PART 4

STANDARD MODIFICATIONS
AND SPECIAL PROVISIONS

to the

STATE OF ALASKA

STANDARD SPECIFICATIONS

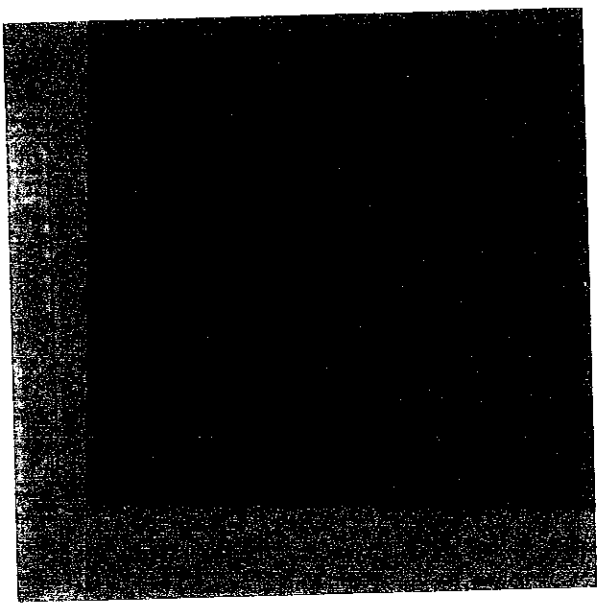
FOR

HIGHWAY CONSTRUCTION

2004 EDITION

Arctic Boulevard Surface Rehabilitation
36th Avenue to Fireweed Lane
IM-0001(340)/57823

Arctic Boulevard HSIP
Benson Boulevard to Fireweed Lane
HHE-0001(283)/55951



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(01/01/06)

SECTION 102

BIDDING REQUIREMENTS AND CONDITIONS

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)

Special Provision

102-1.01 QUALIFICATION OF BIDDERS.

After the last paragraph add the following paragraph:

An Electrical Administrator, or a person whose Electrical Administrator's license is assigned to the Contractor must be employed by the Contractor under AS 08.40 at the time designated for bid opening. ES08(6/30/04)

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(01/01/06)

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SECTION 105

CONTROL OF WORK

Special Provisions

105-1.06 COOPERATION WITH UTILITIES.

Add the following:

Request locates from all the utilities having facilities in the area. Use the Alaska Digline, Inc., Locate Call Center for the following utilities:

ALASKA DIGLINE, INC. **Locate Call Center** Anchorage Area 278-3121 Statewide 800-478-3121	
who will notify the following:	
ACS	Homer Electric Assoc.
Aircraft Service International Group	Interior Telecom.
Alaska Fiberstar	Marathon Oil
Alaska Native Hospital	Matanuska Electric Assoc
Alaska Railroad Corp	Matanuska Telephone Assoc
Anchorage School District	MOA Street Maint. Dept MFS Technologies, inc.
Anchorage Water & Wastewater	Tesoro Alaska Pipeline
Alyeska Cable	Mukluk Telephone Association
AT&T Alascom, Inc.	Municipality of Anchorage
City of Wasilla	Municipal Light & Power
Chugach Electric Assoc	Phillips Petroleum
DOT Street Lights, State of Alaska	PTI
Enstar Natural Gas	Telalaska
Eyecom TV/Interior Telephone	Unocal United
GCI Communications	Utilities
	Yukon Telephone

Call the following utilities and agencies directly:

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

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

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

Payment will be made as follows:

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

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

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

(09/01/04)R3

Provide the Utility Companies fifteen (15) calendar days advance written notice of the relocations described below to begin. The Utility Companies will not be required to work in more than one location at a time, and will be allowed to complete a specific section of work before beginning work with another section.

Relocation or adjustment of underground utility appurtenances will not normally be performed when the ground is frozen. In addition, the utility companies may prohibit the Contractor, through the Engineer, from working near the utility's facilities when the ground is frozen.

Specific coordination requirements for the specific utilities are included below:

CHUGACH ELECTRIC ASSOCIATION (CEA): CEA has existing buried and overhead primary circuits running throughout the project limits. Conflicts exist with CEA facilities within the project limits.

One (1) existing utility pole is in conflict with the proposed southbound right turn lane at Arctic Boulevard and 36th Avenue. From approximately station 36+00 LT to 39+00 LT, CEA will relocate its overhead electrical distribution lines to the west. The work affects two spans. CEA will require forty-five (45) days to complete this relocation. This duration includes GCI and ACS's relocations and allows CEA to return and remove applicable poles.

The CEA relocation work will be conducted within the project limits and will need to be coordinated with the Contractor's work.

CEA contact is Gary Meadows at (907) 762-4618. CEA will require 15 calendar days written notice before beginning utility relocation work.

ALASKA COMMUNICATIONS SYSTEMS (ACS): ACS has existing buried and overhead telecommunications facilities running throughout the project limits. Conflicts exist with ACS lines within the project limits. ACS will be relocating telecommunications facilities.

From approximately station 36+00 LT to 39+00 LT ACS's overhead 400 pair cable and drop wire will be undergrounded. Said facilities will rise up and be transferred at CEA's power pole on the north end of the relocation. The existing overhead drops will be replaced to 3505 & 3503 Indiana Street by undergrounding those drops and utilizing the existing utility easements. Scope includes installation of cables, apparatuses, splicing, cut over, and removals of existing telephone plant. ACS will relocate these facilities to allow for the construction of the southbound right-turn lane at the intersection of Arctic Boulevard and 36th Avenue. ACS will require twenty-five (25) days to complete this relocation.

The ACS relocation work will be conducted within the project limits and will need to be coordinated with the Contractor's work.

ACS contact is Kelly Ward at (907) 564-1424 or (907) 244-2616 cell. ACS will require 15 calendar days written notice before beginning utility relocation work.

GCI CABLE, INC. (GCI): GCI has existing buried and overhead telecommunication and cable television facilities running throughout the project limits. Conflicts exist with GCI lines within the project limits. GCI will be relocating telecommunications facilities.

The project limits contains two (2) 204-count fiber optic cables, one (1) 72-count fiber optic cable, two (2) 0.750 coaxial trunk cables, three (3) 0.500 coaxial distribution cables, and multiple electronic devices. There is also one (1) cross connect cabinet and two (2) cross connect vaults at the northwest quadrant of Arctic Boulevard and 36th Avenue. The cross connect cabinet and one of the cross connect vaults will be relocated approximately 23 feet southwest within the new PUE. In order to facilitate this move the two (2) 204-count fiber optic cables will each have 35 feet of slack pulled to the cross connect vault from existing aerial fiber slack loops. The two (2) 204-count fiber optic cables and the one (1) 72-count fiber optic cable will then be hand exposed to the existing cross connect vault. The cross connect cabinet will then be moved to its new location "In Service" with the two (2) 204-count in 4 inch split duct and one (1) 72 count fiber in existing 1.25 inch HDPE placed underground to the new location. GCI will require twenty-five (25) days to complete this relocation.

Once the new CEA pole #9804 has been placed GCI will move the two (2) existing 0.750 coaxial cables, one (1) existing northbound 0.500 cable, one (1) existing westbound 0.500 coaxial cable, two (2) existing 204-count fiber optic cables and one (1) existing 4" PVC riser from the existing CEA pole #9804 to the new CEA pole #9804 on new strand. GCI will then replace the one (1) existing eastbound 0.500 coaxial cable and strand. GCI will require twenty-five (25) days to complete this relocation, which can be done concurrently with GCIs other relocation task above.

The GCI relocation work will be conducted within the project limits and will need to be coordinated with the Contractor's work.

GCI contact is Bill Powell at (907) 868-6157 or (907) 244-0311 cell. GCI will require 15 calendar days written notice before beginning utility relocation work.

(06/25/05)DOWL

Standard Modification

105-1.16 FINAL ACCEPTANCE AND RECORD RETENTION.

Modify the first paragraph, Item 4., after:

"DOLWD" add: and State Department of Revenue. (6/30/04)E19

105.1.17 CLAIMS FOR ADJUSTMENT AND DISPUTES.

Add the following:

Appeals to the superior court under AS 36.30.685 must be filed in the third judicial district. (03/21/01) R93

SECTION 106

CONTROL OF MATERIAL

Special Provisions

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

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

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

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

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

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

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. ADEC Domestic Wastewater Disposal Systems Approval to Construct Project #4970, July 25, 2005

2. ADEC Class A Public Water System Approval to Construct Project #210906, October 4, 2005

3. ADEC Non-Domestic Storm Water Plan Review Letter of Non-Objection (Not required, less than one acre "ground disturbance").

Provide information to comply with the U.S. 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 you. (05/29/02)R7M98 Modified

107-1.11 PROTECTION AND RESTORATION OF PROPERTY AND LANDSCAPE.

Add the following:

If required water for construction purpose from a non-Municipal water source, obtain a Temporary Water Use Permit from the Water Resource Manager and provide a copy to the Engineer. The Water Resource Manager is with the Department of Natural Resources in Anchorage and may be contacted at (907) 269-8624. (05/29/02)R7M98

Add the following subsection:

107-1.21 FEDERAL AFFIRMATIVE ACTION.

The Federal Equal Employment Opportunity, DBE, 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, noncompliance with these requirements is grounds for withholding of progress payments. (08/13/98)S80

SECTION 108

PROSECUTION AND PROGRESS

Special Provisions

108-1.03 PROSECUTION AND PROGRESS.

Delete the last sentence of the first paragraph and substitute the following:

Submit the following at the Preconstruction Conference:

Delete Item 1, A Progress Schedule, and substitute the following:

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

Delete Item 5 and substitute the following:

The submittals identified under subsection 641-1.03, Submittals. (01/31/02)R160M98

SECTION 109

MEASUREMENT AND PAYMENT

Special Provisions

109-1.02 MEASUREMENT OF QUANTITIES.

Under subtitle Electronic Computerized Weighing System item (1) add the following to the end of the first sentence:

", CD, or a USB device."

109-1.05 COMPENSATION FOR EXTRA WORK.

Under item 3. Equipment, item a. add the following to the second paragraph:

The rental rate area adjustment factors for this project shall be as specified on the adjustment maps for the Alaska - South Region. (4/31/05)R14

109-1.07 PAYMENT FOR MATERIAL ON HAND.

Add the following under item 3:

c. The location of stockpiled materials for payment in acceptable storage facilities off the project will be in Alaska, at a location acceptable to the Engineer. (02/15/05)R16

Standard Modification

109-1.08 FINAL PAYMENT.

Add the following sentence to the first paragraph:

The Department will not process the final estimate until the Contractor completes Items 1 through 4 in the first paragraph of subsection 105-1.16. E11(6/30/04)

Add the following section:

SECTION 120

DISADVANTAGED BUSINESS ENTERPRISE (DBE) PROGRAM

120-1.01 DESCRIPTION.

The work consists of providing 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 the U.S. Department of Transportation (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 that may result in the termination of this contract or such other remedy as ADOT&PF deems appropriate. The Department also considers failure to comply with this section to be so serious as to justify debarment action as provided in AS 36.30.640(4).

120-1.04 DEFINITIONS AND TERMS.

The following definitions will apply.

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

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

3. Disadvantaged Business Enterprise (DBE). An enterprise that 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 according to 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 according to §§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 that the Contractor cannot obtain replacement DBE participation, the Engineer may adjust the DBE Utilization Goal if, in the opinion of the Engineer and the Civil Rights Office, both of the following criteria have been met:

1) The Contractor has not committed any discriminatory practice in its exercise of good business 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 according to 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 all of the following actions constitutes insufficient Good Faith Effort.

a. Consideration of all subcontractable items. The bidder shall, at a minimum, seek DBE participation for each of the subcontractable items upon which the DBE goal was established as identified by the Department (on Form 25A324) before 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 seven calendar days before bid opening. The bidder must give the DBEs no less than five days to respond. The bidder may reject DBE quotes received after the deadline. Such a deadline for bid submission by DBEs will be consistently applied. DBEs certified to perform

work items identified on Form 25A324 must be contacted to solicit their interest in participating in the execution of work with the Contractor. Each contact with a DBE firm will be logged on a Contact Report (Form 25A321A).

d. Noncompetitive DBE quotes may be rejected by the bidder. Allegations of noncompetitive DBE quotes must be documented and verifiable. A DBE quote that is more than 10.0 percent higher than the accepted non-DBE quote will be deemed noncompetitive, 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 noncompetitive 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. Such an opportunity must be exercised by the bidder within three 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 four days of notification that it has failed to meet the requirements of this subsection.

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

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

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 according to 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 (CUF). In order for the CUF work of the DBE to be credited toward the goal, the Contractor will ensure that all of the following requirements are met:

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

   b. A DBE trucking firm certified and performing work in a transportation/ hauling category is restricted to credit for work performed with its own trucks and personnel certified with the CRO before 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, and 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) All 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, according to 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 appealable to USDOT.

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 according to 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 according to 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. (11/17/00)S33

SECTION 201

CLEARING AND GRUBBING

Special Provisions

201-3.01 GENERAL.

Add the following:

The Contractor shall perform the work necessary to preserve and/or restore land monuments and property corners from damage. Any land monument or property corner that is disturbed shall be restored according to Section 642 at the Contractor's expense. An undisturbed area 5-foot in diameter may be left around existing monuments and property corners. A list of land monuments and property corners is shown on the Right-of-Way maps. (5/19/05)DOWL

SECTION 202

REMOVAL OF STRUCTURES AND OBSTRUCTIONS

Special Provisions

202-1.01 DESCRIPTION.

Add the following:

This work also consists of pavement planning as specified in this section. (02/28/01)R143USC

2.02-3.03 REMOVAL OF BRIDGES, CULVERTS, AND OTHER DRAINAGE STRUCTURES.

Add the following after the second paragraph:

Remove, dispose, or salvage sanitary sewer manholes designated for removal by the Plans or as directed by the Engineer.

Remove manhole frame and cover, dustpan, adjusting rings and cone section, or reducing slab for existing sanitary sewer manholes designated for removal by the Plans or by the Engineer. Plug conduits intersecting the manhole and fill the remaining barrel sections of the abandoned manholes with material meeting the requirements of Selected Material, Type C and compact it to the satisfaction of the Engineer.

Carefully remove and deliver salvaged materials to a site directed by the Engineer. Provide a disposal site for non-salvageable materials.

Existing manhole frames, covers, dustpans, adjusting rings, cone sections and reducing slabs removed, but not reinstalled, under these Special Provisions shall become the Contractor's property. Undamaged materials of satisfactory quality and approved by the Engineer may be reused. The Engineer shall inspect clean materials that are to be reused before to reinstallation. (02/02/00)R18M98

202-3.05 REMOVAL OF PAVEMENT, SIDEWALKS, AND CURBS.

Add the following:

Asphalt pavement removed from the existing highway may be used in the construction of the embankment. Bury material so as not to be exposed at the completed surface of the embankment.

For disposal of waste asphalt pavement, the Contractor shall obtain a solid waste disposal permit from the Department of Environmental Conservation (DEC) or use a site previously approved by DEC for disposal of removed asphalt. A DEC permitting officer in Anchorage may be contacted at (907) 269-7590.

A DEC approved site for disposal of removed asphalt is available at no charge to the Contractor at the Hiland Road Solid Waste Facility. In order to use this site, the Contractor shall meet the following requirements:

1. Dumping shall be coordinated through the Eagle River Street Maintenance office at (907) 694-3487.

2. Leveling course material may be included with removed asphalt if it does not exceed 30 percent of the total volume delivered.

3. For quantities over 500 tons, the Contractor shall stockpile materials in a manner acceptable to the Municipality of Anchorage.

4. The broken asphalt pieces shall be 6 inches or less in maximum dimension.

(02/15/05)R84A

202-3.05 REMOVAL OF PAVEMENT, SIDEWALKS, AND CURBS.

Add the following paragraph:

Sawcut and remove existing pavement in areas of distress, cold patches, or potholes as directed by the Engineer. The pavement shall be removed to a distance of one foot outside of the described areas. Pavement that is removed shall be replaced with Asphalt Concrete as show on the Plans according to the requirements of Section 401, Asphalt Concrete Pavement. (02/28/01)R257USC

Add the following subsections:

202-3.06 SALVAGING. Notify the Engineer a minimum of five (5) days before removing manholes and inlets. The Engineer will notify MOA Street Maintenance (907-343-8277) and upon excavation have a Street Maintenance representative identify manholes, inlets, or portions thereof to be salvaged. Deliver items designated for salvage to the MOA Street Maintenance yard located at 3640 East Tudor Road. Items not designated for salvage by MOA Street Maintenance shall become the Contractor's property. (07/08/03)R258M98

202-3.07 PAVEMENT PLANING.

Remove existing asphalt concrete pavement by cold planing at locations shown on the Plans. The surface of the pavement after planing shall be uniformly rough grooved or ridged.

Remove all planed material from the project immediately after planing. Stockpile planed material at the MOA's Porcupine Street pit in Mountain View. Coordinate with MOA Street Maintenance Manager 907-343-8277, for acceptance of material and desired location of stockpile. Planed material not acceptable to Street Maintenance will be disposed of in an acceptable manner or incorporated into the Work as directed by the Engineer and as specified below. 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 269-7590.

During the planing operation, sweep the streets with mechanical sweepers equipped with vacuum and water sprinkling devices to control dust and remove all loosened material from the planed areas. The removal operation shall follow within 50 feet of the planing machine.

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

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

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

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

The planing machine shall have the following capabilities:

1. Operating speeds from 0 to 40 feet per minute,
2. Self-propelled,
3. Able to spray water at the cutting drum to minimize dust,
4. Able to remove material next to the gutter,
5. Designed so that the operator can at all times observe the planing operation without leaving the controls,
6. Adjustable as to slope and depth,
7. Longitudinal grade control automatically actuated by the use of a 30-foot ski, and
8. Able to cut up to three inches without producing fumes or smoke.

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

202-5.01 BASIS OF PAYMENT.

After the third paragraph, add the following:

Replace loop detectors damaged by the planing operation according to Section 660. Replace damaged 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 under Section 109-1.05, Compensation For Extra Work. (02/28/01) R143USC

Costs associated with street sweeping during the planing operation are subsidiary to Item 202(15A) Pavement Planing, 2-Inch Depth.

Add the following Pay Item:

Pay Item	Pay Unit
202(15A) Pavement Planing, 2-Inch Depth	Square Yard

SECTION 203

EXCAVATION AND EMBANKMENT

Special Provisions

203-3.01 GENERAL.

Add the following to the last paragraph:

Before obliterating the existing roadway, remove the existing pavement and dispose according to subsection 202-3.05, Removal of Pavement, Sidewalks, and Curbs. (11/05/02)R177USC02

203-4.01 METHOD OF MEASUREMENT.

Add the following:

9. Item 203(3B) will not be measured for payment.

203.5.01 BASIS OF PAYMENT.

Add the following Pay Item:

Pay Item	Pay Unit
203(3B) Unclassified Excavation	Lump Sum

SECTION 204

STRUCTURE EXCAVATION FOR CONDUITS AND MINOR STRUCTURES

Special Provisions

204-3.01 CONSTRUCTION REQUIREMENTS.

Add the following:

Trench dewatering shall be required to protect adjacent utilities and property and to successfully install the new utility lines. Contractor shall dispose all water from trench dewatering according to Anchorage Municipal Code, Section 15.40, and an ADEC-approved dewatering plan. All ground water shall be screened to prevent debris from entering creeks, lakes, ponds, wetland areas, and drainage systems. When dewatering is required during the course of construction, Contractor shall submit an ADEC-approved dewatering plan and permit before any dewatering activity.

Water resulting from Contractor's dewatering effort may not be pumped or otherwise diverted into existing storm drains unless required permits including, but not limited to, the Alaska Department of Environmental Conservation and Environmental Protection Agency, are obtained by the Contractor. Under no circumstances will Contractor be allowed to divert water from the excavation onto roadways. Contractor shall provide copies of permits and approvals to the Engineer.

Acceptance of Contractor's Dewatering Plan by the Engineer shall not relieve Contractor of his responsibilities for the exercise of reasonable precaution, sound judgment, prudent construction practices, overloading or misuse of existing or new structures, the adequacy and safety of such Work, and potential damage or undermining of existing or completed Work.

204-5.01 BASIS OF PAYMENT.

Add the following:

No separate payment shall be made for dewatering, and any dewatering effort shall be considered subsidiary to the bid item under construction or to the Contract.

Any shoring, sheeting, or bracing required shall be subsidiary to work under this Section.

SECTION 205

EXCAVATION, BACKFILL, AND FOUNDATION FILL FOR STRUCTURES

Special Provisions

205-3.03 BACKFILL.

Add the following:

Backfill placed within one foot of a structural unit shall be graded to pass the three-inch sieve.

205-5.01 BASIS OF PAYMENT.

Add the following:

Grading of material used within one foot of structural units will be subsidiary to Item 203(6A), Borrow, Type A.

(07/24/95)R154USC

SECTION 301

AGGREGATE BASE AND SURFACE COURSE

Special Provisions

301-2.01 MATERIALS.

Add the following:

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.

4. If no gradation type is specified in the bid schedule, the base course material gradation shall conform to the requirements for Grading D-1. (11/05/02)R116USC02

301-3.01 PLACING.

Add the following:

Base course material used for the sidewalk and pathway foundation shall be placed with a "Layton box" or similar equipment capable of providing a specified depth with a uniform surface. (09/01/89)R26

301-3.03 SHAPING AND COMPACTION.

