensure compaction equal or better than the existing asphalt, and to prevent edge ridges or settling of the patch from 'telegraphing' through the final lift asphalt.
Compaction tests shall be required at the discretion of the Project Engineer.

3) Presence Loops In New Asphalt. Loops installed in new asphalt paving shall be installed immediately before final paving of the particular section of road. Installation of loops after final lift paving shall not be permitted.

h. Presence Loops in Concrete.

1) Presence Loop Placement. Unless otherwise noted on the plans, presence loops in a lane shall be located 24-ft from leading edge to leading edge with plus or minus 1 inch (± 1 inch) tolerance. Presence loops located in adjacent lanes shall be aligned plus or minus 1 inch (± 1 inch) tolerance.

2) Presence Loop-Install Concrete Saw Cutting. Saw cutting for inductive detector loops shall not be performed until after the Project Engineer confirms that the PCC pavement has been ground, straight edged and brought into tolerances as provided in these Special Provisions and subsection 501-3.09.3, Finishing Concrete Surfaces: Concrete Decks. A diagonal cut shall be placed 6 inch inside each square corner of presence loop slots cut into the PCC pavement. These diagonal cuts allow avoidance of sharp corners and bends that may damage the presence loop wire. The Contractor will not begin sawcutting until the Engineer approves the sawcutting method. Slot cuts in the pavement shall be washed clean, blown out and thoroughly dried before installing presence loop wire. After the loop wire is placed, the sawcut shall be filled with 3M epoxy loop sealant or an approved equal.

6. Piezoelectric Sensors.

a. Manufacturer's Recommendations: Piezoelectric sensors shall be installed according to AVC equipment and piezoelectric sensor manufacturer's recommendations. Piezoelectric sensor installations will be observed and approved by the piezoelectric sensor manufacturer's representative, or a piezoelectric sensor manufacturer-certified installation technician.

b. Placement Design Adherence. The plans are not schematics; installation of the piezoelectric sensors shall closely conform to the location and layout of conduit runs shown in the plans.

c. Sawcut Requirement. Piezoelectric sensors shall be installed in sawcut slots in final pavement. "Blockouts" shall not be used.

d. Coaxial Cable. Coaxial cables shall be run to the equipment cabinet without splices and terminated on the specified terminal block, with at least 6 ft. of slack cable available in the equipment cabinet before the terminal block.

e. Lead-in Conduit. Lead-in conduit from edge of pavement to the piezoelectric sensors shall be straight and perpendicular to the centerline of the road. Lead-in conduits for piezoelectric sensors shall be installed and capped at the sensor end with tape or sealant before paving. Lead in conduits shall extend beyond the edge of the pavement. Lead in conduit runs to junction boxes and cabinets may be completed before or after paving.

f. Piezoelectric Sensor Alignment. Unless otherwise noted, Piezoelectric Sensors shall be centered in the traffic lane plus or minus 1 inch (± 1 inch) tolerance.

g. Piezoelectric Sensor Alignment for Shouldered Lanes. Piezoelectric Sensors in Shouldered Lanes shall be offset from centerline toward the outside shoulder. Piezoelectric Sensors in Shouldered Lanes shall extend 1 foot beyond the fog line plus or minus 1 inch (± 1 inch) tolerance.

h. Piezoelectric Sensor Interval. Unless otherwise noted, each piezoelectric sensor shall be centered in the travel interval between that sensor's adjoining inductive loops. Piezoelectric sensor placement shall be within plus or minus 1 inch (± 1 inch) tolerance.

i. Piezoelectric Sensor Replacement In Existing Pavement. Any piezoelectric sensors and epoxy to be replaced shall be completely removed by sawcutting. Sawcuts for piezoelectric sensor removal shall be straight and square. Sawcut slots resulting from piezoelectric sensor removal shall be filled with the same type epoxy as used to install piezoelectric sensors. Epoxy patched sawcut slots shall be formed by grinding to match the pavement surface profile.Replacement piezoelectric sensors shall be centered 1 ft. from the original location of removed sensors, offset in the direction opposite of lane traffic flow.

j. Piezoelectric Sensors in New Asphalt. Piezoelectric sensors installed in new asphalt pavement shall be installed only after final paving and three day's normal traffic use of the particular section of road.

k. Piezoelectric Sensor Install Concrete Saw Cutting. Saw cutting for piezoelectric sensors shall not be performed until after the Project Engineer confirms that the PCC pavement has been ground, straight-edged and brought into tolerances as provided in these Special Provisions and subsection 501-3.09.3, Finishing Concrete Surfaces: Concrete Decks. The Engineer shall approve the sawcutting method before beginning cutting. Saw cuts in the pavement shall be washed clean, blown out and thoroughly dried before installing piezoelectric sensors.

7. Cabinets.

a. Cabinet Placement and Orientation. Cabinets shall be installed out of the clear zone and with the doors facing away from the road.

b. Conduit Entry. Conduits entries for any above-ground enclosure shall be made through the bottom of the enclosure. No conduit runs shall be cut through the sides or top of any above-ground enclosure.

c. Style CBA1 Cabinets.

1) Mounting. The Style CBA1 cabinets shall be mounted on a 2.5 inch perforated steel tube and supported with a sleeved concrete foundation as shown on the plans.

2) Terminal Blocks. Terminal blocks in CBA1 cabinets shall be mounted vertically as shown on the plans.

d. Style CBA2 Cabinets.
Mounting. The Style CBA2 cabinets shall be mounted on 4 inch GRMC or DN100 galvanized pipe and supported with a reinforced concrete foundation as shown on the plans.

8. Utilities.

a. Electrical. The Contractor shall provide and install the Load Center according to the plans, specifications and the requirements of the appropriate Electrical Utility. Wiring from the Load Center to the equipment in the cabinet shall be provided and installed by the Contractor. The Contractor shall request inspection of the Load Center by the Department of Labor, Division of Mechanical Inspection (DOL/DMI). After approval of the Load Center by the DOL/DMI, the Contractor shall inform the Resident Engineer as to when electrical service is needed at the Load Center, with sufficient time to schedule the installation with the Electrical Utility before commissioning of the equipment. The Electrical Utility will provide service to the Load Center upon request of the Engineer.

b. PSTN (public switched telephone network). The Telephone Utility will provide and install a Network Interface Device (NID) in or near the Cabinet. Underground wiring for telephone service shall be provided and installed by the Telephone Utility. The Contractor shall provide and install a type RJ-11 telephone jack inside the Cabinet, and shall install all wiring to connect the telephone jack with the NID. The Contractor shall inform the Engineer as to when telephone service is needed at the telephone jack, with sufficient time to schedule the installation with the Telephone Utility before commissioning of the equipment. The Engineer will make arrangements in writing with the Telephone Utility to install and connect the NID. The Engineer will inform the Contractor of the telephone number at the NID.

9. Asphalt Pavement Smoothness: There shall be no transverse seams, joints or roughness within 50 ft. of any inductive loops placed in asphalt pavement section. The finished surface of the asphalt shall be tested with a straightedge 10 ft. long. The surface shall not vary more than ¼ inch from the lower edge of the straightedge within 50 ft. of sensors at the ATR installations. At the discretion of the Engineer, a profilograph equipped with a chart recorder shall be run along each wheelpath of each lane. The profilograph will be supplied by the Highway Data Section and shall be operated by Contractor personnel. Each profilogram shall extend 50 ft. beyond either end of the ATR installation. The asphalt surface as recorded by the chart recorder shall not vary more than ¼ inch within 10 ft. of distance.

10. Concrete Pavement Smoothness: The Portland Cement Concrete pavement smoothness shall be done according to subsection 501-3.09.3, Finishing Concrete Surfaces: Concrete Decks.

11. Field Inspection. Before installation of conduit, wiring, inductive loops, bending plate equipment, piezoelectric sensors, temperature sensors or cabinets, the Contractor shall notify the Engineer. Notification shall be given in writing, through the Project Engineer, a minimum of 3 working days before installation (excluding Saturday, Sunday and State or Federal Holidays). The Engineer shall be present to approve the installation before final burial or encasement. Any unacceptable installations shall be corrected and re-inspected for completeness before burial or encasement. Any burial or encasement without approval by the Engineer shall be uncovered, removed, and/or replaced at the Contractor's expense. Any expense or delay in the project scheduling will be the responsibility of the Contractor.

669-3.02 ACCEPTANCE TESTING. The Contractor shall perform acceptance testing on all ATR installations.

