STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

STANDARD SPECIFICATIONS
FOR
AIRPORT CONSTRUCTION

Ted Stevens Anchorage International Airport
Runway 7R/25L Rehabilitation – Phase II
Project No. 52405
Runway 7R/25L Extension
Project No. 53201

(Advisory Circular 150/5370-10, Standards for Specifying Construction of Airports, as modified, and approved by the Federal Aviation Administration for Airport Improvement Program contracts in Alaska)

NOTE: Special Provisions for each project are marked as changes to the text of the Standard Specifications. Deleted text is identified by strikethrough. Additions are underlined.

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SECTION 10

DEFINITIONS AND TERMS

10-01 GENERAL. The following terms and definitions apply in these Specifications. If a term is not defined, the ordinary, technical, or trade meanings for that term shall apply, within the context in which it is used.

Titles and headings of sections, subsections, and subparts are intended for convenience of reference and will not govern their interpretation. Working titles which have a masculine gender, such as "workman" and "flagman" and the pronouns and adjectives "he", "his" and "him" are utilized in the contract documents for the sake of brevity, and are intended to refer to persons of either sex. Any reference to a specific requirement of a numbered paragraph of the contract specifications or a cited standard shall be interpreted to include all general requirements of the entire section, specification item, or cited standard that may be pertinent to such specific reference.

Cited publications refer to the most recent issue, including interim publications, in effect on the date of the Invitation To Bid, unless specified by year or date.

These Specifications are written to the Bidder or Contractor. Unless otherwise noted, all actions required by the specifications are to be performed by the Bidder, the Contractor, or the Contractor's agent.

Some portions of these Specifications are written using imperative mood, abbreviated format, incomplete sentences, and/or active voice to communicate the Contractor's responsibilities in a direct and concise manner. Omission of words or phrases such as "a," "an," "the," "the Contractor shall," "unless otherwise specified," or "unless otherwise directed" is intentional. Interpret the Contract as if they were included.

For all Specification language except the General Contract Provisions, whenever anything is, or is to be, done, if, as, or, when, or where "acceptable, accepted, approval, approved, authorized, determined, designated, directed, disapproved, ordered, permitted, rejected, required, satisfactory, specified, submit, sufficient, suitable, suspended, unacceptable, unsatisfactory, or unsuitable," the expression is to be interpreted as if it were followed by the words "by the Engineer" or "to the Engineer."

10-02 ACRONYMS. Wherever the following abbreviations are used in these Specifications or on the Plans, they are to be construed the same as the respective expression represented:

AAC	*Alaska Administrative Code*
AASHTO	American Association of State Highway and Transportation Officials
AC	*FAA Advisory Circular*
ACI	American Concrete Institute
AIA	American Institute of Architects
AIP	Airport Improvement Program
AKOSH	Alaska Occupational Safety and Health
ANSI	American National Standards Institute
AOA	Air Operations Area
AS	*Alaska Statute*
ASDS	*Alaska Sign Design Specifications*
ASTM	American Society for Testing & Materials
ATM	Alaska Test Method (See *Alaska Test Methods Manual*)
CFR	Code of Federal Regulations
CSP	Construction Safety Plan
CTAF	Common Traffic Advisory Frequency
DOLWD	Alaska Department of Labor and Workforce Development
DOT&PF	Alaska Department of Transportation and Public Facilities

EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FOP	Field Operating Procedure (See *Alaska Test Methods Manual*)
FSS	Flight Service Station
ICEA	Insulated Cable Engineers Association (formerly IPCEA)
MRP	*Mining and Reclamation Plan*
NEC	*National Electrical Code*
NEMA	National Electrical Manufacturers Association
NOTAMs	*Notices to Airmen*
SSAC	*DOT&PF Standard Specifications for Airport Construction*
SSPC	Society for Protective Coatings
SPCC	*Spill Prevention, Control, and Countermeasure (Plan)*
SWPPP	*Storm Water Pollution Prevention Plan*
TCP	*Traffic Control Plan*
UL	Underwriters Laboratory
WAQTC	Western Alliance for Quality in Transportation Construction (See *Alaska Test Methods Manual*)

10-03 DEFINITIONS.

ACCEPTANCE SAMPLING AND TESTING. Sampling and testing performed by the State of Alaska, or its designated agent, to evaluate acceptability of the final product. This is also called verification sampling and testing when specifically used to validate the contractor's data.

ACCESS ROAD. The right-of-way, the roadway, and all improvements constructed thereon connecting the airport to another public thoroughfare.

ADDENDA. Clarifications, corrections, or changes to the Plans, Specifications, or other Contract documents issued graphically or in writing by the Department after the advertisement but prior to bid opening.

ADVERTISEMENT. The public announcement, as required by law, inviting bids for specified work or materials.

AGREED PRICE. An amount negotiated between the Department and the Contractor after Contract award for additional work performed or additional materials supplied under the Contract.

AIR OPERATIONS AREA (AOA). Any area of the airport used or intended to be used for the landing, takeoff, surface maneuvering, or parking of aircraft. An air operation area shall include such paved or unpaved areas, that are used or intended to be used for the unobstructed movement of aircraft, in addition to its associated runway, ~~runway safety area,~~ taxiway, ~~taxiway safety area and~~ or apron.

AIRPORT. An area of land or water that is used or intended for use for the landing and takeoff of aircraft, and any appurtenant areas that are used or intended for use for airport buildings or other airport facilities or right of way, together with airport buildings and facilities.

AIRPORT IMPROVEMENT PROGRAM (AIP). A grant-in-aid program, administered by the FAA.

ALASKA TEST METHODS MANUAL. The materials testing manual used by the Department. It contains Alaska Test Methods, WAQTC Test Methods, WAQTC FOPs for AASHTO Test Methods, and Alaska Standard Practices for evaluating test results and calibrating testing equipment.

APPENDICES. Supplemental contract documents.

AWARD. Acceptance of the successful bid by the Department. The award is effective upon execution of the Contract by the Contracting Officer.

BASE COURSE. One or more layers of specified material placed on a subbase or subgrade to support a surface course.

BID. The bidder's offer, on the prescribed forms, to perform the specified work at the prices quoted.

BID BOND. A type of bid guaranty.

BIDDER. An individual, firm, corporation, joint venture, or any acceptable combination of individuals and entities submitting a bid for the advertised work.

BID GUARANTY. The security furnished with a bid to guarantee that the bidder will enter into a contract if the Department accepts the bid.

CALENDAR DAY. Every day shown on the calendar, beginning and ending at midnight.

CHANGE ORDER. A written order by the Department to the Contractor making changes to the Contract, within its general scope, and establishing the basis of payment and time adjustment, if any, for the work affected.

COMMON TRAFFIC ADVISORY FREQUENCY (CTAF). A designated frequency for the purpose of carrying out airport advisory practices while operating to or from an airport that does not have a control tower or an airport where the control tower is not operational. CTAF is identified in appropriate aeronautical publications such as the current *Alaska Flight Information Supplement*, a civil/military flight information publication issued by FAA every 56 days.

COMPLETION DATE. The date on which all Contract work is specified to be completed.

CONSTRUCTION. Physical activity by the Contractor or any Subcontractor using labor, materials or equipment within the Project, or within material sources planned for use on the Project.

CONSTRUCTION PHASING PLAN. A plan set that depicts the phasing and timing of major construction activities in relation to the physical features of the work site. This plan may be included with other ancilliary plans as appropriate.

CONSTRUCTION SAFETY PLAN (CSP). ~~A Contract document that specifies methods of controlling the operations of the Contractor, subcontractors, and suppliers so as to provide for (1) safety of workers, equipment, and public, (2) the movement of aircraft in the Air Operations Areas of the airport, and (3) the least inconvenience to traffic.~~ A plan that sets forth guidelines for operational safety on airports during construction.

CONTINGENT SUM. A method for paying for a Contract bid item reserved by the Department for specified contingencies. The Contractor shall perform Contingent Sum work only upon the Directive of the Engineer. The basis of payment for Contingent Sum work shall be specified in the Contract or the Directive.

CONTRACT. The written agreement between the Department and the Contractor setting forth the obligations of the parties for the performance and completion of the work.

The Contract includes the Invitation To Bid, Bid Form, Standard Specifications, Special Provisions, Plans, Bid Schedule, Contract Forms, Contract Bonds, Addenda, and any Change Orders, Interim Work Authorizations, Directives, or Supplemental Agreements that are required to complete the work in an acceptable manner, all of which constitute one instrument.

CONTRACTING OFFICER (PROCUREMENT OFFICER). The person authorized by the Commissioner of the Department to enter into and administer the Contract on behalf of the Department. The Contracting

Officer has authority to make findings, determinations, and decisions with respect to the Contract and, when necessary, to modify or terminate the Contract. The Contracting Officer is identified on the Invitation To Bid.

CONTRACT ITEM (PAY ITEM). A specifically described item of Contract work listed on the Bid Schedule or in a Change Order.

CONTRACTOR. The individual, firm, corporation, joint venture, or any acceptable combination of individuals and entities contracting with the Department for performance of the Contract.

CONTRACT TIME. The time allowed under the Contract, including authorized time extensions, for the completion of all work by the Contractor. Contract time may be specified either in calendar days or by completion date.

CONTROLLING ITEM. Any feature of the work considered at the time by the Engineer: (1) essential to the orderly completion of the work and (2) a feature which, if delayed, will delay the time of completion of the Contract (such as an item of work on the critical path of a network schedule).

COST. Amounts actually incurred by the Contractor in the performance of the Contract that are (a) actually reflected in contemporaneously maintained accounting or other financial records and (b) supported by original source documentation. Costs are to be stated in U.S. dollars.

CULVERT. A pipe or arch half pipe, that provides an opening under the embankment.

DAY. Calendar day unless preceded by the word "working".

DEPARTMENT. The State of Alaska Department of Transportation and Public Facilities.

DIRECTIVE. A written communication to the Contractor from the Engineer enforcing or interpreting a Contract requirement or ordering commencement or suspension of an item of work already established in the Contract.

DRAINAGE SYSTEM. The system of pipes, ditches, and structures by which surface or subsurface waters are collected and conducted from the airport area.

ENGINEER. The authorized representative of the Department's Contracting Officer. The Engineer is responsible for administration of the Contract.

EQUIPMENT. All machinery, tools, apparatus, and supplies necessary to preserve, maintain, construct, and complete the work.

EQUITABLE ADJUSTMENT. An increase or decrease in Contract price or time calculated according to the terms of this Contract.

EXTRA WORK. An item of work not provided for in the Contract as awarded but found essential by the Engineer for the satisfactory completion of the Contract within its intended scope.

FEDERAL AVIATION ADMINISTRATION (FAA). Branch of the U.S. Department of Transportation. When used to designate a person, FAA shall mean the Administrator or their duly authorized representative.

FEDERAL SPECIFICATIONS. The Federal Specifications and Standards, Commercial Item Descriptions, and supplements, amendments, and indices thereto which are prepared and issued by the General Services Administration (GSA) of the Federal Government. They may be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Refer to the following website to determine the status of replaced Federal Specifications: http://apps.fss.gsa.gov/pub/fedspecs/index.cfm

HIGHWAY, STREET, OR ROAD. A general term denoting a public way used by vehicles and pedestrians, including the entire area within the right-of-way.

HOLIDAYS. State of Alaska legal holidays are:

1. New Year's Day - January 1
2. Martin Luther King, Jr. Day - Third Monday in January
3. Presidents' Day - Third Monday in February
4. Seward's Day - Last Monday in March
5. Memorial Day - Last Monday in May
6. Independence Day - July 4
7. Labor Day - First Monday in September
8. Alaska Day - October 18
9. Veteran's Day - November 11
10. Thanksgiving Day - Fourth Thursday in November
11. Christmas Day - December 25
12. Every Sunday
13. Every day designated by public proclamation by the President of the United States or the governor as a legal holiday.

If a holiday listed above falls on a Saturday, Saturday and the preceding Friday are both legal holidays for officers and employees of the state. If the holiday falls on a Sunday, except (12) above, Sunday and the following Monday are both legal holidays (See AS 44.12).

INDEPENDENT ASSURANCE (IA). Activities that are an unbiased and independent evaluation of all the sampling and testing (or inspection) procedures used in the quality assurance program. [IA provides an independent verification of the reliability of the acceptance (or verification) data obtained by the agency and the data obtained by the contractor. The results of the IA testing or inspection are not to be used as a basis of acceptance. IA provides information for quality system management.]

INSPECTOR. The Engineer's representative authorized to make detailed inspections of Contract performance and materials.

INTERIM WORK AUTHORIZATION. A written order by the Engineer initiating changes to the Contract, within its general scope, until a subsequent Change Order is executed.

INVITATION TO BID. The advertisement for bids for all work or materials on which bids are required.

LABORATORY. The official testing laboratories of the Department or such other laboratories as may be designated by the Engineer.

LIGHTING. A system of fixtures providing or controlling the light sources used on or near the airport or within the airport buildings. The field lighting includes all luminous signals, markers, floodlights, and illuminating devices used on or near the airport or to aid in the operation of aircraft landing at, taking off from, or taxiing on the airport surface.

MAJOR CONTRACT ITEM. A Contract item with a total value of 5 percent or more of the Contract award amount.

MATERIALLY UNBALANCED BID. A mathematically unbalanced bid that either (a) gives rise to a reasonable doubt that it will ultimately result in the lowest overall cost to the Department, even though it may be the lowest bid or (b) is so unbalanced as to be tantamount to allowing a significant advance payment.

MATERIALS. Substances specified for use in the construction of the project.

MATERIALS CERTIFICATION LIST (MCL). Also referred to as "Aviation Materials Certification List". A list of materials for which the Contractor shall submit certifications to the Engineer. The MCL is included in the Contract documents as an appendix.

MATHEMATICALLY UNBALANCED BID. A bid (a) where each pay item fails to carry its share of the cost of the work plus the bidder's overhead and profit, or (b) based on nominal prices for some pay items and enhanced prices for other pay items.

MINOR CONTRACT ITEM. A Contract item with a total value of less than 5 percent of the Contract award amount.

NON-FROST SUSCEPTIBLE. Stone, gravel or sand, that contains 6 percent or less material passing the No. 200 screen as determined by sieve analysis performed with WAQTC FOP for AASHTO T27/T 11 on the minus 3-inch material, and has a plastic index of 6 or less as determined by WAQTC FOP for AASHTO T 90.

NOTICE OF INTENT TO AWARD. The written notice by the Department announcing the apparent successful bidder and establishing the Department's intent to award the Contract when all required conditions are met.

NOTICE TO PROCEED. Written notice to the Contractor to begin the Contract work.

ORIGINAL GROUND (OG). The ground surface prior to the start of work.

PAVEMENT STRUCTURE. The combination of subbase, base course, and surface course placed on a subgrade to support and distribute the traffic load. Some layers may not be present, see Plans.

PAYMENT BOND. The security furnished by the Contractor and the Contractor's Surety to guarantee payment of all persons who supply labor and material in prosecution of the work provided for in the contract.

PERFORMANCE BOND. The security furnished by the Contractor and the Contractor's Surety to guarantee performance and completion of the work provided for in the contract.

PLANS. The Department's contract drawings, profiles, typical cross sections, and supplemental drawings or reproductions showing the location, character, dimensions, and details of the work.

PRECONSTRUCTION CONFERENCE. A meeting between the Contractor and the Engineer to discuss the project before the Contractor begins the work.

PROCESS CONTROL. See quality control.

PROFILE. The vertical elevation of the surface of the layer at the location indicated. It is typically indicated at the longitudinal centerline of the top layer of pavement on the runway, taxiway, apron, or roadway. On a material or fabrication it may be used to indicate a shape, or a thickness of material or thickness of a coating.

PROJECT. (a) The specific section of the airport or other property and related facilities on which construction is to be performed, or (b) the work that is to be performed under the Contract whether completed or partially completed.

QUALITY ASSURANCE (QA). (1) All those planned and systematic actions necessary to provide confidence that a product or facility will perform satisfactorily in service; or (2) making sure the quality of a product is what it should be. [QA addresses the overall process of obtaining the quality of a service, product, or facility in the most efficient, economical, and satisfactory manner possible. Within this broad context, QA includes the elements of quality control, independent assurance, acceptance, dispute resolution, etc. The use of the term QA/QC or QC/QA is discouraged and the term QA should be used. QA involves continued evaluation of

the activities of planning design, development of plans and specifications, advertising and awarding contracts, construction, and maintenance, and the interactions of these activities.]

QUALITY ASSURANCE SPECIFICATIONS. Specifications that require contractor quality control and agency acceptance activities throughout production and placement of a product. Final acceptance of the product is usually based on a statistical sampling of the measured quality level for key quality characteristics. [QA specifications typically are statistically based specifications that use methods such as random sampling and lot-by-lot testing, which let the contractor know if the operations are producing an acceptable product.]

QUALITY CONTROL (QC) also called PROCESS CONTROL. The system used by a contractor to monitor, assess and adjust their production or placement processes to ensure that the final product will meet the specified level of quality. Quality control includes sampling, testing, inspection and corrective action (where required) to maintain continuous control of a production or placement process.

RESOURCES. Labor, equipment, materials, supplies, tools, transportation, and supervision necessary to perform the work.

RESPONSIBLE BIDDER. A bidder that the Department determines has the skill, ability, financial resources, legal capacity to contract, equipment, required licenses, integrity, satisfactory record of performance and that is otherwise fully capable of performing the Contract.

RESPONSIVE BID. A bid that the Department determines conforms in all material respects with the solicitation for bids.

RIGHT-OF-WAY. Land or property or an interest in property available for a project. The uses allowed in portions of right-of-way may be restricted.

RUNWAY. The area of the airport prepared for the landing and takeoff of aircraft.

RUNWAY SAFETY AREA (RSA). A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event an aircraft undershoots, overshoots, or departs from the runway.

SECURITY PLAN. A Contract document that specifies methods of controlling the operations of the Contractor, subcontractors, and suppliers so as to provide for (1) security of workers, equipment, and public, (2) security of aircraft in the Air Operations Areas of the airport, and (3) security of the Airport property. This plan may be included with the Construction Safety Plan as appropriate.

SPECIAL PROVISION. Addition or revision that amends or supersedes the Standard Specifications and is applicable to an individual project.

SPECIALTY ITEM. A Contract item identified in the Contract that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid on the contract.

SPECIFICATIONS. General term applied to all Contract terms, conditions, directions, provisions, and requirements.

STANDARD SPECIFICATIONS. A book or electronic file of specifications approved by the Department for general application and repetitive use.

STATE. The State of Alaska, acting through its authorized representative.

STRUCTURE. Bridge, building, catch basin or inlet, cribbing, culvert, electrical duct, flexible and rigid pavements, handholes, junction boxes, lighting fixture and base, manhole, navigational aid, retaining wall,

storm and sanitary sewer lines, transformer, underdrain, vault, visual aid, water line, and other manmade features of the airport that may be encountered in the work and not otherwise classified herein.

SUBBASE. Layer of specified material between the subgrade and base course.

SUBCONTRACTOR. Individual or legal entity to whom or to which the Contractor sublets part of the Contract.

SUBGRADE. The soil or embankment upon which the pavement structure is constructed.

SUBSIDIARY. Work or material not measured or paid for directly. Compensation for such work is included in the payment for other items of work.

SUBSTANTIAL COMPLETION. The point at which the project (1) can be safely and effectively used by the public without further delays, disruption, or other impediments; and (2) pavement structure, shoulder, drainage, sidewalk, permanent signing and markings, guardrail and other traffic barrier, fencing, safety appurtenance, structures, utilities, lighting, bridge deck and parapet work, and guidance systems for aircraft is complete.

For projects built in phases the work is substantially complete when it is ready for the subsequent project.

SUPERINTENDENT. The Contractor's authorized representative in responsible charge of the work.

SUPPLEMENTAL AGREEMENT. Negotiated written agreement between the Department and the Contractor authorizing performance of work beyond the general scope of, but in conjunction with, the original Contract. Supplemental agreements are new procurements under the State Procurement Code, AS 36.30.

SURETY. Corporation, partnership, or individual, other than the Contractor, executing a bond furnished by the Contractor.

SURFACE COURSE. Top homogenous layer of the pavement structure. It is designed to withstand the wear of traffic and the disintegrating effects of climate. Sometimes called the wearing course.

TAXIWAY. The portion of the air operations area of an airport that has been designated for movement of aircraft to and from runways or aircraft parking areas.

TAXIWAY SAFETY AREA (TSA). A defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an airplane unintentionally departing the taxiway.

TRAFFIC CONTROL PLAN (TCP). ~~A Contract document that specifies methods of routing pedestrian and/or vehicular traffic through or around a construction area, including specifying the location of all traffic control devices, for work outside the air operations area.~~ Also referred to as "Highway Traffic Control Plan". A drawing or drawings indicating the method or scheme for safely guiding and protecting motorists, pedestrians, bicyclists, and workers in a highway traffic control zone. The TCP depicts the highway traffic control devices and their placement and times of use.

UTILITY. Line, facility, or system for producing, transmitting, or distributing communications, power, electricity, light, heat, gas, oil, crude products, water, steam, waste, storm water not connected with highway drainage, or other similar commodity, including a publicly owned fire or police signal system, street lighting system, or railroad which directly or indirectly serves the public. Also means Lighting as defined in this subsection. Also means a utility company, inclusive of any subsidiary.

VERIFICATION SAMPLING AND TESTING. See ACCEPTANCE SAMPLING AND TESTING.

WORK. Depending on the context, (a) The act of furnishing all resources for the project and performing all duties and obligations required by the Contract or (b) the physical construction, facility or end–product that is contemplated under the Contract, whether completed or partially completed.

WORKING DAYS. Calendar days, except Saturdays and state holidays.

WORKING DRAWINGS. Stress sheets, shop drawings, erection plans, falsework plans, framework plans, cofferdam plans, bending diagrams for reinforcing steel, wiring diagrams and schematics, traffic control plans, or any other supplementary plans or similar data which the Contractor is required to submit to the Engineer for approval.

SECTION 20

BIDDING REQUIREMENTS AND CONDITIONS

20-01 QUALIFICATION OF BIDDERS. A bidder shall:

a. On wholly state-funded projects, submit evidence of Contractor Registration, under AS 08.18, and valid Alaska Business License at the time designated for bid opening;

b. On federal-aid projects, submit evidence of Alaska Business License and Contractor Registration prior to award; and

c. When requested, submit a completed Contractor's Questionnaire (Form 25D-8) stating previous experience in performing comparable work, business and technical organization, financial resources, and equipment available to be used in performing the work.

All firms desiring to participate in DOT&PF construction projects must register annually by submitting a completed Bidder Registration (Form 25D-6).

~~The bidder must be registered as an Electrical Administrator, or must employ a person whose Electrical Administrator's license is assigned to the bidder, under AS 08.40 at the time of award.~~

20-02 CONTENTS OF BID PACKAGE. Upon request, the Department will furnish prospective bidders with a bid package, at the price stated in the Invitation To Bid.

The bid package includes the following:

a. Location and description of the project;

b. Estimates of quantities of work and materials to be furnished;

c. Schedule of contract items for which bid prices are invited;

d. Time in which the work must be completed

e. Amount of the bid guaranty;

f. Date, time, and place for the bid opening;

g. Plans and specifications; and

h. Bid forms.

Unless otherwise stated in the bid package, the Plans, Specifications, permits, forms and any other documents designated in the bid package are considered a part of the bid whether attached or not.

20-03 INTERPRETATION OF QUANTITIES IN BID SCHEDULE. Bid prices shall be based on the estimated quantities shown in the bid schedule. Quantities of work to be done and materials to be furnished are approximate and are prepared only for the comparison of bids. These quantities may increase, decrease, or be eliminated. Payment for unit price items will be made for the actual accepted quantities of work performed and materials furnished under the Contract, as determined using the method of measurement specified in the Contract.

20-04 EXAMINATION OF PLANS, SPECIFICATIONS, SPECIAL PROVISIONS, AND WORK SITE. Bidders shall examine the work site and all Contract documents before preparing a bid. Submitting a bid is a binding representation that the bidder has examined the work site, is aware of the conditions to be encountered, and has examined and understands all of the Contract documents, including plans and specifications. Bidders shall examine the bidding requirements listed under Subsection 50-06 Utilities.

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 60-02.d.(2) Mandatory Sources and 60-02.d.(3) 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 60-02 Material Sources for further information about material source development.

Any questions about bidding procedures, site conditions, or Contract requirements must be submitted in writing to the persons designated on the Invitation To Bid. Questions must be submitted in sufficient time to get a reply before submitting a bid. No oral responses or other oral statements are binding on the Department. Any response to a material question shall be issued by addendum sent to all bidders.

20-05 PREPARATION OF BID. Bids shall only be submitted on the forms furnished by the Department or legible copies of the Department's forms. All entries shall be legible and in ink or type. Bidders shall:

a. Enter all prices required on the Bid Schedule, in figures;

b. Enter a unit price for each contract item for which a quantity is given;

c. Enter the products of the respective unit prices and quantities in the column provided;

d. Enter lump sum prices for lump sum contract items in the column(s) provided; and

e. Enter the total amount of all contract items for the basic bid and, when specified, any alternates.

When a bid item contains a choice to be made by the bidder, the bidder shall indicate a choice according to the Specifications for that item. No further choice is permitted.

The bid must be signed in ink by the person or persons authorized to sign the Contract for the bidder. If a bidder is a corporation, the bid must be signed by a corporate officer or agent with authority to bind the corporation. If a bidder is a partnership, a partner must sign. If the bidder is a joint venture, each principal member must sign. If a bidder is a sole proprietorship, the owner must sign. Each person signing the bid must initial any changes made to entries on the bid forms.

For multiple-project bid openings, bidders may limit the total dollar amount or number of projects to be accepted by completing the following statement and adding it to the Bid Form for at least one of the projects being bid. The Department will then determine which of the low bids it will accept, up to the total indicated.

"We wish to disqualify all of our successful bids at this bid opening which exceed the total of $_____ or ____ contracts and hereby authorize the Department to determine which bids to disqualify, based on this limit."

20-06 NONRESPONSIVE BIDS.

a. A bid shall be rejected as nonresponsive if it:

(1) Is not properly signed by an authorized representative of the bidder in ink and in a legally binding manner;

(2) Contains unauthorized additions, conditional or alternative bids, or other irregularities that make the bid incomplete, indefinite, or ambiguous;

(3) Includes a reservation of the right to accept or reject any award, or to enter into a contract pursuant to an award, except for an award limitation under Subsection 20-05;

(4) Fails to include an acceptable bid guaranty with the bid;

(5) Is materially unbalanced; or

(6) Fails to meet any other material requirement of the Invitation To Bid.

b. A bid may be rejected as nonresponsive, in the Department's discretion, if it:

(1) Is not typed or completed in ink;

(2) Fails to include an acknowledgement of receipt of each addendum by assigned number and date of issue; or

(3) Is missing a bid price for any pay item, except when alternate pay items are authorized.

20-07 BID GUARANTY. Bids shall be accompanied by a bid guaranty in the amount specified on the Invitation To Bid. The guaranty shall be unconditionally payable to the State of Alaska and shall be in the form of an acceptable Bid Bond (Form 25D-14), or a certified check, cashier's check, or money order.

The surety of a Bid Bond may be any corporation or partnership authorized to do business in Alaska as an insurer under AS 21.09. A legible power of attorney shall be included with each Bid Bond.

An individual surety will not be accepted as a bid guaranty.

20-08 DELIVERY OF BIDS. Bids shall be submitted in the envelope furnished by the Department, or one of the same general size and shape that has the same identifying information. The envelope shall clearly indicate its contents and the designated address, as shown on the Invitation to Bid. Bids for other work may not be included in the envelope. Electronic or faxed bids will not be considered, unless specifically called for in the Invitation to Bid.

20-09 WITHDRAWAL OR REVISION OF BIDS. Bidders may withdraw or revise a bid in writing delivered by mail or by fax, provided that the designated office receives the withdrawal or revision before the time set for opening of bids. Revisions shall be submitted on the forms furnished by the Department or legible copies of the Department's forms.

Revisions shall include both the modification of the unit bid price and the total modification of each item modified, but shall not reveal the amount of the total original or revised bids.

20-10 PROTEST OF INVITATION TO BID. An interested party, as defined in AS 36.30.699, may protest an Invitation to Bid before the bid opening according to AS 36.30.560 and AS 36.30.565. Submit a protest to the Contracting Officer.

20-11 ADDENDA REQUIREMENTS. The Department will issue addenda if it determines, in its discretion, that clarifications or changes to the Contract documents or bid opening date are needed. The Department may send addenda by any reasonable method such as mail, courier, fax, or may post the addenda on its web site. Unless picked up in person or included with the bid documents, addenda or notice that an addenda has been issued will be addressed to the individual or company to whom bidding documents were issued and sent to the address or fax number on the plan holders' list. Notwithstanding the Department's efforts to distribute addenda, bidders are responsible for ensuring that they have received all addenda affecting the Invitation To Bid. Bidders must acknowledge all addenda received, either on the Bid Form or by fax prior to the scheduled time of bid opening. If a bidder received no addenda, the bidder shall enter "None" on the Bid Form.

20-12 RECEIPT AND OPENING OF BIDS. The Department will only consider bids, revisions, and withdrawals received before the scheduled time of bid opening.

Bids will be opened and read publicly at the time and place indicated in the Invitation to Bid. The Department is not responsible for prematurely opening or failing to open bids that are improperly addressed or identified.

20-13 RESPONSIBILITY OF BIDDERS. The Department may find a bidder is nonresponsible for any one of the following reasons, but is not limited in its responsibility analysis to the following factors:

a. Evidence of bid rigging or collusion;

b. Fraud or dishonesty in the performance of previous contracts;

c. More than one bid for the same work from an individual, firm, or corporation under the same or different name;

d. Unsatisfactory performance on previous or current contracts;

e. Failure to pay, or satisfactorily settle, all bills due for labor and material on previous contracts;

f. Uncompleted work that, in the judgment of the Department, might hinder or prevent the bidder's prompt completion of additional work, if awarded;

g. Failure to reimburse the state for monies owed on any previous contracts;

h. Default under previous contracts;

i. Failure to submit evidence of registration and licensing;

j. Failure to comply with any qualification requirements of the Department;

k. Engaging in any activity that constitutes a cause for debarment or suspension under the State Procurement Code (AS 36.30) or submitting a bid during a period of debarment;

l. Failure to satisfy the responsibility standards set out in state regulations;

m. Lack of skill, ability, financial resources, or equipment required to perform the contract; or

n. Lack of legal capacity to contract.

Nothing contained in this section deprives the Department of its discretion in determining the lowest responsible bidder.

20-14 FOREIGN TRADE RESTRICTION. The Contractor by submission of an offer and/or execution of a contract, certifies that it:

a. Is not owned or controlled by one or more citizens or nationals of a foreign country included in the list of countries that discriminate against U.S. firms published by the Office of the United States Trade Representative (USTR);

b. Has not knowingly entered into any contract or subcontract for this project with a contractor that is a citizen or national of a foreign country on said list, or is owned or controlled directly or indirectly by one or more citizens or nationals of a foreign country on said list; and

c. Has not procured any product nor subcontracted for the supply of any product for use on the project that is produced in a foreign country on said list.

Unless the restrictions of this clause are waived by the Secretary of Transportation according to 49 CFR 30.17, no contract shall be awarded to a contractor who is unable to certify to the above. If the Contractor knowingly procures or subcontracts for the supply of any product or service of a foreign country on the said list for use on the project, the FAA may direct, through the Department, cancellation of the contract at no cost to and with no damages available from the Department or the Federal government.

The Contractor shall incorporate this provision for certification without modification in each contract and in all lower tier subcontracts. The Contractor shall require subcontractors to provide immediate written notice to it if the subcontractor learns that its certification was erroneous, or has become erroneous, by reason of changed circumstances. The Contractor may rely upon the certification of a prospective subcontractor unless it has knowledge that the certification is erroneous.

The Contractor shall provide immediate written notice to the Department if the Contractor learns that its certification or that of a subcontractor was erroneous when submitted or has become erroneous by reason of changed circumstances.

This certification is a material representation of fact upon which reliance was placed when making the award. If it is later determined that the Contractor or subcontractor knowingly rendered an erroneous certification, the FAA may direct, through the Department, cancellation of the contract or subcontract for default at no cost to, and with no damages available from, the Department or the Federal Government.

Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render, in good faith, the certification required by this provision. The knowledge and information of a contractor is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

This certification concerns a matter within the jurisdiction of an agency of the United Stated of America and the making of a false, fictitious, or fraudulent certification may render the maker subject to prosecution under Title 18, United States Code, Section 1001.

SECTION 30

AWARD AND EXECUTION OF CONTRACT

30-01 CONSIDERATION OF BIDS. After the bids are opened and read, the bids will be mathematically checked and compared on the basis of the sum of the products of the bid schedule quantities and the unit bid prices. The unit bid prices govern if there is an error in extending the unit bid prices, or in totaling the extensions, or if an extension is missing. The results of the bid comparisons will be made available to the public as soon as practicable.

Until the Award, the Department may reject any or all bids, waive minor informalities or advertise for new bids without liability to any bidder if the Department, in its discretion, determines that to do so is in the best interests of the state.

A bidder may request withdrawal of a bid after opening and before the Award only according to AS 36.30.160(b) and State procurement regulations. Submit the request to the Contracting Officer.

An interested party, as defined in AS 36.30.699, may protest a proposed Award of contract as per AS 36.30.560 and AS 36.30.565. Submit the protest to the Contracting Officer.

30-02 SUBCONTRACTOR LIST. The apparent low bidder shall submit a completed Subcontractor List, Form 25D-5, within five working days following receipt of written notification by the Department that it is the low bidder.

An apparent low bidder who fails to submit a completed Subcontractor List form within the time allowed will be declared nonresponsible and may be required to forfeit the bid security. The Department will then consider the next lowest bidder for award of the Contract.

If a bidder fails to list a subcontractor, or lists more than one subcontractor for the same portion of work, and the value of that work is in excess of one-half of one percent of the total bid amount, the bidder agrees to perform that portion of work without a subcontractor and represents that it is qualified to perform that work.

A bidder who lists as a subcontractor another contractor who, in turn, sublets the majority of the work required under the Contract, violates this subsection.

A bidder or Contractor may, without penalty, replace a listed subcontractor who:

a. Fails to comply with licensing and registration requirements of AS 08.18;

b. Fails to obtain a valid Alaska business license;

c. Files for bankruptcy or becomes insolvent;

d. Fails to execute a subcontract for performance of the work for which the subcontractor was listed, and the bidder acted in good faith;

e. Fails to obtain bonding acceptable to the Department;

f. Fails to obtain insurance acceptable to the Department;

g. Fails to perform the subcontract work for which the subcontractor was listed;

h. Must be replaced to meet the bidder's required state or federal affirmative action requirements;

i. Refuses to agree or abide with the bidder's labor agreement; or

j. Is determined by the Department to be not responsible.

In addition to the circumstances described above, a Contractor may in writing request permission from the Department to add a new subcontractor or replace a listed subcontractor. The Department will approve the request if it determines in writing that allowing the addition or replacement is in the best interest of the State.

A bidder or Contractor shall submit a written request to add a new subcontractor or replace a listed subcontractor to the Contracting Officer a minimum of five working days before the date the new subcontractor is scheduled to begin work on the construction site. The request must state the basis for the request and include supporting documentation acceptable to the Contracting Officer.

If a bidder or Contractor violates this Subsection, the Contracting Officer may:

a. Cancel the Contract after Award without any damages accruing to the Department; or

b. After notice and a hearing, assess a penalty on the bidder or Contractor in an amount not exceeding 10 percent of the value of the subcontract at issue.

30-03 AWARD OF CONTRACT. The Department will award the Contract to the lowest responsible and responsive bidder unless it rejects all bids. The Department will notify all bidders in writing of its intent to award.

The Department will notify the successful bidder in writing of its intent to award the Contract and request that certain required documents, including the Contract Form, bonds, and insurance be submitted within the time specified. The successful bidder's refusal to sign the Contract and provide the requested documents within the time specified may result in cancellation of the notice of intent to award and forfeiture of the bid security.

If an award is made, it will be made as soon as practicable and usually within 40 days after bid opening. ~~Award may be delayed due to bid irregularities or a bid protest, or if the award date is extended by mutual consent.~~ Bids shall be valid for 120 days after bid opening, and may be extended by mutual consent.

For AIP contracts, no award shall be made until the FAA has concurred in the Department's recommendation to make such award and has approved the Department's proposed contract to the extent that such concurrence and approval are required by 49 CFR Part 18.