Add the following:

If recycled asphalt material is substituted for aggregate base course, the following conditions shall be met:

1. Density acceptance will be based upon a roller pattern. The roller pattern shall be determined by a test strip using 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 six 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. (11/05/02)R176USC02

Delete Section 401, Asphalt Concrete Pavement, in its entirety, and substitute the following:

SECTION 401

ASPHALT CONCRETE PAVEMENT

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
ASPHALT CONCRETE MIX 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 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 Table 703-3, for the type of asphalt concrete pavement specified but asphalt concrete mixture will have the full tolerances in Table 401-2 applied for evaluation according to 401-4.03 except the tolerances for the #200 sieve is limited by the broad band limits.

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

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

Submit the following to the Engineer at least 15 days before the production of asphalt concrete mixture:

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 asphalt concrete pavement 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.

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

No payment for asphalt concrete pavement 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 asphalt concrete mixture 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 asphalt concrete aggregate (coarse, intermediate, and fine). Place blend material 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. 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 (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 percent 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 asphalt concrete mixture according to subsection 106-1.03. Provide copies of these test results to the Engineer within 24 hours.

Failure to perform quality control forfeits your right to a retest under subsection 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 asphalt concrete mixture. 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 asphalt concrete mixture on a wet surface, on an unstable/yielding roadbed, when the base material is frozen, or when weather conditions prevent proper handling or

compaction of the mix. Do not place asphalt concrete mixture unless the roadway surface temperature is 40 °F or warmer.

401-3.02 EQUIPMENT, GENERAL.

Use equipment in good working order and free of asphalt concrete mixture buildup. Make equipment available for inspection and demonstration of operation a minimum of 24 hours before placement of asphalt concrete mixture.

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 asphalt concrete mixture production.

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

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

401-3.04 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.

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 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 asphalt concrete mixture. Heat and vibrate screed extensions. Place auger extensions within 20 inches of the screed extensions or per written manufacturer's recommendations.

Equip the paver with a means of preventing the segregation of the coarse aggregate particles from the remainder of the 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 as identified in the December 2000 Service Magazine – entitled: New Asphalt Deflector Kit {6630, 6631, 6640}.

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

The Engineer shall approve all means and methods used to prevent bituminous paver segregation before the bituminous paver is used to place bituminous plant mix on the project.

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 asphalt concrete mixtures 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 tamp in place. Clean, wash, and sweep existing paved surfaces of loose material.

Preparation of a milled surface,

1. 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.

2. 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.

Before placing the asphalt concrete mixture, 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 asphalt concrete mixture 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 asphalt concrete mixture, sampled at the point of acceptance for asphalt cement content, does not exceed 0.5 percent (by total weight of mix), as determined by WAQTC TM 6.

Heat the aggregate for the asphalt concrete mixture 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. Asphalt concrete mixture 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 percent 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 asphalt concrete mixture 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 asphalt concrete mixture 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 mixture are causes for rejection.

401-3.12 PLACING AND SPREADING.

Place the asphalt concrete mixture upon the approved surface, spread, strike off, and adjust surface irregularities. Use asphalt pavers to distribute asphalt concrete mixture, including leveling courses. The maximum compacted lift thickness allowed is 3 inches.

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

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

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

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

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

401-3.13 COMPACTION.

Thoroughly and uniformly compact the asphalt concrete mixture by rolling. In areas not accessible to large rollers, compact with mechanical tampers or trench rollers.

During placement of asphalt concrete the Engineer may evaluate the HMA immediately behind the paver for cyclic low density using an infrared camera. If there is a temperature differential that exceeds 25° F within the newly placed mat, low density is likely to occur. The real time thermal images and thermal profile data will become part of the project records shared with the Contractor. The Contractor shall immediately adjust his lay-down procedures to correct the problem. If the Engineer observes areas in any given pay sublot where the thermal images indicate cyclic low density is probable, the Engineer will order those areas to be cored for determination of density. These cores will be evaluated under subsection 401-4.02 and 401-4.03.

The target value for density is 94 percent 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.

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

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

401-3.14 JOINTS.

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

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

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

Form transverse joints by saw-cutting back on the previous run to expose the full depth of the course 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 6 inches from the edge of the stripe.

Seal the vertical edge of 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 asphalt concrete pavement, the minimum specification limit for longitudinal joint density is 91 percent 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.

Seal the pavement surface 12 inches on each side of the longitudinal joints while the pavement is clean, free of moisture, and before traffic marking with GSB-78 (from Asphalt Systems), or approved equal.

401-3.15 SURFACE REQUIREMENTS AND 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.

401-3.16 PATCHING DEFECTIVE AREAS.

Remove any asphalt concrete mixture that becomes contaminated with foreign material, is segregated, or is in any way determined to be defective. Do not skin patch. Remove defective materials for the full thickness of the course. Cut the pavement so that 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 asphalt concrete mixture according to subsection 401-3.13 to grade and smoothness requirements.

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

401-4.01 METHOD OF MEASUREMENT.

Section 109 and the following:

Asphalt Concrete. By weighing, no deduction will be made for the weight of asphalt cement or anti stripping additive, or by the area of final pavement surface.

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

Asphalt Cement. By the ton, as follows: 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 percent above the optimum asphalt content specified in the Job Mix Design.

1. Percent of asphalt cement for each sublot multiplied by the total weight represented by that sublot. Percent of asphalt cement will be determined by ATM 405 or WAQTC FOP for AASHTO T 308. 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 asphalt concrete mixture 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 percent 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 asphalt concrete mixture 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.

401-4.02 ACCEPTANCE SAMPLING AND TESTING.

The quantity of each type of asphalt concrete mixture produced and placed will be divided into lots and the lots evaluated individually for acceptance.

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. Remove and replace any hot mix asphalt that does not conform to the approved JMD.

Any 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 content will be determined according to ATM 405 or WAQTC FOP for AASHTO T 308.

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 for conformance to the specifications in Section 702. Three separate samples will be taken, one for acceptance testing, one for Contractor retesting, and one held in reserve for referee testing.

3. Aggregate Gradation.

   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, from the stopped conveyor belt or from the same location as samples for the determination of asphalt cement content. 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 asphalt concrete mixture 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. 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 asphalt concrete mixture.

   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. 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 asphalt concrete mixture 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.

4. Density. Cut full depth core samples from the finished asphalt concrete pavement 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 including locations having low cyclic density. 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 asphalt concrete pavement on bridge decks. Backfill and compact voids left by coring with new asphalt concrete mixture within 24 hours.

5. 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. 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.

401-5.01 BASIS OF PAYMENT.

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

Payment for furnishing and installing joint adhesive and sealing the pavement adjacent to the joints will be subsidiary to Item 401(1), Asphalt Concrete.

Payment will be made under:

Pay Item	Pay Unit
401(1) Asphalt Concrete, Type II; Class B	Ton
401(2) Asphalt Cement, Grade PG 52-28	Ton

R199USC04(10/25/05)

SECTION 408

ASPHALT CONCRETE PAVEMENT

408-1.01 DESCRIPTION.

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

Superpave mix design procedures will be used to design the mix.

408-2.01 COMPOSITION OF MIXTURE - JOB MIX DESIGN.

The Job Mix Design will be developed using Asphalt Institute's Superpave Mix Design SP-2 and also meet the requirements of Table 408-1, Table 408-2, and SP-2 TABLE 5.1 and TABLE 5.2. Evaluation of moisture sensitivity by AASHTO T 283 will not be part of the mix design process.

TABLE 408-1
Asphalt Concrete Mix Design Requirements

Design ESALs, millions	0.3 to < 3
Nom. Max Aggr. Size	¾"
Rut Index, max.	3

The approved Job Mix Design will specify the target values for gradation, the target value for asphalt cement content, the Maximum Specific Gravity (MSG) of the 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 Table 703-3, for the type of asphalt concrete pavement specified but asphalt concrete mixture will have the full tolerances in Table 408-2 applied for evaluation according to 408-4.03 except for the following:

Tolerances for the largest sieve specified will be plus 0 percent and minus 1 percent.

Tolerances for the No. 200 sieve may not exceed the broad band limits.

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

Submit the following to the Engineer at least 15 days before the production of asphalt concrete mixture:

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.

2. Representative samples of each aggregate (crushed coarse, crushed intermediate, crushed 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 demonstrating conformance to subsection 702-2.01, manufacturer's certificate of compliance per subsection 106-1.05, a temperature viscosity curve for the asphalt cement or manufacturer's recommended mixing and compaction temperatures, and current Material Safety Data Sheet.

   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.

From this material, the Engineer will develop the Job Mix Design using procedures in SP-2. Approved Job Mix Designs will become a part of the contract. Up to15 working days may be required to determine the Job Mix Design after receipt of all items specified above.

Changes in the source of asphalt cement, source of aggregates, aggregate quality, aggregate gradation changes from Job Mix, or blend ratio requires a new Job Mix Design. The Contractor must provide submittals and materials to create a new job mix design. Approved changes to a previously approved mix design may only be initialized after a lot is completed using the previous mix design.

The Engineer will assess a mix design fee of $3,600.00 under Item 408(3), Asphalt Price Adjustment for each mix design subsequent to the first approved Job Mix Design.

408-2.02 AGGREGATES.

Conform to subsection 703-2.04.

Remove all natural fines passing a #4 sieve before crushing aggregates for asphalt concrete mixtures. Divide the crushed aggregate into a minimum of 3 stockpiles; coarse, intermediate, and fine. Additional stockpiles may be required for some material sources to create a Design Aggregate Structure that meets the volumetric requirements of the mix design procedures.

408-2.03 ASPHALT MATERIALS.

Conform to subsection 702-2.01, PG 64-28. No binder grade adjustment will be made for traffic load rate.

Provide test reports for each batch of asphalt cement showing conformance to the specifications in Section 702 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.

Shipping documents shall include the following:

Manufacturers certificate of compliance, subsection 106-1.05

Conformance test results of the batch, Section 702.

Date and Time of loading

Batch number and storage tank

Type, grade, temperature, and quantity of materials loaded

Type and percent of anti-strip added.

408-2.04 ANTI-STRIP ADDITIVES.

Use anti-strip agents in the proportions determined by ATM T-414 and included in the approved Job Mix Design. At least 70 percent of the aggregate shall remain coated when tested according to ATM T-414. Add a minimum amount of 0.25 percent per ton of asphalt cement.

408-2.05 PROCESS QUALITY CONTROL.

Sample and test materials for quality control of the asphalt concrete mixture according to subsection 106-1.03. Provide copies of these test results to the Engineer within 24 hours.

Failure to perform quality control forfeits the Contractor's right to retest as provided for in subsection 408-4.02.

Submit a paving and plant control plan at least 3 working days before the pre-paving meeting. Address the sequence of operations and joint construction. Outline steps to assure product consistency, to minimize segregation, and to prevent premature cooling of the asphalt concrete mixture. Include a proposed quality control testing frequency for gradation, asphalt cement content, and compaction. The pre-paving meeting shall be held on site with the Engineer a minimum of 5 working days before initiating paving operations shall include the Contractor's superintendent, paving foreman, asphalt plant operator, and quality control person.

CONSTRUCTION REQUIREMENTS

408-3.01 WEATHER LIMITATIONS.

Do not place asphalt concrete mixture on a surface having greater than optimum moisture, on an unstable or yielding surface, or when the base material is frozen, or during detrimental weather conditions. Do not pave unless the roadway surface temperature is 40 °F or warmer.

408-3.02 EQUIPMENT, GENERAL.

Use equipment in good working order and free of asphalt concrete mixture buildup. Make all equipment available for inspection and demonstration of operation a minimum of 24 hours before placement of asphalt concrete mix.

408-3.03 ASPHALT MIXING PLANTS.

Meet AASHTO M156. Calibrate the asphalt plant and furnish calibration data to the Engineer at least one day before production. Maintain a current Air Quality Permit issued by the State Of Alaska.

Provide and maintain a functioning scalping screen on the asphalt plant to prevent oversize material or debris from being incorporated into the mixture. Provide a tap on the asphalt cement supply line just before it enters the plant (after the 3-way valve) for sampling asphalt cement.

Certify weigh silo scales if the weights from them are used for payment.

408-3.04 HAULING EQUIPMENT.

Haul asphalt mixtures in trucks having tight, clean, smooth metal beds, thinly coated with a minimum amount of paraffin oil, lime water solution or other manufactured asphalt release agent included on the Department's Approved Products List. Do not use diesel fuel or fuel oil as an asphalt release agent.

Cover the asphalt mixture in the haul vehicle, when directed.

408-3.05 ASPHALT PAVERS.

Use self-propelled asphalt pavers having a heated vibratory screed. Control with grade and cross slope using automatic grade and slope control devices. Use a paver screed control system that is automatically actuated by a ski least 30 feet in length, or other approved grade follower. 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 asphalt concrete mixture. Provide heaters and vibrators on the main screed and screed extensions. Maintain auger extensions within 1.5 feet of the end of the screed extension.

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:

Blaw-Knox bituminous pavers shall be equipped with the Blaw-Knox Materials Management Kit (MMK).

Cedarapids bituminous pavers must have been manufactured in 1989 or later.

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

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

The Engineer shall approve all means and methods used to prevent bituminous paver segregation before the bituminous paver is used to place bituminous plant mix on the project.

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

408-3.06 ROLLERS.

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

Use fully-skirted pneumatic-tire rollers having a minimum operating weight of 3000 pounds per tire for at least one coverage.

408-3.07 PREPARATION OF EXISTING SURFACE.

Prepare the existing surfaces in conformance with the plans and specifications. 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 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, Class B. Notify the Engineer of pavement areas that might be considered thin or unstable during pavement removal.

Existing paved surfaces shall be cleaned of loose material by sweeping with a power broom, supplemented by hand sweeping, if necessary. Engineer must approve the surface before tack is applied.

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

Allow prime coat to cure or emulsion tack coat to break before placement of asphalt concrete mixture on these surfaces.

408-3.08 PREPARATION OF ASPHALT.

A continuous supply of asphalt cement shall be supplied to the mixer at a uniform temperature, within the allowable mixing temperature range noted in the approved mix design.

408-3.09 PREPARATION OF AGGREGATES.

Dry the aggregate so the moisture content of the asphalt concrete mixture, sampled at the point of acceptance for asphalt cement content, does not exceed 0.5 percent (by total weight of mix), as determined by WAQTC TM 6.

Heat the aggregate for the asphalt concrete mixture 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. Asphalt concrete mixture containing soot or fuel is considered unacceptable per subsection 105-1.11.

408-3.10 MIXING.

Combine the aggregate, asphalt cement and additives in the mixer in the amounts required by the Job Mix Design. Mix to obtain 98 percent 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 asphalt concrete mixture within the temperature range determined by the Job Mix Design.

408-3.11 TEMPORARY STORAGE OF ASPHALT CONCRETE MIXTURE.

Silo type storage bins may be used, provided that the characteristics of the asphalt concrete mixture 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 mixture are causes for rejection. Asphalt concrete mixtures shall not be stored or transported by barges.

408-3.12 PLACING AND SPREADING.

Place the asphalt concrete mixture upon the approved surface, spread, strike off, and adjust surface irregularities. Use asphalt pavers to distribute asphalt concrete mixture, including leveling courses.

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

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

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

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

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

408-3.13 COMPACTION.

Thoroughly and uniformly compact the asphalt concrete mixture by rolling. In areas not accessible to large rollers, compact with mechanical tampers or trench rollers.

During placement of asphalt concrete the Engineer will evaluate the HMA immediately behind the paver for cyclic low density using an infrared camera. If there is a temperature differential that exceeds 25° F within the newly placed mat, low density is likely to occur. The real time thermal images and thermal profile data will become part of the project records shared with the Contractor. The Contractor shall immediately adjust his lay-down procedures to correct the problem. If the Engineer observes four or more areas in any given pay lot where the thermal images indicate cyclic low density is probable, the Engineer will order those areas to be cored for determination of density. These cores will be evaluated under subsection 408-4.02 and 408-4.03.

The target value for density is 95 percent 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.

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

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

408-3.14 JOINTS.

Minimize the number of joints to ensure a continuous bond, texture, and smoothness between adjacent sections of the pavement. No quantity deduction will be made for materials removed for joint preparation.

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

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

Form transverse joints by saw-cutting back on the previous run to expose the full depth of the course 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 6 inches from the edge of the stripe.

Seal the vertical edge of pavement with Crafco 34524 Joint Adhesive or approved equal before completing the longitudinal joint by paving against it. Apply a 1/8-inch-thick band of joint adhesive over the surface according to manufacturer's recommendations.

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

Seal the pavement surface 12 inches on each side of all the longitudinal joints while the pavement is clean, free of moisture, and before traffic marking. Use GSB-78 (from Asphalt Systems), or approved equal.

408-3.15 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, greater than 3/16 inch.

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 has a smoothness Profile Index (PrI) greater than 15.0 inches per mile in a 0.1 mile segment. All costs associated with meeting surface tolerances are subsidiary to the Asphalt Concrete pay item.

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

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

408-3.16 PATCHING DEFECTIVE AREAS.

Remove any asphalt concrete mixture that becomes contaminated with foreign material, is segregated, or is in any way determined to be defective. Do not skin patch. Remove defective materials for the full thickness of the course. Cut the pavement so that all edges are vertical, the sides are parallel to the direction of traffic and the ends are skewed between 15-25 degrees. Coat edges with a tack coat meeting Section 402 and allow to cure. Place and compact fresh asphalt concrete mixture per subsection 408-3.13 to grade and smoothness requirements.

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

408-4.01 METHOD OF MEASUREMENT.

Section 109 and the following:

Asphalt Concrete. Either by weighing, no deduction will be made for the weight of asphalt cement or anti-stripping additive, or by the area of final pavement surface.

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

Asphalt Cement. By the ton (Megagram) as follows. 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 percent above the optimum asphalt content specified in the Job Mix Design.

1. Percent of asphalt cement for each sublot multiplied by the total weight represented by that sublot. The percent of asphalt cement will be determined by ATM 405 or WAQTC FOP for AASHTO T 308. 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 asphalt concrete mixture 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 percent 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 asphalt concrete mixture 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.

Anti-Strip Additive. Subsidiary to and based on the weight of asphalt cement containing required additive.

Longitudinal Joint and Joint Adhesive. By the lineal foot of longitudinal joint.

408-4.02 ACCEPTANCE SAMPLING AND TESTING.

The quantity of each type of asphalt concrete mixture produced and placed will be divided into lots and the lots evaluated individually for acceptance.

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

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

If the contract quantity is between 1,500 tons and 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 408-4.03 except as noted.

For contract quantity of less than 1,500 tons (or for temporary pavement), asphalt concrete pavement will be accepted for payment based on the Engineer's approval of a Job Mix Design and the placement and compaction of the asphalt concrete pavement to the specified depth and finished surface requirements and tolerances.

Any area of finished surfacing that is visibly segregated or fails to meet surface tolerance requirements is considered unacceptable per subsection 105-1.11.

1. Asphalt Cement Content. Samples for the determination of asphalt cement content will be taken from either the windrow, 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 content will be determined according to ATM 405 or WAQTC FOP for AASHTO T 308.

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 metal containers. Asphalt cement will be sampled for acceptance testing according to WAQTC FOP for AASHTO T 40 and tested for conformance to the specifications in Section 702. Three separate samples will be taken, one for acceptance testing, one for Contractor retesting, and one held in reserve for referee testing.

3. Aggregate Gradation.

    a. Drum Mix Plants. Samples taken for the determination of aggregate gradation shall be from the same location as samples for the determination of asphalt cement content. Two separate samples will be taken, one for acceptance testing and one held in reserve for retesting if applicable. For asphalt concrete mixture 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. Two separate samples will be taken, one for acceptance testing and one held in reserve for retesting if applicable. For asphalt concrete mixture 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.

4. Density. Cut full depth core samples from the finished asphalt concrete pavement 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 including locations having low cyclic density. An average of the low cyclic density cores shall be used for density evaluation and price adjustment if they are taken. 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 asphalt concrete pavement on bridge decks. Backfill and compact all voids left by coring with new asphalt concrete mixture within 24 hours.

5. Retesting. A retest of any sample outside the limits specified may be requested provided the quality control requirements of 408-2.05 are met. Deliver this request in writing to the Engineer within 7 days of receipt of the initial test result. The Engineer will mark the sample location for the density retest. The original test results for gradation, asphalt cement content, and 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.

408-4.03 EVALUATION OF MATERIALS FOR ACCEPTANCE.

The following method of price adjustment will be applied to each type of Asphalt Concrete Pavement, for which the contract quantity equals or exceeds 1,500 ton, except as defined in subsection 408-4.02.

Acceptance test results for a lot will be analyzed collectively and statistically by the Quality Level Analysis method as specified in subsection 106-1.03 to determine the total estimated percent of the lot that is within specification limits. Asphalt cement content results will be reported to the nearest 0.1 percent.

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

A lot containing asphalt concrete pavement 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 asphalt concrete pavement 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 asphalt concrete mixture that appears to be defective based on visual inspection. A minimum of two samples will be collected from the rejected mixture and tested if requested. If all test results are within specification limits, payment will be made for the mixture. If any of the test results fail to meet specifications, no payment will be made and the cost of the testing will be subtracted under Item 408(3), Asphalt Price Adjustment. All costs associated with removal and disposal of the rejected asphalt concrete mixture are subsidiary to the Asphalt Concrete 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. Cyclic low density will not be considered outliers.