1. General Tests. The Contractor shall perform tests for the ATR installations according to subsection 660-3.01.7, Field Tests.

2. AVC Acceptance Tests.

   a. Scope and Governance. In addition to the General Tests, the Contractor shall perform Acceptance Tests on all AVC installations. AVC Acceptance tests govern acceptance or rejection of the AVC installation.

   b. Manufacturer Participation. Acceptance tests shall be observed and assisted by the AVC counter manufacturer's representative, or an AVC counter manufacturer-certified installation technician.

c. Engineer Participation. The Engineer shall be on-site during final acceptance testing. The Contractor shall provide documentation of the test vehicle's gross weight and measured axle spacing to the Engineer before testing. The Engineer must approve the test vehicle before testing. The Engineer must approve the scheduling of data sampling and testing for each lane before testing.

d. Results Certification. The Engineer shall certify in writing when the installation has met the accuracy requirements of the acceptance tests.

e. Acceptance Test Procedure. The contractor will perform the Acceptance Tests as follows:

The Contractor shall acquire a set of test data for the AVC sensor array. Test data shall be obtained by passing a test vehicle over the AVC sensors in each lane. Test data shall consist of 10 valid samples per lane for the test vehicle. Test data samples will include FHWA class designation and computed axle spacing for each sensor pass.

To be considered valid, sample data must be obtained under the following conditions:

1) The test vehicle must maintain good lane discipline while traversing the entire sensor array.

2) The test vehicle must maintain a constant speed, between 40 mph and the maximum speed limit, while traversing the entire sensor array.

3) Data for a particular lane must be acquired using the same vehicle.

4) Sample data must be from successive sensor passes of the test vehicle. Data may not be omitted or included out of order for any 10 samples.

f. Accuracy Requirements. The Automated Vehicle Classifier must meet the following requirements separately in each lane:

1) The AVC system correctly assigns FHWA class designation for 9 out of 10 successive sensor passes of the test vehicle.

2) The AVC system computes axle spacings to within 6-inches of the actual measurements, for 9 out of 10 successive sensor passes of the test vehicle.

g. Test Vehicle. The Contractor shall provide, and arrange for, the test vehicle and drivers as needed for the acceptance testing.

The test vehicle shall be a five-axle, 18-wheel, single trailer vehicle (FHWA Class 9), with high-cube-rated (HCR) trailer.

h. Class 9 Vehicle. The Class 9 vehicle shall meet the following requirements:

1) spacing between the steering axle and the drive axle group of 11.3 to 24.6 feet
2) spacing between the drive axles of 3.5 to 6.0 feet
3) spacing between the drive axle group and the trailer axle group of 6.1 to 46.0 feet
4) spacing between the trailer axles of 1.1 to 40.0 feet

i. Vehicle Loading. The Contractor shall ensure that the test vehicle is loaded with non-shifting material to a minimum of 50% of legal load during testing.

j. Tire Inflation. The Contractor shall ensure that all tires on the test vehicle are inflated to recommended pressures during testing.

k. Weighing Method. The gross weight of the test vehicle and the weight of the test vehicle's axle groups shall be determined by weighing on a static scale at a scale house operated by the State of Alaska Department of Commerce, Division of Weights and Measures.

An axle group is defined as any two axles whose centers are within 8 feet of each other.

A Class 9 single trailer test vehicle has three axle groups.

669-3.05 DELIVERABLES. Deliverables shall be submitted to the Engineer before final approval of the work or as otherwise called for herein.

1. Materials Submittal.

a. Format and Contents. The Contractor shall provide a Materials Submittal of proposed equipment and materials for the ATR installations. The Materials Submittal shall consist of three collated copies of an equipment and materials portfolio. Each identical portfolio shall contain information of sufficient detail to determine the suitability of the equipment and materials proposed.

b. Table of Contents. Each portfolio shall include a table of contents listing each item's intended uses, item description, product name, manufacturer, model or part number and reference to associated information within the portfolio.

c. Reference Drawings. The Materials Submittal shall include a detailed shop drawing of each equipment cabinet showing the location of all mounted components.

d. Delivery Interval. The Materials Submittal shall be delivered for review and approval of the Engineer within thirty days following award of the contract.

e. Liability. The State of Alaska will not be liable for any materials purchased, labor performed, equipment used or delay to the work before all equipment and materials have been reviewed and approved.

2. Utility Schedule.

a. The Contractor shall provide a Utility Schedule identifying actions required to ensure activation of electrical and telephone service before installation and commisioning of ATR equipment at affected sites. The Utility Schedule shall consist of three collated copies of the lists of action items.

b. A separate list of chronologically and sequentially organized actions will be created for each affected ATR station.

c. On the lists, each action item shall include:

1) a description of the action
2) when the action will occur
3) the name, employer, position title and telephone number of the point of contact for initiating the action
4) the name, employer, position title and telephone number of the party responsible for completing the action.

d. The Utility Schedule shall be delivered for review and approval of the Engineer within thirty days following award of the contract.

3. As-Built Plans.

a. The Contractor shall prepare four complete sets of as-built plans that will be current with the construction. These as-built plans shall detail all construction changes made to the ATR design and include the following information on the appropriate sheets:

1) location and depth of all inductive loops, piezo sensors, conduit runs and scales

2) locations of all equipment cabinets and junction boxes

3) station and offset of all junction boxes

b. Three sets of as-built plans shall be presented to the Engineer, and one set shall be affixed to the inside of the cabinet door at the appropriate Automated Traffic Recorder Installation in a waterproof, clear plastic holder.

c. Redlines of full size construction plans will be acceptable as-builts.

4. Photographs.

a. The Contractor shall provide photographic prints, 35 mm negatives and Kodak Picture CD format CDROMs documenting sensor installations.

b. Photographs, negatives and CDROMs shall be delivered organized in one or more white colored, D-ring style, 3 ring binders with clear insert overlays on fronts and spines. Photographs and negatives will be mounted in archival quality polypropylene pocketed sheets. CDROMs will be placed in CD storage sheets inside the binders.

c. The photographs shall be 5 in. x 7 in. color prints.

d. Each photograph shall be labeled with the identification of its subject. ATR station and device designation as indicated on the plans will be used as identification whenever possible (example: H1-W1NLA). Labels will be photographed with the subject and will be rendered large enough to be read with the unaided eye.

e. The photographs shall show the inductive loops and conduit in place before covering with gravel and pavement for asphalt pavement sites, or before covering with epoxy compound for concrete pavement sites. The photographs shall include:

1) two or more overall views of each ATR installation showing placement of the inductive loops.

2) one or more views of each loop showing the loop and the conduit to the nearest junction box

3) one or more views of each piezo sensor conduit showing the coaxial cable, sawcut, and conduit to the nearest junction box

4) one or more views of each temperature sensor showing the lead cables, sawcut, and conduit to the nearest junction box

5. Test Results.

a. Written or printed copies of the final results of all tests, signed by the Contractor, shall be provided to the Engineer prior to acceptance of the Automated Traffic Recorder Installation. Tests will be conducted in accordance with subsection 660-3.01.7, Field Tests.

c. AVC Test Results.

An AVC Test Report shall be provided to the Engineer before acceptance of the Automated Traffic Recorder Installation.

The AVC Test Report shall include both an electronic copy and a paper copy of the AVC counter's per-vehicle-record log of the AVC tests.

d. The AVC Test Report shall include an electronic copy and a paper copy of the final AVC calibration test data. Included AVC calibration test data shall be sorted by test vehicle, tabulated in a spreadsheet and certified by the AVC manufacturer's representative.

6. Manuals. The Contractor shall provide to the Engineer all installation, repair and operation manuals for all Automated Traffic Recording equipment, telemetry equipment, dataloggers, and environmental sensors.

7. Materials.

a. The Contractor shall provide to the Engineer any ATR equipment, sensors, and all epoxy grout remaining after installation.

b. The Contractor shall palletize the Deliverable Materials.

c. The Contractor shall group the contents of each pallet by like items.

d. The Contractor shall attach to each pallet a sealed plastic pouch containing complete copies of Material Safety Data Sheets that apply to the contents of that pallet.

e. The Contractor shall provide an itemized list of Deliverable Materials. For each item, the list shall detail:

1) Item description: including nature of the item, brand name, manufacturer name, model number, type number and serial number.
2) Item condition
3) Item quantity

f. The Contractor shall provide complete copies of Material Safety Data Sheets that apply to the Deliverable Materials. The Contractor shall attach these Material Safety Data Sheets after the last page of the Deliverable Materials list.