30-04 RETURN OF BID GUARANTY. The Department will return bid guaranties, other than bid bonds:

a. To all except the two lowest responsive and responsible bidders, as soon as practicable after the opening of bids; and

b. To the two lowest responsive and responsible bidders immediately after Contract award.

30-05 PERFORMANCE AND PAYMENT BONDS. The successful bidder shall furnish all required Performance and Payment Bonds on forms provided by the Department for the sums specified in the Contract. If no sum is specified, the successful bidder shall comply with AS 36.25.010. The Surety on each bond may be any corporation or partnership authorized to do business in the state as an insurer under AS 21.09 or two ~~responsible~~ individual sureties approved by the Contracting Officer.

If individual sureties are used, two individual sureties must each provide the Department with security assets located in Alaska equal to the ~~specified~~ penal amount of each bond. ~~The net worth and the total value of the security assets of each individual surety shall not be less than the penal amount of the bond. In addition, each individual Surety, upon the Department's request, shall execute an affidavit if individual surety on a~~

~~form provided by the Department. Each individual surety affidavit contains a Certificate of Sufficiency that must be signed by an official of an institution having full knowledge of assets and responsibilities of the Surety.~~ Any costs incurred by the Contractor and the individual Surety are subsidiary and shall be borne by the Contractor or the individual Surety. In no event will the Department be liable for these costs.

Individual sureties shall provide security by one, or a combination, of the following methods:

a. **Escrow Account.** An escrow account with a federally insured financial institution, in the name of the Department. Acceptable securities include, but are not limited to, cash, treasury notes, bearer instruments having a specific value, or money market certificates.

~~b. **First Deed of Trust.** A first deed of trust with the Department named as beneficiary, against the unencumbered value of real property or an agreement by a second party, including deeds of trust, mortgage, lien, or judgment interests to subrogate their interests to the Department in the real property offered by the individual Surety. A title insurance policy, with the Department as a named beneficiary, and a current (within three months) professional appraisal or assessed valuation is required to ascertain the true value of the property offered as collateral. Fire and casualty insurance, with the Department as a named insured, and in limits and coverages acceptable to the Contracting Officer, are required if buildings or other valuable improvements are involved. The appraiser must acknowledge in writing that the appraisal is prepared for the benefit of the Department and the Department has the right to rely on its contents. The deed of trust must be recorded in the recording office where the property is located.~~

b. **Irrevocable Letters of Credit.** Irrevocable letters of credit with a financial institution approved by the Contracting Officer.

c. **Cashiers or Certified Check.** A cashier's check or certified check made payable to the State of Alaska issued by financial institutions approved by the Contracting Officer.

These bonds and security assets, as applicable, shall remain in effect for 12 months after the date of final payment or, if longer, until all obligations and liens under this Contract are satisfied, including, but not limited to, obligations under Subsection 70-19.

The Department may, in its discretion, notify the bonding company or Surety of any potential default or liability.

The Contractor shall substitute, within five working days, another bond or surety acceptable to the Department if an individual Surety or the Surety on any bond furnished in connection with the Contract:

a. Becomes insolvent or is declared bankrupt;
b. Loses its right to do business in any state affecting the work;
c. Ceases to meet Contract requirements;
d. Fails to furnish reports of financial condition upon request; or
e. Otherwise becomes unacceptable to the Department.

When approved by the Contracting Officer, the Contractor may replace:

a. An individual surety with a corporate surety; or
b. Posted collateral with substitute collateral.

Failure to maintain the specified bonds or to provide substitute bonds when required under this section may be grounds for withholding contract payments until substitute bonding is obtained, and may, in the Department's discretion, be grounds for declaring the Contractor in default.

30-06 INSURANCE REQUIREMENTS. The Contractor shall provide evidence of insurance with an insurance carrier or carriers satisfactory to the Department covering injury to persons and property suffered by the State of Alaska or by a third party as a result of operations under this contract by the Contractor or by any subcontractor. The Contractor's insurance shall provide protection against injuries to all employees of the Contractor and the employees of any subcontractor engaged in work under this Contract. All insurance policies shall be issued by insurers that (i) are permitted to transact the business of insurance in the State of Alaska under AS 21 and (ii) have a financial rating acceptable to the Department. The Contractor shall notify the Engineer, in writing, at least 30 days before cancellation of any coverage or reduction in any limits of liability.

Where specific limits and coverages are shown, it is understood that they shall be the minimum acceptable. The requirements of this subsection shall not limit the Contractor's indemnity responsibility under Subsection 70-13. Additional insurance requirements specific to this contract are contained in the Special Provisions, when applicable.

The Contractor shall maintain the following policies of insurance with the specified minimum coverages and limits in force at all times during the performance of the Contract:

a. **Workers' Compensation:** as required by AS 23.30.045, for all employees of the Contractor engaged in work under this Contract. The Contractor shall be responsible for Workers' Compensation Insurance for any subcontractor who performs work under this Contract. The coverage shall include:

   (1) Waiver of subrogation against the state;

   (2) Employer's Liability Protection at $500,000 each accident/each employee and $500,000 policy limit;

   (3) "Other States" endorsement if the Contractor directly utilizes labor outside of the State of Alaska;

   (4) United States Longshore and Harbor Workers' Act Endorsement, whenever the work involves activity over or about navigable water; and

   (5) Maritime Employer's Liability (Jones Act) Endorsement with a minimum limit of $1,000,000, whenever the work involves activity from or on a vessel on navigable water.

b. **Commercial General Liability:** on an occurrence policy form covering all operations with combined single limits not less than:

   (1) $1,000,000 Each Occurrence;

   (2) $1,000,000 Personal Injury;

   (3) $2,000,000 General Aggregate; and

   (4) $2,000,000 Products-Completed Operations Aggregate.

c. **Automobile Liability:** covering all vehicles used in Contract work, with combined single limits not less than $1,000,000 each occurrence.

d. **Umbrella Coverage:** for Contract amounts over $5,000,000 not less than $5,000,000 umbrella or excess liability. Umbrella or excess policy shall include products liability completed operations coverage and may be subject to $5,000,000 aggregate limits. Further, the umbrella or excess policy shall contain a clause stating that it takes effect (drops down) in the event the primary limits are impaired or exhausted.

The State of Alaska shall be named as an additional insured on policies required by paragraphs **b** thru **d** above. All of the above insurance coverages shall be considered to be primary and non-contributory to any other insurance carried by the State of Alaska, whether through self-insurance or otherwise.

In any contract or agreement with subcontractors performing work, the Contractor shall require that all indemnities and waivers of subrogation it obtains, and any stipulation to be named as an additional insured it obtains, shall also be extended to waive rights of subrogation against the State of Alaska and to add the State of Alaska as an additional named indemnitee and as an additional insured.

The apparent low bidder shall furnish evidence of insurance for worker's compensation, commercial general liability, automobile liability, and umbrella coverage (if required) to the Department before award of the Contract. Provide evidence of all other insurance coverages required under this Contract prior to commencement of work. The evidence shall be issued to the Department and shall be either a certificate of insurance or the policy declaration page with all required endorsements attached and must:

a. Denote the type, amount, and class of operations covered;
b. Show the effective (and retroactive) dates of the policy;
c. Show the expiration date of the policy;
d. Include all required endorsements;
e. Be executed by the carrier's representative; and
f. If a certificate of insurance, include the following statement:

"This is to certify that the policies described herein comply with all aspects of the insurance requirements of (Project Name and Number). The insurance carrier agrees that it shall notify the Engineer, in writing, at least 30 days before cancellation of any coverage or reduction in any limits of liability."

The Department's acceptance of deficient evidence of insurance does not constitute a waiver of Contract requirements.

Failure to maintain the specified insurance or to provide substitute insurance if an insurance carrier becomes insolvent, is placed in receivership, declares bankruptcy, or cancels a policy may be grounds for withholding Contract payments until substitute insurance is obtained, and may, in the Department's discretion, be sufficient grounds for declaring the Contractor in default.

30-07 EXECUTION AND APPROVAL OF CONTRACT. The successful bidder shall execute and return the Contract Form and all other required documents to the Department within the time specified, or within 15 days after receipt by the bidder if no time is specified. A contract is awarded only after it has been signed by the Contracting Officer.

30-08 FAILURE TO EXECUTE CONTRACT. If the successful bidder fails to appropriately execute and return the Contract Form and other documents within time specified, as required above, the Department may cancel the intent to award and keep the bid guaranty. The Department will then, in its discretion, award the Contract to the next lowest responsive and responsible bidder or readvertise the work.

30-09 ORAL STATEMENTS. The written terms of the Contract are binding. No oral statement of any person shall, in any manner or degree, modify or otherwise affect, change, or amend the terms of the Contract.

30-10 INTEGRATED CONTRACT. This Contract is an integrated document and contains the complete agreement and understanding of the parties. There are no unwritten agreements or understandings between the parties. Changes ordered or agreed upon, Directives given, or Equitable Adjustments issued under this Contract, and all other matters affecting the Contract, must be in writing in order to be binding and effective.

30-11 ESCROW OF BID DOCUMENTATION. Furnish a legible copy of the Bid documentation and an affidavit, as instructed in writing by the Contracting Officer. Bid documentation consists of written

documentation of quantity takeoffs, construction schedules on which the bid is based, cost estimates, rates of production and progress, assumptions, calculations, quotes from subcontractors and suppliers, and information used to prepare the Bid for this project.

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

Meet the following requirements:

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

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

(1) the affiant has examined the bid documentation and that it includes all documents used to prepare the bid,

(2) the sealed container contains all bid documentation submitted,

(3) the escrow materials were relied on to prepare the bid, and

(4) should a dispute arise, the Contractor's rights to use bid preparation documentation other than those in escrow are waived.

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

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

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

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

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

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

d. **Failure to Provide Bid Documentation.** Refusal or failure to provide bid documentation or affidavit renders the bid non-responsive. Failure or refusal to provide subcontractor bid documentation will result in subcontract disapproval.

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

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

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

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

SECTION 40

SCOPE OF WORK

40-01 INTENT OF CONTRACT. The intent of the Contract is to provide for the construction and completion of every detail of the described work. The Contractor shall furnish all labor, material, supervision, equipment, tools, transportation, supplies, and other resources required to complete the work in the time specified and according to the Contract.

40-02 CHANGES.

a. **Within Contract Scope.** The Engineer may order changes within the general scope of the Contract at any time, and without notice to sureties, including altering, ordering additions to, or ordering deletions of quantities of any item or portion of the work. These changes shall be made by a written Change Order and shall not invalidate the Contract or release the sureties.

(1) If the change does not materially differ in character or unit cost from specified Contract work, the Contractor shall perform the work at the original contract measurement methods and prices, subject to the provisions of Subsection 90-04.

(2) If the change is materially different in character or unit cost from that specified in the Contract, a new Contract Item will be established, and an equitable adjustment to Contract price and Contract time shall be calculated by one of the following methods:

(a) The Engineer and Contractor agree upon an adjustment to Contract price and Contract time, and the Engineer issues a change order for the described work;

(b) The Engineer requires the Contractor to proceed with the described work, with an adjustment to contract price and contract time, calculated by time and materials basis under Subsection 90-05, and the Engineer issues a change order for the work. The Contractor shall keep complete daily records of the cost of such work; or

(c) The Engineer may issue a unilateral Change Order requiring the Contractor to proceed with the work with an adjustment to the payment amount or Contract time based on the Engineer's estimate of reasonable value. The Contractor shall keep complete daily records of the cost of such work.

(3) If the Engineer eliminates a Contract item, the Contractor shall accept compensation under Subsection 90-09.

b. **Outside Contract Scope.** Changes determined to be outside the general scope of the Contract shall be made only by Supplemental Agreement issued according to AS 36.30 and the State's procurement regulations. Additional bonding or insurance may be required.

c. **Cost and Pricing Data.** Before a Change Order or Supplemental Agreement covering work for which there is no established Contract price will be approved, the Contractor shall submit detailed cost or pricing data regarding the changed work. The cost or pricing data shall include an itemization of production rates and all costs including labor, materials, and equipment required for the work. The Contractor shall certify that the data submitted are, to the best of its knowledge and belief, accurate, complete, and current as of a mutually agreed date and that the data will continue to be accurate and complete during the performance of the changed work.

40-03 DIFFERING SITE CONDITIONS. The Contractor shall immediately notify the Engineer in writing and specifically describe the alleged differing site condition if the Contractor discovers:

a. Subsurface or latent physical conditions at the site, differing materially from those shown in the Contract documents, that could not have been discovered by a careful examination of the site; or

b. Unknown physical conditions at the site, of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract.

Failure to give the Engineer immediate written notice of the alleged differing site condition as required under this section constitutes a waiver of any future claim arising from or relating to the alleged differing site condition.

Unless otherwise directed by the Engineer, the Contractor shall leave the affected area undisturbed and suspend work in that area until the Engineer investigates the conditions.

If the Engineer finds that such conditions differ materially and increase or decrease the cost of, or the time required for, performance of the Contract, the Engineer will prepare a Change Order for an Equitable Adjustment to the Contract. The Contractor shall cooperate with the Engineer's preparation of the Change Order.

If the Contractor and the Engineer are unable to reach an agreement concerning the alleged differing site condition, the Contractor may file a claim under Subsection 50-17.

The Contractor shall keep accurate and detailed records of the actual cost of the work done as a result of the alleged differing site condition and shall allow the Engineer access to those records. Failure to keep records, to provide the Engineer with access to those records, or to give the notice required above will bar any recovery for the alleged differing site condition.

40-04 USE OF MATERIALS FOUND ON THE WORK. Before using borrow, the Contractor shall utilize Useable Excavation to construct the embankment layer on the project. Useable Excavation is stone, gravel, sand, or other material that is determined suitable by the Engineer, and that is encountered within the lines and grades of the project. For excavating the Useable Excavation and constructing the embankment with Useable Excavation, the Contractor shall be paid only the unit bid price for excavation. Hauling, placing, compacting and other activities required to construct the embankment with Useable Excavation shall be subsidiary to excavation, and the Contractor shall not be paid additional sums for those activities. The Engineer may approve the use of borrow when Useable Excavation is not available.

The Engineer may authorize the Contractor to use the Useable Excavation for Contract items other than construction of embankment, and the Contractor shall be paid both for the excavation of the Useable Excavation and for the other Contract Item for which it is acceptably used. If this action results in a shortage of embankment material:

a. The Contractor shall replace the Useable Excavation used for Contract items other than embankment, on a yard for yard basis with borrow acceptable to the Engineer; and

b. This replacement shall be at the Contractor's expense and at no additional cost to the Department. The Contractor shall pay any royalties required for the borrow.

The Contractor shall not excavate or remove any material that is within the project limits but outside the lines and grades, without written authorization from the Engineer.

In the event the Contractor has processed material from state-furnished sources in excess of the quantities required for performance of the Contract, the Department may retain possession of the surplus processed materials, including any waste material produced as a by-product, without obligation to pay the Contractor for processing costs. When the surplus materials are in a stockpile, the Engineer may direct the Contractor to leave the materials in the stockpile, level the stockpile(s) or remove the materials and restore the premises to a satisfactory condition at no additional cost to the Department.

The Contractor may temporarily use material from a structure that is designated to be removed to erect a new structure, but shall not cut or otherwise damage such material without the Engineer's approval.

40-05 MAINTENANCE OF TRAFFIC. It is the explicit intention of the Contract that the safety of aircraft, the public, the airport's equipment and personnel, and the Contractor's equipment and personnel, shall be the most important consideration. It is understood and agreed that the Contractor shall provide for the free and unobstructed movement of aircraft in the air operations areas of the airport, except as specifically provided in this Contract, with respect to its own operations and the operations of all its subcontractors. It is further understood and agreed that the Contractor shall provide for the uninterrupted operation of visual and electronic signals (including power supplies thereto) used in the guidance of aircraft, whenever the airport is open to the arrival or departure of aircraft.

With respect to the Contractor's own operations and the operations of all the Contractor's subcontractors, the Contractor shall provide marking, lighting, and other acceptable means of identifying: personnel; equipment; vehicles; storage areas; and any work area or condition that may be hazardous to the operation of aircraft, fire-rescue equipment, maintenance vehicles, or support vehicles at the airport.

When the Contract requires the maintenance of vehicular traffic on an existing roadway, the Contractor shall keep such roadway open to all traffic, and shall provide such maintenance as may be required to accommodate traffic and to keep the roadway smooth and even. The Contractor shall furnish, erect, and maintain barricades, warning signs, ~~flagpersons~~flaggers, and other traffic control devices in reasonable conformity with the *Manual on Uniform Traffic Control Devices for Streets and Highways* (published by the United States Government Printing Office) and the *Alaska Traffic Manual Supplement*, unless otherwise specified by the Department. The Contractor shall also construct and maintain in a safe condition any temporary connections necessary for ingress to and egress from abutting property or intersecting roadways, and as required in Subsection 50-13.

The Contractor shall make their own estimate of all labor, materials, equipment, and incidentals necessary for providing the maintenance of aircraft and vehicular traffic as specified in this subsection.

The cost of maintaining the aircraft and vehicular traffic specified in this subsection shall not be measured or paid for directly, but shall be subsidiary to the various contract items, except that G-700, G-710, and P-670 pay items, if included in the bid schedule, will pay directly for the traffic control measures and hazardous area barriers that are specifically described for payment under those items.

40-06 REMOVAL OF EXISTING STRUCTURES. The Contractor shall leave in place, work around and protect from damage existing structures encountered within the project lines and grades; unless such existing structures are to be removed, demolished, relocated, or salvaged.

Should the Contractor encounter an existing structure (above or below ground) in the work for which the disposition is not indicated on the Plans, the Contractor shall notify the Engineer prior to disturbing such structure. The Engineer will determine the disposition of existing structures so encountered according to the provisions of the contract.

The cost of working around and protecting existing structures, or removing existing structures including landfill waste fees, shall not be measured or paid for directly, but shall be subsidiary to the various contract items.

Structures that may be encountered within the project lines and grades shall be utilized in the work, and shall remain the property of the owner when so utilized in the work, unless otherwise indicated in the Contract.

40-07 CLEANUP. The Contractor shall remove all rubbish, solid waste, temporary structures, excess materials, and equipment from the project site, from state owned materials sources, and from all work areas before project completion.

40-08 VALUE ENGINEERING PROPOSALS BY CONTRACTOR.

a. **Purpose and Scope.** The purpose of this section is to encourage the Contractor to propose changes to Contract designs, materials, or methods based on the Contractor's experience and ingenuity. The Value Engineering Proposals (VEPs) contemplated are those that may result in immediate savings to the Department under this Contract without impairing essential functions and characteristics of the Project, including, but not limited to: service life, economy of operation, ease of maintenance, desired appearance, and safety. Cost savings on this project resulting from VEPs offered by the Contractor and accepted by the Department shall be shared equally between the Contractor and the Department.

   The following are not eligible for value engineering proposals: changes in the basic design of a pavement type, runway and taxiway lighting, visual aids, hydraulic capacity of drainage facilities, or changes in grade or alignment that reduce the geometric standards of the project.

b. **Submitting Proposals.** All VEPs must be in writing. The Contractor shall submit the following with each VEP:

   (1) A statement that the proposal is submitted as a Value Engineering Proposal under subsection 40-08;

   (2) A description of the difference between the existing Contract requirements and the proposed change, stating the comparative advantages and disadvantages of each, including effects on service life, economy of operations, ease of maintenance, desired appearance, and safety;

   (3) Drawings or specifications that show the proposed revisions relative to the original Contract requirements. The Contractor may submit schematics for conceptual approval of the proposal;

   (4) A detailed and complete cost estimate comparing the original estimated costs for performing the work under the existing Contract and under the proposed VEP;

   (5) A summary of the Contractor's development costs for the VEP, including costs for designing, testing, preparing and submitting the VEP;

   (6) A description and estimate of added costs the Department may incur in implementing the VEP, such as review, testing and evaluation of the VEP and Contract administration costs;

   (7) A date by which the Department must make a decision to obtain the cost savings projected in the VEP. The date identified must allow a reasonable time for the Department to conduct an adequate review and evaluation of the VEP and process a Change Order without affecting the Contractor's schedule;

   (8) A statement of the probable effect the VEP would have on the Contract completion time. The Department's approval of the VEP shall not change the Contract completion date unless a change to the completion date is specifically provided for in the Change Order authorizing the VEP; and

(9) A description of any previous use or testing of the proposed change and the conditions and results. If the proposal was previously submitted on another Department project, indicate the date, project name and number, and the action taken by the Department.

c. Conditions. VEPs will be considered only when all of the following conditions are met:

(1) The Contractor has not based any bid prices on the anticipated acceptance of a VEP. If the VEP is rejected, the Contractor shall complete the work at the Contract prices.

(2) VEPs, regardless of their approval status, become the property of the Department. The Contractor shall submit VEPs without use or disclosure restrictions. The Department shall have the right to use, duplicate or disclose the VEP and any data necessary to use the VEP on the Project, on any other project, and on any other Contracts. The Contractor shall identify any trade secret information, patented materials or proprietary processes that restrict use of the VEP.

(3) The Department is the sole judge as to whether a VEP qualifies for consideration and evaluation. It may reject any VEP that does not allow a reasonable time for adequate review and evaluation by the Department or that requires excessive time or costs for review, evaluations, or investigations, or which is not consistent with the Department's design standards and policies, safety considerations, land use restrictions, permit stipulations, right-of way limitations, or other essential criteria for the project. The Department may reject a VEP without obligation to the Contractor if it contains proposals that are already under consideration by the Department or that have already been authorized for the Contract.

(4) If additional information is needed to evaluate a VEP, the Contractor shall provide it in a timely manner. Failure to do so may result in rejection of the VEP.

(5) The Contractor may submit VEPs for an approved subcontractor if the Department makes reimbursement to the Contractor.

(6) If the Contractor hires a design professional to prepare the proposal, that professional must seal the documents and provide evidence of Professional Liability Insurance with limits acceptable to the Department.

(7) The Contractor shall not implement proposed changes before the Department accepts the VEP.

(8) The Department shall not consider VEPs to share in cost savings due to changes previously ordered or authorized under other Contract sections or for work already done.

(9) The Engineer shall reject all unsatisfactory work resulting from an accepted VEP. The Contractor shall remove all rejected work or materials, and shall reconstruct the work under the original Contract at the Contractor's sole expense under Subsection 50-11.

(10) Reimbursement for modifications to the VEP to adjust field or other conditions is limited to the total amount of the original Contract bid prices.

(11) The Department shall not be held liable for costs or delays due to the rejection of a VEP, including but not limited to the Contractor's development costs, loss of anticipated profits and increased material, labor or overhead costs.

d. Processing.

(1) The Engineer shall accept or reject the VEP, in writing, by the date the Contractor specifies, unless extended by mutual consent. If rejected, the Engineer will explain the reasons for

rejection. A VEP may be rejected if the Contractor allows the Department insufficient time to adequately review and evaluate it.

(2) The Contractor may withdraw or modify a VEP at any time before it is accepted.

(3) If the VEP is approved in concept (without final drawings and specifications), the Department may either undertake the re-design itself or issue the Contractor a limited notice to proceed, subject to mutual agreement, authorizing the final design. The notice to proceed will include reference to any pertinent design criteria, Department policies, and other limitations on the design or construction methods. Approval in concept does not constitute acceptance of the VEP and will not obligate the Department to accept or pay for the final design.

(4) If the final VEP is accepted, the Engineer will issue a Change Order under Subsection 40-02 incorporating the VEP into the Contract.

e. Payment. If the Department accepts the VEP, payment will be authorized as follows:

(1) The Department will make a direct payment for the changed work at the unit or lump sum agreed prices in the Change Order. Such prices will include reimbursement of the Contractor's costs to develop and submit the VEP, including overhead and profit.

(2) In addition, the Department will share the net savings with the Contractor in a separate lump sum contract item, VEP Incentive, GCP-40a. The amount of the VEP incentive will be equal to 50 percent of the net savings to the Department. The net savings are the difference between the original Contract price for the affected work and the cost of the revised work. For the purpose of this calculation, the cost of the revised work will include costs the Department may incur as a result of the VEP, such as review of the proposal, testing and evaluation, and added Contract administration costs. These costs will be estimated and agreed to in the Change Order.

(3) The VEP Incentive, contract item GCP-40a, will be paid on a prorated basis as the revised work is performed.

SECTION 50

CONTROL OF WORK

50-01 AUTHORITY OF THE ENGINEER. The Engineer has immediate charge of the engineering details of the project and is responsible for Contract administration. The Engineer has authority to reject defective material and suspend work being performed improperly. The Engineer has authority to accept completed work, issue Directives, issue Interim Work Authorizations, issue Change Orders, and recommend Contract payments.

The Engineer will decide all questions about the quality and acceptability of the materials furnished and the work performed by the Contractor, the Contractor's rate of progress, Contract interpretation and all other questions relating to Contract performance.

The Engineer has authority to suspend work for reasons listed under Subsection 80-06. If the suspension is to protect workers or the public from imminent harm, the Engineer may orally order the suspension of work. Following an oral order of suspension, the Engineer will promptly give written notice of suspension. In other circumstances, the Engineer will give the Contractor written notice of suspension before suspension of work. A notice of suspension will state the defects or reasons for a suspension, the corrective actions required to stop suspension, and the time allowed to complete corrective actions. If the Contractor fails to take the corrective action within the specified time, the Engineer may:

a. Suspend the work until it is corrected; and
b. Employ others to correct the condition and deduct the cost from the Contract amount.

The Engineer may, at reasonable times, inspect any part of the plant or place of business of the Contractor or any subcontractor that is related to Contract performance, including private or commercial plants, shops, offices, or other places of business.

The Engineer may audit all books and records related to performance of the Contract, whether kept by the Contractor or a subcontractor, including cost or pricing data submitted under Subsection 40-02.

50-02 PLANS AND WORKING DRAWINGS. The Department shall provide the Contractor at least two full size sets of the conformed Plans and Contract including Special Provisions. If cross-sections are available, one set will be provided if requested in writing by the Contractor. The Contractor shall keep a complete set of these documents available on the project site at all times.

The Contractor shall supplement structure plans with working drawings that include all details that may be required to adequately control the work and that are not included in the Plans furnished by the Department. The Contractor shall not perform work or order materials until the working drawings for such work, or for changes, are approved by the Engineer.

The Contractor shall submit to the Engineer for approval five sets of any required preliminary detail or working drawings. The project name and number shall be stated in the title block for all drawings, as shall the state bridge number, when applicable. The Contractor shall use full-size (22"x34") white paper with dark blue or black lines on all working and detail drawings.

The Contractor shall submit drawings to the Engineer in time to allow for review and correction before beginning the work detailed in the drawing. The Engineer shall return one set of these drawings, either approved or marked with corrections to be made, and shall retain the other sets.

Although the Contractor shall conduct its operations according to the approved working drawings, the Engineer's approval of working drawings does not change the Contract requirements or release the Contractor of the responsibility for successful completion of the work.

The Contractor is responsible for the accuracy of dimensions and details and for conformity of the working drawings with the Plans and Specifications. The Contractor shall indicate clearly on the working drawings any intended deviations from the Plans and Specifications and itemize and explain each deviation in the Contractor's transmittal letter. The Engineer may order the Contractor to comply with the Plans and Specifications at the Contractor's sole expense if the approved working drawings deviate from the Plans and Specifications and the Contractor failed to itemize and explain the deviations in the Contractor's transmittal letter.

Once the Contractor receives approval of the working drawings, the Contractor shall furnish to the Engineer:

a. Enough additional copies to provide eight approved sets of prints;
b. One set of reproducible transparencies (polyester film); and
c. If requested, an electronic file in AutoCAD drawing interchange format (.DXF).

The Contractor shall include the cost of furnishing all working drawings in the Contract price.

50-03 CONFORMITY WITH PLANS AND SPECIFICATIONS. Work performed and materials furnished shall conform to the Plans, Specifications and approved Working Drawings, and be within specified tolerances. When tolerances are not specified, the Engineer will determine the limits allowed in each case.

All work or material not conforming to the Plans, Specifications, and approved Working Drawings is considered unacceptable unless the Engineer finds that reasonably acceptable work has been produced. In this event, the Engineer may allow non-conforming work or material to remain in place, but at a reduced price. The Engineer will document the basis of acceptance and payment by Change Order, unless the contract specifies a method to adjust the price of that item.

The failure of the Department to strictly enforce the Contract in one or more instances does not waive its right to do so in other or future instances.

50-04 COORDINATION OF PLANS, SPECIFICATIONS, AND SPECIAL PROVISIONS. These Standard Specifications, Plans, Special Provisions, and all supplementary documents are essential parts of the Contract. They are intended to complement each other and describe and provide for a complete project. A requirement occurring in one is as binding as if occurring in all.

In case of conflict, calculated dimensions will govern over scaled dimensions. In the event that any of the following listed contract documents conflict with another listed contract document, the order of precedence is (with **a.** having precedence over **b.**, and **b.** having precedence over **c.**, etc.):

a. Special Provisions
b. Plans
c. Standard Specifications
d. Materials testing standards
e. FAA Advisory Circulars

The Contractor shall not take advantage of any apparent error or omission in the Contract documents. The Contractor may not base a claim for additional compensation or Contract time on a patent error, omission, or conflict in the Contract documents. The Contractor shall notify the Engineer immediately of any apparent errors or omissions in the Contract documents. The Engineer will make any corrections or interpretations necessary to fulfill the intent of the Contract.

50-05 COOPERATION BY CONTRACTOR. The Contractor shall give the work the constant attention necessary for its progress, and shall cooperate fully with the Engineer, Department staff, and other contractors in every way possible.

The Contractor shall employ, as its agent, a competent superintendent thoroughly experienced in the type of work being performed and capable of reading and thoroughly understanding the Plans and Specifications. The Contractor shall ensure that the superintendent is available at all times to receive and execute Directives and other instructions from the Engineer, to supervise workers and to coordinate the work of subcontractors. The Contractor shall give the superintendent full authority to supply the resources required. The Contractor shall furnish superintendence regardless of the amount of work sublet.

50-06 UTILITIES.

a. **Bid Considerations.** Bidders shall include in their bid the cost of:

(1) Providing uninterrupted operation of visual and electronic signals, including power supplies and Lighting used in the guidance of aircraft, whenever the airport is open to the arrival or departure of aircraft;

(2) All utility work that is specified in the Contract as work to be performed by the Contractor;

(3) Working around or through all permanent and temporary utilities shown on the Plans, in both their present and adjusted positions;

(4) Accommodating the removal, adjustment, or relocation of utilities shown on the Plans by entities other than the Contractor;

(5) Construction and removal of temporary utilities, to provide temporary utility service during the construction or repair of a permanent utility; and

(6) Other utility work not specifically identified as compensable in Subparagraph d Compensation.

The Department will show the approximate locations of utilities it knows to be within the work zone on the Plans. Bidders shall expect that the location, elevation and nature of utilities may vary from what is shown on the Plans and shall factor those contingencies into the bid price. Additional utilities may exist that are not shown on the Plans. Compensation related to utilities not shown on the plans will only be available according to Subparagraph d Compensation.

When an entity other than the Contractor is to remove, adjust, or relocate any utility, the applicable completion dates or specific calendar days to complete the removal, adjustment, or relocation may be stated in the Special Provisions. If no date is stated in the Special Provisions, the Contractor shall work cooperatively with the utility owner during the Project.

b. **Cooperation with Utility Owners.** The Contractor assumes the obligation of coordinating their activities with utility owners, and shall cooperate with utility owners to facilitate removal, adjustment, or relocation operations, avoid duplication of work, and prevent unnecessary interruption of services. When a utility owner is identified in the Contract as being responsible for removing, adjusting, or relocating a utility, the Contractor shall give the utility owner 15 days advance written notice regarding the dates when the utility owner is required to begin and end operations.

The Contractor shall cooperate with utility owners to determine a utility progress schedule for all parties' utility work. The Contractor shall submit the schedule to the Engineer before beginning that portion of utility work. The Contractor shall update the utility progress schedule monthly and shall note time delays and their cause.

Utility owners are not required to work in more than one location at a time, and shall be allowed to complete a specific section of work prior to commencing another section. Utility owners will not normally perform adjustment or relocation of underground utilities when the ground is frozen. Utility owners may prohibit the Contractor, through the Engineer, from working near utilities when the ground is frozen.

The Department has sole discretion to grant permits for utility work within the state right-of-way. The Contractor shall allow parties with utility permits to work and make excavations in the project.

If utility owners do not complete their work in a timely manner, the Engineer may direct the Contractor to temporarily relocate the utilities, to construct new utilities, or to make necessary repairs to complete the utility work.

Coordination requirements for specific utility companies are included below:

ALASKA COMMUNICATIONS, INC. (AC)

1. AC's Alaska to Oregon (AKORN) fiber optic cable passes/traverses/crosses the west end of the project, crossing the proposed Tower Road 2 at station 2312+60, Tower Road 1 at station 2003+20, and Part 77 grading area between runway stations 1036+00 and 1039+00.

Contact AC 48 hours in advance of excavation within three feet (3') of the fiber optic cable:

David Trailer
AC OSP Inspector
907-564-1445

Coordinate with AC to locate the cable, and provide slope staking and grading information to evaluate the extent of conflict at Tower Road 1, Tower Road 2, and Part 77 Grading area.

Allow AC six (6) calendar days to compete the adjustments to AKORN fiber as required.

2. AC will relocate the 100 pair telephone cable paralleling the existing Service Road.

Contact AC to schedule the cable disconnect prior to beginning unclassified excavation.

Complete unclassified excavation in the Service Road, ILS, and Part 77 Grading areas. Coordinate with AC and CEA for joint trench relocation of electrical and telephone facilities along the new Service Road alignment between stations 1325+50 and 1350+00. The work includes installation of new telephone cable and conduit from a new pedestal at approximate Service Road station 1334+00 west, along Tower Road 1, to a new pedestal at Tower Road 1 station 2009+00.

Allow AC twenty-one (21) calendar days to complete the relocation.

3. AC will provide telephone service to the new FAA glide slope antenna site. Complete the embankment for the ILS critical area. Coordinate with AC and CEA for joint trench line extensions from the new ALSF/NDB site to the new glide slope antenna site. The alignment will follow the north edge of the ILS embankment.

Allow AC five (5) calendar days to complete the line extension.

CHUGACH ELECTRIC ASSOCIATION, Inc. (CEA)

1. CEA will relocate the underground three-phase feeder circuit paralleling the existing Service Road.

Contact CEA to schedule disconnect of the circuit prior to beginning unclassified excavation.

Gary Meadows
Manager Distribution Construction
907-762-4618

Complete unclassified excavation in the Service Road, ILS, and Part 77 Grading areas. Coordinate with AC and CEA for joint trench relocation of electrical and telephone facilities along the new Service Road alignment between stations 1325+50 and 1350+00. The work includes installing a single-phase primary circuit from the new switch cabinet at Service Road station 1334+65 right, west along the new Tower Road 1, to a new transformer at approximate Tower Road 1 station 2009+00.

Allow CEA twenty-one (21) days to complete the relocation.

2. CEA will provide single-phase primary electrical line extension to the new FAA glide slope antenna site. Complete the embankment for the ILS critical area. Coordinate with CEA and AC for joint trench line extensions from the new AFSF/NDB site to the new glide slope antenna site. The alignment will follow the north edge of the ILS embankment.

Allow CEA five (5) calendar days to complete the line extension.

c. Utility Work. The Contractor shall:

(1) Make all necessary arrangements with utility owners to locate all utilities that may be within an area of work before excavation in that area, according to AS 42.30.400;

You are responsible for requesting locates from all utilities having facilities in the area. Initiate locates for the following utilities by contacting the Locate Call Center at 278-3121 or 800-478-3121:

Alaska Communications Systems
Anchorage Water and Wastewater Utility
Chugach Electric Association
Enstar Natural Gas Company
GCI
Municipal Traffic Operations
ASIG Flight Service
Tesoro Alaska Pipeline Company

In addition, contact the following utilities separately and individually for locates of their utility lines. All costs associated with this work are considered subsidiary to other pay items and no separate payment will be made.

ANC Field Maintenance	266-2425
ANC Field Maintenance, Electric (Ron Silva)	266-2423
FAA (Greg Tatum)	271-6783

When your operations are anticipated to occur within 3 feet of an underground electrical or telecommunications line according to locates provided by the owning Utility, advise the owning

Utility in writing at least 24 hours in advance of the work. In the notice, indicate the location and duration of the work to be performed.

The FAA has various navigational aids and other equipment in operation at ANC. The approximate location of the power cable, control cables and equipment is shown on the plans. There may be cables and equipment that are not shown on the plans. Contact the FAA for locates prior to excavation.