If any 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 xn

   n = total number of test values

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

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

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

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

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

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

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

3. The USL and LSL are computed. For aggregate gradation and asphalt cement content, the Specification Limits (USL and LSL) are equal to the Target Value (TV) plus and minus the allowable tolerances in Table 408-2. The TV is the specification value specified in the approved Job Mix Design.

TABLE 408-2

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

Measured Characteristics	LSL	USL
1 inch sieve	TV-1.0	TV
3/4 inch sieve	TV-6.0	TV+6.0
1/2 inch sieve	TV-6.0	TV+6.0
3/8 inch sieve	TV-6.0	TV+6.0
No. 4 sieve	TV-6.0	TV+6.0
No. 8 sieve	TV-6.0	TV+6.0
No. 16 sieve	TV-5.0	TV+5.0
No. 30 sieve	TV-4.0	TV+4.0
No. 50 sieve	TV-4.0	TV+4.0
No. 100 sieve	TV-3.0	TV+3.0
No. 200 sieve[1]	TV-2.0	TV+2.0
Asphalt %	TV-0.4	TV+0.4
Density %	92	98

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

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

   Where: USL = Upper Specification Limit

   Q_U is rounded to the nearest hundredth.

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

   Where: LSL = Lower Specification Limit

   Q_L is rounded to the nearest hundredth.

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

7. P_L (percent within the lower specification limit that 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 408-3 gives the weight factor (f) for each sieve size and asphalt cement content.

TABLE 408-3
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 %	40

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

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

* CPF or DPF, whichever is lower.

PAB = Price Adjustment Base per ton = $72 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 less than 100 tons, 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 408-4.

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

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

	Spec	Pay Reduction Factor (PRF)								
		0	0.04	0.05	0.06	0.07	0.08	0.1	0.25	Reject or Engr Eval
Tests On Original Binder										
Viscosity	<3 Pa-s	≤3		>3						
Dynamic Shear	>1.00 kPa	>1.00		0.99-0.88				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 408-4

Asphalt Cement Appeal Procedure. Once notified of a failing test result of an asphalt cement sample, the Contractor has 21 days to issue a written appeal. The appeal must be accompanied by all of the Contactor's quality control test results and a test result of

Contactor's sample of this lot tested by an AASHTO accredited asphalt laboratory (accredited in the test procedure in question). The Engineer will review these test results and using ASTM D3244 determine a test value upon which to base a price reduction.

If the Contractor challenges this value, then the referee sample held by the Department 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.

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B. EVALUATION OF LONGITUDINAL JOINT DENSITY

Longitudinal joint density price adjustments apply when asphalt concrete mixture quantities are equal to or greater than 1,500 tons. An price adjustment 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 percent MSG, apply the following disincentive:

Deduct = **($3.00 per lineal foot) x (lineal feet of paved joint for the entire project)**

2. If project average joint density is greater than 93% MSG apply the following incentive:

Add = **($1.00 per lineal foot) x (lineal feet of paved joint for the entire project)**

The longitudinal joint price adjustment will be included in Item 408(3), Asphalt Price Adjustment

408-5.01 BASIS OF PAYMENT.

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

The Asphalt Price Adjustment will be the sum of all price adjustments noted including, the price adjustments for each lot, and for fees accrued for failure to cut cores and/or backfill voids left by sampling in the allotted time.

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

Asphalt cement, anti-stripping additives, tack coat, and crack sealing are subsidiary to the asphalt concrete pavement unless specified as pay items

Payment for furnishing and installing joint adhesive and sealing the pavement adjacent to the joints will be paid as 408(4) Longitudinal Joint Adhesive and Sealing.

Price adjustments will not apply to:

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

Payment will be made under:

Pay Item	Pay Unit
408(1) Asphalt Concrete, Type V	Ton
408(2) Asphalt Cement, PG 64-28	Ton
408(3) Asphalt Price Adjustment	Contingent Sum
408(4) Longitudinal Joint Adhesive and Sealing	Linear Foot

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SECTION 604

MANHOLES AND INLETS

Special Provisions

604-2.01 MATERIALS.

Add the following:

The following applies specifically to sanitary sewer manholes:

The tensile strength of the gray cast iron for manhole frames, pavement-adjusting rings [Inland Foundry Co., Inc., Model #845-3 (or equal)] and covers shall be 30,000 psi minimum, conforming to the requirements of ASTM A48. The requirement for transverse breaking load shall be 2,000 pounds, conforming to the requirements of ASTM A-438. Contact surfaces between frames and covers shall conform to the Standard Details of these Specifications. Where lockable manhole covers are specified, the Contractor shall submit Shop Drawings of the locking device for approval of the Engineer.

Each pre-cast concrete barrel section, pre-cast concrete eccentric cone section, concrete adjusting ring and manhole cover/frame shall be set and sealed by use of a plastic gasket joint sealer as manufactured by Henry Co., Inc., Ram-Nek Sealant Division, or an approved equal.

All manhole joints shall be sealed with MacWrap external joint seals as manufactured by MarMac Manufacturing Company, or approved equal. External joint seals to be applied per manufacturer's written recommendations.

All exterior manhole concrete surfaces shall be coated for water proofing with Tremco Tuff and Dry, or approved equal, brush grade foundation coating applied per manufacturer's written recommendations.

Manholes shall be installed with no less than three (3) layers of 8-mil polyethylene encasement on the outside of the manhole.

The use of Transite or Asbestos Cement (AC) pipe to form manhole inverts is prohibited.

Rubber waterstops used in pipe-to-manhole joints shall be rings of resilient material that will fit snugly over a pipe. The resilient material shall be held firmly against pipe surface by means of a stainless steel mechanical take-up device that when tightened will compress the resilient material, or by a stretch, fit. The rubber waterstop shall be designed and installed so that leakage between pipe and manhole is eliminated. Material and manufacture of waterstops shall conform to applicable provision of the ASTM Standard Specifications for Resilient Connectors between Reinforced Concrete Manhole Structure and Pipes, ASTM C923. Waterstops at manhole pipe penetrations shall be sealed with "Z-lok" and "A-lok" manhole pipe connections per MASS Standard Details, or approved equal.

Provide equipment that is capable of cleaning storm drains. The equipment shall be inspected and accepted by the Engineer before use of this project. Provide traffic control while cleaning storm drains.

604-3.01 CONSTRUCTION REQUIREMENTS.

Delete the second paragraph and substitute the following:

Install MOA catch basin inlets consisting of a precast concrete catch basin structure, grade rings, and metal frames and grate as shown on the Plans. Grout pipes in place.

Upon removal of manhole component parts, the Contractor shall clean and prepare existing component parts before installation of replacement parts. This will include, but not be limited to, removing existing grout and Ram-Nek-type sealant from remaining and connecting component parts.

The Contractor shall provide a disposal site for all materials (manhole covers, frames, etc.) removed or replaced.

Delete the third sentence of the tenth paragraph and replace with the following:

Changes in directions of flow shall be made by forming a smooth radius sized to allow adequate access of a C.C.T.V. camera and/or maintenance equipment into the served sewer pipe.

Add the following to the end of the tenth paragraph:

All dead-end sanitary sewer manholes shall have an invert installed through the entire Sanitary Sewer Manhole penetration for insertion of C.C.T.V. and/or maintenance equipment.

Add the following:

The following applies specifically to the construction of sanitary sewer manholes:

> The manhole frames and covers shall be brought to the grades shown on the Drawings. Manhole grade rings shall be set in and made secure by use of "Ram-Nek" with primer (or equal). In paved streets, manhole grade rings and frames shall be placed on a full bed of mortar to prevent settlement. Each manhole must have a minimum of one (1) six-inch (6") grade ring and a two-inch (2") pavement adjusting ring [Inland Foundry Co., Inc., Model #845-3 (or equal)].
>
> Use of and installation of a plastic gasket joint sealer ("Ram-Nek" or equal) for manhole construction shall be strictly according to the manufacturer's printed instructions. Gaskets shall be trimmed on the inside of the manhole to prevent the excess gasket material from entering the sanitary sewer lines.
>
> Before backfilling, the Contractor shall apply a bituminous damp proofing coating to the exterior of the manhole, MacWrap (or equal) at all manhole joints, and three (3) layers of 8-mil polyethylene encasement on the outside of the manhole.

Probe the manholes with a calibrated bar. If 50 percent or more of the manhole sump is filled with debris, remove the debris. Remove debris from catch basins and inlets regardless of the quantity of debris. No more than 5 percent to 10 percent of debris should remain. Remove debris (sticks, plastic bags) blocking culvert inlets and outlets. Record the date of

inspection, the depth of sediments, and whether the manhole was cleaned or not, in a grid map book provided by the Engineer.

The Contractor shall provide equipment that is capable of cleaning storm drains. The equipment shall be inspected and accepted by the Engineer before use on this project. The Contractor shall provide traffic control while cleaning storm drains.

The work shall include disposal of silt, trash, debris and other material removed from the system. This material may be disposed at the Municipality of Anchorage Hazardous Materials Waste Disposal site.

604-4.01 METHOD OF MESUREMENT.

Add the following:

Sanitary Sewer Manhole Rehabilitation: By lump sum, for the manholes and associated repair work specified on the Plans.

Clean Drainage System: Will be measured by contingent sum in the manner specified in the directive authorizing the work.

604-5.01 BASIS OF PAYMENT.

Add the following:

Frames, grates, and lids are subsidiary to the drainage structure.

Removal of sanitary sewer manholes is paid for under Item 202(6).

Connections to existing sewer pipe shall be subsidiary to pay item "Sanitary Sewer Manhole, Type A." No separate payment shall be made for this work that includes, but is not limited to, cutting of existing pipe, removal of cut pipe, Romac clamp, pipe required to make connection between manhole and existing pipe, labor, and other materials needed.

Component parts of existing or new manholes shall be included in the unit price for the bid item being constructed, reset, or replaced, and shall be paid for by a cumulative total of each unit constructed.

Any excavation required in the removal or upgrade of sanitary sewer manholes shall be considered subsidiary to the bid item under construction.

If, in the opinion of the Engineer, the Contractor was negligent in damaging component parts of existing manholes to remain or be reset in place, the Contractor shall replace them in kind at his expense. If in the opinion of the Engineer, the damage was unavoidable, replacement component parts may be furnished by AWWU and the work paid for at the pay item unit price.

Payment for cleaning drainage system will be made on a time and material basis, according to Subsection 109-1.05, Compensation for Extra Work. Traffic control provided to clean storm drains will be paid until the 643 items.

Add the following pay items:

Pay Item	Pay Unit
604(1A) Storm Drain Manhole, Type I	Each
604(1B) Storm Drain Manhole, Type II	Each
604(2A) Sanitary Sewer Manhole, Type A	Each
604(5A) MOA Catch Basin Inlet	Each
604(8) Sanitary Sewer Manhole Rehabilitation	Lump Sum
604(20) Clean Drainage System	**Contingent Sum**

SECTION 608

SIDEWALKS

Special Provisions

608-1.01 DESCRIPTION.

Add the following:

This work also consists of constructing asphalt pathway(s), patterned concrete, and median(s) in conformance with the Plans.

608-2.01 MATERIALS.

Delete subsection 2 and substitute the following:

2. Asphalt Sidewalk and Asphalt Pathway

Asphalt Cement, PG 52-28	Subsection 702-2.01
Aggregate, Type II or III	Subsection 703-2.04

Mix Design Requirements (ATM T-17):

Marshall Stability, pounds, min.	1,000
Percent Voids, Total Mix	2-5
Compaction, Blows/side	50

(02/01/00)R47USC

Add the following:

3. Patterned Concrete

a. Concrete Imprinting System: "Bomanite Running Bond Brick" Concrete imprinting system available from Bomanite Corporation, Palo Alto, California, (415) 321-0718, or approved equal, shall be used according to manufacturer's recommendations.

b. Concrete: Concrete mix for imprinted colored concrete shall conform to Section 501 for Class A concrete.

c. Coloring Materials: Bomacrom Color hardener, heavy-duty grade, available from Bomanite Corporation, or approved equal, shall be applied to the concrete according to these specifications and manufacturer's recommendations. Contractor shall submit imprinted, colored concrete color samples to the Engineer for approval.

d. Curing Compound: Bomanite Curing Compound available from Bomanite Corporation, or approved equal, shall be used according to manufacturer's recommendations.

608-3.03 CURB RAMPS.

Replace this subsection with the following:

Construct curb ramps according to the details and the locations shown on the Plans. Follow the construction requirements of subsection 608-3.01. Give the exposed concrete surface a coarse broom finish. Install detectable warnings. E25(01/01/06)

Add the following subsections:

608-3.04 ASPHALT PATHWAY.

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

608-3.05 DETECTABLE WARNINGS.

Construct detectable warnings according to the details and the locations shown on the Plans. Install detectable warning tiles 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. Detectable warnings/tile made of composite materials, safety yellow color, slip resistant surface, full-length flanges on bottom, and truncated dome pattern, or approved equal.

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

608-3.06 PATTERNED CONCRETE.

Installation of the patterned concrete shall only be performed by a licensed contractor as certified by the manufacturer. Submit license and material information to the Engineer before placement of patterned concrete.

The installation of patterned concrete shall be performed in dry weather with temperatures above 32°Fahrenheit.

The concrete shall be spread uniformly between the forms and thoroughly compacted with a steel shod strikeboard. After the concrete has been thoroughly compacted and leveled, it shall be floated with wooden floats.

Color Hardener shall then be applied evenly to the plastic surface by the dry-shake method using a minimum of 60 pounds per 100 square feet. It shall be applied in two or more shakes, floated after each shake, and finished with a steel float.

While the concrete is still in the plastic stage of set, the "Bomanite" imprinting tools shall be applied in conformance with the manufacturer's specifications to make a desired patterned surface. The patterns shall be "Running Bond Brick" or approved equal.

Bomacrom Color Curing Compound, thinned in the proportion of one part cure to one part mineral spirits (paint thinner), shall then be applied uniformly with a roller or sprayer immediately after imprinting. The coverage shall be approximately 600 to 650 square feet per gallon of unthinned curing compound.

At times when the air temperature is at or near freezing, the slab shall instead be cured using a suitable curing blanket, and the slab shall later be sealed with Bomanite Color Curing Compound at such time as the temperature is safely above freezing.

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

608-4.01 METHOD OF MEASUREMENT.

Add the following:

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

Asphalt Pathways and Medians. By the ton of asphalt concrete according to Section 109, Measurement and Payment. Asphalt cement will not be measured for payment. Additional asphalt pavement used for matching existing surfaces such as paved parking lots behind a new sidewalk/pathway will be measured and paid under this section. (02/01/00)R47USC

Patterned Concrete. Patterned concrete shall be measured per square yard, complete.

Delete the fifth paragraph beginning with "Curb Ramp" and replace with the following:

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

608-5.01 BASIS OF PAYMENT.

Add the following:

Asphalt cement for Asphalt Pathways will not be paid for separately, but will be subsidiary to their respective pay items.

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

Curb and gutter constructed as part of a curb ramp installation shall be paid for under Item 609(2).

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

Embankment and bed course materials will be furnished, placed and paid under Sections 203 and 301, respectively. (02/01/00)R47USC

Protection of the concrete from pedestrians, vehicles, and vandals is the responsibility of the Contractor. No payment for concrete sidewalk will be made if there is damage until damage is removed, replaced, and protected for 72 hours.

Add the following pay items:

Pay Item	Pay Unit
608(8) Asphalt Pathway	Square Yard
608(17B) Patterned Concrete	Square Yard

SECTION 615

STANDARD SIGNS

Special Provisions

615-2.01 MATERIALS.

Under Item 1, delete the first sentence and substitute the following:

Unless Shop Drawings have been provided in the Contract, submit shop drawings for signs that require the use of the Alaska Sign Design Specifications (ASDS), the Department of Transportation and Public Facilities - Sign Face Fabrication Requirements, and the Alaska Traffic Manual, letter width and spacing charts for approval before fabrication.

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(01/1/06)

615-3.01 CONSTRUCTION REQUIREMENTS.

Delete Item 7 and substitute the following:

Salvaged signs, posts, and hardware are to be delivered, undamaged, to the Municipal Paint and Sign Shop located at 2839 Mountain View Drive. Coordinate with the Paint and Sign Shop Foreman at 343-4384.

615-3.02 SIGN PLACEMENT AND INSTALLATION.

Add the following:

Do not remove existing signs without authorization from the Engineer.

615-5.01 BASIS OF PAYMENT.

Delete the first sentence and substitute the following:

Sign posts, bases, mounting hardware, and concrete used for sign bases are subsidiary.

Add the following:

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

No separate payment for removal of existing sign post foundations or work required to abandon them in-place will be made, but shall be subsidiary to Item 615(1), Standard Sign.

No separate payment for salvaging activities detailed in subsection 615-3.01 will be made. (11/06/02)R50USC02

SECTION 618

SEEDING

Special Provisions

618-1.01 DESCRIPTION.

Add the following:

Topsoil and seed new or disturbed slopes and other areas directed by the Engineer. Track the soil and apply seed, mulch, fertilizer, and water. Provide a living ground cover on slopes as soon as possible.

618-2.01 MATERIALS.

Add the following to the list of material specifications:

Mulch.....Subsection 727-2.01

618-3.01 SOIL PREPARATION.

Add the following:

Apply seed as detailed in subsection 618-3.03 immediately after the shaping of the slopes. Cover all slopes to be seeded with topsoil according to Section 620. Prepare slopes for seed by "walking" a dozer transversely up and down the slopes, or by grading with a scarifying slope board, as determined by the Engineer. The resultant indentations shall be perpendicular to the fall of the slope. Complete slope preparation as soon as topsoil is placed on the slopes. Rounding the top and bottom of the slopes is acceptable to facilitate tracking and to create a pleasing appearance, but do not disrupt drainage flow lines.

618-3.03 APPLICATION.

Add the following:

Seeding shall be performed between May 15 and September 1.

618-3.03 APPLICATION.

Add the following:

Apply seed, mulch, and fertilizer as follows per acre. Apply seed and mulch in one application if using the hydraulic method. Apply fertilizer with the hydraulic method.

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

Do not remove the required tags from the seed bags.

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

618-4.01 METHOD OF MEASUREMENT.

Add the following:

The amounts of fertilizer, mulch, and water for application used in this work, including any required reseeding, are subsidiary to other 618 items.

618-5.01 BASIS OF PAYMENT.

Add the following:

The work described under subsection 618-3.01, Soil Preparation, is subsidiary to seeding.

Water required for the hydraulic method of application is subsidiary to seeding. (11/06/02)R52USC

SECTION 626

SANITARY SEWER SYSTEM

Special Provisions

626-2.01 MATERIALS.

Add the following:

Complete Temporary Pumping System: Temporary pumping system, capable of accommodating the peak wastewater flow, shall be provided to ensure uninterrupted sewer service. The Contractor shall be responsible for ensuring that all flows are properly accommodated. The Contractor shall be liable for all damages that result from sewage flows not being properly maintained during the progress of the work.

626-3.01 CONSTRUCTION REQUIREMENTS.

Add the following:

The Contractor shall stagger the joints for the sanitary sewer pipe such that no joint shall be closer than nine feet from the centerline crossing of the water and sewer pipes. In addition, the vertical separation between the water and sewer pipes shall be eighteen inches (18") minimum.

The Contractor shall take precaution to not allow sewage to enter the new sewer line until it has been inspected, tested and accepted for operation and maintenance by the Anchorage Water and Wastewater Utility or AWWU's representative. The Contractor may request inspections, testing and acceptance of the project be done in incremental segments to facilitate maintaining wastewater flows. An incremental segment shall be defined as a completed mainline run with completed manholes at both ends.

All ductile iron pipe and fittings shall be installed with one layer of polyethylene encasement.

The Contractor shall notify the Engineer and the property owner seventy-two hours before any interruption of sewer service. The Contractor shall provide temporary service during the period of interruption.

The Contractor shall provide all operations pertaining to properly connecting the new main to the existing AC or DI sewer main. The Contractor shall be responsible for removing and disposing all excess AC or DI pipe in order to make the connection.

Existing sewer main is to be cut to receive the new sewer main. Connection between the two pipes shall be made with a Romac clamp or an approved equal.

It shall be the responsibility of the Contractor to maintain uninterrupted sanitary sewer service throughout the project at all times. Average and peak flow information is provided in the drawings.

The Contractor shall submit a sewage by-pass plan for the Engineer's approval, detailing how the sewage will be diverted and the equipment necessary to maintain sewer service during construction.

The Contractor shall provide all operations necessary to plug and fill (abandon) existing sanitary sewer main where indicated in the drawings. This includes, but is not limited to, completely filling abandoned pipe with cement grout and disposing of excess pipe.

Pipe to be abandoned shall be filled by flowing cement grout until the entire length of pipe is full and the ends of pipe shall be plugged.

Dispose of AC Pipe as required by Section 627-3.08, Disposal of AC Pipe.

Add the following:

RECORD DOCUMENTS. The Contractor shall maintain Record Documents for the sewer work on the jobsite consisting of a complete 22 x 34-inch full size set of black line plans (record drawings), survey line and grade books, and other Contract Documents. All changes in location (both vertical and horizontal), material, equipment, or other changes in the Work and horizontal and vertical locations of other utilities encountered shall be recorded in red ink (on the Record Documents) and kept current on a daily basis in conformance with the requirements of MASS Division 65, Construction Specifications For Municipal Construction Surveys, Section 65.02 Construction Surveying, Article 2.14 As-built Surveys and Record Drawings. Design dimensions, elevations, and grades that are not changed from the design shall be identified as being accurate by noting "ASB" adjacent to the value. All field installation notes shall also be included in the Record Drawing Documents. The Record Documents shall be made available to the Engineer at all times. The Contractor shall provide horizontal and vertical locations of all water and sewer service connections at the property line or lease lot line, including swing ties and offsets to property or lease lot corners.