669-4.01 METHOD OF MEASUREMENT. The quantity to be paid for will be the actual number of completed and accepted Automated Traffic Recorder Installations as shown on the plans or as directed by the Engineer.

669-5.01 BASIS OF PAYMENT. The contract unit bid price for all Automated Traffic Recorder installations shall be full compensation for furnishing equipment, labor and materials necessary to complete the work as specified, with the following exceptions:

1. Backfill materials required will be paid for under their respective pay items.

2. Asphalt required will be paid for under a separate pay item.

3. Concrete required will be paid for under a separate pay item.

4. Installation of wiring and service to the Load Center(s) will be paid for under the Utility Agreement for Electrical Service. Installation of wiring and service to the Network Interface Device(s) (NIDs) will be paid for under the Utility Agreement for Telephone Service.

5. Excavation, load centers, as-built plans, the manufacturer's representative and acceptance testing required for these installations will not be paid for separately, but will be subsidiary to the Automated Traffic Recorder Installations.

6. Type II and Type IA J-Boxes, 1-inch rigid conduit, and 2-inch rigid conduit associated with the Automated Traffic Recorders are subsidiary to the 669 items. Traffic Control required to install Automated Traffic Recorders is paid for under 643 items.

1) deliverables have been provided to the Engineer, as required, ensure full compliance under this section

2) and the Highway Data Section has approved the deliverables in writing.

Payment will be made under:

Pay Item No.	Pay Item	Pay Unit
669(1)	Automated Traffic Recorders	Each

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.

All pavement markings, transverse markings, words and symbols, and crosswalks on the following alignments: "E5" E 5th Avenue, "E6" E 6th Avenue, "GH" Glenn Highway, and "APH" Airport Heights/Mountain View Drive shall be inlaid. All other pavement markings, transverse markings, words and symbols and crosswalks for all side-streets and cul-de-sacs, including parking areas, shall be surface applied.

670-3.01 CONSTRUCTION REQUIREMENTS. Delete all paragraphs under item 4. Methyl Methacrylate Pavement Markings. and substitute the following:

a. General. 15 days before starting work meet with the Engineer for a prestriping meeting. At this meeting, do the following:

   1. Furnish a striping schedule showing areas and timing of work, placing materials and the Traffic Control Plans to be used.
   2. Discuss placement of materials, potential problems.
   3. Discuss work plan at off ramps, on ramps and intersections.
   4. Discuss material handling procedures.
   5. Provide copies of the manufacturer's installation instructions and copies of the Material Safety Data Sheets.

b. Manufacturer's Representative. Provide the services of a manufacturer's representative (the "Manufacturer's Representative"). Ensure the Manufacturer's Representative observes the application of the pavement marking materials. Cooperate with the Manufacturer's Representative and the Engineer to ensure that the materials are placed according to these Specifications and the manufacturer's recommended procedures.

c. Manufacturer Certified Installers. Install methyl methacrylate pavement markings using only striping installers certified by the marking materials manufacturer for the specific striping material and method. Submit these certifications to the Engineer at the Preconstruction Conference.

d. Preparation. Prepare the roadway surface to receive methyl methacrylate according to these Specifications and the manufacturer's recommendations. Clean and dry the roadway surface. Completely remove contaminants such as dirt, loose asphalt, curing agents, surface oils, or existing road marking materials before applying pavement marking material.

e. Application. Apply methyl methacrylate marking material according to these Specifications and the manufacturer's recommendations. Use equipment designed and capable of properly mixing at the point and time of application and approved by the manufacturer for the type of product being installed. Unless specified otherwise marking shall be surface applied as defined below.

For longitudinal markings use truck mounted automatic extrusion equipment capable of installing a double centerline and a single shoulder line in a single pass. Use automatic bead applicators that place a uniform layer of beads on the lines. Hand units will not be allowed.

For Transverse markings legends, symbols, and transverse markings use manual or automatic application equipment. Stencils or extruders are required to form sharply defined markings

For inlaid applications use grooving equipment that produces a dry cut. Use vacuum shrouded equipment or other equally effective containment procedures. Install markings in the same work shift as the grooving operation.

(1) Longitudinal Markings Surface Applied. Apply markings for lane lines, edge lines, and centerlines to yield a minimum thickness of 90 mils as measured from the surface of the pavement. Use Type B material, as specified in subsection 712-2.17, Methyl Methacrylate Pavement Markings.

(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. Use Type C material, as specified in subsection 712-2.17. Groove the area for inlaid marking to a depth of 250 mils.

(4) Traverse and Symbol Markings Surface Applied. Apply markings for onlys, arrows, stop bars, gore stripes, and cross walks to yield a thickness of 120 mils as measured from the surface of the pavement. Use Type C material.

f. Disposal of Waste. Waste material becomes the Contractor's property. This includes grindings and removed marking material. Do not dispose of or store stripe removal wastes material or asphalt grindings on State property. Dispose of waste material according to applicable Federal, State, and local regulations.

g. Sampling. On the form provided by the Engineer, 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 new subsection:

670-3.07 TOLERANCES FOR METHYL METHACRYLATE PAVEMENT MARKINGS.

1. Length of Stripe. ± 2 inches.
2. Width of Stripe. ± 1/8 inch.
3. Lane Width. ± 4 inches from the width shown in the Plans.
4. Stripes on Tangent. Do not vary more than 1 inch laterally within a distance of 100 feet when using the edge of the stripe as a reference.
5. Stripes on Curves. Uniform in alignment with no apparent deviations from the true curvature.
6. All Stripes. Keep the center of the stripe within 4 inches from the planed alignment.
7. Double Stripes. ± ¼ inches
8. Thickness of surface applied. Minimum specified to a maximum of + 30 mils.
9. Depth of Inlay Slot. Minimum 250 mils to a maximum of 290 mils.
10. Thickness of Inlaid Marking Material. Fill inlay area completely from the bottom of the inlay to the surface of the pavement.

If it is determined that the material is being placed too thin, or otherwise not to specification, make immediate adjustments to correct the problem.

Methyl methacrylate pavement markings applied by any method will be unacceptable if:

1. The marking is not straight or wide enough.
2. The thickness of the line is not uniform or less than specified.
3. The top of the line is not smooth and uniform.
4. The material is uncured.
5. The material blackens or is inconsistent in color.
6. The inlay slot is not ground to the specified depth.
7. The inlay slot is not filled to the specified depth.
8. The edge of the markings are not clear cut and free from overspray.
9. The reflective elements are not properly embedded.
10. The markings exhibit poor adhesion.
11. The retro-reflectivity of the markings is less than specified.
12. The color is not as specified.

Perform repairs using equipment similar to the equipment initially used to place the materials. Do not perform repairs in a "patch-work" manner. If more than one repair is required in a single 300 foot section, grind and repair the entire section.

670-4.01 METHOD OF MEASUREMENT. 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-inch 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.

Special Provisions

670-5.01 BASIS OF PAYMENT. Add the following: There will be no separate or additional payment for the following:

- Over-runs of material caused by the variation of the gradation of the asphalt.
- Additional material required to achieve the thickness specified an open graded pavement.

Milling for installation of the inlaid markings is subsidiary to 670 items. Payment includes costs associated with this item, including the removal of millings.

Traffic control required for the installation of the permanent and temporary markings is subsidiary to 670 items.

Temporary traffic markings required for all phases of the construction of the roadway is subsidiary to 670 items.

Payment will be made under:

Pay Item No.	Pay Item	Pay Unit
670(10A)	MMA Pavement Markings Longitudinal Surface Applied	Lineal Foot
670(10C)	MMA Pavement Marking Only and Arrow Surface Applied	Each
670(10D)	MMA Pavement Transverse Markings Surface Applied	Square foot
670(10E)	MMA Pavement Markings Longitudinal Inlaid	Lineal Foot
670(10G)	MMA Pavement Markings Only and Arrow Inlaid	Each
670(10H)	MMA Transverse Markings Inlaid	Square Foot

R246usco04(01/04/06)

Add the following new Section:

SECTION 685
UTILITY CROSSINGS

Special Provisions

685-1.01 DESCRIPTION. Furnish all labor, equipment, and materials necessary to construct utility crossings as shown on the drawings, coordinate inspections and acceptance of the work, and provide as-built drawings as described in this section.

685-1.02 COORDINATION. Coordinate with the Engineer to schedule inspections and gain acceptance of each crossing by the appropriate utility company. Advise the owning utility in writing at least seven (7) calendar days in advance of actual conduit crossing work indicating both location and the time the work will be completed. After the crossings are completed, the utility companies will complete the relocation described in Section 105-1.06, Utilities.