(2) Provide right-of-way staking and construction staking with lines and grades before excavation in that area;

(3) Prevent damage to utilities or utility property within or adjacent to the project;

(4) Carefully uncover utilities where they intersect the work;

Work around existing underground utilities. When utility lines are found in areas of excavation, hand dig pot-holes every 100 feet along the cable to maintain visibility of the cable. This hand work is subsidiary to the item(s) of work being performed that require this service.

(5) Immediately stop excavating in the vicinity of a utility and notify the Engineer and the utility owner if an underground utility is discovered that was not field marked or was inaccurately field marked;

(6) Promptly notify the utility owner and the Engineer in the event of accidental interruption of utility service, and cooperate with the utility owner and the Engineer until service is restored;

Contacts for inspection:

Alaska Communications Systems
Kelly Ward 564-1424

Chugach Electric Association
Joe Miller 762-4634

GCI
Joe Whittaker 868-8551

(7) Take all precautions necessary to protect the safety of workers and the public when performing work involving utilities;

(8) Follow an approved traffic control plan;

(9) Keep the length of open trench excavation to a minimum, backfill trenches as work is completed;

(10) Cover open trenches with metal plates capable of bearing traffic where traffic will cross trenches;

(11) Maintain continuous utility service and install temporary utility systems where needed;

(12) Ensure all excavation conforms to AS 42.30.400 – 42.30.490;

(13) Ensure all excavation and utility work conforms to excavation requirements in 29 CFR 1926, Subpart P, and confined space requirements in 29 CFR 1926.21(b)(6);

(14) Ensure all work undertaken near energized high voltage overhead electrical lines or conductors conforms to AS 18.60.670, AS 18.60.675, AS 18.60.680 or other applicable law;

(15) Ensure all work undertaken near gas lines and energized high voltage underground electric lines or conductors conforms to all applicable laws and safety requirements of the utility owner;

When working near Chugach Electric Association facilities, adhere to the requirements in *Electrical Facility Clearance Requirements* attached to these specifications as an appendix or available from the utility owner.

When working near ENSTAR Natural Gas Company facilities, adhere to the requirements in *Safety Requirements for Excavation Adjacent to Natural Gas Pipelines* attached to these specifications as an appendix or available from the utility owner.

(16) When required by the utility owner, provide for a cable watch of overhead power, underground power, telephone, and gas;

Provide an attendant whose sole responsibility is to perform as a safety observer while equipment is operating such that any part is capable of reaching within 15 feet of an electrical power, telecommunications or gas line. Providing a safety observer for a utility watch will not be paid for separately, but is considered subsidiary to the item(s) of work being performed that require these services.

(17) Obtain plan approval from the local fire authority, and provide for the continued service of fire hydrants, before working around fire hydrants;

(18) Do all pressure testing or camera testing required to verify utility acceptance in a timely manner; and

(19) Coordinate the Storm Water Pollution Prevention Plan (SWPPP) (Section P-157) with their work and the utility companies' work.

d. Compensation.

(1) Except as otherwise specifically provided in this Subparagraph d, no equitable adjustment will be paid by the Department:

(a) Due to any variations in location, elevation, and nature of utilities shown on the Plans, or the operation of removing, adjusting, or relocating them;

(b) For any delays, inconvenience, or damage sustained as a result of interference from utility owners, interference from utilities, or interference from the operation of removing, adjusting, or relocating utilities; or

(c) For any adjustments or relocations of utilities requested for the Contractor's convenience.

(2) Except as otherwise specifically provided in this Subparagraph d, the Engineer will issue a Change Order with equitable adjustment if:

(a) Utilities not shown on the Plans require removal, adjustment, or relocation;

(b) Conflicts occur between utilities not shown on the Plans and other necessary work; or

(c) Conflicts due to the required elevation of a utility occur between new and existing utilities that are both shown on the Plans.

(3) When the Contractor damages utilities, the utility owner may choose to repair the damage or require the Contractor to repair the damage. When the Contractor damages utilities:

(a) No equitable adjustment will be paid by the Department, and the Contractor shall be solely responsible for repair costs and expenses, when:

1. The Contractor failed to obtain field locates before performing the work that resulted in the damage;

2. The utility was field located by the utility owner or operator, and the field locate is accurate within 24 horizontal inches if the utility is buried 10 feet deep or less, or the field locate is accurate within 30 horizontal inches if the utility is buried deeper than 10 feet;

3. The plan profile or the field locate does not indicate or inaccurately indicates the elevation of a buried utility;

4. The utility is visible in the field; or

5. The Contractor could otherwise reasonably have been aware of the utility.

(b) The Engineer will issue a Change Order with an equitable adjustment for the cost of repairing damage if:

1. The field locate by the owner or operator of a buried utility erred by more than 24 horizontal inches if the utility is buried 10 feet deep or less, or 30 horizontal inches if the utility is buried deeper than 10 feet;

2. The utility was not shown on the Plans or other Contract documents, and the Contractor could not reasonably have been expected to be aware of the utility's existence; or

3. The Contractor made a written request for a field locate according to AS 42.30.400, the utility owner did not locate the utility according to AS 42.30.410, and the Contractor could not reasonably have been expected to be aware of the utility's existence or location.

(4) If a delay is caused by a utility owner, is beyond the control of the Contractor, and is not the result of the Contractor's fault or negligence, the Engineer may issue a Change Order with an equitable adjustment to contract time, but no equitable adjustment will be made for the cost of delay, inconvenience or damage. Additional contract time may be granted if the cause of delay is because a utility owner is to perform utility work:

(a) By dates stated in the Special Provisions, and the utility work is not completed by the dates stated; or

(b) In cooperation with the Contractor, and the utility owner does not complete the work in a timely manner, based on a written progress schedule agreed upon by the Contractor and the utility owner.

(5) If the Engineer orders the Contractor to make necessary construction or repairs due to incomplete utility work by utility owners, the Contractor will be paid as specifically provided for in the Contract, or the Engineer will issue a Change Order with equitable adjustment.

e. **Cooperation with Airport Management and FAA.** The Contractor shall coordinate their activities and cooperate with the Airport Management and the FAA, and shall provide 45 days advance written notice to them before working on utilities in the Air Operations Area. When the work of this contract impacts FAA facilities or operations such as ~~requires~~ the closing of a runway that has visual or navigational aids, interruption of service to these aids, or displacement of a threshold, ~~allow sufficient~~ provide 1 week advance notice (through the Engineer) for the FAA to deactivate/activate these devices. Comply with subsection 80-04d FAA Systems Operations Control Center notification requirements. The Contractor shall include and cooperate with Airport Management, the FAA, and the Engineer, in determining a utility progress schedule for work on the Airport Property. The Contractor shall provide to the Engineer daily written updates of all actions that may effect the operation of visual and electronic signals, lighting, or power supplies, used in the guidance of aircraft.

The Contractor shall submit a written plan to repair damaged utilities to the Engineer, and shall follow the plan when repairing damaged utilities. The plan shall identify repair personnel or subcontractors. The Contractor shall not work on or adjacent to utilities unless repair personnel are available to repair damaged utilities. Personnel repairing utilities shall be licensed for the work required, and shall have the tools and material required to repair damaged utilities within the time limits required.

When damage affects, or may in the Engineer's opinion affect, the function of navigational or visual aids, the Contractor shall repair damage within two hours. When damage affects, or may in the Engineer's opinion affect, the function of utilities, the Contractor shall repair the damage within 24 hours.

50-07 COOPERATION BETWEEN CONTRACTORS. The Department may, at any time, contract for and perform other or additional work on or near the Project. The Contractor shall allow other contractors reasonable access across or through the Project.

The Contractor shall cooperate with other contractors working on or near the Project, and shall conduct work without interrupting or inhibiting the work of other contractors. All contractors working on or near the Project shall accept all liability, financial or otherwise, in connection with their Contract. No claim shall be made by the Contractor or paid by the Department for any inconvenience, delay, damage or loss of any kind to the Contractor due to the presence or work of other contractors working on or near the Project.

The Contractor shall coordinate and sequence the work with other contractors working within the same project limits. The Contractor shall properly join the work with work performed by other contractors and shall perform the work in the proper sequence to that of the others. The Contractor shall arrange, place, and dispose of materials without interfering with the operations of other contractors on the same project. The Contractor shall defend, indemnify and save harmless the Department from any damages or claims caused by inconvenience, delay, or loss that the Contractor causes to other contractors.

50-08 SURVEY CONTROL. The Department will provide sufficient horizontal and vertical control data to establish the planned lines, grades, slopes, shapes, and structures. The Contractor shall provide all additional survey work to maintain control during the project. The survey work shall meet the requirements set forth in the *Alaska Construction Surveying Requirements*.

The Contractor shall provide all survey work including, but not limited to: project layout, cross sections, slope stakes, grade stakes, as-built measurements, and quantity measurements. Immediately upon completion of initial cross sections, the Contractor shall furnish reduced and checked survey notes to the Engineer. From time to time throughout the work, as requested by the Engineer, the Contractor shall take appropriate sections and shall provide the Engineer with reduced and checked notes from which quantity calculations for progress payment purposes can be accomplished. Notes shall be kept in a neat, orderly, and legible form according to professional surveying practices.

Upon completion of each phase of the work, the Contractor shall furnish the Engineer with all necessary measurements for completion of the as-built drawings. The Contractor shall include identification and location of project features where actual locations differ from locations shown on the Plans. All original survey notes and field books shall become the property of the Department and shall be delivered to the Engineer as a condition to final payment on this contract.

The cost of surveying is to be subsidiary to the items of work for which surveying is required, except where a pay item for specified surveying work is included in the bid schedule.

50-09 DUTIES OF THE INSPECTOR. The Department's inspectors are authorized to examine all work done and materials furnished, but cannot approve work or materials. Only the Engineer can approve work or materials. The inspectors can reject work or materials until any issues can be referred to and decided by the Engineer. The inspectors may not alter or waive any Contract requirements, issue instructions contrary to the Contract or act as foremen for the Contractor.

50-10 INSPECTION OF WORK. All materials and each part and detail of the work shall be subject to inspection by the Department. The Contractor shall allow safe access to all parts of the work and provide information and assistance to the Engineer to ensure a complete and detailed inspection.

Any work done or materials used without inspection by an authorized Department representative may be ordered removed and replaced at the Contractor's expense, unless the Department failed to inspect after being given reasonable written notice that the work was to be performed.

The Contractor shall remove and uncover portions of finished work when directed. After inspection, the Contractor shall restore the work to Contract requirements. The cost to uncover and restore work shall be at the Contractor's expense, except the Department will pay the cost to uncover and restore work if (1) an authorized Department representative had previously inspected the work or the Contractor had provided reasonable prior written notice that the work was to be performed and (2) the Department finds the uncovered work to be acceptable. If the Department finds the uncovered work to be unacceptable, the cost to correct the work, or remove and replace the work, shall be at the Contractor's expense.

Representatives of Contract funding agencies have the right to inspect the work. This right does not make that entity a party to the Contract and does not interfere with the rights of parties to the Contract.

The Department's observations, inspections, tests and approvals shall not relieve the Contractor from properly fulfilling its Contract obligations and performing the work according to the Contract. Work that has been inspected but contains latent or hidden defects shall not be deemed acceptable even though it has been inspected and found to be according to the Contract.

The State of Alaska Department of Labor may require electrical inspection of Public Structures. The Contractor shall request inspection by contacting the Electrical Inspector in Anchorage, Alaska, Phone (907) 269-4925. The Contractor shall request inspection a minimum of two weeks prior to the expected date of inspection being needed. If more than one item requires inspection, the Contractor shall submit a list to the Engineer and Electrical Inspector, with dates for all stages that requires inspection. The Department has no control over or responsibility for the timing of inspections by the Electrical Inspector.

50-11 REMOVAL OF UNACCEPTABLE AND UNAUTHORIZED WORK. All work that does not conform to the requirements of the Contract shall be deemed unacceptable by the Engineer, unless otherwise determined acceptable under Subsection 50–03. The Contractor shall correct, or remove and replace, work or material that the Engineer deems unacceptable, as ordered by the Engineer and at no additional cost to the Department.

The Contractor shall establish necessary lines and grades before performing work. Work done before necessary lines and grades are established, work done contrary to the Department's instructions, work done

beyond the limits shown in the Contract, or any extra work done without authority, will be considered as unauthorized and shall not be paid for by the Department, and may be ordered removed or replaced at no additional cost to the Department.

If the Contractor fails to promptly correct, remove, or replace unacceptable or unauthorized work as ordered by the Engineer, the Engineer may employ others to remedy or remove and replace the work and will deduct the cost from the Contract payment.

50-12 LOAD RESTRICTIONS. The Contractor shall comply with all vehicle legal size and weight regulations of 17 AAC 25 and the *Administrative Permit Manual,* and shall obtain permits from the DOT&PF Division of Measurement Standards & Commercial Vehicle Enforcement before moving oversize or overweight equipment on a state highway.

The Engineer may permit oversize and overweight vehicle movements within the project limits provided the Contractor submits a written request and an acceptable Traffic Control Plan. No overloads will by permitted on a pavement, base or structure that will remain in place in the completed project. The Contractor shall be responsible for all damage done by their equipment due to overloads, and for damage done by a load placed on a material that is curing and has not reached adequate strength to support the load.

50-13 MAINTENANCE DURING CONSTRUCTION. The Contractor shall maintain the airport and related airport facilities located within the project from the date construction begins until the Contractor receives a letter of substantial completion (definition in Subsection 10-03). The Contractor shall maintain these areas continually and effectively on a daily basis, with adequate resources to keep them in satisfactory condition at all times. The Contractor shall maintain those areas outside the project that are affected by the work, such as haul routes, detour routes, structures, material sites, and equipment storage sites during periods of their use.

The Engineer may relieve the Contractor of this maintenance responsibility for specified portions of the project:

a. During a seasonal suspension of work. Approximately one month prior to seasonal suspension of work, the Contractor shall hold a preliminary meeting with the Engineer and Airport Management to outline the work the Contractor expects to complete before shut down and the condition the project is to be left in. The Contractor shall then schedule a field review for acceptance by the Department for winter maintenance. At the field review a punch list shall be prepared for implementation prior to acceptance. In order for the Contractor to be relieved of winter maintenance responsibility, the surface of all embankments shall be properly crowned for drainage and all edge lighting shall be in good working order. After acceptance for winter maintenance and until the Contractor resumes construction operations, maintenance of the facility agreed upon will be the responsibility of the Department; or

b. Following partial acceptance (Subsection 50-14).

Avoid placing foreign objects and debris (FOD) or any debris capable of causing damage to aircraft landing gears or propellers or of being ingested in jet engines on surfaces in active aircraft movement areas. Ensure that all loose material and debris has been removed from the sides of equipment and haul vehicles prior to travel on airport or road surfaces. Keep all active runway, taxiway, and apron areas swept clean of materials spilled by your operations. Clean spilled materials off of closed runways, taxiways, or aprons prior to opening these areas to aircraft. If FOD is spilled on an active runway, taxiway, or apron, remove it immediately. The Engineer reserves the right to suspend all hauling operations until FOD is removed from active aircraft movement areas. Hauling time lost due to the suspended haul will not be considered reason to extend contract time or reason for a claim. The Engineer will allow hauling to continue when the spilled material is cleaned up to his satisfaction. FOD preventative measures and FOD cleanup of runways, taxiways, haul routes, and equipment is subsidiary to the contract and no additional payment will be made.

The Department is responsible for routine snow removal and ice control only on those portions of the project that the Department accepts for maintenance.

The Contractor shall maintain previously constructed work until a subsequent course, layer, or structure covers that work. The Contractor shall repair damage done to the work as described in Subsection 70-15.

All costs of maintenance work during construction and before the project is accepted as substantially complete shall be subsidiary to the prices bid on the various contract items, and the Contractor will not be paid an additional amount for such work.

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

a. Suspend the work until corrective maintenance is completed;

b. Assess a traffic price adjustment against the Contract Amount when an adjustment rate is specified in the Contract; and

c. Employ others for corrective maintenance and deduct the cost from the Contract amount.

50-14 PARTIAL ACCEPTANCE. The Contractor may submit a written request for partial acceptance of a geographically separate unit of the project. The Engineer will accept the unit in writing before project completion if the Engineer inspects the unit and finds that the unit is substantially complete to Contract requirements, and acceptance is in the best interest of the State.

The Contractor may submit a written request for partial acceptance of a completed useable portion of the project. The Engineer may, in their discretion, accept the portion in writing before project completion if the Engineer performs an inspection of the portion and finds that the portion is substantially complete to Contract requirements, and acceptance is in the best interest of the State.

Partial acceptance of the unit or portion neither voids nor alters any Contract terms.

50-15 PROJECT COMPLETION. The Contractor shall notify the Engineer, in writing, upon substantial completion of all work provided for under the Contract. The Engineer will then schedule and conduct the final inspection. If the inspection discloses that any work is incomplete or unsatisfactory, the Engineer will give the Contractor a list of work items that must be completed or corrected to reach substantial completion and to reach final completion. The Contractor shall promptly complete or correct any work determined unsatisfactory by the final inspection and request a re-inspection.

The Engineer will identify the date of substantial completion in a letter of substantial completion. The letter of substantial completion will relieve the Contractor of further maintenance responsibility except as listed under Subsection T-901-3.4 Maintenance of Seeded Areas. The letter of substantial completion will not stop Contract time or relieve the Contractor of the obligation to fully complete the work as required by the Contract specifications.

When all physical work and cleanup provided for under the Contract is found to be complete, except for work specified under Subsection T-901-3.4 Maintenance of Seeded Areas, the Engineer will issue a letter of project completion. Project completion stops the Contract time, but does not relieve the Contractor of any other Contract obligations.

50-16 FINAL ACCEPTANCE AND RECORD RETENTION. The Department will issue the letter of Final Acceptance after all of the following:

a. Project completion;

b. Receipt of all certificates, as-builts, warranties, and other required documents;

c. Receipt of the Contractor's Release, with no exceptions;

d. Certification of payment of payroll and revenue taxes by DOLWD and State Dept. of Revenue; and

e. Final payment under the Contract.

Final Acceptance will release the Contractor from further Contract obligations, except those:

a. Specified under Subsection 70-19;

b. Required by law or regulation; or

c. Continuing obligations established by provisions of this Contract, such as warranty, guaranty, indemnity, insurance, or bond.

The Contractor and the subcontractors shall maintain all books and records relating to performance of the Contract for three years after the date of final payment of the Contract and each subcontract.

50-17 CLAIMS. The Contractor shall notify the Engineer as soon as the Contractor becomes aware of any act or occurrence that may form the basis of a claim for additional compensation or an extension of Contract time or of any dispute regarding a question of fact or interpretation of the Contract. The Engineer has no obligation to investigate any fact or occurrence that might form the basis of a claim or to provide any additional compensation or extension of Contract time unless the Contractor notifies the Engineer in a timely manner of all facts the Contractor believes form the basis for the claim.

If the claim or dispute is not resolved by agreement within seven days of the date the Engineer is notified by the Contractor, the Contractor shall within the next fourteen days submit an Intent to Claim in writing to the Engineer.

If the Contractor believes additional compensation or time is warranted, the Contractor shall immediately begin keeping complete, accurate, and specific daily records concerning every detail of the potential claim including actual costs incurred, and shall give the Engineer access to any such records and furnish the Engineer copies, if requested. Equipment costs must be based on the Contractor's internal rates for ownership, depreciation, and operating expenses and not on published rental rates.

The Contractor shall submit a written claim to the Contracting Officer within 90 days after the date the Contractor became aware of the basis of the claim or should have known of the basis of the claim, whichever is earlier. The Contracting Officer will issue written acknowledgement of the receipt of the claim.

The Contractor waives any right to claim if the Engineer was not notified properly or afforded the opportunity to inspect conditions or monitor actual costs or if the Claim is not filed on the date required.

a. The written Claim must include all of the following:

(1) The act, event, or condition giving rise to the claim;

(2) The Contract provisions that apply to the claim and that provide for the requested relief;

(3) The item or items of Contract work affected and how they were affected;

(4) The specific relief requested, including Contract time if applicable, and the basis upon which it was calculated;

(5) Revised progress schedules under Subsection 80–03; and

(6) A certification signed by the Contractor that the claim is made in good faith, that the supporting cost and pricing data are accurate and complete to the best of the Contractor's knowledge and belief, and that the amount requested accurately reflects the Contract adjustment that the Contractor believes is due.

b. The claim, in order to be considered, must show:

(1) That the Contractor suffered damages or delay;

(2) The damages or delay were caused by the act, event, or condition listed in the claim; and

(3) That the Contract entitled the Contractor for relief due to the act, event, or condition specified in the Claim.

The Department may request the Contractor to provide additional information relating to the claim at any time before issuing a decision. The Contractor shall provide the Department with the requested additional information within 30 days of receiving a request. Failure to furnish the additional information may be regarded as a waiver of the claim.

The Contracting Officer will issue a decision within 90 days of receipt of all information relating to the claim. The time for the Contracting Officer to issue a decision may be extended according to AS 36.30.620.

The Contracting Officer's decision is final and conclusive unless the Contractor delivers a notice of appeal to the Commissioner within 14 days of receipt of the decision. The Contractor shall also serve a copy of the notice of appeal on the Contracting Officer.

Appeals from a Contracting Officer's decision shall be decided according to the State Procurement Code's appeal procedures, including AS 36.30.625, AS 36.30.627, AS 36.30.630, and AS 36.30.631.

Criminal and civil penalties authorized under AS 36.30.687 (including, but not limited to, forfeiture of all claimed amounts) may be imposed on the Contractor if the Contractor makes or uses a misrepresentation in support of a claim, or defrauds or attempts to defraud the Department at any stage of prosecuting a claim under this Contract.

SECTION 60

CONTROL OF MATERIAL

60-01 SOURCE OF SUPPLY AND QUALITY REQUIREMENTS. The Contractor shall furnish all materials required to complete the work except those specified to be furnished by the Department. The Contractor shall supply materials that are new and that meet Contract requirements. All manufactured materials shall be delivered and stored in their original containers and shall show the manufacturer's name, brand, and identifying number.

The Contractor shall furnish airport lighting equipment that conforms to the requirements of cited materials specifications. In addition, where an FAA specification for airport lighting equipment is cited in the Plans or Specifications, the Contractor shall furnish such equipment that is certified and listed under AC 150/5345-53, *Airport Lighting Equipment Certification Program.*

The Contractor shall notify the Engineer of proposed sources of materials at least 30 days before shipment, and shall submit to the Engineer and to the Department's State Materials Engineer a complete list of materials to be purchased from suppliers sufficiently in advance of fabrication or shipment to permit the Department to inspect the materials.

The Department's inspectors may inspect any materials, including those originating outside Alaska, at the supply source or other locations. Materials may be conditionally approved at the supply source or other location, but are subject to field inspection and may be ordered removed under Subsection 50-11 if they do not conform to Contract requirements. Inspectors are authorized to reject materials that do not conform to specifications until any issues can be referred to and decided by the Engineer. Inspectors will report their actions to the Engineer.

The Contractor shall submit a manufacturer's certificate of compliance for each item listed on the Material Certification List. The Engineer may authorize the use of materials based on a manufacturer's certificate of compliance, see Subsection 60-05. Materials incorporated into the project on the basis of a manufacturer's certificate of compliance may be tested at any time, whether in place or not, and, if they do not conform to Contract specifications, they may be rejected and ordered removed under Subsection 50-11.

The Engineer may authorize the use of materials listed in the Department's *Qualified Products List.* Materials incorporated into the project on the basis of the *Qualified Products List* may be tested at any time, whether in place or not, and, if they do not conform to Contract specifications, they may be rejected and ordered removed under Subsection 50-11.

The Contractor may request substitution of specified materials with equivalent materials. Requests for substitution shall be submitted to the Engineer, and shall include a manufacturer's statement that certifies, for each lot delivered:

a. Conformance to the specified performance, testing, quality or dimensional requirements; and

b. Suitability for the use intended in the Contract work.

The Engineer will determine the acceptability of a proposed substitute for use in the project. If a substitute is approved, a Change Order will be executed. The Department is never required to accept substitution. The Contractor shall not incorporate substitute materials into the project without written approval from the Engineer. The Engineer may test substitute materials at any time, whether in place or not, and, if the substitute materials do not meet Contract specifications, they may be rejected and ordered removed under Subsection 50-11.

60-02 MATERIAL SOURCES.

a. **General.** The Contractor shall:

(1) Utilize Useable Excavation according to Subsection 40-04 before using material sources listed in Subsection 60-02.d. When there is insufficient useable excavation furnish additional required materials from sources of the Contractor's choice, except that the Contractor shall use a mandatory source when identified in the Contract;

(2) Produce a sufficient quantity of materials meeting the specifications to complete the project;

(3) As a subsidiary cost: clear and grub, strip, drill and blast, excavate, crush, sort, blend, screen, wash, stockpile, haul, and rehandle material as needed to produce and deliver the specified product;

(4) Determine the type of equipment and methods to be used;

(5) Expect variations in material quality within the deposits, and procure material only from acceptable portions of the deposit, regardless of source ownership; and

(6) Prevent erosion, sedimentation, and pollution within a materials source.

The Contractor agrees that:

(7) The costs to explore and develop material sources, including all production effort, are subsidiary to the cost of providing the specified material;

(8) The Engineer may order the Contractor to procure material only from certain portions of the source and may reject material from other portions of the source that does not conform to the specifications; and

(9) All material required may not be procurable from any one source and the Contractor may need to change between sources. That contingency is to be factored into the unit bid price for the Contract Item.

b. **Inspection and Acceptance.** The Contractor shall perform sampling and testing during materials processing and placement according to its Quality Control Plan (Subsection 60-03.a.) and shall obtain acceptable material samples from locations designated within the source.

The Department will sample and test materials to determine the quality of the source, at its expense, as part of its Acceptance Testing (Subsection 60-03.b.). The Department will reject materials when the samples do not meet specifications. The Department may reject a proposed materials site when samples do not meet specifications.

c. **Awareness Training.** The operator of the Contractor's sand and gravel surface mine or other similar materials source shall provide Site-Specific Hazard Awareness Training in compliance with 30 CFR 46.11 for all the Engineer's personnel before beginning operations. All other workers shall be given training in compliance with 30 CFR 46 before exposure to mine hazards. The training must be offered at each surface mine that will be used to supply processed aggregates. A qualified person must provide the training. The training shall be according to the operator's written training plan approved by the Mine Safety and Health Administration, covering the following items:

(1) Site-specific health and safety risks;

(2) Recognition and avoidance of hazards;
(3) Restricted areas;
(4) Warning and evacuation signals;
(5) Evacuation and emergency procedures;
(6) Other special safety procedures; and
(7) A site tour.

The Contractor shall require the Engineer's personnel to sign the *Visitor's Log Book* upon completion of the training to indicate that training was provided. Training is a subsidiary cost.

d. **Type of Sources.** The Contractor shall utilize Useable Excavation according to Subsection 40-04 before using material sources listed in this Subsection. When there is insufficient Useable Excavation, the Contractor shall furnish additional required materials from sources of the Contractor's choice, except that the Contractor shall use a mandatory source when identified in the Contract.

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

(1) **Contractor-Furnished Sources.** For a material source that is a commercial plant as defined in Subsection 80-01.c.(1) the Contractor shall:

(a) Acquire the necessary rights and permits to obtain material from a commercial plant;

(b) Pay as subsidiary costs all related costs to obtain and use material from the source; and

(c) Be solely responsible for the quality and quantity of materials.

For all Contractor-Furnished sources that are not a commercial plant, the Contractor shall:

(d) Acquire the necessary rights and permits to take materials from the sources including state-owned sources that are not under the Department's control;

(e) Pay as subsidiary costs all related costs to obtain, develop, and use the sources, including but not limited to permit costs and mineral royalties;

(f) Be solely responsible for quality and quantity of materials; and

(g) Obtain all necessary rights, permits, and plan approvals before clearing or disturbing the ground in the material source.

No equitable adjustment or other compensation will be made for any additional costs, including increased length of haul, if the Contractor:

(h) Chooses to change material sources for any reason;

(i) Is unable to produce a sufficient quantity or quality of materials from Contractor-Furnished sources; or

(j) Encounters unexpected, unforeseen, or unusual conditions within Contractor-Furnished sources.

(2) **Mandatory Sources.** The Department may identify material sources in the Contract from which the Contractor is required to take a specified quantity of material. No other source will be

permitted for that portion of material unless prior approval is obtained from the Engineer. The Contract will specifically define these sources as Mandatory Sources and define rights and stipulations for each site. The Department will provide a materials report that estimates quality and quantity of material for these sources.

The Contractor acknowledges that samples from within a source may not be representative of the entire source. The Contractor must expect variations of quality and quantity within the source and shall factor that contingency into the unit bid price for the material. No equitable adjustment will be paid for variations encountered within the source.

If it is subsequently found that the quality or quantity of material producible from a Mandatory Source is not as represented by the materials report, and a change of source is necessary for that reason alone, a Change Order with equitable adjustment will be made.

(3) **Designated Sources.** The Department may identify material sources in the Contract which are available to the Contractor but which the Contractor is not required to use. The Contract will specifically define these sources as Designated Sources and define rights and stipulations for each site. The Department will provide a materials report that estimates quality and quantity of material for these sources.

The Contractor acknowledges that samples from within a source may not be representative of the entire source. The Contractor must expect variations of quality and quantity within the source and shall factor that contingency into the unit bid price for the material. No equitable adjustment will be paid for variations encountered within the source.

If the Contractor elects to use a Designated Source, and it is subsequently found that the quality and quantity of material producible from that source is not as represented by the materials report, and a change of source is necessary for that reason alone, a Change Order with equitable adjustment will be made. If the Contractor chooses to change between or among sources for any other reason than quantity or quality of material, no equitable adjustment will be paid.

(4) **Available Sources.** The Department may identify other material sources that are available for use for the project by the Contractor. The Contract will specifically define these sources as Available Sources. The Department makes no guarantee as to quality or quantity of material in Available Sources. The Contractor is responsible for determining the quality and quantity of material, and if additional sources are needed. The Contractor shall be responsible for identifying the rights and stipulations for each site with the owner of the site.

When the Department furnishes copies of existing boring logs, test results, or other data in its possession concerning Available Sources, the Contractor is responsible for determining the accuracy and completeness of this data, for any assumptions the Contractor makes based on this data, and for exploring all Available Sources to the Contractors satisfaction.

The Department makes no representation, guarantees, or warranty whatsoever, expressed or implied, as to:

(a) The quality or quantity of materials producible from an Available Source, even if such information is indicated in a Materials Report or Soils Investigation Report;

(b) Whether boring logs, test results or data reliably represent current existing subsurface conditions;

(c) Whether interpretations of the boring logs, test results, or other data are correct;

(d) Whether moisture conditions and indicated water tables vary from those found at the time borings were made;

(e) Whether the ground at the location of the borings was physically disturbed or altered after the boring was made; and

(f) The condition, materials, or proportions of the materials between borings, regardless of any subsurface information the Department may make available.

The availability of subsurface information from the Department shall not relieve the Contractor from any risks, or of any duty to make on-site examinations and investigations, or of any other responsibility under the Contract or as may be required by law.

No equitable adjustment will be made if the quality and quantity of material available from an Available Source is not as represented in any information provided by the Department, nor if a change of source is necessary for any other reason whatsoever. The use of Available Sources is entirely at the Contractor's option and the Contractor bears all risk associated with their decision to use an Available Source.

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

e. **Rights, Permits and Plan Approvals for Material Sources**. Before disturbing the site of a material source, the Contractor shall acquire and pay for all necessary rights, permits and plan approvals indicated in this Subsection and in Subsection 70-02. For each material site the Contractor shall:

(1) Acquire approval for a Mining and Reclamation Plan (MRP) or receive an exemption, according to AS 27.19. The MRP shall include:

(a) Plan and cross-sectional views of the site;

(b) Applicable boundaries or property lines;

(c) Areas and depths to be developed;

(d) Locations of access roads, stripping, sorting, and waste piles, crushing and plant sites, stockpile sites, drainage features, erosion and pollution control features; and

(e) Condition the Contractor will leave the site after the materials extraction is completed, including reseeding.

(2) Submit a SWPPP as required by Section P-157.

After completing work in a materials source, the Contractor shall finish and grade work areas to a neat, acceptable condition according to the approved MRP. Reclamation of a Contractor-furnished source will be in accord with the Contractor's MRP.

60-03 TESTING AND ACCEPTANCE. Materials are subject to inspection and testing by the Department at any time before, during, or after they are incorporated into the project. Use of untested materials is at the Contractor's risk. The Contractor shall remove and replace unacceptable material according to Subsection 50-11.

a. **QUALITY CONTROL.** The Contractor is responsible for the quality of construction and materials used in the work. Quality control is process control, and includes all activities that ensure that a product meets Contract specifications. Contractor quality control is subsidiary to the applicable items unless a contract item for Quality Control is established on the bid schedule.

The Contractor shall implement a Quality Control Program in conformance with Section GCP-100, Contractor Quality Control Program.

b. **ACCEPTANCE TESTING.** The Department has the exclusive right and responsibility for determining the acceptability of the construction and incorporated materials.

The Department will sample materials and perform acceptance tests at its expense. Copies of tests will be furnished to the Contractor upon request. When material is sampled by other than DOT&PF personnel or their agent(s), the sampling must be witnessed by, and possession of the sample immediately transferred to, DOT&PF personnel or their agent(s).

The Contractor shall not rely on the Department's acceptance testing for its quality control. The Department's acceptance testing is not a substitute for the Contractor's quality control. The Engineer may retest materials that have failed the Department's acceptance test, but is not required to do so.

Acceptance sampling and testing frequencies may be located in the Appendix to these Specifications, and are incorporated into the Contract.

60-04 PLANT INSPECTION. The Department may periodically inspect manufacturing methods, manufactured lots and materials at the source of production. The Department may approve, conditionally approve, or reject them.

The Contractor shall:

a. Notify the Department of the production and fabrication schedule at least 30 days before beginning work on any item requiring inspection, and notify the Department 48 hours before beginning production or fabrication;

b. Give the inspector full and safe access to all parts of the plant used to manufacture or produce materials; and

c. Cooperate fully and assist the inspector during the inspection.

Materials may be rejected if the Department requests a plant inspection and the materials are produced or fabricated without a plant inspection. The materials may be tested at any time before final acceptance, whether in place or not, and whether approved at a plant inspection or not. If the materials do not meet Contract specifications, they may be rejected and ordered removed under Subsection 50-11. If rejected materials are incorporated into the project, the Department may require those materials to be removed and replaced at the Contractor's expense under Subsection 50-11.

60-05 CERTIFICATES OF COMPLIANCE. The Engineer may authorize the use of certain materials or assemblies based on a manufacturer's certificate of compliance. The certificate must state that the material or assembly fully complies with Contract requirements, include the project name and number, and be signed by the manufacturer. The certificate must accompany each lot of the materials or assemblies delivered to the project and must clearly identify the lot.

The Contractor shall submit a manufacturer's certificate of compliance, as required, for each item listed on the Materials Certification List (MCL) included in the Contract documents. The Contractor shall submit additional manufacturer's certificates of compliance if required by the Contract or by the Engineer. If the

Specifications require a material certification that is not listed on the MCL, the Engineer reserves the right to add it.

Materials or assemblies incorporated into the project on the basis of a manufacturer's certificate of compliance may be tested at any time, whether in place or not, and, if they do not meet Contract specifications, they may be rejected and ordered removed under Subsection 50-11. The Engineer may refuse permission to incorporate materials or products into the project based on a manufacturer's certificate of compliance that does not meet specifications.

60-06 STORAGE OF MATERIALS. Materials shall be stored to preserve their quality and fitness for the work, and so they can be readily inspected. Materials inspected before storage may be inspected again, before or after being incorporated into the project. The Contractor shall:

a. Use only approved portions of the project site for storage of materials and equipment or plant operations;

b. Provide any additional space needed for such purposes without extra compensation;

c. Restore Department-owned or controlled storage and plant sites to their original condition without extra compensation;

d. Obtain the landowner's or lessee's written permission before storing material on private property, and furnish copies of the permission to the Engineer, if requested; and

e. Restore privately owned or leased storage sites, without extra compensation from the Department, to their original condition or as agreed to between the Contractor and the private owner.

60-07 DEPARTMENT-FURNISHED MATERIAL. Material furnished by the Department will be made available to the Contractor at a state yard or delivered at the locations specified in the Special Provisions.

The Contractor shall include the cost of handling and placing all materials after they are delivered in the Contract price for the item in connection with which they are used. The Contractor is responsible for all material delivered to the Contractor. Deductions will be made from any monies due the Contractor to make good shortages and deficiencies from any cause whatsoever, for any damage that may occur after delivery, and for demurrage charges.