The "RECORD" set of prints shall include two (2) or more swing ties from prominent, permanent features to show the location of each installed water and sewer service connection. Swing ties are to be as close to perpendicular to each other as possible. When property or lease lot corners are in, they shall be used as swing tie referenced points.

All additions and corrections shall be neat, clean, and legible. If additional plan sheets are required, the Contractor shall prepare them on reproducible Mylar of like material and size as the original plans.

The Engineer will review all Record Documents for completeness and conformance to the standards stated above. The Contractor shall make all corrections, changes, additions, and deletions required conforming to the standards. The Engineer may periodically review the status of the Record Documents during the course of the Work. Failure of the Contractor to keep the Record Documents current and in the required condition will be considered cause for additional withholding from the progress payments.

Approved final Record Documents for the sanitary sewer mainline portion of the work, bearing a signed certification by the Contractor that the Record Documents are a complete and accurate representation of the Project as constructed, shall be delivered to the Engineer within 30 days after Substantial Completion or before final acceptance of the Project, whichever is earlier.

Certification for Record Drawings shall be affixed to the final reproducible Drawings and shall include the following unqualified statement that the Contractor must sign and date as a condition of Final Payment and Final Acceptance of the Arctic Boulevard Surface Rehabilitation, 36th Avenue to Fireweed Lane Project.

"This will serve to certify that these Record Drawings are a true and accurate representation of the Project as constructed."

626-4.01 METHOD OF MEASUREMENT.

Add the following:

Maintain Sanitary Sewer Service: By lump sum and shall include all work associated with maintaining existing sewage flows in the project limits. This includes, but is not limited to, the installation and operation of temporary pumping equipment, construction of temporary by-passes, sewage hauling charges, and clean-up costs associated with Contractor-caused damage from sewage back-up.

Abandon Sanitary Sewer Main: By lump sum and shall include, but is not limited to, cutting of existing pipe, filling abandoned line with cement grout, properly plugging both ends of pipe, labor, removal and disposal of AC and other pipe, and all other materials needed.

BASIS OF PAYMENT.

Add the following:

The development, preparation, and presentation of all Record Documents is subsidiary.

Add the following pay items:

Pay Item	Pay Unit
626(4) Maintain Sanitary Sewer Service	Lump Sum
626(4B) Disconnect/Reconnect Sewer Service	Each
626(5) Abandon Sanitary Sewer Main	Lump Sum
626(6-6) Sanitary Sewer Cleanout, 6-inch	Each
626(10) Sanitary Sewer Asbuilt	Lump Sum

Delete Section 627 in its entirety and substitute the following:

SECTION 627

WATER SYSTEM

627-1.01 DESCRIPTION.

This work consists of all operations pertaining to furnishing, installing, testing, and disinfecting water mains and appurtenances as shown on the Plans or specified in this section. The work also includes furnishing and installing water pipe, fittings, straps, restrained joints and/or restraining system for fittings, valves, and piping deflection points. Contractor shall install them according to these specifications and in conformity with the lines and grades as shown on the drawings, unless otherwise approved. The use of pipe containing asbestos materials shall be prohibited. Submit product data to the Engineer for approval before installation.

In conjunction with working around and/or adjusting the Water Utility water valves, the Contractor shall exercise due care. Before commencement of work by the Contractor, the Water Utility shall check deficiencies that may exist in any valve or valve box. The Engineer and Contractor shall witness the condition and location of each valve or valve box. Failure to participate in the inspection by the Contractor will results in his forfeiting all rights to deny damages at a later date during the course of the work. Notice that the Contractor is ready for the above inspection shall be in writing to the Water Utility and shall be submitted giving at least 48 hours notice. The Contractor shall furnish a copy of the notice to the Engineer.

Contractor shall provide 72 hours written notice to the Engineer, the Anchorage Fire Department, and affected property owners/businesses before anticipated main line flow interruptions. It shall be the Contractor's responsibility to coordinate "turn-off" and "turn-on" with the Engineer.

Manhole and valve box adjustments will need to be made to existing AWWU facilities. This work will be performed by the Department's Contractor.

AWWU's Engineering Planning Section, 564-2765, shall be contacted a minimum of five (5) days before construction to request a preconstruction inspection for existing facilities. The Department's Contractor will be responsible for furnishing traffic control and personnel to assist AWWU while performing the preconstruction inspection. When construction is substantially complete, the Contractor shall contact AWWU's Engineering Planning Section to schedule a post construction inspection, to inspect the existing facilities to determine if any damage was done to existing facilities.

Coordination by the Department's Contractor with AWWU will be required. The AWWU contact is Brian Baus at (907) 564-2765.

627-2.01 GENERAL REQUIREMENTS.

All work in this section shall be in accordance with the most recent revision of the following standards of the American Society for Testing and Materials (ASTM) and the American Water Works Association (AWWA):

1.	Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings	ASTM A126
2.	Specification for Seamless Copper Water Tubing	ASTM B88
3.	Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water	AWWA C104/ANSI A21.4
4.	Polyethylene Encasement for Ductile Iron Piping for Water and Other Liquids	AWWA C105/ANSI A21.5
5.	Ductile-Iron and Gray-Iron Fittings for Water and Other Liquids	AWWA C110/ANSI A21.10
6.	Rubber-Gasket Joints for Ductile-Iron Pipe and Fittings	AWWA C111/ANSI A21.11
7.	Flanged Ductile-Iron Pipe with Threaded Flanges	AWWA C115/ANSI A21.15
8.	Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or Other Liquids	AWWA C151/ANSI A21.51
9.	Gate Valves for Water and Sewerage Systems	AWWA C500
10.	Dry-Barrel Fire Hydrants	ANSI/AWWA C502
11.	Rubber-Seated Butterfly Valves	AWWA 504
12.	Installation of Ductile-Iron Water Mains and Their Appurtenances	ANSI/AWWA C600
13.	Disinfecting Water Mains	AWWA C651
14.	Underground Service Line Valves and Fittings	ANSI/AWWA C800
15.	International Building Code (IBC) latest edition adopted by MOA and current local amendments	
16.	International Fire Code (IFC) latest edition adopted by MOA and current local amendments	
17.	Uniform Plumbing Code (UPC) latest edition adopted by MOA and current local amendments	
18.	Other National Fire Protection Association (NFPA) Standards latest edition adopted by MOA and local amendments	

627-2.02 MATERIALS.

Use materials that conform to the following:

1. Pipe. Class 52 ductile iron pipe shall be used for all water mains 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 before installation. Copper 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. Galvanized pipe, pipe containing asbestos, and the use of lead-tipped gaskets shall not be used. Polyethylene encasement shall be installed on all water mains and shall be eight mils thick and conform to AWWA C105/ANSI A21.5.

2. Fittings. Fittings shall be a minimum of 250 pounds pressure rating, mechanical joint or all bell, lined or unlined, ductile iron, unless otherwise required by the Contract Documents.

3. Continuity Straps. Continuity straps shall be stranded or solid, rubber or plastic coated, Number 2 copper wire.

4. Thrust Restraint System. Tie back rods and/or tie back rod and shackle assemblies will not be acceptable as restrained joints or restraining system for fittings, valves, piping deflection points.

   Unless otherwise detailed on the Plans, pipe joints shall be push-on rubber gasket type conforming to AWWA C111. Where specified on the Plans, restrained joint pipe shall be EBAA Iron MEGALUG, Romac Industries GripRing, U.S. Pipe Field LOK Gasket System, U.S. Pipe TR FLEX Pipe and Fittings, or approved equal. All restrained joint installation areas shall include joints, fittings, and piping deflection points.

   Restraint of field cut ductile iron pipe shall be provided with U.S. Pipe's TR FLEX GRIPPER® Ring, TR FLEX Pipe field weldments or approved equal.

   Contractor shall provide pipe manufacturer submittals that include thrust restraint calculations before construction.

5. Gate Valves. Gate valves shall be iron body, fully bronze mounted, double disc, parallel, or resilient seat valves as manufactured according to the requirements of AWWA C500 "Gate Valves for Water and Sewer Systems." All valves shall be non-rising 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.

6. Butterfly Valves. Butterfly valves shall be of the rubber-seated tight-closing type. They shall meet or exceed the performance requirements of AWWA C504 for operational pressures of 150 psi working pressure and 300 psi hydrostatic pressure.

   Piece Mechanical point valve ends shall be per AWWA C110/ANSI 21.10 and AWWA C111/ANSI 21.11 of the latest revision, and "Short-Body" according to the

requirements of Table 2 of ANSI/AWWA C504. Accessories (bolts, glands, and gaskets) shall be supplied by the valve manufacturer.

Valves must be full ANSI/AWWA C504 Class 150 B valve shaft diameter and full Class 150 B underground service operator torque rating throughout entire travel to provide capability for operation in emergency service.

Valve body shall be high strength cast iron ASTM A126 Class B. For valves with the rubber seat mounted on the disc, the mating surface in the body shall be 304 or 316 steel. For valves containing the rubber seat in the body, the method of seat retention shall be in accordance with the requirements of ANSI/AWWA C504, except that no retaining fasteners or other hardware shall be permitted in the flow stream.

Valve operators, unless otherwise required by the Contract Documents, shall be of the traveling nut type, sealed, gasketed, and lubricated for underground service and capable of withstanding an overload input torque of 450 ft/lbs at full open or closed position without damage to the valve or valve operator. The number of turns to operate the valve shall be a minimum of two (2) turns per inch of valve diameter for ninety (90) degrees of closure travel at a maximum pull of eighty (80) pounds. All valves shall open counterclockwise and be equipped with two-inch-square AWWA operating nut.

Butterfly valves twenty inches (20") and less: The valve shaft shall be on extending full-size through valve bearings, disc and shaft seal. In the event that the shaft is turned down to fit connections to the operator, the limits of ANSI/AWWA C504, Sec. 3.3.2 shall be strictly observed. Carbon steel shafts, if used, shall have 304 or 316 stainless steel journals with static seals to isolate the interior of the disc and the shaft from the water.

Butterfly valves over twenty inches (20"): The valve shaft shall be of two-piece stub shaft type, made of 18-8 Type 304 stainless steel. Valve bearings and shaft seals for valves of all sizes shall meet the requirements of ANSI/AWWA C504 Sec. 3.6 and 3.7, respectively, with the following additional requirements:

Sleeve bearings shall have a maximum coefficient of friction of 0.1.

For underground service, packing shall be pressure-energized chevron or "O" ring type, not requiring adjustment and suitable for permanent duty.

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

8. Valve Box Markers. Valve boxes shall be marked with markers consisting of two and one-half (2-1/2) inch OD 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 fifty (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).

9. Live Tap Connections. Tie back rods and/or tie back rod and shackle assemblies will not be acceptable as restrained joints or restraining system for valves and valve/pipe joint interface.

Unless otherwise detailed on the Plans, valve and valve/pipe interface shall be push-on rubber gasket type conforming to AWWA C111. Where specified on the Plans, restrained joint pipe shall be EBAA Iron MEGALUG, Romac Industries GripRing, or approved equal.

Contractor shall provide pipe manufacturer submittals that include thrust restraint calculations before construction.

10. 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 approved equal.

All fire hydrants shall be supplied with five and one-fourth (5-1/4) inch main valve opening.

All single-pumper hydrants shall be furnished with a six (6) inch ANSI Class 152 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 152 standard mechanical-joint end with two (2) cast on lugs for tie backs.

All connections shall be mechanical-joint unless otherwise indicated in the Contract Documents.

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.

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.

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 shutoff.

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

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."

Operating and nozzle nuts shall be pentagon shaped with one and one-half (1-1/2) inch point to flat measurements.

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

All working parts shall be bronze or non-corrosive metal according to the requirements of ANSI/AWWA C502.

All hydrants shall be right-hand opening (clockwise).

All hydrants shall be non-draining.

All joints shall be restrained. Unless otherwise detailed on the Plans, pipe joints shall be push-on rubber-gasket-type conforming to AWWA C111. Where specified on the Plans, restrained joint pipe shall be EBAA Iron MEGALUG, Romac Industries GripRing, U.S. Pipe Field LOK Gasket System, or approved equal. All restrained joint installation areas shall include joints, fittings, and piping deflection points.

The Contractor shall install four (4) guard posts at each hydrant installation where shown on the Plans, according to the standard detail drawings. If, in the opinion of the Engineer, the guard posts are not to be installed, they shall be delivered to the AWWU Operations and Maintenance Facility. Measurement and payment for guard posts shall be subsidiary to the Bid item "Furnish and Install Fire Hydrant Assembly."

11. 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 six (6) inches to the side of the hydrant leg, extending to the center of the connecting main line, and shall be perforated with one-eighth (1/8) inch diameter holes, spaced one (1) foot apart facing the center of the hydrant leg.

12. Water Service Lines.

a. General. A service line provides potable water to a building or lot for domestic or commercial use. A permit shall be purchased from AWWU permit section before any and all construction (either on or off property in the AWWU service area). Twenty-four (24) hour notification shall be given to AWWU inspector before making the connection available for inspection. Before an on-property service line permit for any new subdivision can be released for construction, all property corners shall be established and identified.

b. Pipe. Soft drawn seamless annealed copper type "K" shall be used for all service lines.

c. Key Box. The key box or valve box shall provide a clear and unobstructed access to a curb stop or valve to enable the AWWU operation of the curb stop or valve. Key boxes or valves shall be installed in the standard location as shown in the Standard Details. Valves shall be of an acceptable construction as outlined in this section and as shown in the Standard Details. Key boxes

for services stubbed to property lines for future use shall be installed with a standard location marker that shall be a wood two (2) inch by four (4) inch by eight (8) foot, protruding above the ground three (3) feet, painted blue, and stenciled with the word "water" in white two (2) inch high letters.

13. Magnesium Bag Anodes.

a. Anodes. Anodes shall be HARCO High Potential Cast Magnesium Anodes or approved equal. Anodes utilized for the galvanic anode system installation shall be prepackaged magnesium style anodes weighing seventeen (17) pounds bare.

Anodes shall be packaged in a low resistive backfill consisting of 75 percent gypsum, 20 percent bentonite, and 5 percent sodium sulfate.

Anodes shall be provided with No. 10 AWG stranded copper, single conductor cable with HMWPE insulation. Lead wire cable shall be rated for 600 volts and designed for direct burial applications.

b. Thermite Welding Equipment and Materials. Equipment and materials used to bond the No. 10 AWG HMWPE to the pipeline shall be "CADWELD" type as manufactured by ERICO Products, Inc., of Cleveland Ohio, or approved equal. Thermite weld caps, designed to protect the cadweld bonds from corrosion, shall be Royston Roskote or approved equal.

14. Temporary Water System. Materials used for temporary water service shall conform to the requirements of MASS. The temporary water service system shall be constructed from one or more of the following materials: Polyvinyl Chloride (PVC), high-density polyethylene (HDPE), copper, Ductile Iron, Cast Iron or galvanized steel. The primary water feeder pipe shall be adequately sized and approved by the Engineer.

15. Insulation Board. The insulation boards shall be extruded polystyrene insulation board, have a minimum full board size of 2' x 8', and meet the R-value specified on the Plans. The insulation board shall be rigid, homogeneous, and essentially unicellular, and shall conform to the following:

Property	Test Method	Tested Value
Compressive Strength, Minimum value at yield or 5 percent deformation	ASTM D-1621	60 psi
Water Absorption, maximum percent by volume	AASHTO M-230	0.10
Thermal Resistance (R) per inch, min. R-Value at 75°F mean temperature, SF-Hr-°F/BTU	ASTM C-177	As Specified

CONSTRUCTION REQUIREMENTS

627-3.01 FURNISH AND INSTALL PIPE

1. Materials Delivery. Pipe and appurtenances shall be handled in such a manner as to ensure delivery to the trench in a sound, undamaged condition. Particular care shall be taken not to damage the pipe, pipe coating, or lining. Before installation, the pipe and appurtenances shall 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 and be protected from freezing temperatures or direct sunlight.

2. Installation. Excavation, backfilling, and compaction for the furnishing and installing of all water conduits shall be in accordance with Section 204. Notify AWWU at least one business day in advance of inspections of pipe bedding and pipe installation before backfilling. 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 and free of debris during laying operations 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, before encountering a known obstacle or tie-in to 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 case-specific fittings to suit actual conditions. All connections larger than two inches in diameter made under pressure shall be made by AWWU forces, unless otherwise indicated on the Plans. 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 eight-foot (8') 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. All ductile iron pipe, fittings, valve boxes, and hydrants shall be encased in one layer of polyethylene encasement according to subsection 3.02, Polyethylene Encasement. The Contractor shall stagger the joints for the water pipe such that no joint shall be closer than nine feet from the centerline crossing of the water and sewer pipes. In addition, the vertical separation between the water and sewer pipes shall be 18 inches minimum.

3. Alignment and Grade. 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

shown on the Plans. A maximum two-tenths (2/10) 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. The Contractor 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. 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 offsets, shall not exceed eighty percent (80 percent) of 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 special fittings.

4. Jointing of Metal Pipe. The Contractor has the option of using either mechanical or push-on joints unless otherwise indicated on the Plans or directed by the Engineer. All joints shall conform to the requirements of ANSI/AWWA C600. The Contractor will be required to use mechanically restrained joints and fittings 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 twelve (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 specified, the flange and fittings shall conform to the requirements of AWWA C110/ANSI A21.10 for 250-pound pressure ratings. If the ductile iron pipe restrained joint system proposed for use in the Work is not one of the restrained joints or restraining systems identified in subsection 2.02 Thrust Restraint System, the Contractor must field demonstrate to the Engineer the installation and/or construction of each new restrained joint or restraining system. The Contractor shall provide AWWU with a minimum of 48 hours notice, excluding nonworking days, to coordinate the review of the field demonstration. The Contractor shall certify, in writing, that the restrained joint system is installed according to the manufacturer's instructions. If the Contractor fails to install the restrained joint system according to manufacturer's instructions, in the opinion of the Engineer, Contractor shall remove the disapproved system and replace with a new restrained joint system. Contractor shall be responsible for access to the field demonstration location and all trench excavation, dewatering, backfill operations and other related operations before, during, and after the restrained joint system is reviewed by the Engineer. The cost for coordinating and providing access for review of Contractor's installation and/or construction of the restrained joint system shall be subsidiary to the bid item under construction.

5. Flushing and Testing. Before 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 and 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 request to supply water for flushing, testing, and disinfecting shall be scheduled in writing with the Engineer at least 24 hours before obtaining AWWU-supplied water. The request for flushing, testing, and disinfecting will be subject to water availability. In the event of high water demand or low water availability within the AWWU water system, meeting Contractor's schedule may not be possible.

Contractor shall submit, in writing, for the Engineer to review and approve, a schedule and procedure for the testing and flushing of all newly installed pipe. When, in the opinion of the Engineer, the testing and flushing schedule and procedure is deficient, inadequate, improper, or conditions are such that the impact to existing water service areas are adversely affected by service interruptions, Contractor will be notified in writing by the Engineer. Such notification shall be accompanied by a statement of the corrective action to be taken. Contractor shall adhere to the testing and flushing schedule and comply with such instruction as directed by the Engineer.

a. Flushing. All newly installed water facilities shall be open-bore flushed to remove any foreign matter. Open-bore flushing shall be accomplished before 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 to the Department. 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 forty-eight (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. AWWU and the Department will not be responsible for any cost incurred by the Contractor for flushing.

   Under no circumstances will disposal of spent flushing water be directed to the sanitary sewer system.

   A request to supply water for flushing, testing, and disinfecting shall be scheduled in writing with the Engineer at least 48 hours before obtaining AWWU-supplied water. The request for flushing, testing, and disinfecting will be subject to water availability. In the event of high water demand or low water availability within the AWWU water system, meeting Contractor's schedule may not be possible.

   Contractor shall submit, in writing, for the Engineer to review and approve, a schedule and procedure for the testing and flushing of all newly installed pipe. When, in the opinion of the Engineer, the testing and flushing schedule and procedure is deficient, inadequate, improper, or conditions are such that the impact to existing water service areas are adversely affected by service interruptions, Contractor will be notified in writing by the Engineer. Such

notification shall be accompanied by a statement of the corrective action to be taken. Contractor shall adhere to the testing and flushing schedule and comply with such instruction as directed by the Engineer.

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 according to the requirements of ANSI/AWWA C600 unless hereinafter modified. The Contractor, at his option, can use either 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 before making the required hydrostatic test. Before 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 thirty (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. 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: $L = ND(P)^{0.5}/7400$, 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, and P = test pressure in pounds per square inch. The duration of each leakage test shall be two (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 two (2) hour period, the preceding 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 at the Contractor's expense until the results are satisfactory. The Contractor shall notify the Engineer forty-eight (48) hours, (two (2) working days) before any test and shall notify the Engineer two (2) hours in advance of the scheduled time. In the event the

Engineer has not been notified of cancellation and the Contractor is not prepared for the test as scheduled, the Contractor shall reimburse 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 forty (40) ppm to fifty (50) ppm. Application of the chlorine solution shall continue until the required dosage is evident at all extremities of the newly laid line. Under no circumstances shall the chlorinating agent be introduced through a fire hydrant. 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 hypochloride 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 five (5) ppm chlorine shall be produced in all parts of the water main and retained for a minimum period of twenty-four (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. The Contractor shall provide a plan for approval by the Engineer for disposal of chlorinated waters from the disinfection of the system. The governing authority shall approve the discharge location. Table 627-1 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 forty (40) to fifty (50) ppm. This dosage takes into account that Contractors most frequently use granular HTH that is sixty-five percent (65 percent) pure. If another chlorinating agent is used, the dosage must be adjusted based on the associated purity. Caution should be exercised against producing too high a concentration of chlorine in the line.