The following contacts will coordinate the work for each utility company:

Utility	Contact	Contact No.
Alaska Communications Systems (ACS)	Kelly Ward	564-1424
Enstar Natural Gas Co.	Wade Ellis	334-7744
Municipal Light & Power	Lance Cluff	263-5244

685-1.03 LICENSING REQUIREMENTS. The Contractor doing the actual work for ACS shall be an ACS approved electrical contractor currently licensed by the State of Alaska. All employees of the Contractor installing rigid steel conduit or PVC conduit shall possess a certificate of fitness for electrical work as defined in 8AAC 90.160, AAC 90.165, and 8 AAC 90.170. These requirements do not extend to engineering or supervisory personnel of the Contractor.

Crossings installed for ENSTAR and ML&P are not required to be installed by an electrical contractor, but must meet all other requirements of this section.

685-2.01 MATERIALS. All equipment and material furnished under this section shall conform to the latest applicable specifications and rules of the National Electrical Manufacturers Association, American Standards Association, American Institute of Electrical Engineers and the Federal Specifications cited hereinafter.

All materials shall be new, standard equipment, and the manufacturer's latest design. No manufacturer's second or rejected materials may be used. Where two or more units of the same class of material are required, they shall be like products of the same manufacturer.

Provide all PVC conduit, polyethylene pipe and all fittings, couplings, cements, and required hardware. All PVC shall be Schedule 40. Corrugated polyethylene pipe shall conform to subsection 706-2.07. Culverts and the type of pipe shall be smooth interior wall.

Fittings – PVC conduits and fittings shall be jointed by means of a solvent welding cement to provide a watertight and root-proof joint.

Corrugated polyethylene pipe shall be joined by fittings or couplings supplied or recommended by the pipe manufacturer. Couplings shall be corrugated to match the pipe corrugations and shall provide sufficient longitudinal strength to preserve pipe alignment and prevent separation.

Pipe Caps – All conduit crossings shall be capped upon completion with caps approved by the pipe manufacturer.

Supply and install conduit locator plates as shown on the drawings.

685-2.02 APPLICABLE STANDARDS AND CODES. In order to resolve any questions on safety regulations, installation practices, and testing procedures, consult and become familiar with the applicable parts of the current editions of the following standards and codes:

1. Alaska State Safety Code
2. Arctic and Subarctic Construction – Utilities, US Army Corps of Engineers
3. Electrical Facility Clearance Requirements
4. National Electrical Code
5. National Electrical Safety Code
6. National Electrical Manufacturers Association
7. Occupational Safety Health Act
8. Underwriters Laboratories

685-3.01 GENERAL CONSTRUCTION REQUIREMENTS. The owning utility, through the Engineer, reserves the right to suspend the utility crossing installation at any time that the Contractor fails to meet the requirements set forth herein until such time as the Contractor makes the necessary corrections. Such a suspension of work will not entitle the Contractor to an extension of time for the completion of the project, and will not entitle him to extra payment for costs incurred.

Each utility crossing shall be installed to result in the maximum degree of reliability and maintenance-free operation and must be installed on a continuous grade from end to end in order to allow placement of the utility facilities within the conduits. Kinked ducts, inadequately supported, protected or swabbed ducts, and ducts that are carelessly jointed are not reliable and therefore, unacceptable. At the Contractor's expense, remove and replace any installation that is not accepted by the utility company as required to gain acceptance of the work.

If construction or excavation require the removal of any existing privately owned facilities on the provided easements, coordinate with the owner for reestablishing lawns, driveways, parking lots, etc., at unit bid prices. Any restorative work will be completed as soon as practicable after the installation, but in no case shall the period of time exceed 2 weeks.

All work for ACS shall comply with the ACS General Construction Agreement construction standards.

685-3.02 SURVEYING AND STAKING. Locate and stake all conduit crossings at the elevations indicated on the plans. Schedule a physical inspection of all line and grade prior to placing any conduits. All conduit crossings shall be constructed to within an allowable vertical tolerance of 1 inch, and a horizontal tolerance of 2 inches from the indicated plan location.

685-3.03 CROSSING EXCAVATION. Identify and locate all underground utilities and take proper care not to damage them. Call for field utility location in accordance with subsection 105-1.06, Cooperation with Utilities.

Do not begin trench excavation until all personnel, materials, and equipment are present to complete the work in the most expedient manner. Complete all trenching and backfill operations in conformance with safety requirements.

Provide a foundation of undisturbed non-frost susceptible material for the conduits. All conduits shall be bedded in compacted clean sand. Where directed by the Engineer, over-excavate native material to provide a minimum of 24 inches of non-frost susceptible material under the conduits. Level the bottom of the trench to provide a uniform support for conduits. Trench depth shall be as shown on the plans, and as staked in the field.

Dig trenches of the necessary width to properly use compaction equipment and place conduits. Compact foundation material and trench backfill in 8-inch lifts to 95 percent of the maximum density in accordance with subsection 203-3.03, Embankment Construction, and subsection 203-3.04, Compaction with Moisture and Density Control, up to the bottom of the roadway structural section. Place warning tape at the depths shown on the Plans. Outside and below the structural section, place native backfill material in layers and compacted as approved by the Engineer. Do not permit construction activity or traffic across any trench until a minimum depth of 3 feet of fill above the conduits has been placed and compacted.

Provide written notification to the owning utility when a utility crossing is ready for an acceptance inspection at least 24 hours in advance. The Contractor, the Engineer, and the appropriate utility company shall mutually agree upon a time for the inspection. Failure of the utility company to attend a prearranged inspection shall not relieve the requirement to have the work accepted by the utility company. However, if additional costs are incurred due to a utility company's failure to attend an agreed-upon inspection, you may submit a request for a contract change order in accordance with subsection 105-1.17, Claims.

685-3.04 CONDUITS. The ends of all conduits, whether shop or field cut, shall be reamed to remove burrs and rough edges. Cuts shall be made square and true so that the ends will butt together for the full circumference.

Place locator plates 6 inches above the top of the conduit at the ends of all crossings.

The clearance between various duct or conduit systems shall be as large as possible to permit maintenance of the system without damage to other parallel systems.

A 3/16-inch diameter polyethylene or polypropylene pull rope, with a minimum breaking strength of 700 pounds, shall be left in each conduit with 3 feet of rope projecting beyond each end of the conduit. Securely tie the rope to the conduit cap in a manner approved by the Engineer. All pull ropes shall be new and without splices.

Determine the most expedient method to complete each utility crossing installation and obtain the Engineer's approval for the plan. All work across the roadway shall be accomplished in accordance with Section 643, Traffic Maintenance.

685-3.10 AS-BUILT DRAWINGS. Provide an as-built drawing for each crossing location. The as-built drawings shall consist of a red-lined markup of the plan sheets, as well as Contractor-furnished cross-section sheets, including the installed station and offset and elevations at each end and at the center. Reference the information to established survey monuments. The Engineer's approval of as-built drawings is required to gain acceptance of the conduit crossing.

685-4.01 METHOD OF MEASUREMENT. Conduit crossings shall be measured by the each, installed and accepted in place at the locations and elevations shown on the plans.

685-5.01 BASIS OF PAYMENT. Payment for conduit crossings will be full compensation for all coordination, labor, equipment, and materials necessary to complete this work including necessary fittings and plugs, pull wires, locator plates, marking tape, and as-built drawings. The unit bid prices will include all necessary excavation to plan grade, placement of specified bedding material, backfill of native materials outside and below the normal lines of the roadway structural section, and any temporary or final paving required. Any excavation of unsuitable material below plan grade shall be paid under Item 203(3), Unclassified Excavation. Borrow, if required, for backfill to replace unsuitable material, will be paid under Item 203(6A), Borrow, Type A.

Payment will be made under:

Pay Item No.	Pay Item	Pay Unit
685(1)	Single Conduit Utility Crossing	Each
685(6)	Multiple Conduit Utility Crossing	Each

SECTION 701
HYDRAULIC CEMENT

Standard Modification

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

SECTION 702
ASPHALT MATERIALS

Special Provisions

702-2.01 ASPHALT CEMENTS. Replace PG 64-28 with PG 64-34.