60-08 SUBMITTAL PROCEDURE. The Contractor shall complete a Submittal Register, and shall submit it to the Engineer on forms provided by the Department. The Submittal Register shall list all working drawings, ~~catalog cuts, manufacturer's certifications, quality control testing plans,~~ schedules of work and other items required to be submitted to the Department by the Contractor including but not limited to Storm Water Pollution Prevention Plan, Quality Control Program, Progress Schedule, Utility Repair Plan, Blasting Plan, Mining Plan, annual EEO reports, DBE payment documentation and subcontracts. The register shall be filled out sequentially by bid item and shall allow at least three spaces between bid items. The intent of the Submittal Register is to provide a blueprint for the smooth flow of specified project documents.

Submit catalog cuts and manufacturer's certifications to the Engineer for review as required by the Materials Certification List (MCL) or by the Contract. The Engineer will track material submittals using the MCL. Choose materials or equipment in the L series of bid items that are FAA certified under AC 150/5345-53, Airport Lighting Equipment Certification Program; except for items not certified such as beacon towers and electrical duct. The Engineer will approve the L series bid items that meet contract requirements and are FAA certified under this AC without further review. For materials other than L series, you may submit for approval a material that is listed on the Qualified Products List, and if that material meets Contract requirements, the Engineer will grant approval without further review.

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

Each copy of each submittal shall include a Submittal Summary sheet. The Contractor may use forms provided by the Department or a similar form of the Contractor's choice as approved by the Department. The Contractor shall sign submittals and submit them to the Engineer. The Department will review submittals within 30 days after they are received. The Department will return submittals to the Contractor as either: approved, conditionally approved with the conditions listed, or rejected with the reasons listed. The Contractor may resubmit a rejected submittal to the Engineer with more information or corrections. The Department will review resubmittals within 30 days after they are received. The Contractor shall not order material or use working drawings that have not been approved by the Department. The Contractor shall be responsible for timely submittals. Failure by the Department to review submittals within the time given may be the basis for a request for extension of Contract time but not for additional compensation.

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

60-09 BUY AMERICAN STEEL AND MANUFACTURED PRODUCTS.

a. The Contractor agrees that only domestic steel and manufactured products will be used by the contractor, subcontractors, material, men, and suppliers in the performance of this contract, as defined below.

b. The following terms apply to this clause:

(1) Steel and Manufactured Products. As used in this clause, steel and manufactured products include (1) those produced in the United States or (2) a manufactured product produced or manufactured in the United States, if the cost of its components mined, produced or manufactured in the United States exceeds 60% of the cost of all its components and final assembly has taken place in the United States. Components of foreign origin of the same class or kind as the products referred to in subparagraphs c.(1) or c.(2) shall be treated as domestic.

(2) Components. As used in this clause, components means those articles, materials, and supplies incorporated directly into steel and manufactured products.

(3) Cost of Components. This means the costs for production of the components, exclusive of final assembly labor costs.

c. Buy American Certificate. Execution and submission of the Buy American Certificate Form 25D-061, is required according to sections 30-07 and 30-08. If there are no exceptions to be listed on the certificate, the bidder shall enter "NONE" on the first line.

If exceptions are listed on the Buy American Certificate, they shall meet at least one of the following criteria for the certificate to be considered appropriately executed:

(1) Those products or materials that the U.S. Department of Transportation has determined, under the *Aviation Safety and Capacity Expansion Act of 1990*, are not produced in the United States in sufficient and reasonably available quantities and of a satisfactory quality. (The current list is included on the back of Form 25D-061.)

(2) Those products or materials where the U.S. Department of Transportation has determined, under the *Aviation Safety and Capacity Expansion Act of 1990*, that domestic preference would be inconsistent with the public interest.

(3) Where inclusion of domestic material will increase the cost of the overall project contract by more than 25%.

60-10 OPERATION AND MAINTENANCE MANUALS. The Contractor shall provide operation and maintenance manuals for equipment and systems incorporated in the work. The Contractor shall submit one set of all manuals 60 days prior to substantial completion for review by the Department. The Contractor shall make corrections noted by the Department, and submit 5 complete sets of manuals 14 days prior to substantial completion.

The Contractor shall submit the manuals in neatly bound hard cover loose-leaf three ring binders. Include project name, Contractor's/Subcontractor's name, address and telephone number on each cover. Prepare data in the form of an instruction manual with a table of contents and a tabbed fly leaf for each section.

The Contractor shall provide a separate section for each product or system installed which includes the following:

a. Description of each unit or system and the component parts. Identify function, normal operating characteristics, and limiting conditions. Include performance curves, with engineering data and tests. Systems shall include:

(1) Heating System
(2) Fuel Oil Storage and Supply System
(3) Runway Lighting System
(4) Surface Sensors

b. Product data with each sheet marked to clearly identify the specific products, component parts, and data applicable to installation. Delete inapplicable information. Product data shall include:

(1) Lighting Fixtures
(2) Wiring Devices
(3) Electric Power Distribution Components
(4) Runway Lighting System Components
(5) Thaw Wire and Heat Trace System Components
(6) Fuel Tank Capacity Diagram (converting stick readings at 6-inch vertical increments to gallons)
(7) Surface Sensors

c. Include drawings to supplement product data and illustrate relations of component parts of equipment and systems. Show control and flow diagrams. Provide copies of all approved shop drawings. Drawings shall include:

(1) Equipment Storage Building Plans
(2) Electrical Equipment Enclosure Plans
(3) Runway Lighting One-line Control and Power Diagrams
(4) Electric Power One-line Diagrams
(5) Electric Power Panel Directories
(6) Thaw Wire and Heat Trace Systems
(7) Surface Sensors

d. Type text as required to supplement product data and show logical sequence of operations for each procedure, incorporating the manufacturer's instructions.

e. Operating procedures to include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include

any special operating instructions. Include reprogramming instructions for all programmable equipment. Systems shall include:

(1) Runway Lighting System
(2) Heating System
(3) Fuel Oil Storage and Distribution System
(4) Surface Sensors

f. Maintenance requirements and repair data. Include routine procedures. Provide a guide for troubleshooting, disassembly, repair, and reassembly. Provide alignment, adjusting, and checking instructions. Maintenance and repair data shall include:
(1) Heating System
(2) Fuel Oil Storage and Distribution System
(3) Surface Sensors

g. Supplies and replacement parts. For each item of equipment and each system list names, addresses, and telephone numbers of subcontractors and suppliers. Provide local source of supplies and replacement parts with complete nomenclature and commercial number of replacement parts. Provide a copy of manufacturer's recommended spare parts list for applicable equipment. Provide data for:
(1) Lamps for Runway Lighting System
(2) Lamps for Lighting Fixtures
(3) Fuel Oil System
(4) Suface Sensors

h. Warranties. Include copies of warranties.

i. Tests. Include logs of all tests performed.

SECTION 70

LEGAL RELATIONS AND RESPONSIBILITY TO PUBLIC

70-01 LAWS TO BE OBSERVED. The Contractor shall keep fully informed of, observe, and comply with all federal, state, and local laws, ordinances, and regulations, and all orders and decrees of bodies or tribunals having any jurisdiction or authority, that in any manner affect those engaged or employed on the work or which in any way affect the conduct of the work.

In addition to all other laws, the Contractor shall fully comply with all laws, regulations and permits issued by agencies of the United States and the State of Alaska when working in, over or adjacent to wetlands, tidelands, anadromous fish streams, eagle nests, navigable waters, or coastal waters.

In addition to other laws, the Contractor shall ensure that all work in, over or adjacent to navigable waters is conducted so that free navigation of the waterways is not obstructed and that existing navigable depths are not impaired, except as allowed by the U.S. Coast Guard and the U.S. Army Corps of Engineers.

The Contractor and the Surety shall defend, indemnify, and hold harmless the state and its representatives against any claim or liability related to violations of any laws, ordinances, regulations, orders, decrees or permits by the Contractor, the Contractor's agents, the Contractor's employees, a subcontractor at any tier, or a supplier or service provider.

The Contractor has the affirmative duty to keep informed of and comply with all laws. The Contractor is not entitled to and shall not rely on any Department employee's interpretation, whether oral or written, of any law, ordinance, regulation, order, or decree, or any permit issued by an agency other than the Department.

70-02 PERMITS, LICENSES, AND TAXES. The terms, conditions, and stipulations in permits obtained either by the Department or by the Contractor are made a part of this Contract.

The Department will:

a. Secure permits and licenses that the Department determines are required for the construction of the proposed project, and the use of mandatory sources, designated sources and designated waste disposal areas for the proposed project; and

b. Modify Department-acquired permits during the performance of the contract, if deemed necessary by the Engineer.

The Contractor shall:

a. Acquire any permits and licenses required to complete the project that are not acquired by the Department;

b. Provide qualified professionals to collect data or perform studies necessary to acquire permits for the use of sites not previously permitted;

c. Give all notices required for the prosecution of the work;

d. Abide by all permits and licenses whether acquired by the Department or by the Contractor;

e. Notify the Engineer promptly if any activity cannot be performed as specified in the permits, and cease conducting the activity until permit modifications or any required additional permits are obtained;

f. Obtain modifications to permits acquired by the Contractor;

g. Pay all charges, fees and taxes; and

h. Provide proof of payment of all taxes before the Department makes final payment.

The Contractor shall not work in areas that are not permitted for use by the Contract. Before working in an area not previously permitted for use by the Contract, the Contractor shall:

a. Contact all government agencies having possible or apparent permit authority over that area;

b. Obtain all required permits, clearances, and licenses from those agencies;

These permits and clearances may include, but are not limited to: NPDES General Permit, State Historic Preservation Officer approval; Department of Natural Resources Coastal Consistency Determination, Title 41, Mining Reclamation, and Temporary Water Use Permits; Department of Environmental Conservation Section 401 Certification, Solid Waste Disposal Site and Construction Camp Permits; Department of Fish and Game Special Area Permits; U.S. Fish and Wildlife Service Threatened and Endangered Species clearance; U.S. Corps of Engineers Section 404/10 Permits; city or local government development permits and flood hazard permits; and the permission of the property owner or lessee.

Obtain permission from any property owners or lessees with an interest in the property; and

d. Provide all of the following to the Engineer:

(1) All permits or clearances necessary to use the site for its intended purpose(s);

(2) A written statement that all permits or clearances necessary have been obtained;

(3) Written evidence that the Contractor has contacted all of the relevant agencies and that no additional permits are required on the part of the Contractor, including at a minimum the name of the agency and staff person contacted, the date contacted, and result of coordination; and

(4) A plan that identifies how the site will be finally stabilized and protected.

The Engineer may reject a proposed site if the Contractor fails to provide any of the above information or to demonstrate that a proposed site can be finally stabilized to eliminate future adverse impacts on natural resources and the environment.

70-03 PATENTED DEVICES, MATERIALS AND PROCESSES. If the Contractor employs any design, device, material, or process covered by patent, trademark, or copyright, the Contractor shall obtain and provide the Engineer with a copy of a suitable legal agreement with the patentee or owner.

The Contractor and the Surety shall defend, indemnify, and hold harmless the state and its representatives and any affected third party or political subdivision from any claim, cause of action, and damages for infringement arising from or relating to the Contractor's use of a patented design, device, material, process, trademark, or copyright.

70-04 WAGE RATES. The Contractor and all subcontractors shall pay the current prevailing rate of wages as per AS 36.05.010 and this Contract. On federally funded projects the Contractor and all subcontractors shall pay the higher of the appropriate wage rates published by the Alaska Department of Labor and the U.S. Department of Labor, for each individual job classification. The Contractor and all subcontractors shall file

certified payroll with the Alaska Department of Labor and Workforce Development (DOLWD) and with the Engineer for all work performed on the project.

Before beginning work the Contractor shall file a Notice of Work with DOLWD and pay all required fees. After finishing work the Contractor shall file a Notice of Completion with DOLWD and pay all additional fees required by increases in the Contract amount.

70-05 FEDERAL PROVISIONS. The Contractor shall:

a. Observe all federal laws, rules, regulations and grant requirements applicable to the project; and

b. Allow appropriate federal officials access to inspect the work.

The federal government is not a party to the Contract. The Contractor agrees that federal inspections will not form the basis for any claim against the federal government or the State for interference with the rights of the Contract parties.

70-06 SANITARY, HEALTH, AND SAFETY PROVISIONS. The Contractor shall provide and maintain neat and sanitary accommodations for employees that meet all federal, state and local requirements.

The Contractor shall comply with federal, state, and local laws, rules, and regulations concerning construction safety and health standards, including U.S. Mine Safety and Health Administration rules when the project includes pit or quarry operations.

The Contractor shall not expose the public to, or require any workers to work under, conditions that are unsanitary, hazardous, or dangerous to health or safety.

The Contractor is responsible for ensuring all workers are adequately protected. The Contractor shall have a safety and health management program that complies with AKOSH requirements, and includes:

a. A worksite hazard analysis;

b. A hazard prevention and control plan including personal protective equipment and safe work procedures required for specific tasks;

c. New employee training and periodic worker training regarding safety and health;

d. Regular safety meetings with written documentation of attendance, safety topics discussed, worker safety complaints, and corrective actions taken; and

e. A designated safety officer, employed by the Contractor, who monitors the construction site and is responsible for implementing the safety and health management program.

The Contractor and Surety shall defend, indemnify and hold harmless the State of Alaska from all claims, causes of action and judgments arising from or relating to the Contractor's failure to comply with any applicable federal, state or local safety requirement, regulation or practice, whether or not listed above.

70-07 ARCHAEOLOGICAL OR HISTORICAL DISCOVERIES. When the Contractor's operation encounters prehistoric artifacts, burials, remains of dwelling sites, paleontological remains, shell heaps, land or sea mammal bones, tusks, or other items of historical significance, the Contractor shall:

a. Immediately cease operations at the site of the find;

b. Immediately notify the Engineer of the find; and

c. Not disturb or remove the finds or perform further operations at the site of the finds until directed by the Engineer.

The Engineer will issue an appropriate Change Order if the Engineer orders suspension of the Contractor's operations or orders the Contractor to perform extra work in order to protect an archaeological or historical find.

70-08 PUBLIC CONVENIENCE AND SAFETY, AND RAILWAY PROVISIONS. The Contractor shall control its operations and those of its subcontractors and all suppliers, to assure the least inconvenience to the traveling public. Under all circumstances, safety shall be the most important consideration.

The Contractor shall maintain the free and unobstructed movement of aircraft, airport personnel and vehicular traffic in the AOA, except as specifically provided in this Contract. The Contractor's operations and those of its subcontractors and all suppliers, shall be done according to subsection 40-05 and shall limit operations for the convenience and safety of the traveling public as specified in subsection 80-04.

The Contractor shall conduct all operations on or near a railroad according to the Contract, any contract between the Department and the railroad, and any permits issued by the railroad. The Department shall obtain permits for hauling materials across railroad tracks at locations specified in the Contract. If the Contractor desires additional crossings, the Contractor shall obtain any required permits at the Contractor's expense.

70-09 BARRICADES, WARNING SIGNS, ~~AND~~ HAZARD MARKINGS, AND TRAFFIC CONTROL PLAN. The Contractor shall furnish, erect, and maintain all barricades, warning signs and markings for hazards necessary to protect the public and the work. It shall be the Contractor's responsibility to maintain markers at all times to separate areas closed to aircraft from adjacent areas that are open to aircraft. When used during periods of darkness, such barricades, warning signs and hazard markings shall be suitably illuminated. Barricades, warning signs, and markings for hazards that are in the air operations area shall be a maximum of 18 inches high. Barricades shall be spaced not more than 25 feet apart.

For public vehicular and pedestrian traffic, the Contractor shall furnish, erect, and maintain barricades, warning signs, lights and other traffic control devices in conformity with the *Manual on Uniform Traffic Control Devices for Streets and Highways* (published by the United States Government Printing Office) and the *Alaska Traffic Manual Supplement* (published by the Department), and according to the Traffic Control Plan.

When the work requires closing an airport operations area of the airport or portion of such area, the Contractor shall furnish, erect and maintain temporary markings and associated lighting conforming to the requirements of AC 150/5340-1, *Standards for Airport Markings*, and according to the Construction Safety Plan.

For work within the airport property, the Contractor shall furnish, erect, and maintain markings and associated lighting of open trenches, excavations, temporary stockpiles, and parked construction equipment that may be hazardous to the operation of emergency, fire-rescue, maintenance or support vehicles on the airport in conformance to AC 150/5370-2, *Operational Safety on Airports During Construction*.

The Contractor shall identify each motorized vehicle or piece of construction equipment in conformance to AC150/5370-2.

Open-flame type lights shall not be permitted within the air operations areas of the airport.

Submit a traffic control plan for approval a minimum of five (5) calendar days prior to any work except surveying.

Ensure that the traffic control plan is developed, set-up, and maintained by the American Traffic Safety Services Association (ATSSA) or the International Municipal Signal Association (IMSA) certified work site

supervision. The cost of plans, signs, permanent construction signs, channelization devices, and marking to meet this requirement is an obligation subsidiary to other items. No separate payment will be made.

Provide an individual on call 24 hours a day for emergency maintenance of Airport Hazard Lighting and Barricades. Inform the Airport Safety Dispatcher, telephone 266-2415 or 266-2575, of the individual's name and telephone number. The individual is required to provide an on-site response within 30 minutes of receiving notice from the Airport Safety Dispatcher or Airport Operations. Upon failure of the designated individual to be available to receive notice or respond accordingly, Airport Safety or Airport Operations has authority to remedy the emergency and to collect the cost from any monies due or to become due the Contractor.

All labor, materials, equipment, replacement parts, batteries, tools and other items necessary to maintain the barriers, flags, and lights are incidental to the contract and no separate payment will be made.

70-10 USE OF EXPLOSIVES. The Contractor shall obey all laws, regulations and permits applicable to using, handling, loading, transporting, or storing explosives. When using explosives, the Contractor shall take utmost care not to endanger life, property, new construction, or existing portions of the project and facilities that are to remain in place after the project is complete.

The Contractor shall provide notice to property owners, the traveling public, and utility companies in the vicinity before using explosives. The Contractor shall provide a minimum of three working days notice to the Federal Aviation Administration and the airport manager. The Contractor shall notify police and fire authorities in the vicinity before transporting or using explosives. The Contractor shall provide notice sufficiently in advance to enable all potentially affected parties to take whatever steps they may deem necessary to protect themselves and their property from injury or damage. The Contractor shall not use explosives on or near airport property until a Notices to Airmen (NOTAMs) has been issued. Each new use of explosives may require a separate NOTAMs to be issued. The Contractor shall not use electric blasting caps within 1,000 feet of the airport property.

The Contractor is liable for all property damage, injury, or death resulting from the use of explosives on the project. The Contractor and Surety shall indemnify, hold harmless, and defend the State of Alaska from all claims related to the use of explosives on the project, including claims from government agencies alleging that explosives were handled, loaded, transported, used, or stored improperly.

70-11 PROTECTION AND RESTORATION OF PROPERTY AND LANDSCAPE.

a. Property Marks. The Contractor shall:

(1) Be responsible for and protect from disturbance all land monuments and property marks until the Engineer has approved the witnessing or otherwise referenced their locations; and

(2) Not move such monuments or marks without the Engineer's approval.

b. Damage to Property. The Contractor shall:

(1) Be responsible for all damage to public or private property resulting from any act, omission, neglect, or misconduct in the manner or method of executing the work;

(2) Be responsible for all damage to public or private property resulting from defective work or materials at any time, before, during, or after project completion; and

(3) Restore all such damaged property to a condition similar or equal to that existing before the damage occurred, at no additional cost to the Department.

c. **Protection of Natural Resources.** The Contractor shall:

(1) Conduct work in a manner that minimizes disturbance to and protects natural resources in compliance with all federal, state, and local laws and regulations;

(2) When working near designated wetlands, as defined by the Corps of Engineers, place no fill, nor operate equipment outside the permitted area;

(3) When working in or near designated anadromous fish streams, as defined by AS 41.14.840 and AS 41.14.870, place no fill or dredge material, nor operate equipment, within or on the banks of the stream (including fording) except as permitted by the State Fish Habitat Permit issued for the project; and

(4) Not refuel and service equipment within 100 feet of wetlands and/or other water bodies.

d. **Hazardous Materials.** Hazardous materials include but are not limited to petroleum products, oils, solvents, paints, lead based paints, asbestos, and chemicals that are toxic, corrosive, explosive, or flammable. Except as otherwise specified in this Contract, the Contractor shall:

(1) Not excavate, nor use for fill, any material at any site suspected of or found to contain hazardous materials or petroleum fuels;

(2) Not raze and remove, or dispose of structures that contain asbestos or lead-based paints;

(3) Not stockpile, nor dispose of, any material at any site suspected of or found to contain hazardous materials or petroleum;

(4) Report immediately to the Engineer any known or suspected hazardous material discovered, exposed, or released into the air, ground, or water during construction of the project;

(5) Report any containment, cleanup, or restoration activities anticipated or performed as a result of such release or discovery;

(6) Handle and dispose of hazardous material with properly trained and licensed personnel who follow an approved Hazardous Material Control Plan as per Section P-157. Dispose of hazardous material according to federal, state and local laws and regulation.

(7) Store, handle and dispose of hazardous material that the Contractor or subcontractors brought to or used on the project, at no additional cost to the Department.

e. **Protected Areas.** The Contractor shall not use land from any park, recreation area, wildlife or waterfowl refuge, or any historical site located inside or outside of the project limits for excess fill disposal, staging activities, equipment or material storage, or for any other purposes unless permitted by the Contract or unless all permits and clearances necessary for such work have been obtained by the Contractor as detailed in Subsection 70-02.

f. **Solid Waste.** The Contractor shall remove all debris, trash, and other solid waste from the project site as soon as possible and according to the Alaska Department of Environmental Conservation Solid Waste Program.

g. **Restoring Areas.** Areas used by the Contractor, including haul routes, shall be restored to their original condition after the Contractor's operations are completed. The original condition of an area shall be determined as follows: Prior to commencement of operations, the Engineer and the Contractor shall inspect each area and haul route that will be used by the Contractor and take photographs to document their condition. After construction operations are completed, the condition

of each area and haul route will be compared to the earlier photographs. Prior to demobilization the Contractor shall repair damages attributed to its operations. The Contractor agrees that all costs associated with repairs shall be subsidiary to other items of work and will not be paid for directly.

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

70-12 FOREST PROTECTION. The Contractor shall:

a. Comply with all laws and regulations of the United States and the State of Alaska, local governments, or other authorities governing the protection of forests and the carrying out of work within forests;

b. Keep forest areas in an orderly condition;

c. Dispose of all refuse and obtain permits for the construction and maintenance of all construction camps, stores, warehouses, residences, latrines, cesspools, septic tanks, and other structures according to the requirements of the supervising authorities;

d. Take all reasonable precautions to prevent and suppress forest fires;

e. Require workers and subcontractors, both independently and at the request of officials, to do all reasonably within their power to prevent and suppress and to assist in preventing and suppressing forest fires; and

f. Make every possible effort to notify the appropriate forestry agency at the earliest moment of the location and extent of any forest fire.

70-13 RESPONSIBILITY FOR DAMAGE CLAIMS. The Contractor shall indemnify, hold harmless, and defend the State of Alaska and its agents and employees from any and all claims or actions for injuries or damages whatsoever sustained by any person or property that arise from or relate to, directly or indirectly, the Contractor's performance of the Contract; however, this provision has no effect if, but only if, the sole proximate cause of the injury or damage is the Department's negligence.

This Contract does not create a third party benefit to the public or any member of the public, nor does it authorize any person or entity not a party to this Contract to maintain a suit based on this Contract or any term or provision of the Contract, whether for personal injuries, property damage, or any other claim or cause of action.

70-14 OPENING SECTIONS OF THE PROJECT TO TRAFFIC. The Engineer may, at their discretion, order the Contractor to open sections of the work to traffic prior to completion of the entire project. Openings under this section shall not constitute (a) acceptance of the opened sections or any other part of the work or (b) a waiver of any other provision of the Contract.

The Engineer may establish a time period for completing any features of the opened section of work that are behind schedule.

The Contractor shall:

a. Maintain the opened portions of the work without additional compensation;

b. Perform all necessary repairs or renewals on the opened sections of the work without additional compensation;

c. Conduct the remainder of the work with minimum interference to traffic; and

d. Maintain barricades and other safety devices required by AC 150/5370-2, *Occupational Safety on Airports During Construction*, to provide separation of opened and closed sections of the project.

70-15 CONTRACTOR'S RESPONSIBILITY FOR WORK. The Contractor shall be responsible for implementing all preventative measures necessary to protect, prevent damage, and repair damage to the work from all causes at no additional cost to the Department. This duty continues from the date construction begins until the date specified in a letter of Substantial Completion or Partial Acceptance of a specific section of the project. Where there is a Partial Acceptance, the duty ends only as to the accepted portion of the work. This duty continues during periods of suspended work, except in specific sections the Department has agreed to maintain under Subsection 50-13.a. Seasonal Suspension of Work.

The Contractor shall rebuild, repair, restore, and make good all losses or damages to any portion of the work including that caused by vandalism, theft, accommodation of public traffic, and weather. The Department will only be responsible for loss or damage due to unforeseeable causes beyond the control of and without the Contractor's fault or negligence, such as Acts of God, the public enemy, and governmental authorities.

In case of suspension of work from any cause, the Contractor shall take such precautions as may be necessary to prevent damage to the work or facilities affected by the work. This will include providing for drainage and erecting any necessary temporary structures, signs, or other facilities and maintaining all living material such as plantings, seedings, and soddings.

70-16 RESERVED.

70-17 FURNISHING RIGHT-OF-WAY. The Department will secure all necessary right-of-way or property in advance of construction. Any exceptions will be indicated in the Contract.

70-18 PERSONAL LIABILITY OF PUBLIC OFFICIALS. There shall be no liability upon the Engineer and their authorized representatives, either personally or as officials of the state, in carrying out any of the provisions of this Contract, or in exercising any power or authority granted to them by or within the scope of the Contract, it being understood that in all such matters the Engineer and their authorized representatives act solely as agents and representatives of the State. The Contractor shall bring no suit related to or arising under this Contract naming as defendants any State officer, employee or representative in either their personal or official capacities, and shall include a prohibition to that effect in all subcontracts entered into for this Project.

70-19 NO WAIVER OF LEGAL RIGHTS. The Department shall not be precluded nor estopped by any measurement, estimate, or certificate made either before or after the completion and acceptance of the work and payment, from showing the true amount and character of the work performed and materials furnished by the Contractor, nor from showing that any measurement, estimate, or certificate is untrue or is incorrectly made, nor that the work or materials do not in fact conform to the Contract.

The Department shall not be precluded nor estopped, notwithstanding any measurement, estimate, or certificate and payment, from recovering from the Contractor or the Contractor's Sureties, or both, such damages as it may sustain by reason of the Contractor's failure to comply with the terms of the Contract.

Neither the acceptance by the Department, or by any representative of the Department, nor any payment for or acceptance of the whole or any part of the work, nor any extension of time, nor any possession taken by the Department, shall operate as a waiver by the Department of any portion of the Contract or of any right of

the Department to damages. A waiver by the Department of any breach of the Contract shall not be held to be a waiver of any other subsequent breach.

70-20 GRATUITY AND CONFLICT OF INTEREST. The Contractor shall not extend any loan, gratuity, or gift of money of any form whatsoever to any employee of the Department, nor will the Contractor rent or purchase any equipment or materials from any employee of the Department or to the best of the Contractor's knowledge from any agent of any employee of the Department. The Contractor shall execute and furnish the Department an affidavit certifying that the Contractor has complied with this section before final acceptance.

70-21 SECURITY.

a. Security Program

The following information will guide you through the security requirements and procedures at Ted Stevens Anchorage International Airport (ANC). ANC has assigned oversight for compliance with all procedures and requirements to Airport Operations. Departments within Airport Operations have specific responsibilities which are defined in greater detail below.

Note: critical contact phone numbers
Airport Operations: 266-2600
Airport Badge Office 266-2409
Airport Dispatch 266-2415

Due to the ever-changing nature of security requirements please contact the Airport Security Manager at 266-2522 for any clarification you may need.

The Transportation Security Administration (TSA) requires ANC to control access and prevent unauthorized persons from entering Air Operations Areas (AOA). In compliance with this requirement, the airport operator has established procedures to authorize or deny access to the AOA and to identify and control persons while in these areas.

b. Inspections and Fines

The Contractor shall be liable for any fines levied against the State, by the TSA, resulting from actions of the Contractor, or those whom the Contractor is responsible for, that cause a failure in the maintaining of security in the area of construction, to include any points of entry into the Air Operations Area (AOA) utilized for the construction project. Failure to maintain security will also include failure to abide by the Airport badge identification program or other requirements pertaining to the security of the AOA.

Contractor personnel are subject to random checks for compliance with the badging and permit regulations. These checks may be conducted by Airport Police, Airport Operations and the TSA.

In order to maintain accountability for all Airport identification badges issued, the Contractor is responsible for physically collecting and returning to the Airport Badge Office all outstanding badges no longer used for the construction project. Proof of return is State Receipt issued by the Airport Badge Office.

A non-refundable fine of $300.00 will be levied against the Contractor for each badge not returned within five (5) days of badge expiration or completion of the project, whichever is sooner.

Temporary ramp permits must be turned back into the Airport Badge Office within five (5) days of completion of work or expiration of the ramp permit(s), whichever is sooner. There is a non-refundable fine of $50.00 for each permit not returned.

Final payment to the Contractor will be withheld pending the return of all badges and vehicle permits to the Airport Badge Office and the settlement of all charges due ANC Accounting.

c. AOA Entry Control

The Contractor is responsible for preventing unauthorized access to the AOA by way of the construction site. This includes maintaining ANC perimeter gates and doors in either a locked condition or attended by appropriately badged persons who ensure that only authorized personnel or vehicles are admitted through them into the AOA. Any opening of the AOA security fence requires prior coordination with Airport Operations. Contact Airport Operations at 266-2600.

Those persons designated to control access points into the AOA shall be instructed by Airport Operations in the proper procedures of identification requirements for persons and vehicles. These procedures are specific to each contract and may change during different phases of the contract.

The Contractor will provide these persons with the capability to communicate directly with Airport Operations and Airport Dispatch.

The Contractor will be responsible for maintaining, as a minimum, a six (6) foot clear zone on both sides of any perimeter fence line affected by the Contractor or any authorized representative.

d. Airport Identification Badges

The Airport Identification Badge, developed and adopted by ANC, is the only identification system recognized as authority to enter the Security Identification Display Area (SIDA) and Sterile Areas of the airport. Only persons identified by this system are permitted access. All Airport Identification Badges must be worn on the outermost garment above the waist.

Any person found in the SIDA or Sterile Area, not in compliance with this program, will be removed from the area and action will be taken against violators as appropriate under Alaska State Statute or Alaska Administrative Code.

Control Authority

1. ANC has delegated authority for approving issuance, system control, implementation, and accountability of this program to the Airport Badge Office.

2. An individually - assigned Airport Identification Badge will be used by each Contractor employee granted access to the airport SIDA, Sterile Area or other airport restricted areas for construction projects. It does not grant access to aircraft and is valid only for the area in which their construction is actually taking place and the approved routes to and from that area.

e. Badge Issue Procedures

All fingerprint, security threat assessment (STA) and badge requests must be authorized through the Project Manager. Detailed instructions and applicable paperwork will be given to the Project Manager and the Contractor prior to requests being submitted to the Badge Office.

Badge Office general information:

Office Location: 6040 DeHaviland Avenue, next to the Airport Police and Fire Building and across the street from the Post Office on Postmark Drive.

Office hours: Monday through Friday from 7:00 a.m. to 4:00 p.m. Closed holidays.

Contact phone number: 907-266-2409

Security and Ramp Driver's Training: Monday through Friday at 8:00 a.m. for walk-ins and groups of 3 or fewer individuals. Larger groups may be scheduled through the Badge Office for Tuesday or Thursday at 1:00 p.m. It is advised that you check in for training 30 minutes prior to the scheduled class time as class size is limited.

The fingerprinting fee is $40.00, STA fee is $20.00 and the badge fee is $40.00. Payment is required at time of service for each. All fees shall be paid by the Contractor as an incidental cost. These fees are subject to change with a 30 day notice.

Badging is a two step process.

1. The first step is that each person requiring an Airport Identification Badge must submit to a FBI fingerprint based Criminal History Records Check (CHRC) and a STA. If the CHRC shows no TSA disqualifying criminal offense within the preceding ten years from the date of fingerprint submission and the TSA clears the individual for the STA, the Project Manager is notified via email and the person may proceed to step two. Allow one to two weeks for this process to take place.

2. Step two is the Security and Ramp Driver Training and badge issuance. This training is available at the Airport Badge Office, see the times above. The actual training takes approximately 30 minutes for badge requests without a Ramp Driver's License and 60 minutes for those individuals requesting a Ramp Driver's License and, or Escort Authorization. Individuals requesting a Ramp Driver's License will be required to pass a written test. Upon successful completion of step two, an Airport Identification Badge may be issued.

In lieu of an Airport Identification Badge, for those employees working in the same area together, there needs to be only one employee with an Airport Identification Badge, with Escort Authorization, while the other employees in the area may be issued a visitor badge. Note: there must be an Airport I.D. Badged employee monitoring them at all times. This person must have Escort Authority indicated on their badge. A person using a visitor badge is not required to view the training video, but is expected to follow all regulations while on the restricted areas of the airport. Contractors utilizing escorts and visitor badges must receive prior approval from Airport Operations or the Airport Security Manager.

Any falsifications can result in revocation of the badges for the individual in question, and any fines incurred from the violations will be passed to the responsible party.

Per TSA regulations badges must be issued within 30 days of receiving notification the individual is cleared for badging.

Upon issuing an Airport Identification Badge, each badged employee will be issued a set of airport rules and regulations they shall be held responsible for while working in restricted areas of the airport.

An Alaska Public Safety Information Network records check may be made on the employee, to include checking current driver's license status for ramp license requests.

The Contractor shall be responsible for the maintenance of records necessary to ensure the retrieval of badges from employees and subcontractor(s).

1. Whenever a badged person's employment authorized by the Contractor is terminated, the Contractor is responsible for immediately recovering the ID badge and returning it to Airport Badge and Vehicle Permit Office within five (5) days of an employee's termination date or the completion of the project, whichever is sooner.

2. When someone terminates employment, the Contractor shall immediately notify the Airport Badge Office so the badge can be deactivated. If termination is outside of the normal Badge Office hours, the Contractor shall immediately notify Airport Dispatch at 266-2415 of the termination.

Should an employee lose his or her I.D. Badge, they should immediately notify their employer, who shall then immediately notify the Airport Badge Office. If lost after normal business hours, then it should be reported to Airport Dispatch. The Badge Office will confirm the employee's employment status prior to reactivation of a badge reported lost, then found by the owner. If requested, a replacement badge will not be issued until a replacement request letter is received and the $50.00 lost badge fee is paid. This is a separate fee from the non-refundable fine of $300.00 applied to non-returned badges. If a replacement badge is issued for a lost badge, and the $200.00 fee paid, the Contractor will not be charged the non-refundable fine of $300.00.

The Airport Operator requires each Contractor and badge holder to agree to abide by the provisions of this identification program. The Contractor shall designate one or more persons to act as the authorized point of contact for coordination in matters of badge program administration and security.

f. Vehicle Access On AOA

As stated previously, the TSA requires the Airport Operator to control access into and prevent unauthorized vehicles from entering the AOA. In compliance with this requirement, the Airport Operator has established procedures to authorize or deny access to the AOA and to identify and control vehicles while within the AOA.

Proper individual identification, ramp driver's licenses, and vehicle permits must be obtained through Airport Badge Office before attempting to enter the AOA.

g. Vehicle Identification Standards

All Contractor vehicles requiring access to the AOA shall display a company logo and temporary ramp permit as issued and instructed by Airport Badge Office. All permit requests must come through and be authorized by the Project Manager.

h. Authorized Vehicles

Contractor vehicles are authorized onto the AOA only when within its area of authorization, to include access routes to and from the constructions site and required vehicle permits are properly displayed, and all occupants have the required airport identification properly displayed.

70-22 AIR QUALITY CONFORMITY REQUIREMENTS. Cease construction activities when the Air Quality Index is 90 or higher as reported by the Municipality of Anchorage between November 1 and March 1. The Municipality of Anchorage issues an air quality report recording 9:00 am Monday – Friday at (907) 343-4899. Check the recorded message daily during the black out times and for shutting down operations at the specified index rate. Do not resume construction activity until after the Municipality of Anchorage determines that air quality standards are not likely to be exceeded (when the Index rate is 89 or below). If air quality standards cause delays beyond the completion dates specified in the special provisions, the contract time may be extended in accordance with Subsection 80-06 on a day for day basis. No other compensation will be due the Contractor for delays caused by air quality standards.