Table 627-1

Pipe Diameter (inches)	Dosage (oz.) per 100 feet
6	1.35
8	2.75
10	4.3
12	6.19
16	11
20	17
30	38
42	76

d. Continuity Tests. The Contractor shall perform electrical conductivity tests on all mains under twelve (12) inches in diameter in the presence of a representative of the Engineer. Continuity testing shall also be performed on all water service connections and extensions greater than two-inches (2") in diameter. The Contractor shall maintain a circuit of 600 amperes DC current for a period of fifteen (15) minutes. Input current shall not exceed ten percent (10 percent) 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 water service thaw wires, fire hydrants, and valves as substitutes for wires will not be accepted. All wires brought to the surface to complete the continuity test shall be removed to a depth of two (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. For ¾-inch and one 1-inch copper pipe vent removal, place a solid copper retainer disc (Mueller Co. H-15535 or approved equal) on the end of the corporation stop and securely tighten with the flare nut.

627-3.02 POLYETHYLENE ENCASEMENT.

The polyethylene encasement shall be installed in strict conformance to the methods described in the most current editions of AWWA C105/ANSI A21.5 and the Ductile Iron Pipe Research Association's "A Guide for the Installation of Ductile Iron Pipe."

The Contractor shall use Method A of ANSI/AWWA C105/A21.5 to install polyethylene encasement. Method A is summarized as follows:

a. Cut polyethylene tube to a length approximately two feet longer than the length of the pipe section. Slip the tube around the pipe, centering it to provide a one-foot overlap on each adjacent pipe section, and bunching it accordion-fashion lengthwise until it clears the pipe.

b. Lower the pipe into the trench and make up the pipe joint with the preceding section of pipe. A shallow bell hole must be made at joints to facilitate installation of the polyethylene tube.

c. After assembling the pipe joint and testing the bonded joint, make the overlap of the polyethylene tube. All welds shall have adequately cooled to 100 degrees Fahrenheit before overlapping the polyethylene tube. Pull the bunched polyethylene from the preceding length of pipe, slip it over the end of the new length of pipe, and secure in place with tape. (The tape used shall have an adhesive specifically designed for superior adhesion to polyethylene film). Then slip the end of the polyethylene from the new pipe section over the end at the first wrap until it overlaps the joint at the end of the preceding length of pipe. Secure the overlap in place. Take up the slack width to make a snug, but not tight, fit along the barrel of the pipe, securing the fold at quarter points with tape.

d. Repair any rips, punctures, or other damage to the polyethylene with an approved adhesive tape or with a short length of polyethylene tube cut open, wrapped around the pipe, and secured in place with tape. Proceed with installation next section of pipe in the same manner.

627-3.03 FURNISH AND INSTALL VALVES.

Excavation, backfilling, and compaction for the furnishing and installing of all water valves shall be in accordance with Section 204. Valve box components shall be plumb and centered over the operating nut. The valve operator shall be placed on the side of the water main away from the centerline 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 before backfilling. The valve shall be inspected by the Engineer in the open and closed positions to ensure that all parts are in working condition. Provisions shall be made to restrict the soils from entering the bottom section to prevent soil infiltration into 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. Encase the valve box with eight (8) mil polyethylene, taped securely in place. The Contractor shall expose all valve boxes for pre-final and final inspection. After final inspection of the valves located in unpaved areas, sawdust shall be poured directly over the valve box lid and covered with gravel to facilitate location in the future.

627-3.04 PROVIDE LIVE TAP CONNECTIONS

Contractor shall provide all trench excavation, backfill, and compaction necessary to perform the live tap connections. Excavation for live tap connections shall be considered subsidiary and Contractor shall excavate substances encountered to the depth required for the live tap connections. Variations from the depth indicated in the Plans will not be grounds for additional compensation. It shall be the Contractor's responsibility to become familiar with the depth of water mains for the project. Contractor shall excavate for live tap connections in such a manner that the excavation is 90 degrees to the main water line, whenever possible. The trench shall be long enough and of sufficient width at the bottom to allow installation of the valve for the live tap connection.

The tapping sequence of operations shall be conducted in such a manner so as to maintain continuous operation of the water distribution system. The Contractor shall submit a Live Tap Connection Work Plan ten (10) days before beginning the live tap connection procedure.

Contractor shall be responsible for, and shall bear the expenses incurred, if a water main should be damaged during excavation or backfilling. Contractor will be responsible for repairing all damaged mains.

AWWU shall provide and pay for all equipment, labor, materials, and supplies associated with the actual live tap connection. Contractor shall notify the Engineer and AWWU 48 hours (two working days) before needing installation of the live tap connection. The Contractor shall obtain all necessary permits for the live tap connection; however, AWWU will waive all permit fees.

627-3.05 FURNISH AND INSTALL FIRE HYDRANTS.

1. General. The Work under this section consists of the performance of all Work required for the furnishing and installation of "L-Base" Fire Hydrant Assemblies, including the fire hydrant leg pipe, auxiliary gate valve, valve box, joint restraint according to subsection 2.02 Materials, Thrust Restraint System, and Fire Hydrants.

2. Installation. Excavation, backfilling, and compaction for the installation of all fire hydrants shall be in accordance with Section 204. The Contractor shall install the hydrant assemblies according to the Standard Details. All fire hydrant legs shall be installed level. The fire hydrant barrel shall be installed plumb. The Contractor shall adjust fire hydrants to final grade. The Contractor shall be responsible for access to the hydrant location and all trench excavation, dewatering, and backfill operations before, during, and after the fire hydrants are adjusted to final grade. The cost for coordinating and providing trenching operations are subsidiary to the fire hydrant installation. 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 two (2)-inch black lettered stencils, the direction and distances to the nearest one-tenth (1/10) foot the distance to the valve box on the face of the fire hydrant directly below the bonnet flange.

627-3.06 FURNISH AND INSTALL GALVANIC BAG ANODES.

1. General. The work under this Section consists of the performance of all Work required for furnishing and installing galvanic anodes. The Contractor shall install the anodes according to these Specifications and in conformity with the details shown on the Drawings, unless otherwise approved.

2. Definitions.

AWG	American Wire Gauge
BDC	Bottom Dead Center of the Pipe
HMWPE	High Molecular Weight Polyethylene
NACE	National Association of Corrosion Engineers

3. Installation. Galvanic anode installation shall be accomplished as shown on the control drawings and as specified herein. The following is a list of general procedures utilized for typical installation of magnesium bag anodes.

a. Anodes. Magnesium bag anodes shall be installed 24" from the side wall of the pipe, to a centerline depth in-line with the approximate horizontal plan of the pipe's BDC. Anodes may be placed on either side of the pipe's BDC. Anodes may be placed on either side of the pipeline, one anode to every other pipe section (joint). Exact anode location shall be shown on the record drawings.

b. Lead Wire Connection to Pipe. The No. 10 AWG HMWPE lead wires shall be attached to the top dead center of the pipe. Lead wire connection to the pipe shall utilize exothermic weld connection methodology as outline above and on the drawings. Contractor shall follow Cadweld manufacturer's instructions for use.

c. Backfilling. Extreme care shall be taken so as not to damage the anodes or direct buried lead wires during backfill procedures.

627-3.07 PROVIDE TEMPORARY WATER SYSTEMS.

The work under this Section consists of the performance of all Work required for the coordination, planning, design, furnishing, construction, installation, maintenance, and removal of temporary water service to current AWWU customers in the project area during construction of this project. The Contractor shall maintain water service during the entire period of construction activities to all current AWWU customers. No AWWU customer shall be without water for a period greater than six (6) hours in any twenty-four (24)-hour period. The water outage period of 6-hours shall be confined to 11 p.m. to 5 a.m., or as coordinated with the AWWU customer by the Contractor. If a water outage is coordinated with an AWWU Customer, the Contractor shall document the person contacted, and the date/time the coordination was performed.

The following minimum criteria shall be used for service to each structure.

1. 25 psi minimum, 85 psi maximum (or existing system pressure, whichever is greater) delivery pressure measured at the connection to the structure.

2. Five (5)-gallons-per-minute flow at the above delivery pressure measured at the connection to the structure.

3. Potable water system and water quality shall conform to 18 AAC 80 Alaska Drinking Water Standards.

4. All services to structures shall be valved to allow individual control of service to each structure.

The Contractor shall submit a Temporary Water System(s) plan for the temporary water system to the Safe Water Division of the State of Alaska, Department of Environmental Conservation at 269-3075, for approval before beginning the work on such systems. Contractor shall then submit ADEC approved plan for any temporary water systems to the Engineer before beginning Work on such system. The plan shall identify the type of system, the design, the method of construction, and the maintenance and operation procedures to be used. The plan must identify service to each existing customer except those who agree in writing to have their service temporarily disconnected. Such agreements shall be obtained by the Contractor. To be submitted with the plan are any agreements between the Contractor

and property owner regarding access and use of private property. The methods to be employed in maintaining water service are left to the Contractor. Surface piping, trailer mounted supply systems, and so forth may all be considered as long as they comply with current health standards and requirements. A copy of the ADEC approved plan shall be provided to the Engineer, along with copies of any agreements with property owners referred to above.

The Contractor shall also submit in writing, 48 hours before the system's activation, the name and phone number of the Work Superintendent and at least one alternate who shall be available on a 24-hour, 7-days per week basis, for repair and/or maintenance of the temporary water system. In the event that the Contractor fails to repair and/or maintain the temporary system to the satisfaction of the Engineer, and AWWU is required to perform repairs and/or maintenance, all costs associated with said repairs and/or maintenance shall be deducted from the contract amount.

All construction shall comply with ADOT&PF specifications unless otherwise noted in these Special Provisions. All temporary water service equipment shall be disinfected per ANSI/AWWA C652-86 Disinfection of Water Storage Facilities and ANSI/AWWA C651-86 Disinfection of Water Mains. A testing laboratory certified by the State of Alaska shall do all bacteriological samples as required under these Specifications.

All temporary service equipment shall be disinfected before connecting to a residence or business and shall be disinfected each and every time the equipment is moved or connected to another residence per above-referenced Specifications.

The Engineer shall be notified forty-eight (48) hours before the installation of any temporary water system. The Engineer shall be present to inspect the disinfection process of any temporary water service system.

No residence presently serviced by the AWWU system shall be without water for a period greater than six (6) hours in any twenty-four (24)-hour period. Each residence or business owner shall be notified seventy-two (72) hours before they are transferred on or off the temporary water system and before any other service interruption. Before constructing temporary water services on private property, the Contractor shall secure a written "Permission to Enter" from the property owner. Such permission shall hold the ADOT&PF, AWWU, and its agents harmless for any claims resulting from damage or harm sustained due to the Contractor's operation. The Contractor shall also provide a copy of each "Permission to Enter" form to the Engineer.

Following the successful installation of the temporary water system, the existing water service shall be appropriately disconnected at a main shut-off valve inside the structure. Qualified personnel who are familiar with building plumbing systems shall accomplish the disconnection of the existing water service. This work shall be performed to prevent back feeding water through the service connection. Installation of a shut-off valve, if required, shall be considered part of this work.

Fire hydrants may be used as a water source for a temporary water system. The Contractor will be required to obtain a no-charge hydrant permit from AWWU, and will be required to meet all permit conditions (winter use of a hydrant shall require special permission from AWWU). In addition, the Contractor shall provide a gate valve assembly at the fire hydrant as a shut-off valve for the temporary water system. The Contractor shall be responsible for

any damage to the hydrant, permanent water distribution system, on-property water service systems, and temporary service piping and shall repair such damage at no cost to the Owner.

Reconnection of the structure to the permanent water system shall be accomplished by a person qualified to perform said work. System shall be complete and fully functional. The Contractor at no additional cost to the Owner shall resolve any conflicts with the homeowner concerning the reconnection of the water system.

627-3.08 DISPOSAL OF AC PIPE.

If AC Pipe (asbestos cement pipe) is encountered and has to be removed from the trench and disposed of, the Contractor is hereby notified that Federal regulations governing the removal and disposal of asbestos are NESHAP 40 CFR, Part 61, Subpart M, and OSHA 29 CFR 1910. Alaska Department of Environmental Conservation requirements include, but are not limited to 18 AAC 50, Air Quality Control Regulations, and 18 AAC 60, Solid Waste Management Regulations. Alaska Department of Labor's governing regulations include, but are not limited to Occupational Safety and Health Standard, Subchapter 04.0103: Asbestos; 8 AAC 61.600.790 Article 8; and Alaska Workers Right to Know, AS 18.60. Asbestos cement pipe removed from the trench must be handled and disposed according to the applicable Federal and State regulations. Asbestos cement pipe must be disposed of and declared at the Hiland Road Municipal Landfill.

No separate payment shall be made for the removal, handling, and disposal of AC pipe, and all Work associated with this item shall be considered subsidiary to the Contract.

627-3.09 FURNISH AND INSTALL INSULATION.

1. General. The work under this Section shall consist of performing all operations including all labor and materials pertaining to placement of insulation. The insulation board shall be extruded polystyrene insulation board in conformance with the Drawings and these specifications. The Work under this Section shall also include shaping and compacting a level area under and over the horizontal insulation boards and placing the insulation as indicated on the Drawings.

2. Installation. The insulation board shall be installed with staggered joints. The thickness of each insulation board shall be minimum of two (2) inch thickness. Layering of insulation to obtain the specified R-value shall be allowed as long as joints are overlapped at least one foot. Before placing the insulation board, the area shall be bladed, shaped, and compacted according to specifications and Drawings. The subgrade shall be shaped to the lines and grades shown on the Drawings and provide a smooth surface on which to place the insulation board. Surface irregularities shall not exceed one inch within eight feet, or 3/8 inch in two feet. Before placing the insulation board on the prepared subgrade, the Contractor shall furnish straight edges to the Engineer for checking surface uniformity. The subgrade shall be uniformly compacted. Ridges left by the compaction equipment shall be hand-raked smooth and recompacted. The horizontal insulation boards shall be set accurately to the line and grade established and in such a manner to hold the board firmly in place by mechanically connecting it to the subgrade.

   The Contractor shall replace or repair any insulation panels broken, crushed, or cracked, as determined by the Engineer, at no cost to the Owner.

The insulation board shall be covered with an approved 3-inch minus classified fill and backfill, placed in a vertical lift so as not to damage the placed insulation, spread, and compacted for the full width of the insulation layer before placing subsequent lifts. Placing, spreading, and all compaction shall be accomplished in such a manner as not to damage the insulation board.

627-3.10 FINAL ACCEPTANCE.

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

627-3.11 RECORD DOCUMENTS.

The Contractor shall maintain Record Documents for the waterline work on the jobsite consisting of a complete 22 x 34 inch full-size set of black line plans (record drawings), survey line and grade books, and other Contract Documents. All changes in location (both vertical and horizontal), material, equipment, or other changes in the Work and horizontal and vertical locations of other utilities encountered shall be recorded in red ink (on the Record Documents) and kept current on a daily basis in conformance with the requirements of MASS Division 65, Construction Specifications For Municipal Construction Surveys, Section 65.02 Construction Surveying, Article 2.14 As-built Surveys and Record Drawings. Design dimensions, elevations, and grades that are not changed from the design shall be identified as being accurate by noting "ASB" adjacent to the value. All field installation notes shall also be included in the Record Drawing Documents. The Record Documents shall be made available to the Engineer at all times. The Contractor shall provide horizontal and vertical locations of all water and sewer service connections at the property line or lease lot line, including swing ties and offsets to property or lease lot corners.

The "RECORD" set of prints shall include two (2) or more swing ties from prominent, permanent features to show the location of each installed water and sewer service connection. Swing ties are to be as close to perpendicular to each other as possible. When property or lease lot corners are in, they shall be used as swing tie referenced points.

All additions and corrections shall be neat, clean, and legible. If additional plan sheets are required, the Contractor shall prepare them on reproducible Mylar of like material and size as the original plans.

The Engineer will review all Record Documents for completeness and conformance to the standards stated above. The Contractor shall make all corrections, changes, additions, and deletions required conforming to the standards. The Engineer may periodically review the status of the Record Documents during the course of the Work. Failure of the Contractor to keep the Record Documents current and in the required condition will be considered cause for additional withholding from the progress payments.

Approved final Record Documents for the waterline portion of the work, bearing a signed certification by the Contractor that the Record Documents are a complete and accurate representation of the Project as constructed, shall be delivered to the Engineer within 30 days after Substantial Completion or before final acceptance of the Project, whichever is earlier.

Certification for Record Drawings shall be affixed to the final reproducible Drawings and shall include the following unqualified statement that the Contractor must sign and date as a condition of Final Payment and Final Acceptance of the Arctic Boulevard Surface Rehabilitation, 36th Avenue to Fireweed Lane Project.

> "This will serve to certify that these Record Drawings are a true and accurate representation of the Project as constructed."

627-4.01 METHOD OF MEASUREMENT.

1. Water Conduit. By the linear foot, for the diameter specified, along the horizontal projection of the conduit from center to center of valves, fittings, and grade breaks. No deduction in length will be made for valves and fittings.

2. Gate Valves and Valve Boxes. By the number of valves and valve boxes adjusted or installed.

3. Butterfly Valves and Valve Boxes. By the number of valves and valve boxes adjusted or installed.

4. Connection to Existing Water Main. By lump sum.

5. Magnesium Bag Anode. By the number of anodes installed.

6. Temporary Water Systems. By lump sum.

7. Insulation Board. The insulation board will not be measured and will be subsidiary to other items.

627-5.01 BASIS OF PAYMENT.

At the contract unit price per unit of measurement for the pay items listed below that appear on the bid schedule.

Item 627(1). Unit price shall include, but not limited to, removal and delivery of non-serviceable portions of removed pipe, valves, and fittings at a Contractor-furnished disposal site; removal and delivery of serviceable portions of removed pipe, valves, and fittings to AWWU, when directed by the Engineer; installation of all pipe, tees, crosses, bends, caps, plugs, adapters, reducers, restrained joint systems, and other fittings; thrust blocks; polyethylene encasement; adjustment to finish grade; cleaning and flushing; hydrostatic testing; provisions coordinating the supply of water as required for flushing and hydrostatic testing; disinfecting; protection-restoration of all existing utilities; maintenance of existing water distribution system flows; shoring-protection of existing light poles; maintenance and restoration of existing drainage patterns; restoration of existing driveways; signage, mail boxes, newspaper boxes, trees and shrubs located on private property; landscaping, utility markers, survey monumentation; removal and replacement of miscellaneous public or private improvements; preparation of off roadway areas for topsoil and re-seeding; cleanup, and miscellaneous items required to complete the Work as shown on the Plans. The unit price shall also include furnishing and installing pipe angle markers as shown on the Plans.

Item 627(10). Unit price shall include valve box top section, dustpan, and lid marked "water."

The development, preparation, and presentation of all Record Documents is subsidiary.

Payment will be made under:

Pay Item No.	Pay Item	Pay Unit
627 (1-12)	12-inch Ductile Iron Water Conduit, Class 52	Linear Foot
627 (1-16)	16-inch Ductile Iron Water Conduit, Class 52	Linear Foot
627 (3)	Install Valve Box	Each
627 (5B)	Fire Hydrant, Double Pumper	Each
627 (7)	Fire Hydrant Removal	Each
627 (8B)	Connection to Existing Water Main	Lump Sum
627 (9-12)	Install 12-inch Gate Valve	Each
627 (9B-16)	Install 16-inch Butterfly Valve	Each
627 (10)	Adjustment of Valve Box	Each
627 (13B)	Disconnect and Reconnect Existing Water Service, Up to 2-inch Diameter	Each
627(20)	Waterline As-Built	Lump Sum
627 (25)	Install Magnesium Bag Anode	Each
627 (27)	Temporary Water System	Lump Sum

(AWWU 12/31/05)

Delete Section 639 in its entirety and substitute the following:

SECTION 639

DRIVEWAYS

Special Provisions

639-1.01 DESCRIPTION.

Construct all approaches (residential, commercial, and public driveways) at the locations shown on the Plans.

639-2.01 MATERIALS.

Use materials that conform to the standards for the main roadway.

639-3.01 CONSTRUCTION.

Construct approaches to the dimensions shown on the Plans.

639-4.01 METHOD OF MEASUREMENT.

By the number of approaches constructed as shown on the Plans or as directed. Pavement removal and excavation required beyond the limits of the adjacent main line will be subsidiary.

639-5.01 BASIS OF PAYMENT.

At the contract unit price shown in the bid schedule. The contract unit price for approaches shall be full compensation for furnishing equipment and labor necessary to complete the work as specified.

Materials required to construct approaches will be paid for separately under the respective items listed in the bid schedule.

Native material meeting the minimum requirements of Selected Material, Type C, will not be paid for directly, but will be considered subsidiary to 639 items.