SECTION 703
AGGREGATES

Special Provisions

703-2.03 AGGREGATE FOR BASE. Delete Table 703-2 and substitute the following:

TABLE 703-2
AGGREGATE FOR UNTREATED BASE
Percent Passing By Weight

Sieve Designation	Grading C-1	Grading D-1	Grading E-1
1 ½ inch	100		
1 inch	70-100	100	100
¾ inch	60-90	70-100	70-100
3/8 inch	45-75	50-79	50-85
No. 4	30-60	35-58	35-65
No. 8	22-52	20-47	23-50
No. 30	10-33	10-26	13-31
No. 50	6-23	6-19	10-26
No. 200	0-6	0-6	8-15

(05/01/06)R199usc04

Replace subsection 703-2.04 with the following:

703-2.04 AGGREGATE FOR ASPHALT CONCRETE PAVEMENT.

Coarse Aggregate (retained on the No. 4 sieve). Crushed stone or crushed gravel consisting of sound, tough, durable rock of uniform quality. Remove all natural fines passing a #4 sieve before crushing aggregates for Type R, 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:

	Type I	Type IIA, IV	Type I, IIB, III	Type V, R	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 %	ATM 306				
5:1		8	8	3	3
3:1		20	-	8	8

	Type I	Type IIA, IV	Type I, IIB, III	Type V, R	Type VH
Nordic Abrasion, max. %	ATM 312			12	8
Absorption, max. %	AASHTO T85	2.0	2.0	2.0	2.0

Fine Aggregate (passing the #4 sieve). For Type IV, V, VH, and R mixes, remove all natural fines passing a #4 sieve before crushing aggregates for this hot mix asphalt. Aggregate consists 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 Fine Aggregate for Type R shall meet the following:

Property	Test Method	Requirement
Uncompacted Void Content of Fine Aggregate (Fine Aggregate Angularity)	AASHTO T 304	45% min.

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	Type R
1 inch	100				100	
¾ inch	80-90	100			100	100
½ inch	60-84	75-90	100	100	65-80	65-80
3/8 inch	48-78	60-84	80-90	80-95	48-60	45-60
No. 4	28-63	33-70	44-81	55-70	30-45	30-45
No. 8	14-55	19-56	26-70	35-50	20-30	20-35
No. 16	9-44	10-44	16-59	20-40	≤22	≤25
No. 30	6-34	7-34	9-49	15-30	≤17	≤20
No. 50	5-24	5-24	6-36	10-24	≤14	≤15
No. 100	4-16	4-16	4-22	5-15	≤12	≤12
No. 200	3-8	3-8	3-8	4-8	3-8	4.0-10.0

Note: For Type R the JMF gradation must provide a minimum of 10 percent difference of percent passing the ¼ inch and the No. 8 sieve. No tolerance is allowed beyond the Broad Band limits of the #200 sieve.

(05/01/07)R199usc04

SECTION 707
METAL PIPE

Standard Modification

Delete subsection 707-2.05 and replace with the following:

707-2.05 DUCTILE IRON PIPE FOR WATER AND SANITARY SEWER.

Ductile Iron Pipe shall conform to the requirements of AWWA C151, with cement mortar lining conforming to the requirements of AWWA C104/ANSI A24.1. Class 52 pipe shall be used for all pipe between three (3) and twenty (20) inches in diameter. The Class for Pipes larger than twenty (20) inches in diameter will require approval by AWWU prior to installation.

Fittings shall be a minimum of 250 pounds pressure rating, mechanical joint or all bell, lined or unlined, either cast iron or ductile iron, unless otherwise required by the Contract Documents. All fittings shall conform to the requirements of AWWA C110/ANSI A21.10. Rubber gasket joints for ductile iron pipe and fittings shall conform to the requirements of AWWA C111/ANSI A21.11.

Delete subsection 707-2.06 and replace with the following:

707-2.06 SERVICE PIPE.

Water service pipe shall be soft-drawn, seamless, annealed copper pipe suitable for use as underground service water connections for general plumbing purposes and shall comply with the requirements of ASTM B88 for Type K soft copper as manufactured by the American Brass Company, or equal.

Delete subsection 707-2.07 and replace with the following:

707-2.07 GALVANIZED STEEL WATER CONDUIT.

Galvanized steel pipe and fittings are not permitted to be used for AWWU water service piping.

Galvanized steel pipe and fittings shall meet the following:

Galvanized Pipe	ASTM A 53 or ASTM A 120, galvanized according to AASHTO 111
Galvanized Fittings	ASTM A 234 galvanized according to AASHTO M 232 E17(6/30/04)

SECTION 710
FENCE AND GUARDRAIL

Special Provision

710-2.03 CHAIN LINK FABRIC. Delete this sentence and replace with the following:

All chain link fencing components shall be black vinyl clad or coated, as manufactured by Merchants Metals (Colorbond II), or an approved equal. Coating shall be Class C and a minimum of 6 mills in thickness. Use 9 gauge, Class 2B wire, 2-inch mesh, 84" high. All fasteners and fittings shall be coated to match the color of the fence fabric.

SECTION 712
MISCELLANEOUS

Standard Modification

712-2.06 FRAMES, GRATES, COVERS, AND LADDER RUNGS. In Gray iron castings, delete text and replace with: AASHTO M 306 and AASHTO M 105, Class 35B. E46(01/27/07)

Special Provisions

Delete subsection 712-2.10 and replace with the following:

712-2.10 GATE VALVES. Gate valves shall be iron body, fully bronze mounted, double disc, parallel or resilient seat valves as manufactured in accordance with the requirements of AWWA C500 "Gate Valves for Water and Sewer Systems." All valves shall be nonrising stem type with an O-ring seal and a two (2) inch square operating nut, and shall open counterclockwise. Valves shall be mechanical joint ends.

Delete subsection 712-2.11 and replace with the following:

712-2.11 VALVE BOXES. Valve boxes shall be cast iron of sliding, adjustable height type with round or oval bottom hood sections to fit over the top of the valve. The top section shall be recessed to receive a close fitting "eared" lid with the word "water" cast into it. Internal diameter of the smallest section shall not be less than five (5) inches. Minimum thickness of the metal shall not be less than five-sixteenth (5/16) inch. Castings shall be smooth and the workmanship shall be acceptable to the Engineer.

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

Delete subsection 712-2.12 and replace with the following:

712-2.12 FIRE HYDRANTS. This subsection consists of "L-Base" Fire Hydrant Assemblies, including the fire hydrant leg pipe, auxiliary gate valve, valve box, steam thaw piping, tie back rods, guard rails, and fire hydrants.

A. Fire Hydrants

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

1. All fire hydrants shall be supplied with a five and one- fourth (5-1/4) inch main valve opening.

2. All single pumper hydrants shall be furnished with a six (6) inch ANSI Class 125 standard mechanical-joint end with two (2) cast-on lugs for tie backs. All double pumper hydrants shall be furnished with an eight inch (8") ANSI Class 125 standard mechanical-joint end with two (2) cast on lugs for tie backs.

3. All connections shall be mechanical-joint unless otherwise indicated in the Contract Documents.

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

5. Unless otherwise required by the Contract Documents, all hydrants shall be furnished with a barrel length that will allow a minimum of ten (10) foot of bury.

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

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

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

9. Operating and nozzle nuts shall be pentagon shaped with one and one-half (1-1/2) inch point to flat measurements.

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

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

12. All hydrants shall be right hand opening (clockwise).

13. All hydrants shall be non-draining.

B. Auxiliary Gate Valves

All gate valves and valve boxes shall be furnished and installed in accordance with subsections 627-3.04 and 627-3.05.

C. Leg Thaw Pipe

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

D. Barrel Thaw Pipe

The barrel thaw pipe shall be installed on the right hand side of the hydrant from six (6) inches above the hydrant leg and extending fifteen (15) inches above finished grade, and installed vertically three (3) inches to the rear and six (6) inches to the side of the traffic flange. The barrel thaw pipe shall be perforated with one-eighth (1/8) inch diameter holes spaced one (1) foot apart starting eighteen (18) inches below finished grade and facing the hydrant barrel. A 1/4" machine screw shall be installed one (1) inch below the cap to provide identification of the barrel thaw pipe.

E. Tie Rods

All tie rods must be three-fourths (3/4) inch O.D. black iron or mild steel.

F. Guard Posts

The contractor shall install guard posts at each hydrant installation in accordance with the MASS Standard Details. If, in the opinion of the Engineer, the guard posts are not to be installed, they shall be delivered to the Anchorage Water and Wastewater Utility storage yard. Measurement and payment for guard posts shall be incidental to the Bid item "Fire Hydrant Installation."

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.
R246usco04(01/04/06)

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.