SECTION 80

PROSECUTION AND PROGRESS

80-01 SUBLETTING OF CONTRACT. The Contractor shall submit a Contractor Self Certification for Subcontractors and Lower Tier Subcontractors, Form 25D-042, before the Contractor or any subcontractor sublets, sells, transfers, assigns, or otherwise disposes of the Contract or any portion of the Contract. The Department has authority to review subcontracts and to deny permission to sublet work. The Department may penalize the Contractor for false statements or omissions made in connection with Form 25D-042.

The Contractor shall perform, with the Contractor's own organization, work amounting to at least 30 percent of the difference between the original Contract price and the price of designated Specialty Items. For the purpose of this Subsection, work is defined as the dollar value of the services, equipment, materials, and manufactured products furnished under the Contract. The Engineer will determine the value of the subcontracts based on Contract unit prices or upon reasonable value, if entire items are not subcontracted.

The Department's consent to the subletting, sale, transfer, assignment, or disposal of all or a part of the Contract shall not relieve the Contractor and the Surety of responsibility for fulfillment of the Contract or for liability under the bonds regardless of the terms of the transfer or sublet approvals.

a. **Submittals.** The Contractor shall ensure ~~that for all~~ the following for each subcontract~~s~~ (agreement~~s~~):

   (1) The Department is furnished with one completed Contractor Self certification, Form 25D-042~~, for each subcontract~~;

   (2) The subcontractors have submitted a Bidder Registration, Form 25D-6;

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

   (4) The subcontractors pay current prevailing rate of wages as per Subsection 70-04 Wage Rates and file certified payrolls with the Engineer and DOLWD for all work performed on the project~~; and~~

   (5) Upon receipt of a request for more information regarding subcontracts, the requested information is provided to the Department within 5 calendar days~~.~~

   (6) The Department is furnished with two copies of the subcontract signed by both parties and including item descriptions and prices of subcontracted work before the subcontracted work begins.

b. **Work that is Subcontracting.** The following will be considered as subcontracting, unless performed by the Contractor:

   (1) **Roadside or Onsite Production.** Roadside or onsite production of crushed stone, gravel, and other materials with portable or semi-portable crushing, screening, or washing plants set up or reopened in the vicinity of the project to supply materials for the project, including borrow pits used exclusively or nearly exclusively for the project.

   (2) **Temporary Plants.** Production of aggregate mix, concrete mix, asphalt mix, other materials, or fabricated items from temporary batching plants, temporary mixing plants, or temporary factories

that are set up or reopened in the vicinity of the project to supply materials exclusively or nearly exclusively for the project.

(3) **Hauling.** Hauling from the project to roadside production, temporary plants, or commercial plants, from roadside production or temporary plants to the project, from roadside production or temporary plants to commercial plants, and all other hauling not specifically excluded in this subsection.

(4) **Other Contractors.** All other contractors working on the project site under contract with the Contractor are considered subcontractors unless specifically excluded in this subsection.

c. **Work that is not Subcontracting.** The following will not be considered as subcontracting, but the Contractor shall comply with the prompt payment provisions of AS 36.90:

(1) **Commercial Plants.** The purchase of sand, gravel, crushed stone, crushed slag, batched concrete aggregates, ready-mixed concrete, asphalt paving mix, and any other material or fabrication produced at and furnished from established and recognized commercial plants that sell to both public and private purchasers.

(2) **Hauling.** Delivery of materials from a commercial plant to a different commercial plant, and delivery from a commercial plant to the project site by vehicles owned and operated by the commercial plants or by commercial freight companies that have a contract with the commercial plant. Commercial freight companies are trucking or hauling companies that deliver multiple types of materials to multiple clients, both public and private, on an established route and on a recurrent basis.

(3) **Contractors' General Business.** Work within permanent home offices, branch plants, fabrication plants, tool yards, and other establishments that are part of a contractor's or subcontractor's general business operations.

d. **Owner-Operators.** Hauling of materials for the project by bona fide truck owner-operators who are listed as such on the certified payroll of the Contractor or approved subcontractor is not considered subcontracting for purposes of AS 36.30.115.

The Contractor shall ensure that the required prompt payment provisions of AS 36.90.210 are included in contracts with owner-operators.

The Contractor shall collect and maintain at the project site current and valid copies of the following to prove that each trucker listed is a bona fide owner-operator:

(1) Alaska Driver's License with appropriate CDL class and endorsements;

(2) Business license for trucking with supporting documents that list the driver as the business owner or corporate officer;

(3) Documents showing the driver's ownership interest in the truck, including copies of:

(a) Truck registration; and

(b) Lease (if truck is not registered in driver's name or in the name of the driver's company).

The Contractor shall maintain legible copies of these records for a period of at least three years after final acceptance of the project.

Owner-operators must qualify as independent contractors under the current Alaska Department of Labor's criteria. Owner-operators may be required to show:

(1) The owner-operator's right to control the manner in which the work is to be performed;

(2) The owner-operator's opportunity for profit or loss depending upon their managerial skill;

(3) The owner-operator's investment in equipment or materials required for their task, or the employment of helpers;

(4) Whether the service rendered requires a special skill;

(5) The degree of permanence of the working relationship; and

(6) Whether the service rendered is an integral part of the owner-operator's business.

The status of owner-operators is subject to evaluation throughout the project period. If the criteria for an independent contractor are not met, the Contractor shall submit amended payrolls listing the driver as an employee subject to all labor provisions of the Contract.

The Contractor shall issue each owner-operator a placard in a form approved by the Engineer that identifies both the truck driver and the vehicle. The placard shall be prominently displayed on the vehicle so that it is visible to scale operators and inspectors.

Not withstanding the Department's definitions of contracting and subcontracting, the Contractor shall be responsible for determining and complying with all federal and state laws and regulations regarding contracting, subcontracting, and payment of wages. The Contractor shall promptly pay any fines or penalties assessed for violations of those laws and regulations, and shall promptly comply with the directives of any government agency having jurisdiction over those matters.

80-02 NOTICE TO PROCEED. The Department will issue a Notice to Proceed authorizing construction to begin and indicating the date when Contract time will begin. The Contractor shall not begin construction before the effective date of the Notice to Proceed. The Department will, in its sole discretion, refuse to pay for construction begun before the effective date of the Notice to Proceed. The Contractor shall notify the Engineer at least 48 hours before construction begins at the project site.

80-03 PROSECUTION AND PROGRESS. The Contractor shall meet with the Engineer at the regional construction office for a preconstruction conference before beginning construction. The Contractor shall submit the following documents to the Engineer at least five working days before the preconstruction conference:

a. A Critical Path Method (CPM) Schedule is required, in a format acceptable to the Engineer, showing the order in which the work will be carried out and the contemplated dates on which the Contractor and subcontractors will start and finish each of the salient features of the work, including any scheduled periods of shutdown. Indicate any anticipated periods of multiple-shift work in the CPM Schedule. If revisions to the proposed CPM Schedule are required, make them promptly. Promptly submit a revised CPM Schedule if there are substantial changes to your schedule, or upon request of the Engineer. ~~A progress schedule, in a format acceptable to the Engineer, showing the order in which the Contractor proposes to carry out the work and the contemplated dates on which the Contractor and the subcontractors will start and finish each of the salient features of the work, including any scheduled periods of shutdown. The schedule shall indicate the anticipated hours of operation and any anticipated periods of multiple-shift work~~.

b. A list showing anticipated dates for procurement of materials and equipment, ordering of articles of special manufacture, furnishing of plans, drawings and other data required under Subsections GCP-50-02 and GCP-60-08, and for other events such as inspection of structural steel fabrication.

c. A list showing all proposed subcontractors and material suppliers.

d. A Submittal Register, according to Subsection GCP-60-08.

e. A Construction Phasing plan, when required under Section G-300.

f. A Storm Water Pollution Prevention Plan, a Hazardous Material Control Plan, and a Spill Prevention Control and Countermeasure Plan, with the line of authority and designated field representatives, as required under Section P-157.

g. A letter designating the Contractor's Project Superintendent, defining that person's responsibility and authority, and providing a specimen signature.

h. A letter designating an Equal Employment Opportunity Officer and a Disadvantaged Business Enterprise Officer, and designating those person's responsibilities and authority.

i. A Quality Control Plan, as required under Sections GCP-60-03 and GCP- 100

j. A letter designating a Safety Officer for workers, and designating that person's responsibilities and authority.

k. A Traffic Control Plan, as required under Subsection GCP-70-09 and Section G-710.

l. A Utility Repair Plan, as required under Subsection GCP-50-06.e.

The Contractor shall provide adequate materials, labor and equipment to ensure the completion of the project according to the Plans and Specifications. The work shall be performed as vigorously and as continuously as weather conditions or other interferences may permit. The Contractor shall take into consideration and make due allowances at the Contractor's expense for foreseeable delays and interruptions to the work such as unfavorable weather, frozen ground, equipment breakdowns, shipping delays, quantity overruns, utility work, permit restrictions, and other foreseeable delays and interruptions. The Contractor shall identify these allowances on the progress schedule.

The Contractor shall adjust forces, equipment and work schedules as necessary to ensure completion of the work within the Contract time, and shall notify the Engineer at least 24 hours before resuming suspended operations. Upon a substantial change to the work schedule or when directed by the Engineer, the Contractor shall submit a revised progress schedule in the form required, including a written explanation for each revision made in the schedule or methods of operation.

The Engineer's review or approval of the documents, plans, and schedules provided by the Contractor under this section shall not change the Contract requirements, release the Contractor of the responsibility for successful completion of the work or relieve the Contractor of the duty to comply with applicable laws. The Engineer's review or approval of schedules shall not indicate agreement with any assertions of delay or claims by the Contractor.

It is the Contractor's responsibility to prepare and submit documents that satisfy all applicable contract requirements. By reviewing and approving the Contractor's documents, the Department does not warrant that following the Contractor's documents will result in successful performance of the work. The Department's failure to discover defects in the Contractor's documents, the assumptions upon which they are based or conditions that prevent the Contractor from performing the work as indicated in the documents will not entitle the Contractor to additional compensation or time. If the Contractor becomes aware of any act or

occurrence that may form the basis of a claim for additional compensation or an extension of time, it must specifically advise the Engineer of these conditions according to Subsection 50-17.

80-04 LIMITATION OF OPERATIONS. The Contractor shall not open up work to the detriment of work already started. The Contractor shall minimize interference with traffic within the project. The Contractor shall not stop or otherwise impede traffic outside the project limits without the Engineer's prior written permission. The Engineer may require the Contractor to finish a section of work in progress before starting additional sections if the Engineer determines it is necessary for the convenience of the public or the Department.

The Contractor shall control its operations and the operations of its subcontractors and all suppliers, so as to provide for the least inconvenience to traffic and the free and unobstructed movement of aircraft in the Air Operations Areas of the airport, except as specifically provided in this Contract. Under all circumstances, safety shall be the most important consideration.

a. **Environmental Limitations.** The Contractor shall comply with all environmental commitments, permit stipulations, and construction limitations, in the Contract permits and specifications. These may include time periods in which certain construction activities are not allowed. The Contractor shall avoid disturbing wetlands unless permitted to do so. The Contractor shall avoid disturbing threatened and endangered species, historic sites, and hazardous materials sites.

   To prevent impacts to migratory birds, the following construction activities are prohibited between May 1 and July 15:

   (1) Clearing of vegetation.
   (2) Fill placement over vegetated areas.
   (3) Excavation of vegetated areas.
   (4) Other construction activities that cause disturbance of vegetation.

   The prohibited activities specified in (1) through (4) above do not apply if the vegetated areas have been sufficiently disturbed or altered (e.g. by grubbing, excavation, fill placement or use of plastic or other materials that will cover the nesting habitat) prior to May 1 to eliminate the nesting habitat.

b. **Construction Safety Plan (CSP).** A CSP is included within the contract documents when attached as Appendix D. The CSP specifies minimum requirements for operational safety during construction activities. The Contactor shall conduct operations according to the CSP and the provisions set forth within the current version of AC 150/5370-2, *Operational Safety on Airports During Construction.* No deviations or modifications may be made to the approved CSP unless approved in writing by the Engineer.

   The Contractor shall implement all necessary CSP measures prior to commencement of any work activity. The Contractor shall conduct daily checks of its workers, equipment, and construction methods to assure compliance with the CSP measures. The Contractor shall document the checks in writing and sign them. Documented checks shall be available for inspection by the Engineer.

   The Contractor is responsible for the conduct of all subcontractors and suppliers it employs on the project. The Contractor shall assure that all subcontractors and suppliers are made aware of the requirements of the CSP, and that the subcontractors and suppliers implement and maintain all necessary safety measures.

   The CSP will indicate areas within airport property boundaries that may be used for material stockpile, and will indicate the maximum height of stockpile allowed. The Contractor shall obtain prior approval from the Engineer before using other areas within airport property. The Engineer may limit stockpile heights or equipment heights in any area, either inside or outside of airport property, based on requirements in the ACs or other factors necessary to ensure the free and unobstructed operation of aircraft.

c. **Security Plan.** When required by the Contract, the Contractor shall control its operations and the operations of its subcontractors and all suppliers so as to provide for the security of the Airport. The Contactor's operations shall be conducted according to the Security Plan and the provisions set forth within the current version of DOT/FAA/AR-00/52, *Recommended Security Guidelines for Airport Planning and Construction*. No deviations or modifications may be made to the approved Security Plan unless approved in writing by the Engineer. The Security plan for this project is incorporated into the Construction Safety Plan, Appendix D.

d. **Notification.** When the work requires the Contractor to conduct its operations within an Air Operations Area of the airport, the work shall be coordinated with ~~Airport Management, the FAA Flight Service Station, and~~the Airport Operations Center through the Engineer. The Contractor shall provide written notice to the ~~Airport Management, FAA, and~~Airport Operations Center through the Engineer, at least 45 days before working in the Air Operations Area. The Contractor shall copy to the Engineer all correspondence with ~~Airport Management and FAA~~the Airport Operations Center.

The Contractor shall prepare a NOTAMs on a form provided by the Department, and submit the form through the Engineer to the ~~Airport Management~~Airport Operations Center at least 72 hours prior to: closure or change in the Air Operations Area; or startup, resumption, cessation of, or change in construction activity that affects aircraft operations.

The Contractor shall not close an Air Operations Area until a NOTAMs has been issued by ~~Airport Management~~the Airport Operations Center or by FAA, until the Engineer has authorized the Contractor to work there, and until the necessary temporary marking and associated lighting is in place as provided in Subsection 70-09.

For questions, the primary FAA contact is the FAA Systems Operations Control Center at (800) 478-2139. If the primary contact is unavailable, contact the Chairman of Long Term Outage Committee, Operations Engineering Section, FAA Airways Facilities Division at ~~(907) 271-5552~~(907) 271-5800.

Notify Airport Operations through the Engineer to coordinate construction and haul activities and comply with their instructions concerning apron closures and the movement of construction equipment, men, and materials in the vicinity of existing ramp areas, runways, or taxiways. Notification is required at least ~~48 hours~~1 week ~~(plus weekend hours)~~ in advance of any planned closure or change.

Contacts. The ADOT&PF Project Engineer will be the central point of contact between the Contractor, the ANC Operations Center, and the FAA.

Project Engineer	**Airport Operations Center**
D.C. "Chuck" Swenor	Tim Lufkin, Operations Construction Coordinator
ADOT&PF Aviation Construction	Ted Stevens Anchorage International Airport
P.O. Box 196900	P.O. Box 196960
Anchorage, Alaska 99519-6900	Anchorage, Alaska 99519-6960
Telephone (907) 243-7799	Telephone (907) 266-2615 (24 hr)
Cellular (907) 830-8109	Cellular (907) 266-2615
FAX (907) 243-4597	FAX (907) 266-2646

Other Contacts (Note: primary contact is Airport Operations Center through the Engineer):

Dan Frisby, Field Maintenance Manager	Ron Silva, Field Electrician
Ted Stevens Anchorage International Airport	Ted Stevens Anchorage International Airport
P.O. Box 196960	P.O. Box 196960
Anchorage, Alaska 99519-6960	Anchorage, Alaska 99519-6960
Telephone (907) 266-2427	Telephone (907) 266-2423
Cellular (907) 748-2302	Cellular (907) 227-9475

e. **Work Procedures and Communications within the Airport Operations Area.** Vehicles, equipment and materials shall never be parked or left standing on runways, runways safety areas, and taxiways open to aircraft. In Air Operations Areas, all vehicles shall be equipped with a functional flashing amber hazard light and all obstructions except stakes or hazard markers shall be removed during non-working hours. The Contractor shall remove construction equipment from and otherwise clear the runway and the designated Runway Safety Areas for operation of regularly scheduled airline flights. The Contractor shall remain continuously informed regarding flight schedule times.

Do not allow your labor force or equipment to interfere with the operation of aircraft on any runway or taxiway. **Aircraft always have the right of way.** Do not park vehicles or equipment or leave materials standing within 300 feet of an active runway or within 150 feet of an active taxiway or taxi lane. When work is to be performed within the limits specified, ensure that the runway or taxiway is closed to aircraft or maintain radio contact with the tower. Minimize time in restricted areas. Provide responsible personnel, such as a foreman, for radio communication.

When the contract work requires the Contractor to work within an Air Operations Area of the airport on an intermittent basis (intermittent opening and closing of all or a portion of the Air Operations Area), the Contractor shall maintain constant communications as hereinafter specified, immediately obey all instructions to vacate the Air Operations Area, and immediately obey all instructions to resume work in such Air Operations Area. Failure to maintain the specified communications or to obey instructions shall be cause for suspension of the Contractor's operations in the Air Operations Area, with no damages available from the Department, until the satisfactory conditions are provided. The Contractor shall establish and maintain communication or monitor communications with the appropriate radio facility as prescribed in the following:

(1) **Airports With Control Towers:** At those airports with control towers, the Contractor shall comply with the instructions of the airport controller. The Contractor shall continuously monitor 2-way radio communication on the appropriate ground control frequency. The Contractor shall furnish a liaison radio operator and 2-way radio communication with each work party located within the Air Operations Area. Ensure that all persons communicating with the control tower are trained by Airport Operations in radio communication procedures.

(2) **Airports Without Control Towers:**

(a) **With a Flight Service Station:** When the airport has an operating FSS, the Contractor shall comply with the instructions of a FSS Employee, a pilot, or a pilot's representative. The Contractor shall continuously monitor by 2-way radio the *Common Traffic Advisory Frequency* (CTAF) published in the current *Alaska Flight Information Supplement*. The Contractor shall furnish a liaison radio operator and 2-way radio communication with each work party located within the Air Operations Area.

(b) **Without a Flight Service Station:** At those airports without an operating FSS, the Contractor shall comply with the instructions of a FSS Employee, a pilot, or a pilot's representative. The Contractor shall continuously monitor by 2-way radio the *Common Traffic Advisory Frequency* (CTAF) published in the current *Alaska Flight Information Supplement*. The Contractor shall furnish 2-way radio communication with each work party located within the Air Operations Area.

f. **Haul Routes and Hauling Restrictions.** Reconstruction of roads affecting access to areas around ANC may take place during the duration of this project. Haul routes may require adjustment and delays may be encountered. Plan your work accordingly. Claims due to delays caused by such

projects will not be considered. Confine your vehicles to the haul routes and work areas shown on the plans. Alternate haul routes require approval by the Engineer and the Airport Operations Center prior to use. The operator of any vehicle hauling material or equipment on the project is required to possess an Engineer approved map of the designated project haul route. The operator is required to present the map to any Department employee upon request. Any driver failing to display the map will be required to cease work until their vehicle is equipped with a copy of the approved map.

Any person working on the project that hauls material or equipment outside of the designated haul route will have their Ramp Operator's License suspended for the duration of the project. Any vehicle used on the project to haul material or equipment outside of the designated haul route will have its Ramp Access Permit suspended for the duration of the project. Operating unloaded vehicles is considered a haul.

Photographs, video tape, or the written testimony of residents living near Northern Lights Boulevard will be considered adequate proof of individual vehicles hauling outside of the project's designated haul route. For this project, the legal load on Northern Lights Boulevard is zero (0).

Refer to subsection GCP 50-12 for additional legal load restrictions.

You are responsible for the maintenance and restoration of all roads that are utilized for hauling purposes in the construction of this project. Condition of haul routes before and after construction will be documented in accordance with subsection GCP 70-11 and by a joint inspection with the Engineer, Contractor, and ANC Operations. Return road conditions to at least their original condition upon completing the work. The Department will not make final payment until all haul routes are restored to at least their original condition. Provide water or other dust palliative and appropriate distribution equipment as required for dust control on haul routes and work areas.

Assign one laborer with a hand broom to sweep off excess material that accumulates on the outside of trucks during loading. Each truck will be hand swept before leaving the work areas.

Comply with the requirements of subsection GCP 50-13 to avoid placing foreign objects and debris (FOD) or any debris capable of causing damage to aircraft landing gears or propellers or of being ingested in jet engines on surfaces in active aircraft movement areas. Maintain a sweeper truck at the job site at all times to clean loose material immediately if it is spilled on any runway or taxiway. Cleaning spilled material from adjacent taxiways, taxi lanes or ramp areas is of primary concern to the ANC Operations Center. Therefore, upon discovery of spilled material on the haul route that you are not cleaning up, the Engineer or his representative will present a hand written memo to your on-site foreman or superintendent stating the location of the spilled material and the time of the memo. You will then have thirty (30) minutes to complete cleanup operations after being notified of the spill. Failure to complete cleanup operations within thirty (30) minutes of receipt of the memo or failure to maintain a sweeper truck at the job site will result in institution of an order from the Engineer for you to cease all hauling operations. If you fail to meet these conditions, the Department reserves the right to hire another contractor to accomplish cleanup activities and to reduce the contract amount by this cost plus costs incurred by the Department to implement the cleanup contract.

Clean all runway and taxiway lights prior to opening to aircraft.

g. **Utilities.** Comply with subsection GCP 50-06 regarding your responsibility to notify utilities, secure all utility locates, and maintain uninterrupted service of existing utilities as a subsidiary obligation. Ensure that all lighting systems, telecommunications, and control cables remain in operation continuously throughout the construction period except as noted in the plans and specifications. Facilities that are directly related to work items for this project may be placed out of service only as long as necessary to make the alterations as shown on the plans. Obtain permission from the Engineer before taking any of the above facilities out of service. Provide at least 72 hours final notice to the Airport Operations Center through the Engineer before placing any airport lighting or NAVAIDS

out of service. Notify ANC Airfield Maintenance (266-2425) when work is expected to begin for de-energizing any circuit. Upon completion of each stage, notify ANC Airfield Maintenance before energizing that portion of the system.

Coordinate requests to temporarily remove any other underground utilities from service with the Engineer.

h. **After Hours.** During non-working hours, remove all materials that are subject to being blown onto active areas of the airport.

Thirty (30) minutes before shutting down construction operations for each day, coordinate through the Engineer, a joint inspection of the construction site with the Airport Operations Center.

i. **Staging Areas.** Locations for Contractor staging areas are shown on the plans. These locations are for your exclusive use for the full time that you are working on the project. No utilities are available at the sites.

Use of staging areas is limited to the storage of construction equipment and supplies used for construction under this contract. Drip pans are required for all powered equipment parked on unpaved surfaces.

Prior to occupying a staging area, mark the staging area limits with lath and flagging. Arrange for a joint inspection with the Engineer and ANC Operations to record the original condition of the staging area. Marking of the staging areas is subsidiary to item G-135a, Construction Surveying by the Contractor. Final payment is subject to the stipulation that each staging area is regraded and reseeded as required to restore to original condition as noted in the initial joint inspection or as approved by the Engineer.

Site preparation, improvements, maintenance and restoration of staging areas is considered subsidiary and no additional payment will be made.

Erosion, sediment and pollution control and prevention as required by Item P-157 shall be fully implimented for staging areas.

Concrete and asphalt plants or crushers are permitted on airport property as approved by the Engineer.

j. **Storage Areas.** Locations for materials storage areas are shown on the plans. These locations shall used for the short and long term storage of aggregate materials as approved by the Engineer.

Prior to occupying a storage area, mark the storage area limits with lath and flagging. Arrange for a joint inspection with the Engineer and ANC Operations to record the original condition of the storage area. Marking of the storage areas is subsidiary to item G-135a, Construction Surveying by the Contractor. Final payment is subject to the stipulation that each storage area is regraded and reseeded as required to restore to original condition as noted in the initial joint inspection or as approved by the Engineer.

Site preparation, improvements, maintenance and restoration of storage areas is considered subsidiary and no additional payment will be made.

Erosion, sediment and pollution control and prevention as required by Item P-157 shall be fully implimented for storage areas.

80-05 CHARACTER OF WORKERS, METHODS, AND EQUIPMENT. The Contractor shall employ sufficient labor and equipment to complete the work required under the Contract and to complete it on time.

The Contractor shall ensure that all workers on the project have the skills and experience necessary to properly perform their assigned work. Workers engaged in special work or skilled work shall have sufficient experience in that work and in the operation of the equipment required to properly perform that work.

The Contractor shall comply with any written order by the Engineer to remove workers, who, in the opinion of the Engineer, violate operational regulations, violate construction safety plan requirements, violate security plan requirements, perform the work in an unskilled manner, who are intemperate or disorderly, or who jeopardize the safety of the public, other workers or Engineer's personnel. The Contractor shall allow removed workers to return to the project only with the Engineer's written permission. The Engineer may suspend the work if the Contractor fails to furnish suitable and sufficient personnel necessary to perform the work, or fails to remove any worker at the Engineer's order.

The Contractor shall not use prisoner labor on the project.

The Contractor shall use equipment of the appropriate size and mechanical condition to produce the specified quality and quantity of work by the means specified in the Contract, if any, and shall ensure that the equipment does not damage roadways or property.

The Contractor shall ensure all equipment, materials, and articles incorporated into the work are new and of the specified quality, unless the Contract specifically permits otherwise.

The Contractor shall provide the Engineer with a list of all powered equipment that will be used on the project, showing the make, model, year, capacity, horsepower, and related information. The Contractor shall update this list when equipment is added or removed from the work site, but need not update more frequently than weekly.

When the methods and equipment to be used by the Contractor are not prescribed by the contract, the Contractor is free to use any method, means or equipment that is satisfactory to produce the specified work in conformity with the Contract, except as provided above. At the request of the Engineer, the Contractor shall demonstrate that the method, means and equipment chosen will produce the work specified in the Contract in the time allowed under the Contract. The Contractor shall bear all costs and impacts associated with any means, methods and equipment chosen by the Contractor. No suggestion, statement or observation from the Engineer or other Department representatives shall alter this responsibility.

If the Contract specifies a particular method, means or type of equipment for performance of the work, the Contractor must use that method, means or equipment unless the Contractor first requests, in writing, permission to alter the Contract requirement and receives prior written approval from the Engineer. The written request shall include a full description of the methods and equipment proposed and of the reasons for desiring to make the change. If approval is given, it will be on the condition that the Contractor will be fully responsible for producing work in conformity with contract requirements. If, after trial use of the substituted methods or equipment, the Engineer determines that the work produced does not meet contract requirements, the Contractor shall discontinue the use of the substitute method or equipment and shall complete the remaining work with the specified methods and equipment. The Contractor shall remove any deficient work and replace it with work of specified quality, or take such other corrective action as the Engineer may direct. No change will be made in basis of payment for the contract items involved, nor in contract time, as a result of authorizing a change in methods or equipment under this subsection, except as specifically provided under Subsection 40-08.

80-05.1 Qualification Submittal for Portland Cement Concrete Paving Contractor

The Contractor performing the work described in this specification shall provide documentation which verifies experience constructing Portland cement concrete (PCC) pavement similar to those shown on

the plans on five (5) separate PCC paving projects during the previous ten (10) years prior to the bid date for this project. A minimum of two (2) of the five (5) projects must have been PCC runway paving projects with contract amounts greater than $10,000,000 and with slip formed PCC quantities of 30,000 cubic yards or more. The runway project work shall have taken place on a secure airfield with the following elements: airport air operations area (AOA), controlled access, daily operations by commercial jets, and an active air traffic control tower. Submit the required information on the form in Appendix N within one week of NTP.

80-05.2 Qualification Submittal for Portland Cement Concrete Paving Contractor's Key Personnel

A list of the PCC contractor's key personnel including the names of the project manager, quality control manager, superintendent(s), concrete slip form equipment operator(s) and lead concrete finishers who will perform or direct the actual installation operations, shall be submitted to the engineer for review and approval one (1) week after Notice to Proceed. This list of personnel shall be accompanied by resumes for the listed staff. The listed staff shall be assigned full time to this project during paving operations. The project manager, superintendent and quality control manager shall have ten (10) years experience in their respective positions and equipment operators and lead concrete finishers shall have five (5) years experience. Key personnel resumes must show successful completion of work of similar complexity and magnitude and include:

1. Number of years of recent continuous relevant experience in performing similar paving operations to this project.
2. Detailed relevant project experience, for the number of years required (5 or 10 depending on position) and containing at a minimum, project description, date of work, actual work performed by the individual, and references (one (1) for each project listed).
3. List of relevant equipment operated: information provided shall include the type of equipment used and the amount and type of experience on the equipment. Operators must show experience on equipment similar to the equipment proposed for this project.

The contractor shall submit resumes for key personnel along with the form in Appendix N within one week of NTP. The Engineer will have the right to approve or reject personnel qualifications as submitted. After approval this list will contain the paving personnel authorized to work on the project. The Engineer may suspend paving if the contractor substitutes unauthorized personnel for authorized personnel during construction without prior authorization. If work is suspended due to the substitution of unauthorized personnel, the Contractor shall be fully liable for additional costs resulting from the suspension of work and no adjustment in contract time resulting from the suspension of work will be allowed.

80-06 CONTRACT TIME, EXTENSION OF CONTRACT TIME AND SUSPENSION OF WORK. Contract time will be specified in Calendar Days or by specific Completion Date.

a. **Calendar Days.** When the contract time is specified on a calendar days basis, all work under the Contract shall be completed within the number of calendar days specified. If no starting day is specified in the Contract, the count of Contract time begins on the day following receipt of the Notice to Proceed by the Contractor.

   Calendar days shall continue to be counted against Contract time until and including the date of project completion. Calendar days shall not be counted during the period from November 1 through April 30, except for days that the Contractor is working on the project site.

b. **Completion Date.** When the contract time is specified on a completion date basis, all work under the Contract shall be completed by the specified completion date.

c. **Reasons for Suspension of Work and Extension of Contract Time.** The Department may order a suspension of work for any reason listed in Items c.(1) through c.(16).

The Department shall not pay additional compensation, but may extend Contract time only, if there are delays in the completion of controlling items of work from unforeseeable causes that are beyond the Contractor's control and are not the result of the Contractor's fault or negligence, including:

(1) Acts of God;

(2) Acts of the public enemy;

(3) Fires;

(4) Floods;

(5) Epidemics;

(6) Quarantine restrictions;

(7) Strikes;

(8) Freight embargoes;

(9) Unusually severe weather;

(10) According to Subsection 50-06.d.(4), delays by utility owners beyond completion dates specified in the Special Provisions for relocating or adjusting utilities and related facilities; or

(11) Delays of subcontractors, suppliers and fabricators from unforeseeable causes beyond the control of the subcontractors, suppliers or fabricators and that are not the fault of the subcontractors, suppliers or fabricators, including those causes listed in this Subparagraph c, Items (1) through (10).

No additional Contract time or additional compensation will be allowed due to delays caused by or suspensions ordered due to:

(12) Failure to correct unsafe conditions for the workers or the public;

(13) Adverse weather that is not unusually severe;

(14) Failure to carry out Contract provisions;

(15) Failure to carry out orders given by the Engineer; or

(16) Failure to timely obtain materials, equipment, or services.

The Contractor shall notify the Engineer as soon as the Contractor becomes aware of any act or occurrence that may form the basis of a request for a time extension under this section. The Contractor shall submit a request for a time extension to the Engineer within 10 days of the act or occurrence, and if an agreement is not reached, the Contractor may submit a Claim under Subsection 50-17.

The time allowed in the Contract, as awarded, is based on performing the original estimated quantities of work set out in the bid schedule. An assertion that insufficient time was originally specified shall not constitute a valid reason for extension of contract time. If satisfactory fulfillment of the Contract requires extra work, the Department may extend Contract time on a basis

commensurate with the amount and difficulty of the extra work, provided that the extra work is for a controlling item.

d. Suspension of Work. The Engineer will suspend work on the project, in whole or in part, for such periods and for such reasons as the Engineer determines to be reasonable, necessary, in the public interest, or for the convenience of the Department.

(1) The Engineer will issue a written order to suspend, delay, or interrupt all or any part of the work. The Contractor shall not be compensated for the suspension, delay, or interruption if it is imposed for a reasonable time under the circumstances.

(2) Unless another Contract section specifically provides otherwise, the Contractor will be compensated by equitable adjustment for a suspension, delay, or interruption of the work only if:

(a) The period of suspension, delay, or interruption is for an unreasonable time under the circumstances and another Contract section allows compensation in the event of a suspension, delay, or interruption of the work under the circumstances that actually caused the suspension, delay, or interruption; or

(b) The delay, suspension, or interruption results from the Department's failure to fulfill a contractual obligation to the Contractor within the time period specified in the Contract or, if no time period is specified, within a reasonable time.

(3) No equitable adjustment will be made under this subsection for any suspension, delay, or interruption of the work if the Contractor's performance would have been suspended, delayed, or interrupted by any other cause for which:

(a) The Department is not responsible under the Contract, including the Contractor's fault or negligence; or

(b) An equitable adjustment is either provided for or excluded under any other section of this Contract.

(4) Claims for equitable adjustments under this section shall be filed under Subsection 50-17 except that:

(a) The Contractor must give written notice of intent to claim no later than 20 days after the event giving rise to the delay, suspension, or interruption; and

(b) The claim may not include any costs incurred more than 20 days before the Contractor files the Contractor's written notice of intent to claim.

80-07 FAILURE TO COMPLETE ON TIME.

~~For each calendar day that the work is not substantially complete after the expiration of the Contract time or the completion date has passed, the Engineer shall deduct the full daily charge corresponding to the original Contract amount shown in Table 80-1 from progress payments.~~
For every calendar day after September 15, 2011, that Runway 7R/25L is not open and fully operational, a sum of fifty thousand dollars and no cents ($50,000.00) per day will be deducted from any moneys otherwise due the Contractor.

~~For each calendar day that the work is substantially complete but the project is not complete, after the expiration of the Contract time or the completion date has passed,~~ For each calendar day that Runway 7R/25L is open and fully operational, but the project is not complete, after the expiration of the Contract time

or the completion date has passed, the Engineer shall deduct 20 percent of the daily charge corresponding to the original Contract amount shown in Table 80-1 from progress payments.

For each work item listed below not completed by the completion date listed, the Engineer shall deduct the full daily charge in table 80-1 corresponding to the item cost estimate listed below.

Work Item	Estimated Cost	Required Completion Date
Pad for ALSF and NDB buildings	$27,000	July 29, 2011
Unclassified excavation completed for Service Road stations 1324+50 to 1345+21	$1,074,000	August 15, 2011
Tower roads and pads	$376,200	August 4, 2011
Glideslope/RVR pad, ILS grading and access driveway	$409,200	August 15, 2011

TABLE 80-1
DAILY CHARGE FOR LIQUIDATED DAMAGES
FOR EACH CALENDAR DAY OF DELAY

Original Contract Amount or Estimated Cost		Daily Charge
From More Than	To and Including	
$ 0	$ 100,000	$ 300
100,000	500,000	550
500,000	1,000,000	750
1,000,000	2,000,000	1,000
2,000,000	5,000,000	1,500
5,000,000	10,000,000	2,500
10,000,000	---------	3,000

If no money is due the Contractor, the Department may recover these sums from the Contractor, from the Surety, or from both. These are liquidated damages and not penalties. These charges shall reimburse the Department for its additional administrative expenses incurred due to the Contractor's failure to complete the work within the time specified.
Permitting the Contractor to continue work after the Contract time has elapsed or the completion date has passed does not waive the Department's rights to collect liquidated damages under this section.