Pavement removal and excavation required beyond the limits of the adjacent main line will be subsidiary. (05/04/02)R58M98

Payment will be made under:

Pay Item	Pay Unit
639(6) Approach	Each

Delete Section 641 in its entirety and substitute the following:

SECTION 641

EROSION, SEDIMENT, AND POLLUTION CONTROL

Special Provisions

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. BMPs include temporary or permanent structural and non-structural devices and practices. The Department describes common BMPs in its *Alaska Storm Water Pollution Prevention Plan Guide, the most recent version.*

2. ESCP (Erosion and Sediment Control Plan). The general plan for control of project-related erosion and sedimentation. 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. The ESCP has been included in Appendix C.

3. Final Stabilization. A point in time when all 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, all 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 percent 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. SPCC Plan (Spill Prevention, Control, and Countermeasure) Plan. The Contractor's detailed plan for oil spill prevention and control measures, that meets the requirements of 40 CFR 112.

6. SWPPP (Storm Water Pollution Prevention Plan). The Contractor's plan for erosion and sediment control and storm water management under the NPDES General Permit. The SWPPP is developed by the Contractor and describes site-specific controls and management of issues identified for the project.

641-1.03 SUBMITTALS.

For projects disturbing less than one (1) acre of ground submit two (2) copies each of your SWPPP and HMCP to the Engineer for approval. Submit one (1) copy of your SPCC Plan (if required under Subsection 641-2.03) to the Engineer. Sign all submittals. Deliver these documents to the Engineer no less than five (5) calendar days prior to the preconstruction conference.

The Department will review the SWPPP and HMCP submittals within fourteen (14) calendar days. Submittals will be returned to you as either requiring modification unless approved by the Department.

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.

Once the Department has determined the site has achieved final stabilization, the Engineer will provide written notification to you.

641-2.01 STORM WATER POLLUTION PREVENTION PLAN (SWPPP) REQUIREMENTS.

For projects disturbing less than one (1) acre of ground, you must prepare a Storm Water Pollution Prevention Plan. Use the Department's ESCP to develop a SWPPP based on your scheduling, equipment, and use of alternative BMPs. Follow the format presented in the *Alaska Storm Water Pollution Prevention Plan Guide, in most recent version.* The plan must consider first preventing erosion, then minimizing erosion, and finally trapping sediment before it enters waterways.

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

Specify the line of authority and designate your field representative for implementing SWPPP compliance. Designate one representative for each subcontractor who performs earth-disturbing activities or who install and maintain erosion and sediment control measures.

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 all hazardous materials, including office materials, to be used and/or stored on site, and their estimated quantities. Detail your 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 all controls to prevent the accidental spillage of oil, petroleum products, and other hazardous materials.

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

Specify the line of authority and designate your 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 that is certified by a licensed Professional Engineer, when required by 40 CFR 112, including:

1. When oil spills may reach navigable waters; and

2. Your total above ground oil storage capacity is greater than 1,320 gallons.

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

3. Operating procedures that prevent oil spills;

4. Control measures installed to prevent a spill from reaching navigable waters; and

5. Countermeasures to contain, clean up, and mitigate the effects of an oil spill.

641-3.01 CONSTRUCTION REQUIREMENTS.

Do not begin ground-disturbing work until the Engineer provides you written notice.

Comply with the requirements of the approved HMCP, the submitted SPCC Plan, and all 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 all discharges of petroleum products and/or other materials hazardous to the land, air, water, and organic life forms. Perform all 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 your SPCC Plan.

Implement temporary and permanent erosion and sediment control measures identified in the SWPPP, and ensure the SWPPP remains current. Maintain the temporary and permanent erosion and sediment control measures in effective operating condition.

Perform inspections and prepare inspection reports in compliance with the project SWPPP.

1. Joint Inspections. Prior to start of construction, conduct a joint on-site inspection with the Engineer 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 (7) days and within 24 hours of the end of a storm exceeding 1/2 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.

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

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

2. Winter Inspections. During winter shutdown, conduct inspections at least once every month and within 24 hours of a storm resulting in rainfall of 1/2 inch or greater. The Engineer may waive monthly inspection requirements until one month before thawing conditions are expected to result in a discharge, if all of the following requirements are met:

a. Below-freezing conditions are anticipated to continue for more than one month.

b. Land disturbance activities have been suspended.

c. The beginning and ending dates of the waiver period are documented in the SWPPP.

3. Inspection Reports. Prepare and submit, within three (3) working days of each inspection, a report on state Form 25D-100, with 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 non-compliance.

Where a report does not identify any incidents of non-compliance, certify that the facility is in compliance with the SWPPP. Include reports as an appendix to the SWPPP.

Retain copies of the SWPPP for at least three (3) years from the date of final stabilization.

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

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

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 (7) 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 (7) days of the temporary or permanent cessation of ground-disturbing activities.

If you fail 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 your earthwork operations and withhold monies due on current estimates for such earthwork items until all aspects of the work are coordinated in a satisfactory manner.

If you fail to:

1. Pursue 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 Engineer may, after giving you written notice, proceed to perform such work and deduct the cost thereof, including project engineering costs, from your progress payments.

641-4.01 METHOD OF MEASUREMENT.

Section 109 and as follows:

Item 641(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) and (2) or Items 641(1), (3), and (4).

1. Item 641(1) Erosion and Pollution Control Administration. At the contract lump sum price for administration of all 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(3) Temporary Erosion and Pollution Control. At the lump sum price shown on the bid schedule to install and maintain all temporary erosion, sedimentation, and pollution control measures under the original approved SWPPP and HMCP.

3. 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. All work paid under this item will be shown as amendments to the original approved SWPPP or HMCP.

Temporary erosion and pollution control measures that are required at Contractor-furnished sites are subsidiary.

Perform temporary erosion and pollution control measures that are required due to your negligence, carelessness, or failure to install permanent controls as a part of the work as scheduled or ordered by the Engineer, or for your convenience, at your own expense.

Permanent erosion and pollution control measures will be measured and paid for under other contract items, when shown on the bid schedule. (06/10/04)R272USC04

Payment will be made under:

Pay Item	Pay Unit
641(1) Erosion and Pollution Control Administration	Lump Sum
641(3) Temporary Erosion and Pollution Control	Lump Sum
641(4) Temporary Erosion and Pollution Control Amendments	Contingent Sum

SECTION 643

TRAFFIC MAINTENANCE

Special Provision

643-1.01 DESCRIPTION.

Add the following as a third paragraph:

Illuminate construction activities listed in Table 643-2 during hours of night work on roads open to the public within project limits.

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:

Latitude	No Lighting Required		Nearby
(degrees)	Start	End	Cities
61	June 11	July 1	Anchorage
62	June 2	July 13	Wasilla, Palmer

R276USC04(11/29/04)

643-1.03 TRAFFIC CONTROL PLAN.

Replace the last paragraph with the following:

A waiver may be requested of regulation 17 AAC 25 regarding oversize and overweight vehicle movements within this project in writing. If the waiver is approved, movements of oversize and overweight vehicles in or near traffic within the project limits will be done according to the provisions of an approved Traffic Control Plan. Maintain a minimum12-foot lateral separation between the non-street legal vehicles and the motoring public. The Traffic Control plan shall specify the traffic control devices required for these operations. (01/04/06)R222USC04

643-1.04. WORKSITE SUPERVISOR.

Add the following to Item 2. Duties:

i. Supervise lighting of Night Work.

Add the following new subsection:

643-1.08 STATIC FIELD LIGHTING TEST.

Before work begins, do a static layout of construction and lighting equipment meeting light level requirements in Table 643-2. Tell the Engineer when the test will be conducted. Conduct the test in an area where existing artificial illumination will not increase light readings. Wait until after dark and turn on all lights. The Engineer will measure the minimum horizontal illuminance levels at the locations specified in Table 643-2. In addition, the Engineer or designee will determine whether the system produces too much glare. Modify the system to provide the required illuminance level, uniformity, and glare mitigation.

Take meter readings at roadway surface level.

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. (01/01/06)E28

R276USC04(11/29/04)

643-2.01 MATERIALS.

Add the following:

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

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. (01/04/06)R222USC04

Standard Modification

643-3.01 GENERAL CONSTRUCTION REQUIREMENTS.

Add the following:

Immediately notify the Engineer of a traffic related accident that occurs within the project limits as soon as becoming aware of the accident. (01/01/06)E28

643-3.04 TRAFFIC CONTROL DEVICES.

In the sixth paragraph, delete "ATTSA" and replace with "ATSSA". (01/01/06)E28

Special Provision

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.

643-3.05 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
0-9,999	$30
10,000+	$40

643-3.08 CONSTRUCTION SEQUENCING.

Delete the last sentence and substitute the following:

Unless otherwise determined by the Engineer and on an approved Traffic Control Plan (TCP), do not restrict traffic during the times listed below.

1. Monday through Friday during the periods of 0600 to 0800 and 1600 to 1830

2. Obtain the local school bus schedule and coordinate his work efforts to ensure the school buses are not delayed through the construction zone. This plan shall be submitted, as a TCP, to the Engineer for approval before the implementation of the school bus coordination plan.

Weekend intersection closures will be limited to Friday from 2000 to Monday 0500. Below is the number of intersection closures for each intersection:

36th Avenue/Arctic Boulevard	3 weekends
2 weekends for waterline installation, and	
1 weekend for traffic signal, 1st lift paving, and stormdrain	
Benson Boulevard/Arctic Boulevard	1 weekend
Traffic signal, asphalt patching, and stormdrain	
Northern Lights Boulevard/Arctic Boulevard	1 weekend
Traffic signal, asphalt patching, and stormdrain	
Fireweed Lane/Arctic Boulevard	1 weekend
Traffic signal, asphalt patching, and stormdrain	

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. (01/04/06)R222USC04

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 643-2 does not provide a comprehensive list of operations that require lighting. Provide lighting for other operations when necessary.

Table 643-2 Night Work Illumination Level and Area of Coverage

Type of Work/ Equipment	LIGHTING CONFIGURATION	Minimum Illumination (footcandles)	Area of Illumination	
			Length (along road)	Width (across road)
Paving, Milling, Striping, Pavement Marking Removal, Rumble Strip Installation	At least 2 machine-mounted balloon lights with a total wattage of at least 4000 watts. Provide additional lights or wattage to meet illumination and area requirements.	5	15' beyond front and back of machine	15' beyond both sides of machine
		1	30' beyond front and back of machine	30' beyond both sides of machine
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.	5	20' beyond front and back of roller	Not specified
Flagging	One light plant with 4 - 1000 watt metal halide lamps illuminating the flagger located within 50' of flagger. Orient to avoid creating glare for drivers.	Not specified	Not specified	Not specified
Truck Crossings (meaning where haul vehicles cross or enter a road):	One light plant with 4 - 1000 watt metal halide lamps located in a manner that will illuminate haul vehicles approaching the crossing. Orient to avoid creating glare for drivers. If it is not possible to illuminate both the flagger and haul vehicles at flagger controlled crossings, provide an additional light plant of the same type.	Not specified	Not specified	Not specified
1) with roads with ADTs over 10,000 or				
2) that are controlled by portable signals or flaggers				

When Table 643-2 gives the option of balloon lights or light plants, use balloon lights where possible – they provide uniform light with minimal glare.

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

Install lighting in a manner that minimizes glare for motorists, workers, and annoyance or discomfort for residents living along the roadway. Locate, aim, louver, and/or shield light sources to achieve this goal.

The Engineer shall be the sole judge of when glare is unacceptable, either for traffic or for adjoining residences. When notified of unacceptable glare, modify the lighting system to eliminate it.

If the Contractor fails to meet required illuminance levels or provides lighting that creates unacceptable glare at any time, the Contractor shall cease nighttime operations in that area until the condition is corrected.

Lighting equipment shall be in good operating condition and in compliance with applicable OSHA, NEC, and NEMA codes.

Provide suitable brackets and hardware to mount lighting fixtures and generators on machines and equipment. Design mountings so lights can be aimed and positioned as necessary to reduce glare and to provide the required illuminance. Locate mounting brackets and fixtures so they don't interfere with the equipment operator or overhead structures. Connect fixtures securely in a manner that minimizes vibration.

Ground, trailer, and equipment-mounted light towers shall be sturdy and freestanding without the aid of guy wires. Towers shall be capable of being moved to keep pace with the construction operation. Position ground and trailer-mounted towers and trailers to minimize the risk of being impacted by traffic on the roadway or by construction traffic or equipment.

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

Conventional vehicle headlights do not eliminate the need for the Contractor to provide lighting. Furnish each side of non-street legal equipment with a minimum of 75 square inches high intensity retroreflective sheeting in each corner, so at least 150 square inches of sheeting is visible from each direction.

Existing street and highway lighting do not eliminate the need for the Contractor to provide lighting.

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 emergency flares for use in the event of emergency or unanticipated situations.

Provide NCHRP 350-compliant breakaway bases for post-mounted electroliers located within the clear zone. R276USC04(11/29/04)

Standard Modification

Add the following new subsection:

643-3.11 HIGH VISIBILITY CLOTHING.

Ensure all workers within project limits wear an outer visible surface or layer that complies with the following requirements:

1. Tops.

   Wear fluorescent vests, jackets, or coverall tops at all times. Furnish each vest, jacket, or coverall top with at least one 360-degree horizontal performance retroreflective band around the torso; and two vertical retroreflective bands that begin at the horizontal band or lower in front, reach over the shoulder, and end at the horizontal band or lower in back. Furnish each jacket and coverall top with two horizontal retroreflective bands on each sleeve; one above and one below the elbow.

2. Bottoms.

   Wear fluorescent red-orange pants or coverall bottoms during nighttime work (sunset to sunrise). Flaggers wear fluorescent red-orange pants or coverall bottoms at all times. Furnish each pants or coverall bottom with two horizontal retroreflective bands on each leg.

3. Raingear.

   Raingear tops and bottoms, when worn as the outer visible surface or layer, shall conform to the requirements listed in this subsection 643-3.11.

4. Exceptions.

   When workers are inside an enclosed compartment of a vehicle, they are not required to wear high visibility clothing.

5. Standard.

   High visibility garments shall conform to the requirements of ANSI/ISEA 107-2004, Class 2 for tops of Class E for bottoms, and Level 2 retroreflective material.

   Retroflective bands are made of material conforming to either:

   a. A two-inch-wide strip, fluorescent yellow-green color, made of retroreflective microprisms; or

   b. A two-inch-wide strip, silver color, made of retroreflective lenses bonded to a durable cloth backing; and on two long edges, apply one-inch-wide strips, fluorescent yellow-green color, made of durable cloth material. Total width of band is four inches.

6. Labeling.

   Garments shall be labeled according to Section 10.2 of ANSI/ISEA 107-2004; except garments may be labeled to conform to ANSI/ISEA 107-1999 until January 1, 2008.

7. Condition.

Furnish and maintain all vests, jackets, coveralls, rain gear, hard hats, and other apparel in a neat, clean, and presentable condition. Maintain retroreflective material to Level 2 standards. (01/01/06)E28

Special Provision

643-4.01 METHOD OF MEASUREMENT.

Replace the second sentence with the following:

2. 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. (01/04/06)R222USC04

16. Work Zone Illumination. This item consists of the labor, materials, and equipment required to illuminate night work zones as specified in this section.

Standard Modification

643-4.01 METHOD OF MEASUREMENT.

Add the following:

Payment for high visibility clothing for workers is subsidiary to other items. (12/02/03)E07

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	$20.00
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	$2.50
Portable Changeable Message Board Sign	Calendar Day	$150.00
Temporary Sidewalk Surfacing	Square Foot	$1.15
Flexible Markers	Each	$50.00
Removal of Pavement Markings	Foot	$1.25
Temporary Guardrail	Foot	$21.00
Interim Pavement Markings		
Painted Markings	Foot	$0.30
Removable Preformed Markings	Foot	$0.65
Temporary Raised Pavement Markings	Each	$0.75
Word or Symbol Markings	Each	$40.00
Preformed Marking Tape	4 Inch by 1 Foot	$1.50

The Engineer will pay for Item 643(15) Flagging on a contingent sum basis at the rate of $38/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. (01/04/06)R222USC04

Delete Item 643(15) and substitute the following:

Pay Item	Pay Unit
643(15) Flagging	Contingent Sum
643(29) Work Zone Illumination	Contingent Sum

SECTION 644

SERVICES 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 two (2) weeks before commencing work through thirty (30) days after issuance of the notice of project completion as defined in subsection 105-1.15. The following office requirements shall be met:

1. A minimum of 1,000 square feet of floor area. The office area shall be divided so that it contains an office room separated by a closable door. The office room shall have a minimum of 160 square feet of floor area.

2. A thermostatically controlled interior heating system with necessary fuel.

3. Adequate electrical lighting and 120 volt, 60 hertz power, with a minimum of six (6) electrical outlets.

4. A minimum of 100 square feet of window area and adequate ventilation.

5. Adequate parking for a minimum of sixteen (16) vehicles, with one handicap parking space meeting the requirements of Americans with Disabilities Act Accessibility Guidelines (ADAAG).

6. Attached indoor plumbing with sanitary lavatory facilities and potable drinking water provided.

7. Four (4) telephone service lines available at the office location.

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 one (1) mile of the project.

10. The Engineer's office shall be accessible by disabled individuals from the designated handicap parking space according to the requirements of Americans with Disabilities Act Accessibility Guidelines (ADAAG).

11. Weekly janitorial service consisting of emptying trash receptacles, vacuuming office area and cleaning restrooms and counter areas.

12. Provide one mobilization and one demobilization of the Engineer's office equipment and furniture from Anchorage.

Add the following section:

SECTION 645

TRAINING PROGRAM

Special Provisions

645-1.01 DESCRIPTION.

This Training Special Provision implements 23 CFR 230, Subpart A.

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 before 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 you 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 you where the apprentices/trainees are concurrently employed on the project and you do one or more of the following: 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.

Before 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 two (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 you, and approval by the Engineer, of efforts made in good faith that substantiate the necessity for a change.

Contractors may use a training program approved by the U.S. Department of Labor, Bureau of Apprenticeship and Training (USDOL/BAT), or one developed by the Contractor and approved before contract award by the 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 you. 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 your judgment, an apprentice/trainee becomes proficient enough to qualify as a journey worker before the end of the prescribed training period and you employ 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. You must 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 according to

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 SUBCONTRACTORS.

In the event you subcontract a portion of the work, you 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 you; compliance or noncompliance with these provisions rests with you and sanctions and/or damages, if any, shall be applied to you according to subsection 645-5.01, Basis of Payment.

645-4.01 METHOD OF MEASUREMENT.

You 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 your 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 your discretion, graduates early and is employed as a journey worker according to the provisions of subsection 645-3.01, you will receive payment only for those hours of training actually provided.

This payment will be made regardless of any other training program funds you may receive, unless such other funding sources specifically prohibit you 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 all training programs approved for the project. No payment or partial payment will be made to you if you fail to do any of 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 you have failed, by the end of the project, to provide the required number of hours of training and have failed to submit acceptable good faith efforts documentation that establishes why you were unable to do so, you 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. (10/29/91)S16

Payment will be made under:

Pay Item	Pay Unit
645(1) Training Program, 1 Trainee/Apprentice	Labor Hour

SECTION 646

CPM SCHEDULING

Special Provisions

646-2.01 SUBMITTAL OF SCHEDULE.

Delete this subsection and substitute 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 fourteen (14) days to review the initial CPM Schedule. Revise promptly. The finalized CPM Schedule must be completed and accepted before beginning work on the Project.

646-3.01 REQUIREMENTS AND USE OF SCHEDULE.

Delete Item 2, 60-day Preliminary Schedule.

Delete the first sentence of Item 3, Schedule Updates, and substitute the following: Hold job site progress meetings with the Engineer for the purpose of updating the CPM Schedule. Meet with the Engineer monthly or as deemed necessary by the Engineer. (12/13/02)R261M98

Add the following section:

SECTION 647

EQUIPMENT RENTAL

Special Provisions

647-1.01 DESCRIPTION.

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

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

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 when, in the opinion of the Engineer, the condition is below that normal for efficient output and production.

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

647-2.02 EQUIPMENT OPERATORS AND SUPERVISION PERSONNEL.

Equipment operators shall be competent and experienced and shall be capable of operating the equipment to its capacity. Personnel furnished by the Contractor shall be, and shall remain during the work hereunder, the Contractor's employees.

Furnish, without direct compensation, a job superintendent or the Contractor's representative together with other personnel as are needed for Union, State, or Federal requirements and in

servicing, maintaining, repairing and caring for the equipment, tools, supplies, and materials provided by the Contractor and involved in the performance of the work. Also, furnish, without direct compensation, transportation as 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 begin, continue, and stop the 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 a 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 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, that shall be verified and signed by the Contractor's representative at the end of each shift, and a copy will be provided to the Contractor's representative.

647-401 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 according to the instruction of the Engineer. The pay time will not include idle periods, and no payment will be made for time used in oiling, servicing, or repairing of equipment, or in making changeovers of parts to the equipment. Travel time to or from the project, will not be authorized for payment.

647-5.01 BASIS OF PAYMENT.

Payment for Items 647(2) and 647(1A1) will be paid on a contingent sum basis at the rate of $125/hour on a per-hour basis at the rate shown on the bid schedule. This 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 horsepower than specified will not entitle you to any extra compensation. (11/12/98)R15USC

Payment will be made under:

Pay Item	Pay Unit
647(2) Wide Pad Dozer, 65-HP Minimum	Contingent Sum
647(1A1) Backhoe, Self-Propelled, 1 CY Bucket, 75-HP, 14.5 ft Depth	Contingent Sum

SECTION 660

SIGNALS AND LIGHTING

Special Provisions

660-2.01 MATERIALS.