R52USC(11/06/02)

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. R81USC04(06/22/04)

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 and breakaway signal poles with shaft lengths 10 to 15 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 and the highway lighting and breakaway pole sheets in the Plans. Design and fabricate traffic signal structures to conform to the 2001 Edition of AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals* with interim revisions and the signal pole sheets in the Plans. For the design and fabrication of high tower poles, see subsection 740-2.04.

   A registered professional engineer shall design the structures and provide stamped shop drawings and calculations. Submit the stamped drawings and calculations for each pole to the Engineer for approval. Design for stresses on the completed structure with hardware in place.

   a. In the stamped calculations, indicate the edition of Standard Specifications to which the poles are being designed and provide the input data used to design each pole and mast arm, including: design wind speed, cross section shape, yield strengths of the component materials, dimensions of the pole components, and a summary of the loads used.

   b. On the stamped shop drawings, provide design wind speed and the details for building the poles and mast arms, including: materials specifications, slip fit joint dimensions, pole component dimensions, welds that will be made, and the welding inspection that will be done.

   Submit the mill certifications for the steel items (piles, plates, bolts, and other related items) to the Engineer for approval.

   Design electrolier 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.

Design signal poles for a basic wind speed of 100 mph and Fatigue Category II.

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 and one half (2.5) feet or the overlap specified in the Plans, whichever is greater. 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 D1.1. Fabricate elements greater than ½ inch thick from steel that conforms to AASHTO M270 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 breakaway signal poles 10 to 15 feet long signal posts from 7 US Standard Gage sheet steel. Fabricate each post with a minimum inside diameter of eight inches at the base plate. Use a 4 inch long piece of four inch nominal schedule 40 pipe that conforms to ASTM A 53 Grade B as a post-top adapter.

The Department does not allow holes made for lifting purposes in the ends of tubular segments, except in the free ends of luminaire mast arms. To add lift points, weld them to the tube opposite the longitudinal seam weld on the outside of female segments and on the inside of male segments. Before shipment, remove lift points added to the outside of the tubes, grind the area smooth with the base metal, and hot stick repair the finish according to subsection 660-3.01.8.a. Lift points added to the inside of tubes in place may be left in place.

Hot dip galvanize lighting and signal structures to meet AASHTO M 111 and these specifications. Completely submerge pole and mast arm segments in one dip in a kettle of concentrated zinc ammonium chloride flux solution heated to 130 °F, then completely submerge in one dip in a separate kettle of prime western grade zinc heated to approximately 825 °F. Galvanize bolts and fasteners to meet AASHTO M 232.

After the poles and mast arms are galvanized, remove all excess zinc from all drip lines and points and the surfaces of all tube ends that form slip type joints to provide a smooth finish.

The Department will reject poles and mast arms that are:

a. Not fabricated according to these specifications or the approved shop drawings,

b. Bowed with sweeps exceeding ¾ inch throughout the length of the pole, mast arm, or segment, if furnishing a 2 piece pole or mast arm,

c. Out of round. Sections are out of round when the diameters of round members or the dimension across the flats of multisided members exceed 2 percent of the dimension specified on the shop drawings.

Fabricate pile cap adapters from grade X42 steel line pipe that conforms to API 5L and from steel plate that conforms to ASTM A 709 Grade 50. Attach the anchor plate to the pile section with a complete joint penetration (CJP) weld. Fabricate the anchor plate to match the base plate of the lighting standard.

3. Welding. Perform welding to conform to subsection 504-3.01, 8. Welding, and the following:

a. Make welds continuous. Grind exposed welds flush with the base metal at slip joints, the length of the slip fit joint plus on half diameter of the female section.

b. Use partial joint penetration (PJP) welds in longitudinal seams. PJP welds must provide at least 60% penetration.

c. Use CJP groove welds to connect base plates to tubes with walls 5/16 inch thick and thicker. When CJP groove welds are used, the designer may use additional fillet welds when deemed necessary.

d. Use socket type joints with two fillet welds to connect base plates to tubes with walls less than 5/16 of an inch thick.

e. On steels 5/16 of an inch thick and thicker, inspect 100 Percent of CJP welds by either radiography (RT) or ultrasound (UT).

f. Inspect a random 25 percent of PJP and fillet welds by magnetic particle (MT). If a defect is found, inspect 100% of the PJP and fillet welds made to fill the order. In steels less than 1/8 inch thick, complete the tests according to AWS D1.3.

g. Only visually inspect welds made on luminaire mast arms.

4. Miscellaneous. Finish the edges of poles and mast arms to conform to the following requirements. Before hot dip galvanizing, neatly round the following features to the radius specified

a. On holes through which electrical conductors pass, provide a 1/16-inch radius on both the entrance and exit edges,

b. On pole base plates, provide a 1/8 inch radius on edges along which plate thickness is measured and a smooth finish on all other exposed edges,

c. On the ends of tubes that form slip type joints, complete the following tasks on the two surfaces that contact one another. First, provide 1/16 inch radii on the inside and outside edges of the female and male segments, respectively. Then for the length of the joint plus 6 inches grind down welds until they feature a radius concentric with the mating surface and remove material protruding from the two surfaces, and

d. Grind exposed welds flush with the base metal, except fillet welds and seam welds on top of mast arms. Grinding seam welds on multisided poles is not required, except in slip type joints.

Provide caps to cover the free ends of poles and mast arms.

Identify critical information for poles and arms with visible permanent aluminum tags that contain the information shown in Table 740-1. The measurements shown are for illustration purposes only. Use tags large enough to include required information using ¼ inch high text, 3/8 inch of space between successive lines of text, and at least 3/8 inch of space between the edges of the tag and the text. Secure the tags with two 1/8 inch blind rivets at the base of poles and the under side of mast arms. If furnishing a two piece signal mast arm with slip type joint, mark both pieces with the same message.

TABLE 740-1
POLE MARKINGS
Note: *Italic type indicates additional Tag Markings if poles have 2 luminaire or 2 signal mast arms.*

	MEASUREMENTS	TAG MARKINGS
Signal Poles		
a) Signal mast arm length	45 ft./*55 ft.*	SMA 45/*SMA 55*
b) Luminaire mast arm length	22 ft./*18 ft.*	LMA 22/*LMA 18*
c) Pole height	36 ft.	PH 36
d) Intersection number (if more than one) -pole number		1 - P 4
e) Sum of signal mast arm moments about centerline of signal pole		SM 4000/*SM 3200*
f) Design wind speed	100 mph	DWS 100
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 Spare	Red Orange Green White White/Black	14	Head No.

TABLE 740-2
CONDUCTOR TERMINATION TABLE

CONDUCTORS PER CABLE	CIRCUIT	WIRE COLOR	AWG. NO.	BAND LEGEND
	Vehicle Yellow Arrow Vehicle Green Arrow	Black Blue		
4	Pedestrian Don't Walk Pedestrian Walk	Red Green	14	Head No.
4	Common Neutral Spare	White Black		
4	Pedestrian Pushbutton Neutral Spare Spare	Black White Red Green	14	Head No.
5	Photo Electric Control Load to Contactor Neutral Spare Spare	Black Red White Orange Green	14	PEC
3	Flashing Beacon Neutral Spare	Black White Red	14	Head No.
3	Preemption Neutral Spare	Black White Red	20	"PRE"
3	Preemption Confirmation Neutral Spare	Black White Red	14	"PRECON"
3	Highway Luminaire Highway Luminaire Highway Luminaire Spare	Black Red White	8 or 6	Circuit No. Circuit No.
3	Service to Controller Neutral Spare	Black White Red	6 or 4	"SIG" No Band No Band
3	Sign Luminaire Sign Luminaire Sign Spare	Black Red White	8	SIGN SIGN

Replace Item 7. with the following:

7. Detector Loops. Use No. 14 AWG conductors for detector inductive loops that meet IMSA Specification 51-3, Type RHW/USE, or IMSA Specification 51-5, when called for on the Plans or specified in the Special Provisions.

Replace subsection 740-2.06 with the following:

Replace the first three sentences of subpart (5) Light Fixture. of subitem D. Cabinet Accessories. of item 1. Standard Features. with the following : Mount a third party certified, incandescent luminaire on the inside of each cabinet near the top edge of the door opening. Install white porcelain, surface mounted lamp holders that fit medium base lamps and are rated for a minimum 600 watts and 250 volts ac. Furnish each lamp holder with a 100 watt soft white incandescent lamp.