80-08 DEFAULT OF CONTRACT. The Contracting Officer will give a written Notice of Default to the Contractor and the Surety if the Contractor:

a. Fails to begin work under the Contract within the time specified;

b. Fails to perform the work with sufficient workers, equipment, or materials to ensure the prompt completion of the work;

c. Performs the work unsuitably or neglects or refuses to remove materials or to replace rejected work;

d. Discontinues the prosecution of the work;

e. Fails to resume work that has been discontinued within a reasonable time after notice to do so;

f. Becomes insolvent except that if the Contractor declares bankruptcy, termination shall be according to the Federal Bankruptcy Code. In the event that the Contractor declares bankruptcy, the Contractor agrees that the Contract will be assumed by the Surety in a timely manner so as to complete the Contract by the date specified in the Contract;

g. Allows any final judgment to stand against the Contractor unsatisfied for a period of 60 days;

h. Makes an assignment for the benefit of creditors, without the consent of the Engineer;

i. Fails to comply with applicable minimum wage or civil rights requirements;

j. Is a party to fraud, deceit, misrepresentation, or malfeasance in connection with the Contract; or

k. Fails to perform the work in an acceptable manner for any other cause whatsoever.

The written Notice of Default will include a notice to cure and will establish a date by which the cure must be completed. The Contracting Officer may allow more time to cure than originally stated in the Notice to Default if the Contracting Officer deems it to be in the best interests of the Department. Failure to cure the delay, neglect, or default within the time specified in the Contracting Officer's Notice of Default authorizes the Department to terminate the contract. The Department will provide the Contractor and the Contractor's Surety with a written Notice of Termination.

After the Notice of Termination is issued, the Department may take over the work without further notice; may complete it by itself, by contract or otherwise; and may take possession of and use materials, appliances, equipment, or plant on the work site necessary for completing the work.

The Department may transfer the obligation to perform the work from the Contractor to the Surety. In that event, the Surety shall submit its plan for completion of the work, including any contracts or agreements with third parties for completion, to the Department for approval before beginning work. The Surety must follow the Contract requirements for approval of subcontracts, except that the limitation on percent of work subcontracted will not apply. On receipt of the transfer notice, the Surety shall take possession of all materials, tools, equipment, and appliances at the work site, employ an appropriate work force, and complete the Contract work as specified. The Contract specifications and requirements shall remain in effect, except that the Department will make subsequent Contract payments directly to the Surety. The Contractor forfeits any right to claim for the work and is not entitled to receive any further balance of the amount to be paid under the Contract.

The Contractor and the Contractor's Surety are jointly and severally liable for any damage to the Department resulting from the Contractor's delay, neglect, or default, whether or not the Department terminates the Contractor's right to prosecute the work. The Department's damages include any increased costs incurred by the Department in completing the work or paying for the work to be completed. The Department's rights and remedies are in addition to any other rights and remedies provided by law or under the Contract.

If, after notice of termination of the Contractor's right to proceed under this clause, it is determined that the Contractor was not in default, or that the default was excusable, the rights and obligations of the parties will be determined under Subsection 80-09, Termination for Convenience.

80-09 TERMINATION FOR CONVENIENCE.

a. Notice. The Contracting Officer may terminate the Contract in whole or in part due to:

(1) Executive Orders of the President of the United States or the Governor of the State of Alaska with respect to the prosecution of war or the interest of national defense, or any disaster declaration.

(2) Restraining orders or injunctions by a court of competent jurisdiction affecting prosecution of the work based on acts or omissions of persons or agencies other than the Contractor.

(3) Any reason determined by the Contracting Officer to be in the best interest of the Department.

The Contracting Officer will issue a written Notice of Termination to the Contractor. The Notice of Termination shall state the extent to which performance of work under the Contract is terminated, the

effective date of the termination, and for which of the above-listed reasons the Contract is terminated.

b. **Required Actions.** Unless otherwise directed by the Contracting Officer, upon receipt of a Notice of Termination the Contractor shall immediately:

(1) Stop work as directed in the Notice.

(2) Place no further orders or subcontracts for materials, services, or facilities except as approved to complete work not terminated.

(3) Terminate all orders and subcontracts for the terminated work.

(4) Accomplish either (a) or (b) below as directed by the Contracting Officer:

(a) Assign to the Department all right, title and interest in any terminated orders or subcontracts. The Contracting Officer will settle all claims on the terminated orders or subcontracts.

(b) Settle any outstanding liabilities and claims arising from termination of orders and subcontracts. Settlements must be limited to costs allowed under this Section.

(5) Submit to the Contracting Officer a list, certified as to quantity and quality, of all materials acquired or produced for incorporation into the project and that are properly allocable to the terminated portion of the project, exclusive of items disposed of under Subsection 80-09.b.(6), below.

(6) Dispose of materials in the Contractor's possession or control that were acquired or produced but not incorporated into the project as of the termination date as directed by the Contracting Officer under either (a) or (b) below:

(a) Transfer title and deliver the materials to the Department. The Department will pay for the materials at the actual cost delivered to the project or storage site, including transportation charges, to which cost 15% will be added.

(b) Sell the materials. Credit will not have to be extended to prospective purchasers.

The Contractor may acquire the materials if the Contracting Officer approves the sale price and the Contractor meets any other conditions prescribed by the Contracting Officer.

At the sole discretion of the Contracting Officer, the proceeds of any sale, transfer, or disposition of materials may be:

(a) Applied to reduce any payments to be made by the Department under the Contract;
(b) Credited to the cost of the work; or
(c) Paid in any other manner as directed.

(7) Deliver to the Department completed or partially completed plans, drawings, information, and other property required to be furnished under the Contract.

(8) Take all necessary actions and comply with all directives to protect contract-related property in which the Department has or may acquire an interest.

(9) Complete work not terminated.

The Contractor shall proceed immediately with performance of the above obligations notwithstanding any delay in determining or adjusting the amount of any item or reimbursable cost under this clause.

c. Claim. The Contractor shall submit any termination claim to the Contracting Officer within 90 days after the effective date of termination, unless the date for submitting a claim is extended in writing by the Contracting Officer.

(1) Without duplication of any amount paid for under Subsection 80-09.b., the claim may be for the total of:

(a) Costs incurred in performing the terminated work from the date of Contract award to the effective date of the termination subject to the provisions of 80-09.c.(2) regarding reimbursement of equipment costs and 80-09.c.(3) regarding unallowable items.

(b) Payments approved by the Contracting Officer under 80-09.b.(4)(b) to settle the termination claims of suppliers and subcontractors to the extent not covered under 80-09.c.(1)(a).

(c) Reasonably incurred costs for:

1. Accounting, legal, clerical, and other costs reasonably necessary for preparation of the termination claim and settlement negotiations, excluding costs incurred after the date an appeal is filed with the Appeals Officer under 80-09.h.

2. Settling subcontractor and supplier claims, excluding the amounts of those settlements paid under 80-09.c.(1)(b).

(d) Reasonable profit on the costs included in Subsection 80-09.c.(1)(a) based on the Contractor's bid rate for profit or as determined under any other reasonable accounting method. However, if it appears that the Contractor would have sustained a loss on the entire Contract had it been completed, the Contracting Officer will allow no profit and will reduce the settlement to reflect the indicated rate of loss under Subsection 80-09.d. The Department will not pay profit on costs included in Subsections 80-09.c.(1)(b) and 80-09.c.(1)(c).

(2) Equipment claims will be reimbursed as follows:

(a) Contractor-owned equipment usage, based on the Contractor's ownership and operating costs for each piece of equipment as determined from the Contractor's accounting records. Do not base equipment claims on published rental rates.

(b) Idle time for Contractor-owned equipment, based on the Contractor's internal ownership and depreciation costs. Idle equipment time is limited to the actual period of time equipment is idle as a direct result of the termination, not to exceed 30 days. Operating expenses will not be included for payment of idle equipment time.

(c) Rented equipment, based on reasonable, actual rental costs. Equipment leased under "capital leases" as defined in Financial Accounting Standard No. 13 will be considered Contractor-owned equipment. Equipment leased from an affiliate, division, subsidiary or other organization under common control with the Contractor will be considered Contractor-owned equipment, unless the affiliate, division, subsidiary or other organization has an established practice of leasing to unaffiliated lessees.

(3) The following costs are not payable under a termination settlement agreement or Contracting Officer's determination of the termination claim, or on appeal:

(a) Loss of anticipated profits or consequential or compensatory damages.

(b) Unabsorbed home office overhead (also termed "General & Administrative Expense") related to ongoing business operations.

(c) Bidding and project investigative costs.

(d) Direct costs of repairing equipment to render it operable for use on the terminated work.

d. Adjustment for Loss. If the Contractor would have sustained a loss on the entire Contract had it been completed, the Department will not pay the Contractor more than the total of:

(1) The amount due for termination claim costs under Subsection 80-09.c.(1)(c); plus

(2) The remainder of the total allowable claim amount due reduced by multiplying the remainder by the ratio of (a) the total contract price to (b) the remainder plus the estimated cost to complete the entire Contract; minus

(3) All disposal and other credits, all advance and progress payments and all other amounts previously paid under the Contract.

e. Deductions. In arriving at the amount due under this Subsection, the Department will deduct:

(1) All previous payments made before termination;

(2) Any claim which the Department may have against the Contractor;

(3) The proceeds of the sale or transfer of any materials, supplies, or other items acquired for the terminated work and not otherwise recovered by or credited to the Department;

(4) All partial payments made under this Section; and

(5) Any adjustment for loss determined under Subsection 80-09.d.

f. Agreed Settlement. The Contractor shall make every effort to arrive at a claim settlement with the Contracting Officer that is fair to both parties, that reflects the reasonable and allocable incurred costs allowable under Subsection 80-09.c, that includes a profit under Subsection 80-09.c.(1)(d) or, where appropriate, a loss adjustment under Subsection 80-09.d., and that takes into account the Contractor's reasonable business judgment in performing the work.

The total settlement, whether determined under this Subsection 80-09.f. or under Subsection 80-09.g., exclusive of the costs listed in Subsection 80-09.c.(1)(c), may not exceed the total contract price as reduced by previous payments made and the contract price of work not terminated.

If an agreement is reached in whole or in part, the Department will amend the contract and will pay the agreed amount.

g. Determined Settlement. If the Contractor fails to submit a termination claim within the time allowed, or if an agreement is not reached on the amount due, the Contracting Officer may determine in a Contracting Officer's Decision, the amount due under Subsection 80-09 on the basis of information available to the Department.

h. Right of Appeal. The Contractor may appeal a Contracting Officer's Decision within the time and in the manner specified in Subsection 50-17.

i. **Partial Payments.** In the sole discretion of the Contracting Officer, the Department may make partial payments against costs incurred by the Contractor in connection with the terminated portion of the Contract. The sum of these partial payments will not exceed the Contracting Officer's estimate of the total amount that will be due as a result of the termination. The estimate will be based on available information. The Contracting Officer may adjust the estimate as additional information becomes available. If the Contracting Officer orders an audit of the Contractor's financial or project records, the Contracting Officer may decline to make partial payments until the audit is completed.

j. **No Waiver of Rights.** The termination of work by the Department does not affect or extinguish any of the rights of the Department against the Contractor or the Contractor's Surety then existing or which may thereafter accrue. Any retention or payment of monies by the Department due under the terms of the Contract will not release the Contractor or the Contractor's Surety from the contractual obligations or warranties made under Subsection 70-19 or elsewhere in the Contract.

k. **Retaining Records.** The Contractor shall unless otherwise provided for in the Contract or by applicable statute, keep all books, records, documents, and other evidence bearing on the Contractor's cost and expenses under the Contract and relating to the work terminated for a period of 3 years after final settlement under this Contract. Records must be made available to the Department at the Contractor's office and at all reasonable times.

l. **Definitions.** In this Subsection 80-09, the term "cost" and the term "expense" mean a monetary amount in U.S. Dollars actually incurred by the Contractor, actually reflected in the Contractor's contemporaneously maintained accounting or other financial records and supported by original source documentation.

m. **Cost Principles.** The Department may use the federal cost principles at 48 CFR §§ 31.201-1 to 31.205-52 (or succeeding cost principles for fixed price contracts) as guidelines in determining allowable costs under this Subsection to the extent they are applicable to airport construction contracts and consistent with the specifications of this Contract. The provisions of this contract control where they are more restrictive than, or inconsistent with, these federal cost principles.

SECTION 90

MEASUREMENT AND PAYMENT

90-01 GENERAL. Wherever the Contract provides that certain work is subsidiary or it is without extra compensation, the payment for that work is included in the payment for other items of work, and no further or additional payment shall be made for that work.

When more than one type of material or work is specified for a pay item, letter or numeric suffixes included within parentheses following the pay item number are used to differentiate the types.

Lump sum items will not be measured for payment. The Contractor shall accept the bid amount for a lump sum item as complete payment for all work necessary to complete that item. Quantities shown for lump sum items are approximate. No adjustment in the lump sum price will be made if the quantity furnished is more or less than the estimated quantity unless the Contract specifically states otherwise.

90-02 MEASUREMENT OF QUANTITIES. All work completed under the Contract will be measured using the U.S. Customary system of measure. The Engineer may agree for purposes of making progress payments to use a method of measurement other than the methods described below. However, all final payments for quantities will be calculated using one or more of the methods of measurement described below and in the applicable pay item section. Unless otherwise specified, work will be measured as follows:

a. **Acre (43,560 ft^2).** Horizontally, unless specified on the ground surface. No deductions will be made for individual fixtures with an area of 500 ft^2 or less.

b. **Contingent Sum.** Measured as specified in the Contract or Directive authorizing the work. The method of payment may include: (1) a lump sum basis, (2) a price multiplied by the units of work performed, (3) a pay adjustment based on the quality of work, or (4) a deduction from the contract amount.

c. **Cubic Yard (yd^3).** At the location specified using one of the following methods:

(1) **Average End Area.** End area is the calculated area between original ground cross section and either the design cross section or at the Engineer's discretion the final cross section. Volume of material is calculated using the average of end areas multiplied by the distance along centerline between end areas. In extreme cases where most of the earthwork lies along a single horizontal curve the Engineer may compute volume using the average of end areas multiplied by the distance along centroid of cross section between end areas.

(2) **Three-Dimensional.** Where it is impractical to measure material by cross sectioning due to erratic location of isolated deposits, acceptable methods involving three-dimensional measurements may be used.

(3) **Neat Line.** Structures will be measured according to neat lines shown on the Plans or as altered to fit field conditions.

(4) **Nominal.** Volume calculated as nominal width times nominal thickness times the average length of each piece.

(5) **Weight.** With the Engineer's written approval, material that is specified to be measured by volume may be weighed and converted to volume for payment purposes. The Engineer will determine the appropriate conversion factors. When liquid asphalt is a pay item, ASTM D 4311 will be used to convert from weight to volume at 60 °F.

d. **Cubic Yard Vehicle Measure (CYVM).** Material measured by volume in the hauling vehicle will be measured at the point of delivery. Vehicles may be of any acceptable size or type provided that the volume of the actual contents may be readily and accurately determined. Vehicles shall be loaded to the measured vehicle volume. If vehicles are not loaded to the measured vehicle volume, the Engineer at their discretion, may apply a percentage of full factor to the measured volume. Loads shall be leveled when directed. No payment will be made for loads that exceed the legal capacity of the vehicle.

e. **Linear Foot (LF).** From end to end, in place, parallel to the centerline of the item or ground surface on which the items are placed.

f. **Thousand Feet Board Measure (MBM).** Nominal volume based on nominal widths and thickness times actual extreme length of each piece. One board foot = 1 ft^2 X 1 inch thick.

g. **Thousand Gallon (MGal).** By one of the following methods:

(1) Measured or calibrated volume tank;

(2) Metered volume, using a certified calibrated meter; or

(3) Weighed under this subsection and converted to volume, using a specified or approved conversion factor.

h. **Mile.** From end to end, measured horizontally along centerline.

i. **Pound.** Using a certified scale or the net weight of packaged material as labeled by the manufacturer. The Engineer will accept nominal weights for standard manufactured items, unless otherwise specified. The Engineer will accept industry-established manufacturing tolerances, unless otherwise specified.

j. **Square Foot (ft^2).** Parallel to the surface being measured. No deductions will be made for individual fixtures with an area of 1 ft^2 or less. Transverse measurement for area computations will be the neat dimensions shown on the Plans or as directed by the Engineer.

k. **Square Yard (yd^2).** Parallel to the surface being measured. No deductions will be made for individual fixtures with an area of 1 yd^2 or less. Transverse measurement for area computations will be the neat dimensions shown on the Plans or as directed by the Engineer.

l. **Station (100 feet).** Horizontally, parallel to centerline.

m. **Ton (2,000 pounds).** By one of the following methods:

(1) **Commercial Weighing System.** Permanently installed and certified commercial scale that meets the requirements for the project weighing system.

(2) **Project weighing system.** As specified under Subsection G-130.

(3) **Invoices.** If bulk material is shipped by truck or rail and is not passed through a mixing plant, furnish a supplier's invoice with net weight or volume converted to weight. Periodic check weighing may be required.

Trucks used to haul material being paid for by weight shall be weighed empty at least once daily and at such times as directed. Each truck shall bear a plainly legible identification mark.

Due to possible variations in the specific gravity of the aggregates, the measured weight may vary from the weight used to estimate bid quantity, and no adjustment in contract unit price will be made because of such variation.

If material is shipped by rail, the certified car weight may be accepted provided that only the actual weight of material is paid for. Car weights will not be acceptable for material to be passed through mixing plants.

Net certified scale weights or weights based on certified volumes in the case of rail shipments may be used as a basis of measurement, subject to correction when material has been lost, wasted, or otherwise not incorporated into the work.

When materials are shipped by truck or transport, net certified weights or volume, subject to correction for loss or foaming, may be used for computing quantities, in the Engineers discretion.

All aggregate paid by weight shall be less than 2% over optimum moisture.

(4) Barge Displacement Method. When the barge displacement method is proposed the Contractor shall furnish water loading charts, certified by a Professional Engineer for all barges utilized in the hauling of the material. If barge hauled material is stockpiled, loss shall be estimated by the Engineer and shall be deducted from the total weight measured to allow for stockpile loss. Any material wasted or lost between the barge and the point where it is placed in final position shall be estimated and the loss deducted by the Engineer.

When standard manufactured items are specified such as fence, wire, plates, rolled shapes, pipe conduit, etc., and these items are identified by unit weight, section dimensions, etc., such identification will be considered to be nominal weights or dimensions. Unless more stringently controlled by tolerances in cited specifications, manufacturing tolerances established by the industries involved will be accepted.

90-03 SCOPE OF PAYMENT. The Department will make payment at the Contract price or prices for each item shown on the bid schedule or as modified by change order with specified price adjustments. The Contractor shall accept the Contract prices as full and complete payment for (a) furnishing all equipment, materials, tools, and labor necessary to complete the work in a complete and acceptable manner, and for (b) all of the Contractor's risk, loss, damage, or expense of whatever character arising from or relating to the work and performance of the work.

90-04 COMPENSATION FOR ALTERED QUANTITIES. Payment to the Contractor for unit price items shall be made only for the actual quantities of work performed and accepted or materials furnished, in conformance with the Contract. When the accepted quantities of work or materials vary from the quantities stated in the bid schedule, the Contractor shall accept payment at the original Contract unit prices for the quantities of work and materials furnished, completed and accepted as payment in full. Payment at the Contract unit price shall compensate the Contractor for all costs, expenses, and profit that the Contractor is entitled to receive for the altered quantities, except as provided below:

a. When the final quantity of a Major Contract Item varies more than 25 percent above or below the bid quantity, either party to the Contract may receive an equitable adjustment in the Contract unit price of that item. If the final quantity of work is:

(1) Greater than 125 percent of the bid quantity, the equitable adjustment will be made only for those units that are in excess of 125 percent of the bid quantity.

(2) Less than 75 percent of the bid quantity, the equitable adjustment will be made for those units of work done and accepted, except that the total payment for the item shall not exceed 75 percent of the total amount bid for the item.

Except as provided above and in Subsection 40-02, no allowance shall be made for any increased expenses, loss of expected reimbursement, or loss of anticipated profits suffered or claimed, either directly from alterations in quantities or indirectly from unbalanced allocations among the contract items on the part of the bidder and subsequent loss of expected reimbursements, or any other causes.

90-05 COMPENSATION FOR EXTRA WORK ON TIME AND MATERIALS BASIS. When the Engineer orders extra work to be performed on a time and materials basis, compensation will be computed as follows:

a. **Labor.** Based on the sum of **(1)** through **(6)**:

(1) **Total hours worked times the straight time rate of pay.** The rates of pay are those indicated on the certified payroll for all labor and foremen in direct charge of the specific operations. Rates shall not exceed those for comparable labor currently employed on the project, and shall not include general superintendence.

(2) **Overtime hours worked times the difference between the overtime rate and the straight time rate.** No markup is allowed.

(3) **Fringe benefit rate times the total hours worked.** Fringe benefits include Health and Welfare, Pension Fund, etc., when such amounts are required by collective bargaining agreement or other employment contracts generally applicable to the classes of labor employed on the project.

(4) **Workers' Compensation Insurance at 8 percent of (1).** The actual net rate may be used if it exceeds 10 percent and if proof of rates is furnished within 30 days of the completion of the extra work.

(5) **Either subsistence and travel allowances or prorated camp costs.** If an employee is due and receives subsistence or camp privileges on their days off, divide that cost by the number of days worked that week and add to their daily subsistence entitlement. If the employee did not work an entire day on time and materials work, prorate the entitlement for the hours worked on time and materials.

(6) **Markup at 35 percent of the sum of (1), (3), (4), and (5).** This includes and shall fully compensate the Contractor for all overhead and profit, including general superintendence, additional bond, property damage liability insurance, unemployment insurance contributions, social security and other taxes, administrative overhead costs, and profit.

b. **Materials.** Actual invoiced material and delivery costs plus 15 percent markup. The material must be approved and incorporated into the work. The Contractor shall furnish to the Engineer proof of payment for materials used in the work plus applicable transportation charges. For Contractor-produced materials, certify in writing the Contractor's actual direct costs, the quantities used, and attach cost spreadsheets and production documentation to verify the costs.

c. **Equipment.** Includes machinery and special equipment (other than small tools) necessary for the work and authorized by the Engineer. No additional compensation will be made for overhead, profit, maintenance, service, repairs, fuels, lubricants, or replacement parts.

(1) **Hourly Rental Rate.** Based on rental rates in the current edition and appropriate volume of the *Rental Rate Blue Book for Construction Equipment*, published by PRIMEDIA Information, Inc., 1735 Technology Drive, Suite 410, San Jose, CA 95110-1313.

The regular hourly rental rate is equal to the equipment rate plus the estimated hourly operating cost. These rates apply for equipment used during the Contractor's regular shift of 10 hours per day. No markup is allowed.

The equipment rate is equal to the age adjusted monthly rate for the basic equipment plus the age adjusted monthly rate for applicable attachments, both divided by 176, and multiplied by the regional adjustment factor. The equipment rate is per hour.

The age adjusted monthly rate is that resulting from application of the age adjustment formula, to eliminate replacement cost allowances in machine depreciation and contingency cost allowances.

Only the attachments required for the time and materials work will be included.

(2) **Hourly Overtime Rate.** Half of the equipment rate plus the full estimated hourly operating cost. The overtime rate will apply to hours the equipment is used in excess of 10 hours per day, either on the Contractor's normal work or on time and materials, and either on single or multiple shifts. No markup is allowed.

(3) **Hourly Stand-by Rate.** Half of the equipment rate, for equipment ordered on stand-by during the Contractor's normal work shift, not to exceed eight hours per day. No operating costs or markup is allowed.

(4) **Unlisted Equipment.** For equipment not listed in The Blue Book, the Contractor and the Engineer may agree to a rate before extra work is begun. If agreement is not reached, the Engineer has authority to establish a rate based on similar equipment in the Blue Book or prevailing commercial rates. No markup is allowed.

(5) **Leased or Rented Equipment.** Equipment that must be rented or leased specifically for work required under this section and authorized in writing by the Engineer shall be paid at invoice price plus 15 percent markup.

Equipment rented or leased for other work under the Contract and used for work under this section shall be paid based on c.(1), (2), and (3). (above) with no markup, except that the adjusted monthly rate is the monthly rate determined directly from the submitted rental or lease agreement.

(6) **Transportation of Equipment.** The actual cost of moving equipment to and from the work site. To receive reimbursement for transportation of equipment, the Contractor shall obtain the equipment from the nearest approved source and use the equipment exclusively for time and materials work. Payment for move-out will not exceed the amount of the move-in. No markup is allowed, except on operator's wages.

Basis of payment:

(a) If by common carrier: paid freight bill or invoice.

(b) If hauled with the Contractor's own resources: hourly rental rate for hauling unit plus operator wages.

(c) If equipment must be moved under its own power: half of the normal hourly rental rate plus operator's wages.

d. Work by a Subcontractor or Owner-Operator. For time and materials work performed by an approved subcontractor or owner-operator under items **a.** through **c.** above, the Contractor will receive a 5 percent markup for administrative costs. No percentage will be paid on work covered under bid items in the original Contract. No percentage over the amount covered above will be paid for work done by a lower tier subcontractor.

e. **Work by a Specialty Subcontractor.** The Contractor shall obtain the Engineer's advance agreement that the specialty item needed is beyond the Contractor's ability or expertise or that of the Contractor's other subcontractors. For work on a specialty item performed by an approved specialty subcontractor, the Contractor will receive the approved invoice cost of work or service plus a 15 percent markup for administrative costs.

f. **Records.** The Engineer will maintain a daily record of labor, equipment and materials utilized in the extra work. The Engineer will present this record to the Contractor at the end of each day's work for verification and signature.

g. **Compensation.** Payment for time and materials work will be made in the progress estimate following receipt of the verified daily records and all required supporting information from the Contractor. If, at any time, a unit price or lump sum basis of compensation is agreed to for work being performed under this subsection, that compensation will be set forth in writing as a Change Order.

90-06 PROGRESS PAYMENTS. The Department will make monthly progress payments to the Contractor based on estimates of the value of work performed and materials on hand under Subsection 90-07. At the Departments discretion, a progress payment may be made twice monthly if the value of the estimate exceeds $10,000.

If satisfactory progress is being made, the Engineer will authorize 100 percent payment for the estimated value of work accomplished, less any authorized deductions.

If the Engineer finds that satisfactory progress is not being made, the Engineer may withhold up to 10 percent of the total amount earned as retainage from subsequent progress payments. The Engineer may withhold up to 200 percent of the estimated cost to complete final punch list items as retainage until those items are complete. The Engineer will notify the Contractor in writing within eight working days of a request for a progress payment of the reasons why part or all of the payment is being withheld as retainage and what actions may be taken by the Contractor to receive full payment.

Payments of withheld amounts will be made according to AS 36.90.200. No interest will be paid on amounts withheld as retainage.

90-07 PAYMENT FOR MATERIAL ON HAND.

a. **Partial Payment.** The Engineer will make partial payment for materials designated for incorporation into the work. The material shall:

(1) Meet Contract requirements;

(2) Be delivered and stockpiled at the project or other approved location;

(3) Be supported by invoices, freight bills, and other required information; and

(4) Not be living or perishable.

b. **Payment Requests.** The Contractor shall make each payment request in writing and:

(1) List stockpiled items, quantities of each, and stockpile location(s);

(2) Certify that materials meet the applicable Contract specifications;

(3) For purchased materials, attach copies of invoices, freight bills, and manufacturer's published storage recommendations;

(4) For Contractor-produced materials, attach production statements showing quantities and dates produced and copies of process quality control test results; and

(5) Include other information requested by the Engineer.

c. **Storage Conditions.** The Contractor shall protect material from damage or loss while in storage. The Contractor shall:

(1) Physically separate stockpiled materials from other materials at the storage location;

(2) Clearly label materials with the project name and number; and

(3) Store materials per the manufacturer's recommendations.

If storage conditions become unsatisfactory, liens are filed on any materials, or the storage location is changed without approval, the Engineer will deduct any previous payments made for such materials.

d. **Method of Payment.** The Engineer will include payments for acceptably stockpiled materials in the progress estimate following receipt of the Contractor's written request and all required documentation. The Engineer will:

(1) Pay for materials purchased by the Contractor at the delivered cost but not to exceed 85% of the Contract amount for those items.

(2) Pay for materials produced by the Contractor at up to 50% of the Contract amount for those items.

(3) Deduct the Department's cost to inspect materials stored off the limits of the project.

(4) Deduct partial payment quantities as they are incorporated into the project.

The Contractor shall release and discharge the Department from any liability for damages or delays related to the storage or transport of, and to the payment for, material on hand.

The Department's payment for material on hand will not constitute final acceptance by the Department.

90-08 FINAL PAYMENT. When the project has been completed as provided in Subsection 50-15, the Engineer will prepare the final estimate of the quantities of the various classes of work performed. All prior progress estimates and payments shall be subject to correction in the final estimate and payment. The final estimate will not be processed until the Alaska Department of Labor and Workforce Development has verified that final payment can be released. The Department will not process the final estimate until the Contractor completes Items **a** through **d** in the first paragraph of Subsection 50-16.

If the Contractor approves the final estimate, or does not file a claim within 90 days of receiving the final estimate, the estimate shall be processed for final payment. Final payment shall consist of the entire sum found to be due after deducting all previous payments and all amounts to be retained or deducted under the provisions of the Contract. Failure to file a claim within 90 days of receiving the final estimate is a waiver of any and all claims relating to or arising from the final estimate.

When the Contractor approves the final estimate and executes the Contractor's Release form, final payment will be processed.

The Contractor may reserve any unresolved claims that were timely filed according to Subsection 50-17 by listing those claims as exceptions on the Contractor's Release. Any claims listed as exceptions that were not filed before the Contractor executes the final estimate will be considered null and void. Any claims filed in a timely manner but not listed on the Contractor's Release are waived and deemed released.

If the Contractor fails or declines to approve the final estimate within 90 days but does not file any claims, the Department will consider the estimate approved and process the estimate for final payment. Any subsequently raised claims will be considered null and void.

90-09 ELIMINATED ITEMS. When the Contractor is notified of the elimination of a minor Contract item, the Contractor will be reimbursed for actual work performed and all direct costs incurred before notification. In no case will any payment be made for loss of anticipated profits or overhead.

Should it become necessary to eliminate a major Contract item, an equitable adjustment will be made and the Contract modified in writing accordingly.

SECTION 100

CONTRACTOR QUALITY CONTROL PROGRAM

100-01 GENERAL. The Contractor shall assure that all materials and completed construction conform to contract Plans, technical specifications and other requirements, whether manufactured by the Contractor, or procured from subcontractors or vendors. When required, the Contractor shall establish, provide, and maintain an effective Quality Control Program that details the methods and procedures that will be used. Although guidelines are established and certain minimum requirements are specified herein and elsewhere in the contract technical specifications, the Contractor shall assume full responsibility for accomplishing the stated purpose.

The intent of this section is to enable the Contractor to establish a necessary level of control that will:

a. Adequately provide for the production of acceptable quality materials.

b. Provide sufficient information to assure both the Contractor and the Engineer that the specification requirements can be met.

c. Allow the Contractor as much latitude as possible to develop their own standard of control.

The Contractor shall be prepared to discuss and present, at the preconstruction conference, their understanding of the quality control requirements. The Contractor shall not begin any construction or production of materials to be incorporated into the completed work until the Quality Control Program has been reviewed by the Engineer. No partial payment will be made for materials subject to specific quality control requirements until the Quality Control Program has been reviewed.

The quality control requirements contained in this section and elsewhere in the contract technical specifications are in addition to and separate from the acceptance testing requirements. Acceptance testing requirements are the responsibility of the Engineer.

100-02 DESCRIPTION OF PROGRAM.

a. General Description. The Contractor shall establish a Quality Control Program to perform inspection and testing of each item of work for which it is required by the technical specifications, including those performed by subcontractors. This Quality Control Program shall ensure conformance to applicable specifications and Plans with respect to materials, workmanship, construction, finish, and functional performance. The Quality Control Program shall be effective for control of all construction work performed under this Contract and shall specifically include surveillance and tests required by the technical specifications, in addition to other requirements of this section and any other activities deemed necessary by the Contractor to establish an effective level of quality control.

b. Quality Control Program. The Contractor shall describe the Quality Control Program in a written document which shall be reviewed by the Engineer prior to the start of any production, construction, or off-site fabrication. The written Quality Control Program shall be submitted to the Engineer for review at least 5 calendar days before the preconstruction conference.

The Quality Control Program shall be organized to address, as a minimum, the following items:

a. Quality control organization;

b. Project progress schedule;

c. Submittals schedule;

d. Inspection requirements;

e. Quality control testing plan;

f. Documentation of quality control activities; and

g. Requirements for corrective action when quality control and/or acceptance criteria are not met.

The Contractor is encouraged to add any additional elements to the Quality Control Program that he/she deems necessary to adequately control all production and/or construction processes required by this contract.

100-03 QUALITY CONTROL ORGANIZATION. The Contractor's Quality Control Program shall be implemented by the establishment of a separate quality control organization. An organizational chart shall be developed to show all quality control personnel and how these personnel integrate with other management/production and construction functions and personnel.

The organizational chart shall identify all quality control staff by name and function, and shall indicate the total staff required to implement all elements of the Quality Control Program, including inspection and testing for each item of work. If necessary, different technicians can be utilized for specific inspection and testing functions for different items of work. If an outside organization or independent testing laboratory is used for implementation of all or part of the Quality Control Program, the personnel assigned shall be subject to the qualification requirements of Subsection 100-03a and 100-03b. The organizational chart shall indicate which personnel are Contractor employees and which are provided by an outside organization.

The quality control organization shall consist of the following minimum personnel:

a. Program Administrator. The Program Administrator shall be a full-time employee of the Contractor, or a consultant engaged by the Contractor. The Program Administrator shall have a minimum of 5 years of experience in airport and/or highway construction and shall have had prior quality control experience on a project of comparable size and scope as the contract.

Additional qualifications for the Program Administrator shall include at least one of the following requirements:

(1) Professional engineer with 1 year of airport paving experience acceptable to the Engineer.

(2) Engineer-in-training with 2 years of airport paving experience acceptable to the Engineer.

(3) An individual with 3 years of highway and/or airport paving experience acceptable to the Engineer, with a Bachelor of Science Degree in Civil Engineering, Civil Engineering Technology or Construction.

(4) Construction materials technician certified at Level III by the National Institute for Certification in Engineering Technologies (NICET).

(5) Highway materials technician certified at Level III by NICET.

(6) Highway construction technician certified at Level III by NICET.

(7) A NICET certified engineering technician in Civil Engineering Technology with 5 years of highway and/or airport paving experience acceptable to the Engineer.

The Program Administrator shall have full authority to institute any and all actions necessary for the successful implementation of the Quality Control Program to ensure compliance with the contract Plans and technical specifications. The Program Administrator shall report directly to a responsible officer of the construction firm. The Program Administrator may supervise the Quality Control Program on more than one project provided that person can be at the job site within 2 hours after being notified of a problem.

b. Quality Control Technicians. A sufficient number of quality control technicians necessary to adequately implement the Quality Control Program shall be provided. These personnel shall be either engineers, engineering technicians, or experienced craftsman with qualifications in the appropriate field equivalent to NICET Level II or higher construction materials technician or highway construction technician and shall have a minimum of 2 years of experience in their area of expertise.

The quality control technicians shall report directly to the Program Administrator and shall perform the following functions:

(1) Inspection of all materials, construction, plant, and equipment for conformance to the technical specifications, and as required by Section 100-05.

(2) Performance of all quality control tests as required by the technical specifications and Section 100-06.

Certification at an equivalent level, by a state or nationally recognized organization will be acceptable in lieu of NICET certification.

c. Staffing Levels. The Contractor shall provide sufficient qualified quality control personnel to monitor each work activity at all times. Where material is being produced in a plant for incorporation into the work, separate plant and field technicians shall be provided at each plant and field placement location. The scheduling and coordinating of all inspection and testing must match the type and pace of work activity. The Quality Control Program shall state where different technicians will be required for different work elements.

100-04 SUBMITTALS SCHEDULE. The Contractor shall submit a detailed listing of all submittals (e.g., mix designs, material certifications) and shop drawings required by the technical specifications. The listing can be developed in a spreadsheet format and shall include:

a. Specification item number;

b. Item description;

c. Description of submittal;

d. Specification Subsection requiring submittal; and

e. Scheduled date of submittal.

100-05 INSPECTION REQUIREMENTS. Quality control inspection functions shall be organized to provide inspections for all definable features of work, as detailed below. All inspections shall be documented by the Contractor as specified by Section 100-07.

Inspections shall be performed daily to ensure continuing compliance with contract requirements until completion of the particular feature of work. These shall include the following minimum requirements:

During plant operation for material production, quality control test results and periodic inspections shall be utilized to ensure the quality of aggregates and other mix components, and to adjust and control mix proportioning to meet the approved mix design and other requirements of the technical specifications. All equipment utilized in proportioning and mixing shall be inspected to ensure its proper operating condition. The Quality Control Program shall detail how these and other quality control functions will be accomplished and utilized.