Item 1, Equipment List(s) and Drawings. Delete Subitem a in its entirety and the last sentence in Subitem 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).

Add the following to the last paragraph of Item 2, As-Built Plans:

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.

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. Complete this work according to the requirements of Section 643. Place excavated materials where it will not interfere with surface drainage.

   Support and protect conduits and utilities scheduled to remain in service when encountering them during excavation.

   Excavate trenches wide enough to install the number of conduits specified side by side, to provide clearances of at least 2½ inches around 2 inch conduits and at least 2 inches around conduits larger than 2 inches, and to compact the bedding and backfill materials according to these specifications.

   To install conduits, excavate trenches deep enough to allow for 6 inches of bedding material, the depth of the largest conduit, and the minimum burial depth specified between the top of the conduit and finished grade of the ground above the conduit. Keep the longitudinal profile of trench bottoms free of irregularities that would prevent the assembled conduit run from continuously contacting the top of the bedding material.

   Dispose of, according to subsection 203-3.01, excavated materials that remains after completing backfill work and excavated material not meeting the requirements of Selected Material, Type C, as defined in subsection 703-2.07.

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

a. Around formed foundations and the tops of pipe pile foundations, use material that meets the requirements of Selected Material, Type A that passes through a 3 inch sieve,

b. Within the limits of the typical section, embed conduits and backfill trenches using material that meets the requirements of the lift where it is located, reusing excavated materials if it meets the requirements of the applicable lift,

c. In other locations, embed conduits and backfill trenches using material that meets the requirements of Selected Material, Type C, reusing excavated materials if it meets this requirement.

d. Import, when ordered, embedment and backfill materials that satisfy the preceding materials requirements.

Embed conduit(s) between two 6 inch lifts of material gleaned free of rocks exceeding a 1 inch maximum dimension. Grade and compact the first lift to provide a surface that continuously contacts the assembled conduit run.

Within 6 feet of paved surfaces and around foundations, backfill in uniform layers no more than 6 inches deep and compact each layer according to subsection 203-3.04. In other locations, compaction may be as approved by the Engineer.

4. Welding. Complete welding according to subsection 504-3.01.8. Welding and approved shop drawings.

Submit shop drawings of the proposed work with the welding plans for approval. The shop drawings shall include material specifications, component dimensions, the types of welds that will be made, and the proposed type and extent of weld inspection.

Repair the holes, that 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 non-reusable 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.

Non-reusable 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. Contractor shall dispose of all signal poles and mast arms not identified for salvage by the Engineer. Poles and mast arms to be disposed shall be rendered unusable by cutting off the mounting plates in the presence of the Engineer. Deliver the salvaged materials undamaged to the Municipality of Anchorage Electronics Warehouse at 5823 Rowan Street, or the Municipality of Anchorage Pole Yard at 3rd Avenue and Orca Street, to be placed as directed by the MOA Traffic Signal Foreman. Notify the Traffic Signal Foreman at 343-8355 at least 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 that 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 multi-conductor 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.

1. For overhead signals located 53 feet and more from the stop line, maintain 17.5 feet to 21.5 feet of clearance between the traveled way and the bottom of each signal. For closer signals refer to the MUTCD for maximum clearances.

2. For side mounted signals, maintain nine feet to 11 feet of clearance between the traveled way and the bottom of the signal.

3. Align overhead signals controlling a single lane with the center of the lane.

4. Align overhead signals controlling two or more lanes with the lane lines separating the lanes.

5. When the horizontal angle to the side mounted far right signal exceeds 20°, relocate this signal to an overhead location. Measure the angle 10 feet back from the stop line on the lane line between the two farthest left through lanes.

   - With two or more through lanes, center one signal head over each lane.
   - With one through lane and protected permitted signal phasing, leave the five section signal over the lane line and center the signal to be relocated over the through lane.
   - Otherwise, install the relocated signal 8 feet to the right of the signal centered over the through lane.

6. For pedestrian signals, maintain 7 to 9 feet between the traveled way and the bottom of each pedestrian signal.

7. Aim signal heads according to Table 660-2 found in subsection 660-3.08, Signal and Lighting Structures.

When no longer required, salvage original and Department provided equipment according to the Plans and item 6. Salvaging or Reusing Electrical Equipment found in subsection 660-3.01, and remove other materials used in the temporary systems from the project.

Add the following subsection:

660-3.11 SIGNAL SYSTEM TIMING AND ADJUSTMENTS.

The Engineer will use Municipality of Anchorage (MOA) signal maintenance personnel for certain work inside controller cabinets. Before MOA personnel arrive to terminate conductors, ensure terminal connectors are attached to conductor ends and paired loop detector conductors and cables are labeled as specified in subsection 660-3.05, Wiring. On projects outside the MOA, send controller equipment to the MOA for testing and complete work specified inside controller cabinets.

Controller Cabinet Preparation. Ship the traffic controller cabinet(s) and equipment to the Municipality of Anchorage Traffic Signal Electronics Shop at 3650 E. Tudor Road, Building C. MOA will inspect cabinet wiring, burn in signal equipment, customize cabinets for desired operation, and test the equipment according to subsection 660-3.07, Shop Tests.

1. Loop Detector Wiring. Municipality of Anchorage Traffic Signal Maintenance (MOA Signal Maintenance) will test and connect paired loop detector conductors to the terminal blocks.

2. Control Cable Wiring. When modifying an operational signal system or controller assembly, MOA Signal Maintenance will connect control cables within the controller cabinet to the terminal blocks.

3. Timing Adjustments. During construction, MOA Signal Maintenance may adjust the system and intersection operational timing to accommodate project conditions.

4. Interconnect Wiring. MOA Signal Maintenance will test and connect interconnect wiring to the terminal blocks.

660-3.21 SALVAGING OR REUSING ELECTRICAL EQUIPMENT.

Add the following:

Deliver signal heads, signal poles, LED modules, pedestrian button assemblies, controller assemblies, and junction box lids to the Municipality of Anchorage Signal Electronics Shop. Allow maintenance personnel to select the equipment they would like to salvage, and dispose of all remaining equipment. Any LED module damaged during the salvaging and delivery process shall be replaced at the Contractor's expense. Contact the Foreman at 343-8355; provide one-week notice of the intent to deliver salvaged materials.

Deliver all salvaged signal and luminaire poles, mast arms, connecting hardware, luminaires, and load centers to the Municipality of Anchorage Pole Yard at 3rd Avenue and Orca Street. Allow maintenance personnel to select the equipment they would like to salvage, and dispose of all remaining equipment. Contact the MOA Signal Electronics Foreman (traffic signal items) at 343-8355 and MOA Street Light Maintenance Superintendent (load center and luminaire items) at 343-4557; provide one-week notice of your intent to deliver salvaged materials.

The following existing items not being reused shall become the property of the Contractor and be disposed of as indicated:

1. Junction boxes (not including lids), conductors, and load center and controller assembly foundations.

2. All unused abandoned conduits shall be removed.

3. Traffic signal pole foundations and electrolier foundations may be abandoned in place, provided the tops of the foundations, reinforcing steel, anchor bolts, and conduits are removed to a depth of not less than one foot below roadway subgrade, pathway, or unimproved ground, whichever applies.

4. Existing conductors for vehicle detectors that are encountered while installing new detectors shall be removed.

Items that are to be removed shall be removed from the highway right-of-way.

To complete Item 660(34), Salvage Signal System Complete, the Contractor shall salvage the existing traffic signal system, the existing load center, and the temporary signal system used during completion of the project. ***** Deleted Text *****

Delete subsections 660-4.01 and 660-5.01 and replace with the following:

660-4.01 METHOD OF MEASUREMENT.

Section 109 and the following:

Detector Loops. Work associated with installing loop detectors and junction boxes is subsidiary to Items 660(1) and 660(20). This includes, but is not limited to, saw cutting, asphalt removal, aggregate base course, tack coating, and installing new asphalt concrete.

Salvage Signal System. Per each intersection that a new signal system is installed.

660-5.01 BASIS OF PAYMENT.

The Engineer will pay Item 660(26), Signal System Timing and Adjustments, based on paid receipts plus 15 percent for authorized work performed by the MOA. A directive will not be required to initiate payment for work performed under Item 660(26). Pay costs of the Municipality retesting equipment that fails to comply with the Plans and Specifications. (06/26/03)R65USC02

Payment will be made under:

Pay Item	Pay Unit
660(1A) Traffic Signal System Complete at Fireweed Lane	Lump Sum
660(1B) Traffic Signal System Complete at Northern Lights Boulevard	Lump Sum
660(1C) Traffic Signal System Complete at Benson Boulevard	Lump Sum
660(1D) Traffic Signal System Complete at 36th Avenue	Lump Sum
660(7A) Temporary Signal System Complete at Fireweed Lane	Lump Sum
660(7B) Temporary Signal System Complete at Northern Lights Blvd.	Lump Sum
660(7C) Temporary Signal System Complete at Benson Blvd.	Lump Sum
660(7D) Temporary Signal System Complete at 36th Avenue	Lump Sum
660(18) Adjust Junction Box	Each
660(20) Highway Lighting System Modifications	Lump Sum
660(26) Signal System Timing and Adjustments	Contingent Sum
660(34) Salvage Signal System Complete	Each

R66USC04(08/02/05)

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SECTION 670

TRAFFIC MARKINGS

Special Provisions

670-1.01 DESCRIPTION.

Delete this subsection in its entirety and substitute the following:

This work consists of furnishing, preparing and placing pavement markings at the locations shown on the Plans or as directed. Meet these Specifications and the applicable portions of the Alaska Traffic Manual.

670-3.01 CONSTRUCTION REQUIREMENTS.

Delete all paragraphs under item 4. Methyl Methacrylate Pavement Markings. and substitute the following:

a. General. 15 days before starting work meet with the Engineer for a pre-striping meeting. At this meeting, do the following:

   (1) Furnish a striping schedule showing areas and timing of work, placing materials and the Traffic Control Plans to be used.

   (2) Discuss placement of materials, potential problems.

   (3) Discuss work plan at off ramps, on ramps and intersections.

   (4) Discuss material handling procedures.

   (5) Provide copies of the manufacturer's installation instructions and copies of the Material Safety Data Sheets.

b. Manufacturer's Representative. Provide the services of a manufacturer's representative (the "Manufacturer's Representative"). Ensure the Manufacturer's Representative observes the application of the pavement marking materials. Cooperate with the Manufacturer's Representative and the Engineer to ensure that the materials are placed according to these Specifications and the manufacturer's recommended procedures.

c. Manufacturer Certified Installers. Install methyl methacrylate pavement markings using only striping installers certified by the marking materials manufacturer for the specific striping material and method. Submit these certifications to the Engineer at the Preconstruction Conference.

d. Preparation. Prepare the roadway surface to receive methyl methacrylate according to these Specifications and the manufacturer's recommendations. Clean and dry the roadway surface. Completely remove contaminants such as dirt, loose asphalt, curing agents, surface oils, or existing road marking materials before applying pavement marking material.

e. Application. Apply methyl methacrylate marking material according to these Specifications and the manufacturer's recommendations. Use equipment designed and capable of properly mixing at the point and time of application and approved by the manufacturer for the type of product being installed. Unless specified otherwise, all marking shall be surface applied as defined below.

For longitudinal markings use truck mounted automatic extrusion equipment capable of installing a double centerline and a single shoulder line in a single pass. Use automatic bead applicators that place a uniform layer of beads on the lines. Hand units will not be allowed.

For Transverse markings legends, symbols, and transverse markings use manual or automatic application equipment. Stencils or extruders are required to form sharply defined markings.

For inlaid applications use grooving equipment that produces a dry cut. Use vacuum shrouded equipment or other equally effective containment procedures. Install markings in the same work shift as the grooving operation.

(1) Longitudinal Markings Surface Applied. Apply markings for lane lines, edge lines, and centerlines to yield a minimum thickness of 90 mils as measured from the surface of the pavement.

(2) Longitudinal Extruded Markings Inlaid. Apply markings for lane lines, edge lines, and centerlines to yield a thickness of 250 mils as measured from the surface of the pavement. Use Type b material. Groove the area for the inlaid markings to a depth of 250 mils.

(3) Transverse and Symbol Markings Inlaid. Apply markings for onlys, arrows, stop bars, gore stripes, railroad symbols, and cross walks to yield a thickness of 250 mils as measured from the surface of the pavement. 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.

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 an 8.5" x 11" sheet of paper, record the following readings, and the locations where they were taken using project stationing, and submit them to the Engineer within 24 hours for evaluation. Thickness of material and depth of slot are measured from the surface of the pavement.

(1) For inlay applications, record the depth of the slot every 300 feet during the grinding operation.

(2) For other longitudinal applications, measure the thickness of the lines (above the pavement surface), at the time of application, every 300 feet.

(3) For surface applied transverse markings measure the thickness in three locations for each marking.

(4) Inspect the markings initially, and again two weeks after placement, to ensure the material has cured properly. Remove soft spots or abnormally darkened areas and replace with material meeting specifications.

(5) Measure the retroreflecivity of each transverse marking at three locations, and of each line at intervals not to exceed 1,500 feet. Take these measurements using a Delta LTL2000 Retrometer, a 100-foot retro-reflectometer, or approved similar device. Perform testing within 72 hours of curing. On an 8.5" x 11" sheet of paper, record the following readings, and the locations where they were taken using project stationing, and submit them to the Engineer within 24 hours for evaluation.

The Engineer may elect to use the Contractors readings or perform additional sampling.

670-3.04 PAVEMENT MARKING REMOVAL.

Add the following:

Coordinate removal work with construction activity. Remove pavement markings the same day permanent markings are applied, unless otherwise directed. Use vacuum shrouded equipment or other equally effective containment procedures.

Add the following subsection:

670-3.07 TOLERANCES FOR METHYL METHACRYLATE PAVEMENT MARKINGS.

1. Length of Stripe. ±2 inches.

2. Width of Stripe. ± 1/8 inch.

3. Lane Width. ± 4 inches from the width shown in the Plans.

4. Stripes on Tangent. Do not vary more than 1 inch laterally within a distance of 100 feet when using the edge of the stripe as a reference.

5. Stripes on Curves. Uniform in alignment with no apparent deviations from the true curvature.

6. All Stripes. Keep the center of the stripe within 4 inches from the planed alignment.

7. Double Stripes. ±1/4 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.

670-5.01 BASIS OF PAYMENT.

Add the following:

Item 670(10) includes full compensation for resources required to perform the work according to the Plans and Specifications. No separate payment shall be made for over-runs of material caused by the variation of the gradation of the asphalt or for additional material required to achieve the thickness specified on open-graded pavement.

Add the following pay item:

Pay Item	Pay Unit
670(10) Methyl Methacrylate Pavement Markings	Lump Sum

(01/04/06)R246USC004

Add the following section:

SECTION 671

PIPE LINING

671-1.01 DESCRIPTION.

The Work under this section consists of the performance of all operations pertaining to furnishing and installing a cured-in-place pipe (CIPP) lining system for storm drain pipe rehabilitation, including all required bypass pumping, existing storm drain pipe preparation, and post-construction and warranty close-out closed-circuit television (CCTV) inspection.

671-2.01 WARRANTY REQUIREMENTS.

Installer Warranty: The Contractor will submit two executed copies of a one-year "Installer Warranty," warranting the Contractor's work in the preparation of the substrate pipe, the installation of the pipe lining system, and the performance of the ancillary work, according to the provisions of these Contract Documents. This warranty will include provisions for the completion of the Warranty Close-out Inspection described herein. The Contractor will sign this warranty.

Manufacturer Warranty: The Contractor will submit an executed copy of a one-year Manufacturer Warranty, warranting the performance of the lining system materials for the duration of the warranty period. An authorized representative of the Manufacturer will sign the warranty.

Warranty Period: The one-year Warranty Period will commence on the date following the Substantial Completion Date.

Warranty Closeout Inspection: Within 90 days before the expiration of the one-year warranty, Owner will perform a CCTV inspection, with DVD recording, for the purposes of evaluating the integrity and condition of the lining system.

671-2.02 MATERIALS AND MINIMUM PERFORMANCE REQUIREMENTS

The lining system will have a minimum service life of 50 years with standard operational and maintenance practices.

1. Minimum Lining System Specifications:

   a. The felt tube will consist of one or more layers of flexible, needled felt or an equivalent woven and/or non-woven material capable of carrying resin, withstanding installation pressures and curing temperatures, and compatible with the resin system used. The tube will meet the requirements of ASTM D 5813.

   b. The Contractor will furnish a thermosetting polyester resin compatible with the approved liner and a compatible catalyst system as specified by the resin manufacturer. The resin manufacturer will provide the Contractor with their recommended curing cycle and will submit the same to the project engineer for his approval.

c. The CIPP thickness will be calculated and designed based upon the following physical condition of the existing pipe to be rehabilitated.

1) The pipe lining system will provide for adequate structural integrity to act as a "stand-alone" pipe upon deterioration of existing substrate pipe.

2) All pipes will be subject to soil load of 132 pounds/cubic feet with a minimum soil depth and water depth as shown on the Plans. Section lengths are center of manhole to center of manhole. Actual pipe length may vary. Contractor is responsible for verifying actual pipe length before ordering or cutting liner.

3) All pipes will have a minimum of two percent ovality reduction factor in the circumference.

4) A factor of safety of not less than 2.0 will be applied.

5) The enhancement factor K will not be less than 3.5.

6) Abrasiveness of existing pipe.

7) The corrugations of the pipe will be filled to create a reasonably smooth interior surface.

d. The pipe lining system will be capable of withstanding periodic higher temperatures during steam heating and thawing. The lining system will also retain its installed form and shape during pipe thawing operations.

e. Pipe lining system will be chemically resistant and resistant to exposure to bacteria and other substances found in soils.

f. Pipe lining system will require no special training or equipment for repairs made by the Owner.

g. Pipe lining system will be a light color interior to promote proper reflective light during CCTV inspection.

h. Pipe lining system will have been successfully installed on a minimum of five (5) previous jobs.

i. The hydraulic capacity of the lined pipes will equal or exceed 100 percent of the original unlined pipe.

2. Submittals:

Submit submittals within ten (10) days of the effective date of the Notice-to-Proceed and at least five (5) working days before commencement of Work.

a. The Contractor will provide all calculations and documentation on the lining system thickness, lining system specifications, maintenance requirements,

methods of repair, applicable ASTMs, and Material Safety Data Sheets (MSDS) for all materials used.

b. The Contractor will provide installer's proof of manufacturer's certification.

c. The Contractor will provide proof that the lining system materials meet the appropriate ASTM performance standards for such materials in the form of certified test results from the manufacturer. The tests will confirm "long-term" (minimum of 50-year design life) integrity and effective life span of the lining system. Test sample results will include, but not be limited to, the following soil cell testing, chemical resistance, creep, and long-term structural loading tests.

d. The Contractor will provide certification that all products used in the preparation and installation of the lining system are complementary to the lining system and in no way detrimentally impacts the manufacturer's warranty for the lining system product. The products certification will also include a manufacturer's installation procedure and equipment necessary to complete installation.

e. The Contractor will submit test sample results from at least five (5) previous jobs. The test sample results will meet current industry standards and all requirements of these Contract documents.

f. After installation of the first run of pipe lining, Contractor will perform testing according to ASTM F1216. Perform the test on the first run of mainline liner installed. Submit a testing plan to the Engineer for approval before work.

3. Pipe lining system manufacturers include, but are not limited to the following:

a. National Liner

b. Masterliner, Inc.

c. Instituform Technologies, Inc.

d. Or an approved equal.

The acceptance of any of the above manufacturers or systems will be dependent upon compliance with these Contract documents, as verified by appropriate submittals.

671-3.01 CONSTRUCTION.

1. Safety. The Contractor will carry out this operation in strict accordance with all OSHA and manufacturer's safety requirements. Particular attention is drawn to those safety requirements involving working with scaffolding entering confined spaces, and operations with hot media.

2. Bypass Pumping Storm Flows. The Contractor will bypass the storm flows around those section(s) of pipe designated for rehabilitation on an as-required basis. The Contractor will ensure the pumps and bypass lines have appropriate capacity and size

to accommodate the anticipated storm flows during the duration of all operations requiring such bypass.

Before construction, the Contractor will submit to the Engineer a plan detailing the scheduled deployment of pumps, hoses, and other equipment necessary to maintain storm flows during construction. The Contractor is reminded that after-hours pumping may require a permit to exceed the allowable noise levels. In the event that such permit is not available for certain locations, such lack of availability will not be the basis for claim for additional compensation or time extension.

Contractor will dispose of all water from bypass operations and dewatering according to Anchorage Municipal Code Section 15.40, and an ADEC-approved dewatering plan. Screen all storm water to prevent debris from entering creeks, lakes, ponds, wetland areas, and drainage systems. Contractor will submit an ADEC-approved dewatering plan and permit before any dewatering activity.

Acceptance of Contractor's Dewatering Plan by the Engineer will not relieve Contractor of his responsibilities for the exercise of reasonable precaution, sound engineering judgment, prudent construction practices, overloading, or misuse of existing or new structures, the adequacy and safety of any such works, and potential damage or undermining of existing or completed works.

3. Prepare Pipe for Lining. The Contractor will thoroughly clean each section of the pipe scheduled for lining by using a high-pressure water jet or another technique approved by the Engineer consistent with the lining system manufacturer's or industry standards for the preparation and cleaning of the pipe. The Contractor will take all necessary precautions and actions to prevent debris from entering the pipe. Contractor will collect and dispose of all water generated during pipe cleaning operations. No pipe cleaning water will be disposed in the storm drain system or stream.