740-2.12 STANDARD AUXILIARY EQUIPMENT. Under item 3. Conflict Monitors, add the following:

d. Supply conflict monitors with an RS-232 serial port that allows the monitor to download information through an external dial up modem or to a personal computer using the Microsoft Windows NT operating system.

740-2.13 SPECIAL AUXILIARY EQUIPMENT. Add the following items:

1. Preemption Units. Provide preemption that conforms to the requirements of NEMA TS-2, Section 3.7 Preemption and the following:

   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.

   a. The system must be capable of sending a signal to the controller when an Opticom signal from a vehicle-mounted "3M OPTICOM Emitter" has been received and maintained for a period of 1.7 seconds.

   b. Use Opticom Priority Control System Model 792H emitters.

   c. Unless otherwise shown on the Plan use Opticom Traffic Control Systems Opticom Detector Model 721 preemption detectors.

   d. Furnish the appropriate number of Opticom Traffic Control Systems 754 Phase Selectors to meet the number of channels of detection for each intersection. Use rack mounted phase selectors.

   e. When more than one detector is required per phase, furnish the appropriate number of harnesses for the 754 Phase Selectors to handle the auxiliary detection.

   f. 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.

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.

g. The controller, rather than the phase selector or auxiliary logic, must perform interval timing, signal sequences, and phase skips.

h. Mount detectors according to manufacturer recommendations or as approved by the Engineer. Mount and aim detectors to provide maximum emergency vehicle recognition. Detector locations shown on the Plans are approximate and subject to change as directed by the Engineer.

i. When emitters are required, provide 3M Opticom Priority Control System, Model 792H Emitter with 793 in vehicle switch. The Emitter shall be factory programmed to the class and vehicle identification numbers assigned by jurisdiction as shown in the Plans and the following:

1) Class 0 and Vehicle ID. Number 0 shall be disabled for Emitters.

2) Vehicle Id. Numbers shall be sequential, beginning with the lowest number in the EVP Emitter table for the appropriate class.

3) Provide one copy of 790IS Emitter Software Kit including "Y" cable.

4) One 3-M Opticom Portable Emitter Kit with 792R emitter on a magnetic base, 793R switch and cigarette lighter adapter power cord in a "Camera Bag" case.

7. Traffic Logging System. Furnish, and others will install in the controller cabinet, a stand alone unit that collects, time stamps, and stores data in an unattended manner. The traffic logging system shall conform to the following:

a. Operation. The unit shall accept a new operating program, operational parameters, and the date and time stamp from a personal computer, downloaded through an RS-232 cable. The use of replaceable proms to change the operational program is unacceptable. Data collection shall be automatic and not require an operator to reset or start operation.

In the event of a power interruption, data collection shall automatically restart at the proper time. Other than, the current sample being collected, the unit shall not lose stored data because of the power interruption. At power up or at the restoration of power after an outage, the unit shall log the date and time at the start of data collection.

The unit shall maintain the operating program, data storage, and date/time for a minimum of 5 years from when power is removed from the unit. The internal program/data size shall be a minimum of 32,000 bytes.

b. Input Interface. The unit shall have a minimum of 28 inputs. Furnish new and

existing controller cabinet only with a loose Detector Systems TLS-1-C1 interface cable to connect the unit to the output of the loop detector units. The Municipality of Anchorage's Signal Maintenance Section will install the interface cable in the controller cabinets under Item 660(26) Signal System Timing and Adjustments. Do not furnish new controller cabinets with a built in interface panel.

c. Output Interface. Furnish units with an RS-232 serial port that allows a user to download and upload directly between the unit and a personal computer using the Microsoft Windows NT operating system or the external dial-up multi-port modem.

740-2.14 VEHICULAR SIGNAL HEADS. Replace the first sentence of Item 1. b. with the following:

Use red, yellow, and green LED signal modules that meet the requirements of Chapter 2a of *Equipment and Material Standards of the ITE* (Publication ST-0017A), Vehicle Traffic Control Signal Heads (VTCHS2), and the following:

Replace item 4 with the following and add item 5:

4. Backplates. Backplates shall not be louvered. Install backplates around vehicular signal faces except post-mounted flashers. Furnish backplates constructed of 0.063 inch minimum thickness aluminum alloy sheet meeting ASTM B 209, alloy 3003-H14. For those backplates fabricated from 2 or more pieces of sheeting, furnish them fastened together with 3/16" aluminum rivets or bolts preened after assembly.

   For traffic signals that consist of all 8 inch or all 12 inch signal sections, furnish 5 or 5-½ inch wide backplates regardless of where the signals are installed, i.e. on mast arms, on top of posts, or on the sides of poles.

   For traffic signals that consist of combinations of vertically stacked 8 and 12 inch signal sections, furnish backplates with nominal borders of 8 inch for the 8 inch sections and 5 inch for 12 inch sections.

   Furnish backplates with the back and front faces factory finished with 2 coats of dark olive green enamel and 2 coats of flat black enamel, respectively.

5. Signal Mounting Hardware: Furnish elevator plumbizers, elbow pipe fittings, and post top adapters (without a terminal compartment) with integral serrated contacts that feature 72 teeth.

   Provide signal heads that will be mounted on mast arms or pipe tenons with ferrous or bronze elevator plumbizers.

For signal faces installed on the sides of poles, furnish signal frames that consist of watertight assemblies of 1½ inch nominal diameter standard steel pipe, malleable iron or brass pipe fittings, and bronze terminal compartments. The side of the terminal compartment opposite the door shall feature a saddle shape for wobble free mounting on round poles and include a cable guide and two holes for mounting the compartment.

Furnish vehicular signal frames with a horizontal dimension between the center of the terminal compartment and the axis of the adjacent signal face of 22 inches in side mounted frames and 11 inches in post top installations.

Post top adapters shall slip fit over 4 inch nominal standard pipe and feature two rows of three cadmium plated steel setscrews. Furnish post top adapters with terminal compartments, except one way signal heads may be installed on adapters without a terminal compartment provided the adapters include offset openings. Provide post top adapters without a terminal compartment made of cast iron.

Furnish terminal compartments with a terminal block containing 12 poles, each with two screw type terminals. Each terminal must accommodate at least three 14 AWG conductors. Provide terminal compartments with a rain tight door that provide ready access to the terminal block.

For mounting each terminal compartment, furnish two ½" x 13 hot dip galvanized bolts that conform to ASTM A 325 and two ½" hot dip galvanized washers that conform to ASTM F 436.

740-2.15 PEDESTRIAN SIGNALS. Add the following as item 12: Furnish pedestrian signals side mounted on poles with a 2 piece, hinge connected, cast aluminum clamshell bracket that mounts directly between the pole and the side of the housing. The bracket shall fit round poles with outside diameters of 4.5 inches and greater without wobbling and allow a minimum rotation of ±15 degrees when mounted on a 4.5 inch O.D. pole. The bracket shall feature a rain-tight terminal compartment and include a 12 position terminal block. Installed, the bracket shall take less than three inches of space between the housing and pole.

For mounting each clamshell bracket, furnish two ½" x 13 hot dip galvanized bolts that conform to ASTM A 325 and two spacers provided by the bracket manufacturer to keep the bolt head clear of the recess that holds the nut in a through bolted installation.

Replace subsection 740-2.16 with the following:

740-2.16 PEDESTRIAN PUSH BUTTONS. Tamper proof with a 2 inch minimum diameter convex 316 stainless steel actuator button.

Construct a weatherproof assembly designed to prevent an electrical shock under any weather condition and grounded per the NEC.

Push button switch. Furnish Polara model RBDLM2-B-4H or approved equal with the following features. Provide a solid state electronic piezo type, switching unit, with screw type terminals, rated 15 amperes at 125 volts, AC. Must have the following characteristics:

1. Switching unit that is solid state electronic piezo rated for 100 million cycles.
2. Sealed to prevent ice from impeding function.
3. Must hold the call for a minimum of 5 seconds.
4. Switch operating force of 3 pounds or less with no moving plunger or moving electrical contacts.
5. Provide an LED indication and an audible tone or beep within the button when pushed.
6. Must have a raised rim or ridges to protect the button from side impacts.
7. Powder coated cast switch housing of dark olive green or black.

Where a pedestrian push button is to be mounted on top of a 2-1/2 inch diameter post, provide the housing with a slip-fitter with screws for securing to the post.

Factory finish pedestrian push button housings, mountings, brackets and fittings with 2 coats of dark olive green enamel or powder coat. Painting/powder coating is not required where the color is an integral part of the component material.