During field operations, quality control test results and periodic inspections shall be utilized to ensure the quality of all materials and workmanship. All equipment utilized in placing, finishing, and compacting shall be inspected to ensure its proper operating condition and to ensure that all such operations are in conformance to the technical specifications and are within the plan dimensions, lines, grades, and tolerances specified. The Program shall document how these and other quality control functions will be accomplished and utilized.

100-06 QUALITY CONTROL TESTING PLAN. As a part of the overall Quality Control Program, the Contractor shall implement a quality control testing plan, as required by the technical specifications. The testing plan shall include the minimum tests and test frequencies required by the technical specification Item, as well as any additional quality control tests that the Contractor deems necessary to adequately control production and/or construction processes.

The testing plan can be developed in a spreadsheet fashion and shall, as a minimum, include the following:

a. Specification item number (e.g., P-401);

b. Item description (e.g., Plant Mix Bituminous Pavements);

c. Test type (e.g., gradation, grade, asphalt content);

d. Test standard (e.g., ASTM or AASHTO test number, as applicable);

e. Test frequency (e.g., as required by technical specifications or minimum frequency listed in appendix C when requirements are not stated);

f. Responsibility (e.g., plant technician); and

g. Control requirements (e.g., target, permissible deviations).

The testing plan shall contain a statistically-based procedure of random sampling for acquiring test samples according to ASTM D 3665. The Engineer shall be provided the opportunity to witness quality control sampling and testing.

All quality control test results shall be documented by the Contractor as required by Section 100-07.

100-07 DOCUMENTATION. The Contractor shall maintain current quality control records of all inspections and tests performed. These records shall include factual evidence that the required inspections or tests have been performed, including type and number of inspections or tests involved; results of inspections or tests; nature of defects, deviations, causes for rejection, etc.; proposed remedial action; and corrective actions taken.

These records must cover both conforming and defective or deficient features, and must include a statement that all supplies and materials incorporated in the work are in full compliance with the terms of the contract. Legible copies of these records shall be furnished to the Engineer daily. The records shall cover all work placed subsequent to the previously furnished records and shall be verified and signed by the Contractor's Program Administrator.

Specific Contractor quality control records required for the contract shall include, but are not necessarily limited to, the following records:

a. **Daily Inspection Reports.** Each Contractor quality control technician shall maintain a daily log of all inspections performed for both Contractor and subcontractor operations on a form acceptable to the Engineer. These technician's daily reports shall provide factual evidence that continuous quality control inspections have been performed and shall, as a minimum, include the following:

(1) Technical specification item number and description;

(2) Compliance with approved submittals;

(3) Proper storage of materials and equipment;

(4) Proper operation of all equipment;

(5) Adherence to Plans and technical specifications;

(6) Review of quality control tests; and

(7) Safety inspection.

The daily inspection reports shall identify inspections conducted, results of inspections, location and nature of defects found, causes for rejection, and remedial or corrective actions taken or proposed.

The daily inspection reports shall be signed by the responsible quality control technician and the Program Administrator. The Engineer shall be provided at least one copy of each daily inspection report on the work day following the day of record.

b. **Daily Test Reports.** The Contractor shall be responsible for establishing a system which will record all quality control test results. Daily test reports shall document the following information:

(1) Technical specification item number and description;

(2) Test designation;

(3) Location;

(4) Date of test;

(5) Control requirements;

(6) Test results;

(7) Causes for rejection;

(8) Recommended remedial actions; and

(9) Retests.

Test results from each day's work period shall be submitted to the Engineer prior to the start of the next day's work period. When required by the technical specifications, the Contractor shall maintain statistical quality control charts. The daily test reports shall be signed by the responsible quality control technician and the Program Administrator.

100-08 CORRECTIVE ACTION REQUIREMENTS. The Quality Control Program shall indicate the appropriate action to be taken when a process is deemed, or believed, to be out of control (out of tolerance) and detail what action will be taken to bring the process into control. The requirements for corrective action shall include both general requirements for operation of the Quality Control Program as a whole, and for individual items of work contained in the technical specifications.

The Quality Control Program shall detail how the results of quality control inspections and tests will be used for determining the need for corrective action and shall contain clear sets of rules to gauge when a process is out of control and the type of correction to be taken to regain process control.

When applicable or required by the technical specifications, the Contractor shall establish and utilize statistical quality control charts for individual quality control tests. The requirements for corrective action shall be linked to the control charts.

100-09 INSPECTION BY THE ENGINEER. All items of material and equipment shall be subject to inspection by the Engineer at the point of production, manufacture or shipment to determine if the Contractor, producer, manufacturer or shipper maintains an adequate quality control system in conformance with the requirements detailed herein and the applicable technical specifications and Plans. In addition, all items of materials, equipment and work in place shall be subject to inspection by the Engineer at the site for the same purpose.

Inspection by the Engineer does not relieve the Contractor of performing quality control inspections of either on-site or off-site Contractor's or subcontractor's work.

100-10 NONCOMPLIANCE.

a. The Engineer will notify the Contractor of any noncompliance with any of the foregoing requirements. The Contractor shall, after receipt of such notice, immediately take corrective action. Any notice, when delivered by the Engineer or their authorized representative to the Contractor or their authorized representative at the site of the work, shall be considered sufficient notice.

b. In cases where quality control activities do not comply with either the Contractor's Quality Control Program or the contract provisions, or where the Contractor fails to properly operate and maintain an effective Quality Control Program, as determined by the Engineer, the Engineer may:

(1) Order the Contractor to replace ineffective or unqualified quality control personnel or subcontractors.

(2) Order the Contractor to stop operations until appropriate corrective action is taken.

SECTION 110

METHOD OF ESTIMATING PERCENTAGE OF MATERIAL WITHIN SPECIFICATION LIMITS (PWL)

110-01 GENERAL. When the Specifications provide for acceptance of material based on the method of estimating percentage of material within specification limits (PWL), the PWL will be determined according to this section. All test results for a lot will be analyzed statistically to determine the total estimated percent of the lot that is within specification limits. The PWL is computed using the sample average (X) and sample standard deviation (Sn) of the specified number (n) of sublots for the lot and the specification tolerance limits, L for lower and U for upper, for the particular acceptance parameter. From these values, the respective Quality index(s), QL for Lower Quality Index and/or QU for Upper Quality Index, is computed and the PWL for the lot for the specified n is determined from Table 1. Analysis of test results will be based on an Acceptable Quality Level (AQL) of 95.0% and a contractor's risk of 5.0% unless otherwise specified. AQL may be viewed as the lowest percent within the specification limits of a material that is acceptable as a process average and receive 100% pay. The Contractor's risk is the probability that when the Contractor is producing material at exactly the AQL, the materials will receive less than 1.00 pay factor.

There is some degree of uncertainty (risk) in the measurement for acceptance because only a small fraction of production material (the population) is sampled and tested. This uncertainty exists because all portions of the production material have the same probability to be randomly sampled. The Contractor's risk is the probability that material produced at the acceptable quality level is rejected or subjected to a pay adjustment. The Department's risk is the probability that material produced at the rejectable quality level is accepted.

IT IS THE INTENT OF THIS SECTION TO INFORM THE CONTRACTOR THAT, IN ORDER TO CONSISTENTLY OFFSET THE CONTRACTOR'S RISK FOR MATERIAL EVALUATED, PRODUCTION QUALITY (USING POPULATION AVERAGE AND POPULATION STANDARD DEVIATION) MUST BE MAINTAINED AT THE ACCEPTABLE QUALITY SPECIFIED OR HIGHER. IN ALL CASES, IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO PRODUCE AT QUALITY LEVELS THAT WILL MEET THE SPECIFIED ACCEPTANCE CRITERIA WHEN SAMPLED AND TESTED AT THE FREQUENCIES SPECIFIED.

110-02 METHOD FOR COMPUTING PWL. The computational sequence for computing PWL is as follows:

a. Divide the lot into n sublots according to the acceptance requirements of the specification.

b. Locate the random sampling position within the sublot according to the requirements of the specification. Make a measurement at each location, or take a test portion and make the measurement on the test portion according to the testing requirements of the specification.

c. Discard outliers as determined by ATM SP-7.

d. Find the sample average (X) for all remaining sublot values within the lot by using the following formula:

$$X = (x_1 + x_2 + x_3 + \ldots x_n) / n$$

Where:
X = Sample average of all sublot values within a lot
x_1, x_2 = Individual sublot values
n = Number of sublots

e. Find the sample standard deviation (S_n) by use of the following formula:

$$S_n = [(d_1^2 + d_2^2 + d_3^2 + \ldots d_n^2)/(n-1)]^{1/2}$$

Where:
S_n = Sample standard deviation of the number of sublot values in the set
$d_1, d_2, \ldots$ = Deviations of the individual sublot values $x_1, x_2, \ldots$ from the average value X
that is: $d_1 = (x_1 - X)$, $d_2 = (x_2 - X) \ldots d_n = (x_n - X)$
n = Number of sublots

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

f. For single sided specification limits (i.e., L only), compute the Lower Quality Index Q_L by use of the following formula:

$$Q_L = (X - L) / Sn$$

Where:
L = specification lower tolerance limit
Q_L = Lower Quality Index

Estimate the percentage of material within limits (PWL) by entering Table 1 with Q_L, using the column appropriate to the total number (n) of measurements. Q_L is rounded to the nearest hundredth.

g. For double sided specification limits (i.e. L and U), compute the Quality Indexes Q_L and Q_U by use of the following formulas:

$$Q_L = (X - L) / S_n \quad \text{and} \quad Q_U = (U - X) / S_n$$

Where:
L and U = specification lower and upper tolerance limits. Limits for the largest sieve specified will be plus 0% and minus 1%.
Q_L = Lower Quality Index
Qu = Upper Quality Index

QL and QU are rounded to the nearest hundredth.

Estimate the percentage of material between the lower (L) and upper (U) tolerance limits (PWL) by entering Table 1 separately with Q_L and Q_U, using the column appropriate to the total number (n) of measurements, and determining the percent of material above P_L and percent of material below P_U for each tolerance limit. Determine the PWL by use of the following formula:

$$PWL = (P_U + P_L) - 100$$

Where:
P_L = percent within lower specification limit
P_U = percent within upper specification limit

EXAMPLE OF PWL CALCULATION

(This is an example PWL determination of five random samples from Lot 1. Cores for mat density are used for this example. Follow the same basic procedure for all acceptance criteria requiring a PWL calculation.)

Project: Example Project
Test Item: Item 401a, Lot 1

1. Densities of five random core samples from Lot 1 (n = 5).
   x_1 (D-1) = 93
   x_2 (D-2) = 94
   x_3 (D-3) = 92
   x_4 (D-4) = 95
   x_5 (D-5) = 95

2. Calculate average density (X) for Lot 1.
   $X = (x_1 + x_2 + x_3 + x_4 + x_5)/n$
   $X = (93 + 94 + 92 + 95 + 95)/5$
   X = 93.8 percent density

3. Calculate the standard deviation (S_n) for Lot 1.
   $S_n = [(\{x_1-X\}^2+\{x_2-X\}^2+\{x_3-X\}^2+\{x_4-X\}^2+\{x_5-X\}^2)/n-1)]^{1/2}$
   $S5 = [(\{93-93.8\}^2+\{94-93.8\}^2+\{92-93.8\}^2+\{95-93.8\}^2+\{95-93.8\}^2)/5-1]^{1/2}$
   $S5 = [(0.64+0.04+3.24+1.44+1.44)/4]^{1/2}$
   $S5 = [1.70]^{1/2}$
   S5 = 1.30

4. Calculate the lower Quality Index (Q_L) for Lot 1. (L = Lower specification limit.)
   $Q_L = (X - L)/S_n$
   $Q_L = (93.8-92)/1.30$
   $Q_L = 1.38$

5. Calculate the upper Quality Index (QU) for Lot 1. (U = Upper specification limit.)
   $Q_U = (U - X)/S_n$
   $Q_U = (98-93.8)/1.30$
   $Q_U = 3.23$

6. Determine the percent within lower specification limits (P_L) from Table 1.
   For n = 5 and QL = 1.38, PL = 94

7. Determine the percent within upper specification limits (PU) from Table 1.
   For n = 5 and Q_U = 3.23, P_U = 100

8. Calculate mat density PWL for LOT 1.
   $PWL = (P_L + P_U) - 100$
   $PWL = (94 + 100) - 100$
   PWL = 94

TABLE 1. Table for Estimating Percent of Lot Within Limits (PWL)

For negative values of Q_U or Q_L, use absolute values of Q_U or Q_L and determine P_U or P_L from the table. The P_U or P_L associated with the negative Q_U or Q_L value is equal to 100 minus the table value of P_U or P_L.

P_U or P_L	n = 3	n = 4	n = 5	n = 6	n = 7
	Upper or Lower Quality Index (Q_U or Q_L)				
100	1.16-50.0	1.48-50.0	1.68-50.0	1.81-50.0	1.90-50.0
99	-	1.45-1.47	1.61-1.67	1.71-1.80	1.77-1.89
98	1.15	1.42-1.44	1.55-1.60	1.63-1.70	1.68-1.76
97	-	1.39-1.41	1.50-1.54	1.56-1.62	1.60-1.67
96	1.14	1.36-1.38	1.45-1.49	1.50-1.55	1.53-1.59
95	-	1.33-1.35	1.40-1.44	1.44-1.49	1.47-1.52
94	1.13	1.30-1.32	1.36-1.39	1.39-1.43	1.41-1.46
93	-	1.27-1.29	1.32-1.35	1.34-1.38	1.36-1.40
92	1.12	1.24-1.26	1.28-1.31	1.30-1.33	1.31-1.35
91	1.11	1.21-1.23	1.24-1.27	1.25-1.29	1.26-1.30
90	1.10	1.18-1.20	1.20-1.23	1.21-1.24	1.21-1.25
89	1.08-1.09	1.15-1.17	1.16-1.19	1.17-1.20	1.17-1.20
88	1.07	1.12-1.14	1.13-1.15	1.13-1.16	1.13-1.16
87	1.05-1.06	1.09-1.11	1.09-1.12	1.09-1.12	1.09-1.12
86	1.04	1.06-1.08	1.06-1.08	1.05-1.08	1.05-1.08
85	1.02-1.03	1.03-1.05	1.02-1.05	1.02-1.04	1.01-1.04
84	1.01	1.00-1.02	0.99-1.01	0.98-1.01	0.98-1.00
83	0.98-1.00	0.97-0.99	0.96-0.98	0.95-0.97	0.94-0.97
82	0.97	0.94-0.96	0.92-0.95	0.91-0.94	0.91-0.93
81	0.94-0.96	0.91-0.93	0.89-0.91	0.88-0.90	0.87-0.90
80	0.92-0.93	0.88-0.90	0.86-0.88	0.85-0.87	0.84-0.86
79	0.90-0.91	0.85-0.87	0.83-0.85	0.81-0.84	0.81-0.83
78	0.88-0.89	0.82-0.84	0.79-0.82	0.78-0.80	0.77-0.80
77	0.85-0.87	0.79-0.81	0.76-0.78	0.75-0.77	0.74-0.76
76	0.83-0.84	0.76-0.78	0.73-0.75	0.72-0.74	0.71-0.73
75	0.80-0.82	0.73-0.75	0.70-0.72	0.69-0.71	0.68-0.70
74	0.77-0.79	0.70-0.72	0.67-0.69	0.66-0.68	0.65-0.67
73	0.75-0.76	0.67-0.69	0.64-0.66	0.63-0.65	0.62-0.64
72	0.72-0.74	0.64-0.66	0.61-0.63	0.60-0.62	0.59-0.61
71	0.69-0.71	0.61-0.63	0.58-0.60	0.57-0.59	0.56-0.58
70	0.66-0.68	0.58-0.60	0.55-0.57	0.54-0.56	0.53-0.55
69	0.63-0.65	0.55-0.57	0.52-0.54	0.51-0.53	0.50-0.52
68	0.60-0.62	0.52-0.54	0.48-0.51	0.48-0.50	0.47-0.49
67	0.57-0.59	0.49-0.51	0.46-0.47	0.45-0.47	0.45-0.46
66	0.53-0.56	0.46-0.48	0.44-0.45	0.42-0.44	0.42-0.44
65	0.50-0.52	0.43-0.45	0.41-0.43	0.40-0.41	0.39-0.41
64	0.47-0.49	0.40-0.42	0.38-0.40	0.37-0.39	0.36-0.38
63	0.44-0.46	0.37-0.39	0.35-0.37	0.34-0.36	0.33-0.35
62	0.40-0.43	0.34-0.36	0.32-0.34	0.31-0.33	0.31-0.32
61	0.37-0.39	0.31-0.33	0.29-0.31	0.28-0.30	0.28-0.30
60	0.33-0.36	0.28-0.30	0.26-0.28	0.26-0.27	0.25-0.27
59	0.30-0.32	0.25-0.27	0.24-0.25	0.23-0.25	0.22-0.24
58	0.26-0.29	0.22-0.24	0.21-0.23	0.20-0.22	0.20-0.21
57	0.23-0.25	0.19-0.21	0.18-0.20	0.17-0.19	0.17-0.19
56	0.19-0.22	0.16-0.18	0.15-0.17	0.15-0.16	0.14-0.16
55	0.15-0.18	0.13-0.15	0.12-0.14	0.12-0.14	0.12-0.13
54	0.12-0.14	0.10-0.12	0.09-0.11	0.09-0.11	0.09-0.11
53	0.08-0.11	0.07-0.09	0.07-0.08	0.06-0.08	0.06-0.08
52	0.05-0.07	0.04-0.06	0.04-0.06	0.04-0.05	0.04-0.05
51	0.01-0.04	0.01-0.03	0.01-0.03	0.01-0.03	0.01-0.03

50	0.00	0.00	0.00	0.00	0.00

P_U or P_L	n = 8	n = 9	n = 10 to 11	n = 12 to 14	n = 15 to 18
	Upper or Lower Quality Index (Q_U or Q_L)				
100	1.96-50.0	2.01-50.0	2.05-50.0	2.10-50.0	2.15-50.0
99	1.82-1.95	1.85-2.00	1.87-2.04	1.92-2.09	1.94-2.14
98	1.71-1.81	1.73-1.84	1.75-1.86	1.78-1.91	1.80-1.93
97	1.62-1.70	1.64-1.72	1.66-1.74	1.68-1.77	1.69-1.79
96	1.55-1.61	1.56-1.63	1.57-1.65	1.59-1.67	1.60-1.68
95	1.48-1.54	1.49-1.55	1.50-1.56	1.51-1.58	1.52-1.59
94	1.42-1.47	1.43-1.48	1.44-1.49	1.45-1.50	1.45-1.51
93	1.37-1.41	1.37-1.42	1.38-1.43	1.38-1.44	1.39-1.44
92	1.31-1.36	1.32-1.36	1.32-1.37	1.33-1.37	1.33-1.38
91	1.26-1.30	1.27-1.31	1.27-1.31	1.27-1.32	1.28-1.32
90	1.22-1.25	1.22-1.26	1.22-1.26	1.22-1.26	1.23-1.27
89	1.17-1.21	1.17-1.21	1.18-1.21	1.18-1.21	1.18-1.22
88	1.13-1.16	1.13-1.16	1.13-1.17	1.13-1.17	1.13-1.17
87	1.09-1.12	1.09-1.12	1.09-1.12	1.09-1.12	1.09-1.12
86	1.05-1.08	1.05-1.08	1.05-1.08	1.05-1.08	1.05-1.08
85	1.01-1.04	1.01-1.04	1.01-1.04	1.01-1.04	1.01-1.04
84	0.97-1.00	0.97-1.00	0.97-1.00	0.97-1.00	0.97-1.00
83	0.94-0.96	0.94-0.96	0.93-0.96	0.93-0.96	0.93-0.96
82	0.90-0.93	0.90-0.93	0.90-0.92	0.90-0.92	0.89-0.92
81	0.87-0.89	0.87-0.89	0.86-0.89	0.86-0.89	0.86-0.88
80	0.83-0.86	0.83-0.86	0.83-0.85	0.83-0.85	0.82-0.85
79	0.80-0.82	0.80-0.82	0.80-0.82	0.79-0.82	0.79-0.81
78	0.77-0.79	0.77-0.79	0.76-0.79	0.76-0.78	0.76-0.78
77	0.74-0.76	0.73-0.76	0.73-0.75	0.73-0.75	0.72-0.75
76	0.71-0.73	0.70-0.72	0.70-0.72	0.70-0.72	0.69-0.71
75	0.67-0.70	0.67-0.69	0.67-0.69	0.67-0.69	0.66-0.68
74	0.64-0.66	0.64-0.66	0.64-0.66	0.63-0.66	0.63-0.65
73	0.61-0.63	0.61-0.63	0.61-0.63	0.60-0.62	0.60-0.62
72	0.58-0.60	0.58-0.60	0.58-0.60	0.58-0.59	0.57-0.59
71	0.56-0.57	0.55-0.57	0.55-0.57	0.55-0.57	0.54-0.56
70	0.53-0.55	0.52-0.54	0.52-0.54	0.52-0.54	0.51-0.53
69	0.50-0.52	0.49-0.51	0.49-0.51	0.49-0.51	0.49-0.50
68	0.47-0.49	0.47-0.48	0.46-0.48	0.46-0.48	0.46-0.48
67	0.44-0.46	0.44-0.46	0.44-0.45	0.43-0.45	0.43-0.45
66	0.41-0.43	0.41-0.43	0.41-0.43	0.41-0.42	0.40-0.42
65	0.39-0.40	0.38-0.40	0.38-0.40	0.38-0.40	0.38-0.39
64	0.36-0.38	0.36-0.37	0.35-0.37	0.35-0.37	0.35-0.37
63	0.33-0.35	0.33-0.35	0.33-0.34	0.32-0.34	0.32-0.34
62	0.30-0.32	0.30-0.32	0.30-0.32	0.30-0.31	0.30-0.31
61	0.28-0.29	0.27-0.29	0.27-0.29	0.27-0.29	0.27-0.29
60	0.25-0.27	0.25-0.26	0.25-0.26	0.24-0.26	0.24-0.26
59	0.22-0.24	0.22-0.24	0.22-0.24	0.22-0.23	0.22-0.23
58	0.20-0.21	0.19-0.21	0.19-0.21	0.19-0.21	0.19-0.21
57	0.17-0.19	0.17-0.18	0.17-0.18	0.17-0.18	0.16-0.18
56	0.14-0.16	0.14-0.16	0.14-0.16	0.14-0.16	0.14-0.15
55	0.12-0.13	0.11-0.13	0.11-0.13	0.11-0.13	0.11-0.13
54	0.09-0.11	0.09-0.10	0.09-0.10	0.09-0.10	0.09-0.10
53	0.06-0.08	0.06-0.08	0.06-0.08	0.06-0.08	0.06-0.08
52	0.04-0.05	0.04-0.05	0.04-0.05	0.04-0.05	0.04-0.05

51	0.01-0.03	0.01-0.03	0.01-0.03	0.01-0.03	0.01-0.03
50	0.00	0.00	0.00	0.00	0.00

ITEM D-701 STORM DRAINS AND CULVERTS

DESCRIPTION

701-1.1 This item shall consist of the construction of pipe culverts and storm drains according to these Specifications and in reasonably close conformity with the lines and grades shown on the Plans. This item shall include the removal of existing storm drains and culverts.

MATERIALS

701-2.1 Materials shall meet the requirements shown on the Plans and specified below.

701-2.2 PIPE. The pipe shall be of the type called for on the Plans and shall be according to the following appropriate requirements.

Metallic Coated Corrugated Steel Pipe (Type I, IR or II)	AASHTO M 36
Galvanized Steel Corrugated Structural Plates and Fasteners for Pipe, Pipe-Arches, and Arches	ASTM A 761
Polymer Precoated Corrugated Steel Pipe for Sewers and Drains	ASTM A 762
Post-Coated and Lined (Bituminous or Concrete) Corrugated Steel Sewer and Drainage Pipe	ASTM A 849
Steel Sheet, Zinc and Aramid Fiber Composite Coated for Corrugated Steel Sewer, Culvert, and Underdrain Pipe	ASTM A 885
Corrugated Aluminum Alloy Culvert Pipe	ASTM B 745
Non-Reinforced Concrete Pipe	ASTM C 14
Reinforced Concrete Pipe	ASTM C 76
Reinforced Concrete D-Load Pipe	ASTM C 655
Reinforced Concrete Arch Pipe	ASTM C 506
Reinforced Concrete Elliptical Pipe	ASTM C 507
Precast Reinforced Concrete Box Sections	ASTM C 789 and C 850
Poly (Vinyl Chloride) Ribbed Drain Pipe & Fittings Based on Controlled Inside Diameter	ASTM F 794
Poly (Vinyl Chloride) (PVC) Corrugated Sewer Pipe With a Smooth Interior and Fittings	ASTM F 949
Bituminous-Coated Corrugated Metal Pipe and Pipe Arches	AASHTO M 190
Bituminous-Coated Corrugated Aluminum Alloy Culvert Pipe	AASHTO M 190 and M 196
Bituminous-Coated Structural Plate Pipe, Pipe Arch, and Arches	AASHTO M 167 and M 243
Aluminum Alloy Structural Plate for Pipe, Pipe Arch, and Arches	AASHTO M 219
Polyvinyl Chloride (PVC) Pipe	ASTM D 3034
Corrugated Polyethylene Drainage Tubing	AASHTO M 252
Corrugated Polyethylene Pipe, 300 mm to 1200 mm Diameter	AASHTO M 294
Poly (Vinyl Chloride) (PVC) Profile Wall Drain Pipe and Fittings Based on Controlled Inside Diameter	AASHTO M 304

701-2.3 CONCRETE. Concrete for pipe cradles ~~shall have a minimum compressive strength of 2,000 psi at 28 days and conform to the requirements of AASHTO M 157.~~ and headwalls shall conform to the requirements of Item P-610.

701-2.4 RUBBER GASKETS. Rubber gaskets for rigid pipe shall conform to the requirements of ASTM C 443. Rubber gaskets for PVC pipe and polyethylene pipe shall conform to the requirements of ASTM F 477. Rubber gaskets for zinc-coated steel pipe and precoated galvanized pipe shall conform to the requirements of ASTM D 1056, for the ``RE" closed cell grades.

701-2.5 JOINT MORTAR. Pipe joint mortar shall consist of one part portland cement and two parts sand. The portland cement shall conform to the requirements of AASHTO M 85, Type I. The sand shall conform to the requirements of AASHTO M 45.

701-2.6 JOINT FILLERS. Poured filler for joints shall conform to the requirements of AASHTO M 324.

701-2.7 PLASTIC GASKETS. Plastic gaskets shall conform to the requirements of AASHTO M 198(Type B).

701-2.8 CULVERT MARKER POSTS. Provide posts made of durable glass fiber and resin reinforced material flexible to -40° F, resistant to impact and ultraviolet light, "T" in cross section, 3.75 inch wide x 72 inches long, and color blue. Provide Carsonite CUM-375 utility marker or approved equal.

701-2.9 CLASS B BEDDING. Use one of the following materials:

a. Suitable material as defined in specification subsection P-152-2.3, except that 100% of the material will pass a 1 inch sieve. Use only outside of vertical pavement edge.

b. P-154 Subbase Course except that 100% of the material will pass a 1 inch sieve. Use inside the vertical pavement edge.

701-2.10 END SECTIONS. End sections for metal pipe must be of the same material as the pipe.

701-2.11 CULVERT PIPE REHABILITATION. All materials, fasteners, fillers, and coatings used in the rehabilitation of the 72" culverts shall be compatible with existing materials.

CONSTRUCTION METHODS

701-3.1 EXCAVATION. The width of the pipe trench shall be sufficient to permit satisfactory jointing of the pipe and thorough tamping of the bedding material under and around the pipe and thorough inspection of the installation. ~~but it shall not be less than the external diameter of the pipe plus 6 inches on each side.~~ The trench shall comply with OSHA requirements for safety. ~~walls shall be approximately vertical.~~

~~Where rock, hardpan, or other unyielding material is encountered, the Contractor shall remove it from below the foundation grade for a depth of at least 12 inches or 1/2 inch for each foot of fill over the top of the pipe (whichever is greater) but for no more than 75% of the nominal diameter of the pipe. The width of the excavation shall be at least 1 foot greater than the horizontal outside diameter of the pipe. The excavation below grade shall be backfilled with selected fine compressible material, such as silty clay or loam, and lightly compacted in layers not over 6 inches in uncompacted depth to form a uniform but yielding foundation.~~

~~Where a firm foundation is not encountered at the grade established, due to soft, spongy, or other unstable soil, the unstable soil shall be removed and replaced.~~ All pipes shall be bedded with approved ~~granular~~ Class B bedding material for the full trench width. The Engineer shall determine the depth of over excavation, ~~removal~~ if necessary, to remove unstable foundation soil. Over excavation shall be replaced with suitable material per Item P-152 compacted as approved by the Engineer. The ~~granular~~ Class B bedding material shall be compacted to 95% maximum density or the satisfaction of the Engineer to provide adequate support for the pipe.

The excavation for pipes that are placed in embankment fill shall not be made until the embankment has been completed to a height above the top of the pipe as shown on the Plans.

Existing storm drains and culverts shall be removed as shown on the plans or as directed by the Engineer and the resulting trenches backfilled.

Debris from pipe removal shall be disposed of off airport property.

701-3.2 BEDDING. The pipe bedding shall conform to the class specified on the Plans. When no bedding class is specified or detailed on the Plans, the requirements for Class B bedding shall apply.

a. **Rigid Pipe.** Class A bedding shall consist of a continuous concrete cradle conforming to the plan details.

Class B bedding shall consist of a bed of granular material having a thickness of at least 6 inches below the bottom of the pipe and extending up around the pipe for a depth of not less than 30% of the pipe's vertical outside diameter. The layer of bedding material shall be shaped to fit the pipe for at least 10% of the pipe's vertical diameter and shall have recesses shaped to receive the bell of bell and spigot pipe. The bedding material shall be Class B Bedding. ~~sand or selected sandy soil, all of which passes a 3/8 inch sieve and not more than 10% of which passes a No. 200 sieve.~~

b. **Flexible Pipe.** For flexible pipe, the bed shall be roughly shaped to fit the pipe, and a bedding blanket of ~~sand or fine granular material~~ Class B bedding shall be provided as follows:

Class B bedding shall consist of a bed having a thickness of at least 6 inches plus the depth shown in the following table below the bottom of the pipe:

Pipe Corrugation Depth, in.	Minimum Bedding Depth, in.
½	1
1	2
2	3
2-1/2	3-1/2

The bedding shall extend up around the pipe for a depth of not less than 50% of the pipe's vertical outside diameter.

c. **PVC and Polyethylene Pipe.** For PVC and polyethylene pipe, the bedding material shall consist of Class B bedding. ~~coarse sands and gravels with 100% passing the 3/4 inch sieve. For pipes installed under paved areas, no more than 12% of the material shall pass the No. 200 sieve. For all other areas, no more than 50% of the material shall pass the No. 200 sieve.~~ The bedding shall have a thickness of at least 6 inches below the bottom of the pipe and extend up around the pipe for a depth of not less than 50% of the pipe's vertical outside diameter.

701-3.3 LAYING PIPE. The pipe laying shall begin at the lowest point of the trench and proceed upgrade. The lower segment of the pipe shall be in contact with the bedding throughout its full length. Bell or groove ends of rigid pipes and outside circumferential laps of flexible pipes shall be placed facing upgrade.

Paved or partially lined pipe shall be placed so that the longitudinal center line of the paved segment coincides with the flow line.

Elliptical and elliptically reinforced pipes shall be placed with the manufacturer's top of pipe mark within five degrees of a vertical plane through the longitudinal axis of the pipe.

701-3.4 JOINING PIPE. Joints shall be made with (1) portland cement mortar, (2) portland cement grout, (3) rubber gaskets, (4) plastic gaskets, or (5) coupling bands.

Mortar joints shall be made with an excess of mortar to form a continuous bead around the outside of the pipe and shall be finished smooth on the inside. Molds or runners shall be used for grouted joints in order to retain the poured grout. Rubber ring gaskets shall be installed to form a flexible watertight seal.

a. **Concrete Pipe.** Concrete pipe may be either bell and spigot or tongue and groove. The method of joining pipe sections shall be such that the ends are fully entered and the inner surfaces are reasonably flush and even. Joints shall be thoroughly wetted before mortar or grout is applied.

b. **Metal Pipe.** Metal pipe shall be firmly joined by form fitting bands conforming to the requirements of ASTM A 760 for steel pipe and AASHTO M 36 for aluminum pipe.

c. **PVC and Polyethylene Pipe.** Joints for PVC and polyethlyene pipe shall conform to the requirements of ASTM D 3212 when water tight joints are required. Joints for PVC and polyethlyene pipe shall conform to the requirements of AASHTO M 304 when soil tight joints are required. All joints shall made with a mechanically locking external sleeve or coupling. Tab or slip joints are not sufficient. Fittings for polyethylene pipe shall conform to the requirements of AASHTO M 252 or M 294.

701-3.5 BACKFILLING. Pipes shall be inspected before any backfill is placed; any pipes found to be out of alignment, unduly settled, or damaged shall be removed and relaid or replaced at the Contractor's expense.

~~Material for backfill shall be fine, readily compactable soil, or granular material selected from the excavation or a source of the Contractor's choosing. It shall not contain frozen lumps, chunks of highly plastic clay, or other objectionable material. Material for backfill shall be 100% passing a 2 inch sieve, 95-100% passing a 1/2 sieve, and 0-5% passing a No. 4 sieve.~~

Use backfill that is suitable material as defined in subsection P-152-2.3 except that:

a) All pipes shall be bedded with Class B Bedding except those inside the templates.

b) 100% of the material placed within 1 foot of the pipe will pass a 3 inch sieve.

c) If the pipe is placed in the templates, construct the backfill according to the material and construction requirements of the specifications for the applicable lift of material (P-154, P-208, P-209) etc.

d) Trenches within the vertical pavement edge but outside the template shall be backfilled with Recycled Asphalt Pavement Item P-161 and Subbase Course P-154 up to the bottom of the template as shown in the plans.

When the top of the pipe is even with or below the top of the trench, the backfill shall be compacted in layers not exceeding 6 inches on both sides of the pipe and shall be brought up 1 foot above the top of the pipe or to natural ground level, whichever is greater. Care shall be exercised to thoroughly compact the backfill material under the haunches of the pipe. Material shall be brought up evenly on both sides of the pipe.

When the top of the pipe is above the top of the trench, the backfill shall be compacted in layers not exceeding 6 inches and shall be brought up evenly on both sides of the pipe to 1 foot above the top of the pipe. The width of backfill on each side of the pipe for the portion above the top of the trench shall be equal to twice the pipe's diameter or 12 feet, whichever is less.

For PVC and polyethylene pipe, the backfill shall be placed in two stages; first to the top of the pipe and then at least 12 inches over the top of the pipe. The backfill material shall meet the requirements of Subsection 701-3.2c.

All backfill shall be compacted to ~~the~~ 95% maximum density or as approved by the Engineer. ~~required under Item P-152.~~

701-3.6 72" CULVERT PIPE REHABILITATION. Remove, realign, and reinstall approximately 60' of two 72"x48" culvert pipes beneath the service road south of Runway 7R at approx station 1070+00. Re-establish the flow lines of the pipes by alignment with the average flow line of the adjacent 200' of each pipe. Bed the

pipes as shown on the drawings. Replace all fasteners, and caulk with new materials. Install headwalls as shown in the drawings and re-grade the area in front of the inlets to flow toward the pipes.

701-3.7 CULVERT MARKER POSTS. Install culvert marker posts at each culvert inlet and outlet. Drive posts to 18 inches minimum embedment.

METHOD OF MEASUREMENT

701-4.1 PIPE. The length of pipe will be measured in linear feet of pipe in place, completed, and approved. It will be measured along the centerline of the pipe from end or inside face of structure to the end or inside face of structure, whichever is applicable. The several classes, types and size will be measured separately. All fittings and end sections will be included in the length of the pipe being measured.

Class B Bedding will be weighed by the ton or measured by the cubic yard in final position according to Subsection GCP-90-02. Hauling and placing of the material is subsidiary.

Removal of the existing pipes from the trench and disposal shall not be measured for separate payment but shall be subsidiary to Item P-152 Drainage Excavation.

Over excavation of unstable material in trenches shall be paid under Item P-152 Drainage Excavation.

Replacement of unstable material in trenches with suitable material from excavations shall be subsidiary to Item P-152.

Headwall shall be paid under Item D-752g.

Service road reconstruction shall be paid under the Items required by the service road work.

701-4.2 CONCRETE. The volume of concrete for pipe cradles to be paid for will be the number of cubic yards of concrete which is completed in place and accepted.