Contractor will use a pan-and-tilt camera to perform a CCTV inspection in conjunction with the pipe cleaning process, to determine the current condition of the pipe and prevent undermining of the road and pipe section. The inspection will also identify any and all protruding objects that may interfere with the installation or service performance of the lining system and will serve as a reference for the Contractor's operations to remove such protrusions before the installation of the lining system. If the CCTV inspection reveals differences from the plans, the Contractor will immediately notify the Engineer of the discrepancy in writing, using the DCVR form, and suggest appropriate solution(s) that are consistent with the recommendations of the pipe lining system's manufacturer.

The CCTV inspection will be performed by experienced Contractor-furnished personnel who are trained and experienced in locating breaks and obstacles by CCTV. Record inspections on standard DVD format. The DVD recording will include an audio description of date, location of main, manholes, size of pipe, type of pipe, and lining system. Record said audio description on the DVD and include location of joints, bends, adverse grades, and irregularities. The Contractor will provide all DVD records and inspection logs to the Owner.

Contractor's camera, lighting system, and DVD recording equipment used in the CCTV inspection will produce good color quality images and will meet current industry standards for clarity, resolution, and sharpness.

The Contractor will remove all intruding pipe ends, all intruding pipe material, and all other obstructions and deleterious material, with the pipe cross-section and throughout the full length of the pipe, not eliminated by water jet cleaning. This work will be performed manually or by using remote-controlled equipment, including a pipe cutter. Remove the obstructions to the standards set forth by the lining system manufacturer's specifications for preparation of the substrate pipe and applicable industry standards. No excavation is permitted. The Contractor will ensure that no debris from this operation enters the down-stream collection system or remains in the section to be lined. If removal is done manually, Contractor will comply with OSHA regulations for work in confined spaces.

The Contractor will prevent flow of groundwater into the pipe to the standards set forth by the lining system manufacturer's specifications for preparation of the substrate pipe and applicable industry standards. This work will be performed by repairing the pipe, grouting, or by use of a pre-liner. No excavation is permitted. If preparation is done manually, Contractor will comply with OSHA regulations for work in confined spaces.

At locations where there is a sharp break in invert slope, the Contractor will smooth the invert using concrete grout before lining.

In addition to the work described above, the Contractor will perform all other actions and operations required by the lining system manufacturer and/or industry standards to prepare the pipe for acceptance of the lining system. The Contractor will ensure that any substances and/or compounds used in the preparation of the substrate pipe for the installation of the proposed lining system are acceptable in all respects to the manufacturer of said lining system.

The Contractor will coordinate the work so as to provide the Engineer two (2) working days to review the CCTV inspection, including the DVD

4. Pre-installation. The existing corrugated metal pipeline will be inspected and measured to determine the correct liner size and length before fabrication and installation of the CIPP.

   It will be the responsibility of the Contractor to video inspect the storm drain pipe immediately before the insertion of the impregnated tube to assure that the pipe is clean and existing pipe conditions are acceptable for lining.

5. Resin Impregnation. The Contractor will designate a location where the felt tube will be impregnated with resin. Resin impregnation will be accomplished using distribution rollers and vacuum, to thoroughly saturate the felt tube before its dispatch for installation. A catalyst system or additive(s) compatible with the resin and tube may be used per the manufacturer's recommendation. They will, however, not impair or reduce the resin's ability to withstand the minimum chemical resistance or load-bearing criteria. The quantity of resin used for tube impregnation will be sufficient to fill the volume of air voids in the tube with additional allowances for polymerization shrinkage and the loss of resin through cracks and irregularities in the original pipe

wall. The quantity of resin should be determined per manufacturer's recommendations.

6. Inversion. The welted-out tube will be transported and kept in a refrigerated truck until it is inserted through an existing manhole. The insertion area, equipment platform, etc., will be securely protected, and all damaged structures will be repaired at no cost to the Owner.

   The resin-impregnated tube will be inserted through an existing manhole by means of an inversion ring or standpipe, capable of applying the hydrostatic head required to fully extend the tube to the next designated manhole or termination point. The tube will be inserted into the inversion standpipe; the tube will be turned inside out and attached to the inversion standpipe so that a leak-proof seal is obtained. The inversion head will be adjusted to a sufficient height to invert the tube from manhole to manhole and to hold it tight against the existing pipe wall, producing dimples at side connections and flared ends at the manhole. Care will be taken not to overstress the felt tube at the elevated curing temperatures that may cause damage or failure before cure.

7. Curing. After completion of the insertion, the Contractor will use a hot water recirculation system, capable of delivering desired heat uniformly throughout the section, for a consistent cure of the resin. Contractor will be responsible for obtaining water for the inversion and curing process. The Contractor will be responsible for moving or conveying the water to the work area. The curing temperature will be as recommended by the resin manufacturer.

   Curing with steam will not be allowed.

   The heat source will be fitted with suitable monitors to gauge the temperature of the outgoing and incoming curing water. Another such gauge will be placed between the impregnated tube and the invert to the original pipe at the manhole(s) to determine the temperatures during the resin curing process. Initial cure may be considered completed when the exposed portions of the felt tube pipe appear to be hard, and the remote sensing device indicates the temperatures to be adequate, as recommended by the resin/catalyst system manufacturer. Curing temperatures and duration will comply with previously submitted data and information.

8. Cooling Down. The Contractor will cool the hardened CIPP to a temperature below 100 degrees Fahrenheit before relieving the curing water column. Cool water may be added to the water column while draining hot water from a small hole at the end of the CIPP so that a constant water column height is maintained until cool-down is completed. Careful attention will be taken not to cool too quickly to eliminate the possibility of thermoshock. Care will be taken in the release of the water column so that a vacuum will not be developed that could damage the newly installed liner. Cool down process may vary depending on the installation technique of the manufacturer/Contractor.

9. Disposal of Water Used in CIPP Operations. This storm drain system discharges to a low flow anadromous fish stream.

   Contractor will collect and dispose of all water generated during pipe curing operations. No pipe curing water will be disposed in the storm drain system.

Contractor is responsible for obtaining all necessary permits for disposal of water generated during pipe cleaning and curing operations.

An AWWU Discharge Permit is required for discharge into the sewer system. An Application for Discharge Permit is attached as Appendix A of these specifications.

Before construction, Contractor will submit to the Engineer a plan detailing the necessary permits acquired and the method of collecting and disposing of water generated during cleaning and curing operations.

Contractor will dispose of all water generated from lining operations according to Anchorage Municipal Code Section 21.67, and ADEC regulations.

10. Fit/Finish. The finished pipe will be continuous over the entire length of the storm drain section. The finished liner will tightly conform to the walls of the existing (host) pipe; therefore, it is the Contractor's responsibility to verify the section lengths and pipe dimensions. No gap or annular space between the finished liner and the host pipe will be allowed or be visible at the manhole, storm drain service connection, or other exposed points within the finished liner section. The finished liner will be homogenous throughout and free of any protrusions, holes, cracks, etc., that in the opinion of the Engineer will affect the liner's structural integrity, hydraulic performance, future maintenance access, and overall line performance.

11. Clean Up. After the installation work has been completed and all testing acceptable, the Contractor will clean up the entire project area. The Contractor will dispose of all excess material and debris not incorporated into the permanent installation.

12. Sampling and Testing. Sampling and testing will meet the requirements of ASTM F-1216-98 and will include the following:

    a. Prepare a minimum of two CIPP samples. First sample will be from first run of pipe. Second sample location will be as directed by the Engineer.

    b. Samples will be large enough to provide a minimum of five specimens.

    c. Test for initial tangent flexural modulus of elasticity and flexural stress according to Test Methods D 790 and meet the requirements of Article 17.3 Materials, D. Mechanical Properties within this specification.

    d. Submit test results to the Engineer for review and approval.

    e. Contractor is responsible for all necessary sampling, testing coordination, laboratory fees, and all costs associated with providing the Owner with the certified test results. Test samples taken will not impact the overall performance of the lining system, and will conform to the intent of these Contract documents. No excavation will be permitted to obtain test samples. Contractor will submit a sampling and testing plan to the Engineer for approval before work.

13. Post-Construction CCTV Inspection. After the lining system has been installed, Contractor will perform a post-construction CCTV inspection and DVD recording. Contractor will perform the post-construction CCTV inspection not less than 24 hours

after the curing process to allow for cool down and thermal construction/expansion of the lining system to stabilize. The post construction CCTV inspection will document the lining system installation.

The entire circumference of the liner will be observed during the television inspection. The Contractor will bypass or temporarily block the storm drain flow according to Article 671-4.01.2, Bypass Pumping Storm Flows, if necessary to achieve this condition.

Contractor's camera, lighting system, and DVD recording equipment used in the post-construction CCTV inspection will produce good color quality images and will meet current industry standards for clarity, resolution, and sharpness. Record an audio description of date, location of main, manholes, size of pipe, type of pipe, and lining system on the DVD before recording pipe. Also, audio description will parallel the recording and will include location of joints, adverse grades, and irregularities. The Contractor will provide all DVD records and inspection logs to the Owner. This post-construction CCTV inspection will be recorded on a clean, separate DVD, and will be submitted in conjunction with project Record Drawings as the record documentation for the project. Record the inspections on standard DVD format.

As directed by the Engineer, the Contractor will repair and/or replace any portions of the lining where defects or imperfections are revealed at no additional cost to the Owner.

671-4.01 METHOD OF MEASUREMENT.

Pipe Lining System. By the linear foot, for the diameter specified, along the horizontal projection of the conduit from center of manhole to center of manhole.

Bypass pumping, existing storm drain pipe preparation, and CCTV inspections for work required in this section will not be measured.

671-5.01 BASIS OF PAYMENT.

At the Contract unit price per linear foot. By-pass pumping, existing storm drain pipe preparation, disposal of cleaning water, and CCTV inspections will be subsidiary to the 671 Items.

Payment will be made under:

Pay Item	Pay Unit
671(1) ___-inch Pipe Lining System	Linear Foot

SECTION 702

ASPHALT MATERIALS

Special Provisions

702-2.01 ASPHALT CEMENTS.

Add the following:

Performance Graded Asphalt Binder will conform to the requirements of AASHTO **M320** and the additional properties defined by AASHTO T 53 for and ASTM D 5801 assigned to each grade.

Performance Graded Asphalt Cement

Property	Standard	PG 52-28	PG 58-28	PG 64-28
Softening Point	AASHTO T 53	(none)	120°F	125°F
Toughness (min)	ASTM D 5801	(none)	110 inch-lbs	110 inch-lbs
Tenacity (min)	ASTM D 5801	(none)	75 inch-lbs	75 inch-lbs

(09/18/00)R244USC

SECTION 703

AGGREGATES

Special Provisions

703-2.03 AGGREGATE FOR BASE AND SURFACE COURSE.

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
1-1/2 inch	100		
1 inch	70-100	100	100
3/4 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

(10/25/05)R199USC04

Delete this subsection in its entirety and substitute the following:

703-2.04 AGGREGATE FOR ASPHALT CONCRETE PAVEMENT.

Replace this subsection with the following:

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 V or VH asphalt concrete mixtures. Free from clay balls, organic matter, and other deleterious material. Not coated with dirt or other finely divided mineral matter. Meet the following requirements (note A or B indicate class of mix, see Table 401-1), the Engineer may modify the fracture requirements if the hard aggregate sources stated in 106-1.02 do not meet specifications.

		Type IIA, IV	Type I, IIB, III	Type V	Type VH
LA Wear, % max	AASHTO T 96	45	45	45	45
Degradation Value, min	ATM 313	30	30	30	30
Sodium Sulfate Loss % max (5 cycles)	AASHTO T 104	9	9	9	9
Fracture, min %	WAQTC FOP for AASHTO TP61	90, 2face	80, 1face	98, 2face	98, 2face
Thin-Elongated Pieces, max %					
1:5	ATM 306	8	8	3	3
1:3		20	-	8	8
Nordic Abrasion, max. %	ATM 312			12	8
Absorption, max. %	AASHTO T85	2.0		2.0	2.0

TABLE 703-3
BROAD BAND GRADATIONS FOR ASPHALT CONCRETE PAVEMENT AGGREGATE
Percent Passing by Weight

GRADATION				
SIEVE	**Type II**	**Type III**	**Type IV**	**Type V,VH**
1 inch				100
¾ inch	100			90-100
½ inch	75-95	100	100	65-75
3/8 inch	60-84	80-90	80-95	48-60
No. 4	33-70	44-81	55-70	30-40
No. 8	19-56	26-70	35-50	20-30
No. 16	10-44	16-59	20-40	< 22
No. 30	7-34	9-49	15-30	< 17
No. 50	5-24	6-36	10-24	< 14
No. 100	4-16	4-16	5-15	< 12
No. 200	3-8	3-8	3-8	3-8

703-2.14 AGGREGATE FOR ASPHALT CONCRETE PAVEMENT (SUPERPAVE)

Fine Aggregate (passing the #4 sieve). Meet the quality requirements of AASHTO M 29, including S1.1, Sulfate Soundness.

For Type IV, V, and VH mixes, remove all natural fines passing a #4 sieve before crushing aggregates for this asphalt concrete mixture. Consist entirely of aggregate produced from aggregate crushing process and be non-plastic as determined by WAQTC FOP for AASHTO T 90, and meets the following:

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

SECTION 712

MISCELLANEOUS

Special Provisions

712-2.06 FRAMES, GRATES, COVERS, AND LADDER RUNGS.

Add the following:

Ductile iron castings	ASTM A536 for grade 60-401

(02/22/00)R78M98

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:

k. Adhesion: To Portland cement, minimum 13.8 MPa, to asphalt, dependent on tensile failure of the substrate. (07/17/03)R24M98

l. Color: Yellow, PR-1 chart, 33538 Federal Yellow. White, minimum daylight reflectance of 84.

712-2.18 GLASS BEADS FOR METHYL METHACRYLATE PAVEMENT MARKINGS.

Delete the bead table and substitute the following:

Use the type and amount of beads specified in writing by the marking material manufacturer necessary to meet the performance requirements. (01/04/06)R246USCO04

SECTION 724

SEED

Special Provisions

724-2.02. MATERIALS.

Delete Table 724-1 and 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.

(11/06/02)R52USC

SECTION 726

TOPSOIL

Special Provisions

Delete this section in its entirety, except for Table 726-1, and substitute the following:

726-2.01 TOPSOIL. Furnish topsoil that is representative of the existing, natural organic blanket of the project area. Perform a quality test, as defined by ALASKA FOP for AASHTO T 267, on the soil to determine the organic content of the soil. Supply the results to the Engineer.

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

Soil with an organic content of less than five percent cannot be used as topsoil for the project. In this case, furnish topsoil consisting of a natural friable surface soil without admixtures of undesirable subsoil, refuse, or foreign materials having an organic content of five percent or more, as determined by ALASKA FOP for AASHTO T 267. The material shall be reasonably free from roots, clods, hard clay, rocks greater than three inches in diameter, noxious weeds, tall grass, brush, sticks, stubble or other litter, and shall be free-draining and nontoxic. Notify the Engineer of the location topsoil is to be furnished at least thirty (30) calendar days before delivery of topsoil to the project from that location. The Engineer will inspect the topsoil and its sources before approval will be granted for its use. (12/05/01)R208USC

SECTION 730

SIGN MATERIALS

Special Provisions

730-2.04 SIGN POSTS.

Add the following item:

7. Structural Tubing and W-Shape Beams.

   a. Structural tubing shall conform to either ASTM A500, Grade B or ASTM A501. The tubing shall be square and of the dimensions called for in the Plans with 0.2-inch-thick walls. 0.4-inch-diameter holes shall be drilled as required to permit mounting of the sign.

   b. W-shape beams shall conform to ASTM A36.

   c. Structural tubing and W-shape beams shall be hot dip galvanized according to 1.b. of this subsection. Damaged and abraded tubes and beams shall be repaired according to 1.c. of this subsection. (06/22/04)R81USC04

SECTION 740

SIGNALS AND LIGHTING MATERIALS

Special Provisions

740-2.05 CONDUCTORS.

Delete the first sentence of the second paragraph of Item 6, Loop Lead-in Cables, and substitute the following:

Use seven pair size18 AWG, 16-strand, tinned copper conductors per ASTM B 33 insulated with flame-retardant polyvinyl chloride (PVC) and clear polyamide (nylon).

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 all controller cabinets wired to accommodate five 4-channel inductive loop detector units and two 2-channel inductive loop detector units.

Delete subpart (3e) of Subitem c, Cabinet Wiring, of Item 1 Standard Features and replace with the following:

(e) The right hand side of the cabinet shall have a 16 position neutral buss bar and a 16 position ground buss bar. The left hand side of the cabinet shall have a 32 position neutral position buss bar and a 32 positions ground buss bar.

740-2.12 STANDARD AUXILIARY EQUIPMENT.

Add the following subitem under Item 3, Conflict Monitors:

a. Supply conflict monitors with an RS-232 serial port that allows the monitor to download information through an external dial-up multi-port modem or to a personal computer using the Microsoft Windows NT operating system.

740-2.13 SPECIAL AUXILIARY EQUIPMENT.

Add the following subitem under Item 3, Conflict Monitors:

6. Opticom Priority Control System. Install the following components of the 3M Company's Opticom Priority Control System according to 3M's written installation instructions at the signalized intersections listed on the Plans.

   Install the quantity of Model 711, 721, and 722 optical detectors on the signal pole mast arms shown on the Plans. Before you install the detectors, gain approval of their final lateral location from the Engineer. See the Plans for installation details.

   Install Model 138 Optical detector lead-in cable between the end of each signal mast arm and the controller cabinet. Furnish enough slack in these cables for them to extend two feet beyond the end of each signal mast arm and to leave 10 feet of slack

in the controller cabinet. Seal both ends of each lead-in cable with mastic lined, heat shrink tubing end caps.

Before you attach the conductors to the optical detectors, strip the insulation for the conductors and attach all four conductors to ground in the controller cabinet. Attach the signal cable to the confirmation light. The MOA Signal Maintenance Section will tie down the conductors in the controller cabinet under Item 660(26), Signal Timings and Adjustments.

Furnish each controller cabinet with a Model 754 phase selector, a Model 760 card rack, and an Opticom Panel Assembly, U.S. Traffic Corporation part number 103303. The panel assembly interfaces the card rack to the controller cabinet. Furnish new controller assemblies with these parts installed by the controller assembly manufacturer. To retrofit existing controller assemblies, deliver the parts to MOA Signal Maintenance, who will install the parts under Item 660(26), Signal Timings and Adjustments.

7. Traffic Logging System. Furnish, and others will install in the controller cabinet, a stand-alone unit that collects, time stamps, and stores data in an unattended manner. The traffic logging system shall conform to the following:

a. Operation. The unit shall accept a new operating program, operational parameters, and the date and time stamp from a personal computer, downloaded through an RS-232 cable. The use of replaceable proms to change the operational program is unacceptable. Data collection shall be automatic and not require an operator to reset or start operation.

In the event of a power interruption, data collection shall automatically restart at the proper time. Other than the current sample being collected, the unit shall not lose stored data because of the power interruption. At power-up or at the restoration of power after an outage, the unit shall log the date and time at the start of data collection.

The unit shall maintain the operating program, data storage, and date/time for a minimum of five (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 with a loose Detector Systems TLS-1-C1 interface cable only to connect the unit to the output of the loop detector units. The MOA'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.

d. Software. Supply Microsoft Windows NT compatible software and user manuals with the unit that provides the operator an interface to the hardware.

Furnish menu-driven software that allows an operator to: 1) download to initialize the unit with its operating program and data collection parameters; 2) upload information from the unit (both stored data and real-time data); and 3) transfer a data file to a text file.

The operating program shall provide for month, day, day-of-week, hour, minute, and second information and allow sampling periods of 5, 15, 30, and 60 minutes.

8. Traffic Management Communication System. Furnish a software-driven, multi-port modem system that provides communication between interconnected traffic controller assemblies and an off-site personal computer using the Microsoft Windows NT operating system. Supply the necessary parts and cabling that enables full duplex communications through an uncompressed baud range of 300 to 9600. The modem system shall remain operational through a temperature range of –40°F to +104°F.

a. Office Modems. Furnish two external dial-up master modems designed to provide communications between an off-site personal computer using the Microsoft Windows NT operating system and an on-site dial-up multi-port modem. Supply software that provides a front-end to a third-party software connection between the off-site computer and the components connected to the multi-port modems.

b. Modems for traffic signal controller cabinets with telephone service.

(1) For each traffic signal controller cabinet with a telephone service, provide a dial-up, remote modem equipped with five communication ports. Furnish a modem with: four RS-232 serial ports, designed to interface between the traffic signal controller unit, the conflict monitor, the traffic logging system, and the emergency vehicle preemption system; and one port designed to allow communication to the lease-line master modem. The modem shall be remotely addressable and able to switch between ports without hanging up.

Install a lease-line master modem designed to allow communications between the dial-up remote modem and lease-line remote modems located in downstream traffic signal controller cabinets.

c. Interconnected traffic signal controller cabinets. Install a lease-line remote modem equipped with four RS-232 serial ports at each traffic signal controller cabinet. The ports shall interface between the traffic signal controller unit, the conflict monitor, the traffic logging system, and the emergency vehicle preemption system. The modem shall be remotely addressable and able to switch between ports without hanging up. (5/23/05) DOWL