Replace subsection 740-2.17 with the following:

740-2.17 FLASHING BEACONS. Furnish beacons that consist of one or more traffic signal sections meeting the requirements of subsection 740-2.14 Vehicular Signal Heads. See the Plans for the number, size and color of the signal sections required for each beacon.

Use the flasher in signal controller cabinets to energize beacons that flash continuously and are installed near traffic signals. Otherwise, each flashing beacon controller assembly consists of the following 120 volt ac equipment housed in a NEMA 3R enclosure: a circuit breaker, a radio interference suppressor, a transient voltage suppressor, a NEMA type 3 flasher, neutral and ground busses, and terminal blocks.

Controller assemblies for school zone speed limit sign beacons shall also include a time switch and a second 120-volt ac circuit breaker that protects a thermostat and heater.

The NEMA 3R enclosure shall feature a single shelf and a top hinged cover with a hasp and staple for sealing and locking the cabinet door.

The radio interference and transient voltage suppressors shall meet the requirements of subsections 740-2.11.1.d.(3) and (4), respectively.

Use a solid state NEMA Type 3 flasher meeting the requirements of NEMA Standard TS 1-1989, Traffic Control Systems.

Use 20 ampere, 600 volt barrier type phenolic terminal blocks with plated brass screw type terminals and integral strips can be marked with a pen or pencil.

Furnish an RTC Manufacturing model AP41-L time switch complete with wiring harness, or an approved, calendar programmable, solid-state time switch with liquid crystal display, keyboard, input/output port, and wiring harness. The approved time switch shall:

1. Operate on line voltages from 95 to 135 volts ac, operate in temperatures from -22° F to 165° F, and include a capacitor that provides 48 hours of back up power to retain programming and time when the unit is disconnected from ac voltage.
2. Include a backlit display and provide 2 lines of alphanumeric legend with 16 characters per line. The display shall automatically prompt the operator while programming the device through the keyboard for ease of use.
3. Include an input/output port and keyboard activated special functions that transfer the program to other units and download the program to a printer for a hard copy record of the program.
4. Automatically compensate for changes in Daylight Savings Time and leap years and include a keyboard activated special function to quickly change the dates for the beginning and end of Daylight Savings Time.
5. Provide at least 10 basic plans for daily and/or weekly use and at least 200 program steps that are equally divided amongst the actual number of basic plans. Each program step shall be assignable to a single day, weekend, weekday, or every day. The time switch shall also include 20 plans that activate the basic plans to provide one year of time based control.
6. Include at least 4 single pole double throw, relay controlled outputs rated for 15 amperes of resistive load at 115 volts ac. Each pole shall be independently activated for steady on or momentary on and be manually switched on through the keyboard.

When a signal controller cabinet flasher is used to energize a beacon, furnish a two pole, fused block with built in fuse pullers to protect the flasher. Furnish third party certified blocks that hold 13/32" x 1-1/2" midget ferrule fuses, are rated for 30 amperes, and feature tubular screw terminals that accommodate conductors to 8 AWG. Furnish blocks with two fast acting, 3 ampere (BAF-3) fuses and flat bases that can be directly mounted on a dead panel.

Replace subsection 740-2.18 with the following:

740-2.18 ROADWAY LUMINAIRES. Furnish luminaires that conform the following specifications and provide the light distributions specified. When luminaire performance criteria

are specified, luminaires shall also:

- Meet or exceed the minimum initial light levels indicated.
- Provide light distribution uniformity ratios and veiling luminance ratios equal to or less than the maximums indicated.

When luminaire performance criteria are specified, submit the following information for each luminaire type and light distribution type specified: luminaire specifications, the lumen output of the lamps that will be furnished, and current electronic photometric data to the Engineer for approval. Furnish the photometric data in Illuminating Engineering Society (I.E.S.) format. The Engineer will use software that calculates light levels and uniformity ratios according to the American National Standard Practice for Roadway Lighting, A.N.S.I./I.E.S RP-8 to verify each luminaire provides the light levels, uniformities, and veiling luminance ratios specified.

When cut off distributions are specified, furnish luminaires with flat glass lenses and a full cutoff light distribution as defined in the American National Standard Practice for Roadway Lighting, A.N.S.I./I.E.S RP-8, dated 2000.

Furnish each luminaire with a high pressure sodium lamp of the wattage specified and matching ballast with an input voltage equal to circuit voltage. Furnish lamps that feature a rated life of 24,000 hours based on 10 hours per start and ballasts that conform to subsection 740-2.21.

Luminaries General

Install luminaires that feature:

1. Corrosion resistant enclosures with gray paint finish and space for the ballast.
2. Third party certification for use in wet locations.
3. Glass lenses, unless polycarbonate resin refractors are specified.
4. Terminal blocks for attaching the illumination tap conductors.
5. Aluminum reflectors with an ALZAK or ALGLAS finish.
6. Optical components free of substances that affect photometric performance, e.g. paint.
7. Housings cast with no provision for a photoelectric control receptacle.
8. Airtight reflector and lens units that breathe through activated charcoal filters and include elastomer gaskets to seal the gap between the two components. Gasket material must withstand the temperatures involved and be securely held in place.
9. Plug in starting aids in fixtures with lamps through 400 watts.

Luminaries – Cobrahead

Each cobrahead luminaire shall also include:

1. An easily removed hinged door used exclusively for mounting the ballast.
2. A second door that frames the lens, hinges on the house side, and fastens on the street side with an automatic type latch.
3. A four bolt mounting brackets that fit 2 inch nominal diameter standard pipe and feature a center pivot for leveling the luminaire.

Offset luminaires shall also include knuckle style pole top adapters that are sized to fit 2 inch nominal diameter standard pipe and feature a wire way meeting NEC requirements for installing three size 10 AWG conductors between the pole and the terminal block located in the luminaire.

High Tower Luminaire.

1. A 1,000-watt, high pressure sodium lamp that provide 140,000 minimum initial lumens.
2. A side entry 4 bolt mounting bracket designed for 2 inch nominal diameter pipe with provision for leveling the luminaire.
3. A die cast aluminum housing attached to the mounting bracket, which provides a weather tight enclosure for the ballast and terminal block and is readily removable without removing the luminaire from the bracket arm.
4. A cover and reflector that readily detaches from the mounting bracket without removing the luminaire from the bracket arm.
5. A double fused 480 volt ballast with fuses sized by the luminaire manufacturer.
6. A hinged lens compatible with add on light shields.
7. A stainless steel lamp clamp to prevent lamps from loosening, which is separate from the socket.

When the Plans specify shielding areas from illumination, install light shields on luminaires on high tower poles whose templates touch the shielded areas. Provide shields that limit light levels to 0.1 footcandle or less at the right of way line. Whenever stock shields fail to limit light levels to the 0.1 footcandle level, hire the luminaire manufacturer to custom design and fabricate shields. If the first generation of custom fabricated shields fail to limit light levels to the 0.1 footcandle level, the Engineer may waive the 0.1 footcandle requirement.

Lenses.

When polycarbonate resin lenses are specified, furnish lenses the fabricator certifies conforms to the following criteria.

1. The lenses are molded in a single piece from virgin polycarbonate resin.
2. The lenses are free from cracks, blisters, burns, and flow lines, and furnished with the natural molded surface.
3. The lenses are of uniform density throughout and free from air, gas, or moisture pockets, and uncured areas.
4. The lenses are transparent with a clear bluish tint, produced from ultraviolet stabilized resin to reduce the effects of ultraviolet radiation on their color properties.
5. The resins used meet the requirements for the self extinguishing classification of ASTM D 635 and feature a minimum impact strength, Izod notched of 12 foot pounds per inch when tested according to ASTM D 256, Method A, using a 1/8 inch by ½ inch bar molded according to ASTM recommended practice.

740-2.19 WIRELESS INTERCOM SYSTEM. Furnish only fully functioning new equipment of the brand and type listed or approved equal. To be considered an approved equal, equipment

must meet or exceed the listed specifications. The products listed in this subsection are subject to review and approval if they are included on the Materials Certification List (MCL).

Furnish a Universal Wireless Solutions WireFree Intercom with weatherproof WireFree outdoor intercom accessory. Provide optional AC adapter for indoor base station unit. Approved product shall have the following characteristics:

- 4-channel, 900 MHz operation
- 1,000 foot transmission range
- Digital Spread Spectrum Technology
- Battery operated
- Unlimited unit expansion capability
- Paging, conference, and monitor modes
- Voice Operated Switch (VOX)