701-4.3 ROCK. The volume of rock to be paid for will be the number of cubic yards of rock excavated. No payment will be made for the cushion material placed for the bed of the pipe.

701-4.4 CULVERT MARKER POSTS. Culvert marker posts will not be measured for payment.

BASIS OF PAYMENT

701-5.1 Payment will be made at the contract unit price per linear foot for each kind of pipe of the type and size designated; at the contract unit price per cubic yard of concrete for pipe cradles; and at the contract unit price per cubic yard for rock excavation.

Culvert marker posts will not be paid for directly, but will be subsidiary to pipe items.

Class B Bedding will be paid for at the contract price , per unit of measurement, accepted in place.

Payment will be made under:

Item D-701a	CMP Pipe, 18 inch – per linear foot
Item D-701b	Concrete for pipe cradles - per cubic yard
Item D-701c	Rock excavation - per cubic yard
Item D-701g	Adjust CMP Pipe, 72 inch x 48 inch – per linear foot

Item D-701h Class B Bedding – per ton

MATERIAL REQUIREMENTS

AASHTO M 36	Corrugated Steel Pipe, Metallic-Coated, for Sewers and Drains
AASHTO M 45	Aggregate for Masonry Mortar
AASHTO M 85	Portland Cement
AASHTO M 157	Ready-Mixed Concrete
AASHTO M 190	Bituminous-Coated Corrugated Metal Culvert Pipe and Pipe Arches
AASHTO M 196	Corrugated Aluminum Alloy Culverts and Underdrains
AASHTO M 198	Joints for Circular Concrete Sewer and Culvert Pipe Using Flexible Watertight Gaskets
AASHTO M 219	Aluminum Alloy Structural Plate for Pipe, Pipe-Arches, and Arches
AASHTO M 243	Field Applied Coating of Corrugated Metal Structural Plate for Pipe, Pipe-Arches, and Arches
AASHTO M 252	Corrugated Polyethylene Drainage Tubing
AASHTO M 294	Corrugated Polyethylene Pipe, 300 to 1200 mm Diameter
AASHTO M 304	Poly (Vinyl Chloride) (PVC) Profile Wall Drain Pipe and Fittings Based on Controlled Inside Diameter
AASHTO M 324	Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements
ASTM A 761	Steel Galvanized, Corrugated Structural Plates and Fasteners for Pipe, Pipe-Arches, and Arches
ASTM A 762	Precoated (Polymeric) Galvanized Steel Sewer and Drainage Pipe
ASTM A 849	Post-Coated and Lined (Bituminous or Concrete) Corrugated Steel Sewer and Drainage Pipe
ASTM A 885	Steel Sheet, Zinc and Aramid Fiber Composite Coated for Corrugated Steel Sewer, Culvert, and Underdrain Pipe
ASTM B 745	Corrugated Aluminum Alloy Culvert Pipe
ASTM C 14	Concrete Sewer, Storm Drain, and Culvert Pipe
ASTM C 76	Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
ASTM C 443	Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets
ASTM C 506	Reinforced Concrete Arch Culvert, Storm Drain, and Sewer Pipe
ASTM C 507	Reinforced Concrete Elliptical Culvert, Storm Drain and Sewer Pipe

ASTM C 655	Reinforced Concrete D-Load Culvert, Storm Drain and Sewer Pipe
ASTM C 700	Vitrified Clay Pipe, Extra Strength, Standard Strength, and Perforated
ASTM C 789	Precast Reinforced Concrete Box Sections for Culverts, Storm Drains, and Sewers
ASTM C 850	Precast Reinforced Concrete Box Sections for Culverts, Storm Drains, and Sewers with Less than 2 feet of Cover
ASTM D 1056	Flexible Cellular Materials--Sponge or Expanded Rubber
ASTM D 3034	Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings
ASTM D 3212	Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
ASTM F 477	Elastomeric Seals (Gaskets) for Joining Plastic Pipe
ASTM F 794	Poly (Vinyl Chloride) Ribbed Drain Pipe & Fittings Based on Controlled Inside Diameter
ASTM F 949	Poly (Vinyl Chloride) (PVC) Corrugated Sewer Pipe With a Smooth Interior and Fittings

ITEM D-705 PIPE UNDERDRAINS

DESCRIPTION

705-1.1 This item shall consist of the construction of pipe drains according to these Specifications and in reasonably close conformity with the lines and grades shown on the Plans. This item shall include the removal of existing underdrains and outlet pipes.

MATERIALS

705-2.1 GENERAL. Materials shall meet the requirements shown on the Plans and specified below.

705-2.2 PIPE. The pipe shall be of the type called for on the Plans or in the bid and shall be according to the following appropriate requirements.

Perforated Concrete Pipe	ASTM C 444
Porous Concrete Pipe	ASTM C 654
Polymer Precoated Perforated Corrugated Steel Pipe	ASTM A 762
Perforated Corrugated Aluminum Alloy Pipe	AASHTO M 196
Smooth-Wall Perforated PVC Pipe	ASTM F 758
Poly (Vinyl Chloride) Ribbed Drain Pipe & Fittings Based on Controlled Inside Diameter	ASTM F 794
Poly (Vinyl Chloride)(PVC) Corrugated Sewer Pipe With a Smooth Interior and Fittings	ASTM F 949
Perforated Corrugated Steel Pipe	AASHTO M 36
Bituminous-Coated Perforated Corrugated Aluminum Alloy Pipe	AASHTO M 196 and M 190
Corrugated Polyethylene Drainage Tubing	AASHTO M 252
Corrugated Polyethylene Pipe, 300 to 1200 mm Diameter	AASHTO M 294
Corrugated Polyethelene Channel-Muck Pipe	ASTM F405
Poly (Vinyl Chloride) (PVC) Profile Wall Drain Pipe and Fittings Based on Controlled Inside Diameter	AASHTO M 304

705-2.3 JOINT MORTAR. Pipe joint mortar shall consist of one part portland cement and two parts sand. The portland cement shall conform to the requirements of AASHTO M 85, Type I. The sand shall conform to the requirements of AASHTO M 45.

705-2.4 ELASTOMERIC SEALS. Elastomeric seals shall conform to the requirements of ASTM F 477.

705-2.5 POROUS BACKFILL. Porous backfill shall be free of clay, humus, or other objectionable matter, and shall conform to the gradation in Table 1 when tested according to WAQTC FOP for AASHTO T 27/T 11.

TABLE 1. GRADATION OF POROUS BACKFILL

Sieve Designation (square openings)	Percentage by Weight Passing Sieves	
	Porous Material No. 1	Porous Material No. 2
1-1/2 in.		100
1 in.		90-100
3/8 in.	100	25-60
No. 4	95 - 100	5-40
No. 8	---	0-20
No. 16	45 - 80	---
No. 50	10 - 30	---

No. 100	0 - 10	---

When two courses of porous backfill are specified in the Plans, the finer of the materials shall conform to particle size tabulated herein for porous material No. 1. The coarser granular material shall meet the gradation given in the tabulation for porous material No. 2.

705-2.6. GRANULAR MATERIAL. Granular material used for bedding outlet pipes shall be Class B Bedding placed per Item D-701. ~~and bedding shall be fine, readily compactable soil, or granular material selected from the excavation or a source of the Contractor's choosing. It shall not contain frozen lumps, chunks of highly plastic clay, or other objectionable material. Material for backfill shall be 100% passing a 2-inch sieve, 95-100% passing a 1/2-sieve, and 0-5% passing a No. 4 sieve~~.

705-2.7. FILTER FABRIC. The filter fabric shall conform to the requirements of AASHTO M 288, Class 2.

705-2.8. CLEANOUT. Cleanouts shall be compatible with solid PE pipe used for the risers. Each shall be supplied with a tight fitting threaded plug. The cleanout shall allow for the inspection and clearing of obstructions in the underdrains or outlet pipes.

705-2.9 INSPECTION FRAME WITH LID. Inspection frames shall be approved for airport use and capable of supporting #250 wheel loads. Inside diameter shall not be less the 8". They shall be made of ductile iron or other approved material made for outdoor use. They shall be large enough to allow ready access and removal of the cleanout plugs. The lids shall have screw down attachments.

705-2.10 GROUT. Grout for filling existing outlet pipes to be abandoned in place shall be of a commercial grade with a minimum 28-day compressive strength of 2,500 psi or an approved, pre-mixed, sacked concrete.

705-2.11 ROCK FLUME. Using stones that are sound and durable, are no longer than 8" in the greatest dimension, and not more than 50% by weight passing a 3" sieve.

CONSTRUCTION METHODS

705-3.1 EQUIPMENT. All equipment necessary and required for the proper construction of pipe underdrains shall be on the project, in first-class working condition, and approved by the Engineer before construction is permitted to start.

705-3.2 EXCAVATION. The width of the pipe trench shall be sufficient to permit satisfactory jointing of the pipe and thorough tamping of the bedding material under and around the pipe and thorough inspection of the installation. ~~, but shall not be less than the external diameter of the pipe plus 6 inches on each side.~~ The trench shall comply with OSHA requirements. ~~walls shall be approximately vertical.~~

~~Where rock, hardpan, or other unyielding material is encountered, it shall be removed below the foundation grade for a depth of at least 4 inches. The excavation below grade shall be backfilled with selected fine compressible material, such as silty clay or loam, and lightly compacted in layers not over 6 inches in uncompacted depth to form a uniform but yielding foundation.~~

~~Where a firm foundation is not encountered at the grade established, due to soft, spongy, or other unstable soil, the unstable soil shall be removed and replaced.~~ All outlet pipes,except those in the templates, shall be bedded with approved ~~granular material~~ Class B Bedding per Item D-701 for the full trench width. The engineer shall determine the depth of ~~removal~~ over excavation, if necessary to remove unstable foundation soil. Over excavation shall be replaced with suitable material per Item P-152 compacted as approved by the Engineer. The ~~granular~~ Class B Bedding material shall be compacted to 95% density or the satisfaction of the Engineer to provide adequate support for the pipe.

Underdrain pipes shall not be bedded but shall be surrounded by porous material as shown on the plans.

Excavated material not required or acceptable for backfill shall be disposed of by the Contractor as directed by the Engineer. The excavation shall not be carried below the required depth; when this is done, the trench shall be backfilled at the Contractor's expense with material approved by the Engineer and compacted to the density of the surrounding earth material.

The bed for the pipe shall be so shaped that at least the lower quarter of the pipe shall be in continuous contact with the bottom of the trench. Spaces for the pipe bell shall be excavated accurately to size to clear the bell so that the barrel supports the entire weight of the pipe.

The Contractor shall do such trench bracing, sheathing, or shoring necessary to perform and protect the excavation as required for safety and conformance to governing laws. Unless otherwise provided, the bracing, sheathing, or shoring shall be removed by the Contractor after the completion of the backfill to at least 12 inches over the top of the pipe. The sheathing or shoring shall be pulled as the granular backfill is placed and compacted to avoid any unfilled spaces between the trench wall and the backfill material. The cost of bracing, sheathing, or shoring, and the removal of same, shall be included in the unit price bid per linear foot for the pipe.

Existing underdrains and outlet pipes within the vertical pavement edge shall be removed as shown on the plans or as directed by the Engineer. Trenches, except those required by the new work, shall be backfilled.

Existing underdrains that continue outside the vertical pavement edge shall be connected to the new underdrains whenever possible.

Portions of existing outlet pipes that continue outside the vertical pavement edge that are not required to be removed by the new work, shall be abandoned in place, filled with grout to the greatest extent possible, and capped /plugged at both ends as shown on the plans or directed by the Engineer to prevent hazards and subterranean erosion.

Debris from outlet pipe and underdrain removal shall be disposed of off airport property.

705-3.3 LAYING AND INSTALLING PIPE.

a. **Clay or Concrete Pipe.** The laying of the pipe in the finished trench shall be started at the lowest point and laid upgrade. When bell and spigot pipe is used, the bells shall be laid upgrade. If tongue and groove pipe is used, the groove end shall be laid upgrade. Holes in perforated pipe shall be placed down, unless otherwise shown on the Plans. The pipe shall be firmly and accurately set to line and grade so that the invert will be smooth and uniform. Pipe shall not be laid on frozen ground.

   Pipe which is not true in alignment, or which shows any settlement after laying, shall be taken up and relaid without extra compensation.

b. **Metal and Fiber Pipe.** The metal pipe shall be laid with the separate sections joined firmly together with bands, with outside laps of circumferential joints pointing upgrade, and with longitudinal laps on the sides. Any metal in the pipe or bands which is not protected thoroughly by galvanizing shall be coated with a suitable asphaltum paint.

   The sections of bituminized-fiber pipe shall be securely fastened together with suitable fittings. When the fiber couplings are tapered, they shall provide a tight, driven fit.

   During installation, the asphalt-protected pipe shall be handled without damaging the asphalt coating. Any breaks in the bitumen or treatment of the pipe shall be refilled with the type and kind of bitumen used in coating the pipe originally.

—**PVC or Polyethylene Pipe.** PVC or polyethylene pipe shall be installed according to the requirements of ASTM D 2321 or AASHTO Standard Specification for Highway Bridges Section 30. Perforations shall meet the requirements of AASHTO M 252 or M 294 Class 2, unless otherwise indicated on the Plans. The pipe shall be laid accurately to line and grade. Outlet pipes shall type S double walled, solid PE pipe. Cleanouts shall be connected to underdrains with type S solid PE pipe. Underdrains shall be perforated, type S semi-rigid PE pipe.

c. **All Types of Pipe.** The upgrade end of pipelines, not terminating in a structure or cleanout, shall be plugged or capped as approved by the Engineer.

Unless otherwise shown on the Plans, a 4-inch bed of granular backfill material shall be spread in the bottom of the trench throughout the entire length under all perforated pipe underdrains.

Pipe outlets for the underdrains shall be constructed when required or shown on the Plans. The pipe shall be laid with tight-fitting, mechanical locking, joints as approved by the Engineer. Tab or slip joints are not sufficent. Porous backfill is not required around or over pipe outlets ~~for underdrains~~ or cleanouts but shall be bedded with Class B bedding per Item D-701. All connections to other drainage pipes or structures shall be made as required and in a satisfactory manner. If connections are not made to other pipes or structures, the outlets shall be protected and constructed as shown on the Plans.

e. **Filter Fabric.** The filter fabric shall be installed according to the manufacturer's recommendations, or according to AASHTO M 288 APPENDIX, unless otherwise shown on the Plans.

f. Cleanouts shall be enclosed in an inspection frame with screw down lid. The inspection frame shall be installed centered on the cleanout with sufficient cleanance to prevent the frame from bearing on the cleanout in final position with the lid in-place.

705-3.4 MORTAR. The mortar shall be of the desired consistency for caulking and filling the joints of the pipe and for making connections to other pipes or to structures. Mortar that is not used within 45 minutes after water has been added shall be discarded. Retempering of mortar shall not be permitted.

705-3.5 JOINTS IN CLAY OR CONCRETE PIPE. When open or partly open joints are required or specified, they shall be constructed as indicated on the Plans. The pipe shall be laid with the ends fitted together as designed. If bell and spigot pipe is used, mortar shall be placed along the inside bottom quarter of the bell to center the following section of pipe.

The open or partly open joints shall be surrounded with granular material meeting requirements of porous backfill No. 2 or as indicated on the Plans. This backfill shall be placed so its thickness will be not less than 3 inches nor more than 6 inches, unless otherwise shown on the Plans.

When the original material excavated from the trench is impervious, commercial concrete sand or granular material meeting requirements of porous backfill No. 1 shall surround porous backfill No. 2, as shown on the Plans or as directed by the Engineer.

When the original material excavated from the trench is previous and suitable, it may be used as backfill in lieu of porous backfill No. 1, when indicated on the Plans or as directed by the Engineer.

705-3.6 BACKFILLING.

a. **Earth.** All trenches and excavations shall be backfilled within a reasonable time after the pipes are installed, unless other protection of the pipe is directed. The backfill material shall be selected material from excavation or borrow; material which is placed within a nominal pipe diameter distance

at the sides of the pipe and 1 foot over the top shall be material which can be readily compacted. It shall not contain stones retained on a 3-inch sieve, frozen lumps, chunks of highly plastic clay, or any other material which is objectionable to the Engineer. The material shall be moistened or dried, if necessary to be compacted by the method in use. Backfill material shall be approved by the Engineer. Special care shall be taken in placing the backfill. Great care shall be used to obtain thorough compaction under the haunches and along the sides to the top of the pipe.

The backfill shall be placed in loose layers not exceeding 6 inches in depth under and around the pipe, and not exceeding 8 inches over the pipe. Successive layers shall be added and thoroughly compacted by hand and pneumatic tampers, approved by the Engineer, until the trench is completely filled and brought to the proper elevation. Backfilling shall be done in a manner to avoid injurious top or side pressures on the pipe.

b. In embankments and for other areas outside of pavements, the backfill shall be compacted to the density required for embankments in unpaved areas under Item P-152. Under paved areas, the subgrade and any backfill shall be compacted to the density required for embankments for paved areas under Item P-152.

c. Granular Material. When granular backfill is required, its placement in the trench and about the pipe shall be as shown on the Plans. Special care shall be taken in placing the backfill. The granular backfill shall not contain a damaging amount of foreign matter, nor shall earth from the sides of the trench or from the windrow be allowed to filter into the backfill. When required by the Engineer, a template shall be used to properly place and keep separate the two sizes of backfill. The backfill shall be placed in loose layers not exceeding 6 inches in depth and compacted by hand and pneumatic tampers to the requirements as given for earth backfill. Backfilling shall be done in a manner to avoid injurious top or side pressure on the pipe. The granular backfill shall be made to the elevation of the trench, as shown on the Plans.

When perforated pipe is specified, granular backfill material shall be placed along the full length of the pipe. The position of the granular material shall be as shown on the Plans. If the original material excavated from the trench is pervious and suitable, it shall be used in lieu of porous backfill No. 1.

When porous backfill is to be placed in paved or adjacent areas prior to the completion of grading or subgrade operations, the backfill material shall be placed immediately after laying the pipe. The depth of this granular backfill shall be not less than 12 inches, measured from the top of the underdrain. During subsequent construction operations, this minimum backfill of 12 inches of depth shall not be disturbed until such time as the underdrains are to be completed. When the underdrains are to be completed, the unsuitable material shall be removed until the porous backfill is exposed. That part of the porous backfill which contains objectionable material shall be removed and replaced with suitable material. The cost of removing and replacing any such unsuitable material shall be borne by the Contractor.

Whenever a granular subbase blanket course is to be used under pavements which extends beyond the edge of paving to the outside edge of the underdrain trench, the granular backfill material over the underdrains shall be placed in the trench up to an elevation of 2 inches above the bottom surface of the granular subbase blanket course. Immediately prior to the placing of the granular subbase blanket course, the Contractor shall blade this excess trench backfill from the top of the trench onto the adjacent subgrade where it can be incorporated into the granular subbase blanket course. Any unsuitable material which remains over the underdrain trench shall be removed and replaced. The subbase material shall be placed to provide clean contact between the subbase material and the underdrain granular backfill material for the full width of the underdrain trench.

d. Deflection Testing. The Engineer may at any time, not withstanding previous material acceptance, reject or require re-installation of pipe that exceeds 5% deflection when measured according to ASTM D 2321, including Appendices.

705-3.7 CONNECTIONS. When the Plans call for connections to existing or proposed pipe or structures, these connections shall be watertight and made so that a smooth uniform flow line will be obtained throughout the drainage system.

METHOD OF MEASUREMENT

705-4.1 The length of pipe to be paid for will be the number of linear feet of pipe underdrains and outlet pipes in place, completed, and approved; measured along the centerline of the pipe from end or inside face of structure to the end or inside face of structure, whichever is applicable. The several classes, types, and sizes will be measured separately. All fittings will be included in the length as typical pipe sections in the pipeline being measured and not measured separately for payment.

705-4.2 The quantity of porous backfill to be paid for will be the number of cubic yards of porous backfill No. 1 and No. 2, complete in place and accepted, and will be determined from the dimensions given on the Plans by typical trench sections indicating the placement of porous backfill or dimensions ordered by the Engineer.

705-4.3 The quantity of filter fabric to be paid for will be the number of square yards of filter fabric in place, completed, and approved; and will be determined from the dimensions given on the Plans by typical trench sections indicating the placement of filter fabric or dimensions ordered by the Engineer.

705-4.4 Clearing and grubbing for outlet pipe trenches shall be subsidiary to Item P-152 Drainage Excavation.

Trench excavation outside the templates shall be paid under Item P-152 Drainage excavation.

Class B Bedding will be measured and paid per Item D-701.

Over excavation of unstable material in trenches shall be paid under Item P-152 Drainage Excavation.

Replacement of unstable material in trenches with suitable material from the excavations shall be subsidiary to Item P-152.

Removal of the existing pipes from the trench and disposal shall not be measured for separate payment but shall be subsidiary to Item P-152 Drainage Excavation.

Concrete grouting for existing outlet pipes to be abandoned in place shall not be measured for separate payment but shall be subsidiary to Item D-705a(4).

Capping and plugging of existing pipes to be abandoned shall not be measured for separate payment but shall be subsidiary to Item D-705a(4).

Backfill inside the typical sections shall be paid for under the applicable Item P-154, P-208, P-209, etc. for each lift of materials as required by the typical sections.

Backfill outside the typical sections using suitable material obtained from excavations shall be subsidiary to Item P-152.

Rock flumes as shown on the plans shall be subsidiary to D-705a(4).

Seeding and mulching trenches outside the vertical pavement edge shall be paid per Item T-901.

705-4.5 The quanity of cleanouts to be paid for will be the number of cleanouts in place, completed and approved; and will be determined from the number shown on the Plans or directed by the Engineer. Inspection frames and lids for cleanouts shall be subsidiary.

BASIS OF PAYMENT

705-5.1 Payment will be made at the contract unit price per linear foot for pipe underdrains of the type, class, and size designated; at the contract unit price per each for cleanouts; at the contract unit price per cubic yard for porous backfill No.1; at the contract unit price per cubic yard for porous backfill No. 2, and at the contract unit price per square yard for filter fabric.
Payment will be made under:

Item D-705a(1)	PE, Type S Underdrain, 6 inch semi-rigid- per linear foot
Item D-705a(2)	PE, Underdrain, 6 inch flexible – per linear foot
Item D-705a(3)	PE, Type S Solid Pipe, 6 inch- per linear foot
Item D-705a(4)	PE, Type S Solid Pipe, 12 inch- per linear foot
Item D-705b	Porous Backfill No. 1 - per cubic yard
Item D-705c	Porous Backfill No. 2 - per cubic yard
Item D-705d	Filter Fabric - per square yard
Item D-705f	Cleanout – per each

TESTING REQUIREMENTS

WAQTC FOP for AASHTO T 27/T 11	Sieve Analysis of Aggregates & Soils

MATERIAL REQUIREMENTS

AASHTO M 36	Corrugated Steel Pipe, Metallic-Coated, for Sewers and Drains
AASHTO M 45	Aggregate for Masonry Mortar
AASHTO M 85	Portland Cement
AASHTO M 190	Bituminous Coated Corrugated Metal Culvert Pipe and Pipe Arches
AASHTO M 196	Corrugated Aluminum Alloy Culverts and Underdrains
AASHTO M 252	Corrugated Polyethylene Drainage Tubing
AASHTO M 288	Geotextile Specification for Highway Applications
AASHTO M 294	Corrugated Polyethylene Pipe, 300 to 1200 mm Diameter
AASHTO M 304	Poly (Vinyl Chloride) (PVC) Profile Wall Drain Pipe and Fittings Based on Controlled Inside Diameter
AASHTO	*Standard Specifications for Highway Bridges*
ASTM A 762	Corrugated Steel Pipe, Polymer Precoated for Sewers and Drains
ASTM C 444	Perforated Concrete Pipe
ASTM C 654	Porous Concrete Pipe
ASTM D 2321	Underground Installation of Flexible Thermoplastic Sewer Pipe

ASTM D 3034	Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings
ASTM F 477	Elastomeric Seals (Gaskets) for Joining Plastic Pipe
ASTM F 758	Smooth-Wall Poly(Vinyl Chloride) (PVC) Plastic Underdrain Systems for Highway, Airport, and Similar Drainage
ASTM F 949	Poly (Vinyl Chloride)(PVC) Corrugated Sewer Pipe with a Smooth Interior and Fittings

ITEM D-752 CONCRETE CULVERTS, HEADWALLS, AND MISCELLANEOUS DRAINAGE STRUCTURES

DESCRIPTION

752-1.1 This item shall consist of plain or reinforced concrete culverts, headwalls, and miscellaneous drainage structures constructed according to these Specifications, at the specified locations and conforming to the lines, grades, and dimensions shown on the Plans or required by the Engineer.

MATERIALS

752-2.1 CONCRETE. Concrete shall meet the requirements of Item P-610.

CONSTRUCTION METHODS

752-3.1 UNCLASSIFIED EXCAVATION.

a. Trenches and foundation pits for structures or structure footings shall be excavated to the lines and grades or elevations shown on the Plans. The excavation shall be of sufficient size to permit the placing of the full width and length of the structure or structure footings shown. The elevations of the bottoms of footings, as shown on the Plans, shall be considered as approximate only; and the Engineer may order, in writing, changes in dimensions or elevations of footings necessary to secure a satisfactory foundation.

b. Boulders, logs, or any other objectionable material encountered in excavation shall be removed. All rock or other hard foundation material shall be cleaned of all loose material and cut to a firm surface either level, stepped, or serrated, as directed by the Engineer. All seams or crevices shall be cleaned out and grouted. All loose and disintegrated rock and thin strata shall be removed. When concrete is to rest on a surface other than rock, special care shall be taken not to disturb the bottom of the excavation, and excavation to final grade shall not be made until just before the concrete or reinforcing steel is to be placed.

c. The Contractor shall do all bracing, sheathing, or shoring necessary to perform and protect the excavation and the structure as required for safety or conformance to governing laws. The cost of bracing, sheathing, or shoring shall be included in the unit price bid for excavation.

d. Unless otherwise provided, bracing, sheathing, or shoring involved therewith shall be removed by the Contractor after the completion of the structure. Removal shall be effected in a manner which will not disturb or mar finished concrete. The cost of removal shall be included in the unit price bid for excavation.

e. After each excavation is completed, the Contractor shall notify the Engineer to that effect, and concrete or reinforcing steel shall be placed after the Engineer has approved the depth of the excavation and the character of the foundation material.

752-3.2 BACKFILLING.

a. After a structure has been completed, backfill with approved material, in horizontal layers not to exceed 8 inches in loose depth, and compact. The field density of the compacted material shall be at least 95%. ~~90% of the maximum density for cohesive soils and 95% of the maximum density for noncohesive soils.~~ The maximum density shall be determined according to WAQTC FOP for AASHTO T 99/T 180 or ATM 212. The field density and moisture content shall be determined according to WAQTC FOP for AASHTO T 310.

b. No backfilling shall be placed against any structure until permission is given by the Engineer. In the case of concrete, such permission shall not be given until the concrete has been in place 7 days, or until tests made by the laboratory under the supervision of the Engineer establish that the concrete has attained sufficient strength to provide a factor of safety against damage or strain in withstanding any pressure created by the backfill or the methods used in placing it.

c. Fill placed around concrete culverts shall be deposited on both sides at the same time and to approximately the same elevation. All slopes bounding or within the areas to be backfilled shall be stepped or serrated to prevent wedge action against the structure.

d. Backfill will not be measured for direct payment. Performance of this work under the contract is not payable directly but shall be considered as a subsidiary obligation of the Contractor, covered under the contract unit price for "unclassified excavation for structures."

752-3.3 WEEP HOLES. Weep holes shall be constructed as shown on the Plans.

METHOD OF MEASUREMENT

752-4.1 Unclassified excavation for structures will not be measured for payment and shall be subsidiary to item D-752b ~~in original position, between vertical planes 18 inches outside of and parallel to the neat lines of the footings.~~

752-4.2 Concrete will be measured by the dimensions shown on the Plans or ordered by the Engineer complete in-place and accepted. No measurement or other allowances will be made for forms, false work, cofferdams, pumping, bracing, expansion joints, or finishing of the concrete. No deductions will be made for the volumes of reinforcing steel or embedded items.

752-4.3 Reinforcing steel will not be measured for payment and shall be subsidiary to Item D-752b. ~~by the theoretical weight shown on the Plans, complete in place and accepted. The unit weight used for deformed bars will be the weight of plain square or round bars, as the case may be, of equal nominal size~~.

BASIS OF PAYMENT

752-5.1 Payment will be made ~~at the contract unit price per cubic yard for unclassified excavation the structures;~~ at the contract unit price per cubic yard for concrete for the structures; ~~and at the contract unit price per pound for reinforcing steel~~.

Payment will be made under:

Item D-752a	Unclassified Excavation for Headwalls - -per cubic yard
Item D-752b	Structural Concrete Headwalls- per cubic yard
Item D-752c	Reinforcing Steel for Headwalls- per pound

TESTING REQUIREMENTS

ATM 212	Standard Density of Coarse Granular Materials Using the Vibratory Compactor
WAQTC FOP for AASHTO T 99/T 180	Moisture-Density Relations of Soils
WAQTC FOP for AASHTO T 310	In-Place Density and Moisture Content of Soil and Soil-Aggregate by Nuclear Methods

ITEM F-162 CHAIN-LINK FENCE

DESCRIPTION

162-1.1 This item shall consist of furnishing and erecting a chain-link fence according to these specifications and the details shown on the Plans. Work includes removal of fence and gates as shown on the Plans.

MATERIALS

162-2.1 FABRIC. Chain-link fabric shall meet AASHTO M 181, 9-gage thickness, Type I (zinc-coated steel), Class ~~C or~~ D coating, and 2-inch mesh.

162-2.2 BARBED WIRE. Barbed wire shall meet AASHTO M 280, Design Number 12-4-5-14R, Standard Grade, Coating Type Z, and Coating Class 3.

162-2.3 POSTS, RAILS AND BRACES. Line posts, rails, and braces shall be galvanized steel pipe, or equivalent galvanized roll-formed sections, and meet AASHTO M 181, Type I, Grade 1 or Grade 2.

The dimensions of the posts, rails, and braces shall be as shown on the Plans.

162-2.4 GATES. Gate frames shall consist of galvanized steel pipe, or equivalent galvanized roll-formed sections, and shall meet AASHTO M 181, Type I, Grade 1 or Grade 2. The fabric shall be of the same type material as used in the fence.

162-2.5 WIRE TIES AND TENSION WIRES. Wire ties for use in conjunction with a given type of fabric shall be of the same material and coating weight identified with the fabric type. Tension wire shall meet AASHTO M 181, Type I, Class 3 coating.

162-6 MISCELLANEOUS FITTINGS AND HARDWARE. Miscellaneous steel fittings and hardware shall meet AASHTO M 181, Type I, Grade 1 Barbed wire support arms shall withstand a load of 250 pounds applied vertically to the outermost end of the arm.

162-2.7 CONCRETE. Concrete shall be of a commercial grade with a minimum 28-day compressive strength of 2,500 psi or an approved, pre-mixed, sacked concrete.

162-2.8 MARKING. Each roll of fabric shall carry a tag showing the kind of base metal, kind of coating, the gage of the wire, the length of fencing in the roll, and the name of the manufacturer. Posts, wire, and other fittings shall be identified as to manufacturer, kind of base metal, and kind of coating.

162-2.9 GATE LOCKS. Gate locks shall be provided for each gate and shall be brass, restricted keyway padlocks with a shackle that is 3/8 inch in diameter having a closed clearance of 2-1/4 inches. The locks shall have control key removable cores and each lock shall have a separate replacement core. All cores shall be keyed differently. The Contractor shall provide 4 keys per lock, and 2 core-removal keys.

162-2.10 KEYLESS LOCKS. When specified, a changeable combination lock shall be furnished with pedestrian gates. The keyless lock shall have a 4- or 5-digit mechanism and shall be an Ilco Unican Model 1011 or approved equal. A sign, 12 inches by 12 inches, shall be securely mounted on the inside of the gate. The sign shall be shielded from view from outside of the gate by means of a hinged 12-inch by 12-inch cover or other means approved by the Engineer. The cover shall have the legend "LIFT AND RECORD COMBINATION FOR REENTRY". The sign shall be aluminum sheet with white reflective coating. Letters shall be black and a minimum of 3/4 inch tall.

CONSTRUCTION METHODS

162-3.1 GENERAL. The fence shall be constructed according to the details on the Plans and as specified herein using new materials. The Contractor shall be responsible for establishing the fence alignment as shown on the Plans. After the fence line has been staked and prior to fence installation, the Contractor shall review the alignment with the Engineer and make required adjustments to avoid conflicts.

162-3.2 CLEARING FENCE LINE. All trees, brush, stumps, logs, and other debris which would interfere with the proper construction of the fence in the required location shall be removed a minimum width of 10 feet on each side of the fence centerline before starting fencing operations.

162-3.3 INSTALLING POSTS. All end posts, corner posts and pull posts shall be set in concrete at the required dimensions and depths and at the spacing shown on the Plans. Line posts may be either set in concrete as shown on the Plans or driven a minimum of 5 feet embedment. Pull posts shall have a maximum spacing of 250 feet.

Posts shall be spaced as shown on the Plans but in no case shall spacing be more than 10 feet. The post holes shall be in proper alignment so that there is a minimum of 3 inches of concrete on all sides of the posts. The concrete shall be thoroughly compacted around the posts by tamping or vibrating and shall have a smooth finish slightly higher than the ground and sloped to drain away from the posts. All posts shall be set plumb and to the required grade and alignment. No materials shall be installed on the posts, nor shall the posts be disturbed in any manner within 7 days after the individual post footing is completed.

Should rock be encountered at a depth less than the planned embedment depth, a hole 2 inches larger than the greatest dimension of the posts shall be drilled to a depth of 12 inches. After the posts are set, the remainder of the drilled hole shall be filled with grout, composed of one part Portland cement and two parts mortar sand. Any remaining space above the rock shall be filled with concrete in the manner described above.

In lieu of drilling, the rock may be excavated to the required embedment depth.

162-3.4 INSTALLING TOP RAILS. The top rail shall be continuous and shall pass through the post tops. The coupling used to join the top rail lengths shall allow for expansion.

162-3.5 INSTALLING BRACES. Horizontal brace rails, with diagonal truss rods and turnbuckles, shall be installed at all terminal posts.

162-3.6 INSTALLING FABRIC. The wire fabric shall be firmly attached to the posts and braced in the manner shown on the Plans. All wire shall be stretched taut and shall be installed to the required elevations. The fence shall generally follow the contour of the ground, with the bottom of the fence fabric no less than 1 inch or more than 4 inches from the ground surface. Grading shall be performed where necessary to provide a neat appearance.

At locations of small natural swales or drainage ditches and where it is not practical to have the fence conform to the general contour of the ground surface, longer posts may be used and multiple strands of barbed wire stretched thereon to span the opening below the fence. The vertical clearance between strands of barbed wire shall be 6 inches or less.

162-3.7 ELECTRICAL GROUNDS. Electrical grounds shall be installed along the fence between gate openings and at intervals not exceeding 500 feet. Electrical grounds shall also be installed where a power line passes over the fence. The ground shall be accomplished with a copper clad rod 8 feet long and a minimum of 5/8 inch diameter driven vertically until the top is 6 inches below the ground surface. A No. 6 solid copper conductor shall be clamped to the rod and to the fence in such a manner that each element of the fence is grounded.

162-3.8 REMOVE FENCE. Remove fence and gates in areas shown on the Plans. Roll undamaged fence fabric into tight six (6) foot diameter rolls, secure the ends, and deliver the rolled fabric to Airport Operations and Maintenance at a time and place of their choosing. Deliver any posts without concrete to Airport Operations and Maintenance. Unless otherwise directed by the Engineer, all other removed components become the Contractor's property for disposal off airport property.

METHOD OF MEASUREMENT

162-4.1. Chain-link fence will be measured along the top of the fence from center to center of end posts, excluding the length occupied by gate openings.

162-4.2. Gates will be measured as complete units.

162-4.3 Removal of fence will be measured along the top of the fence from center to center of end posts, including the length occupied by gate openings for gates that are designated for removal.

BASIS OF PAYMENT

162-5.1 Payment will be made at the contract unit price per linear foot for fence complete in place and per each for gates complete in place including locks.

Work and materials involved in clearing and disposal of material along the fence line, rock excavation, and ground rod installation are subsidiary. Temporary gates are subsidiary to Item F-162p.

Payment will be made under:

Item F-162a	8' Chain-Link Fence - per linear foot
Item F-162b	15' Single Swing Gate - per each
Item F-162c	20' Double Swing Gate – per each
Item F-162d	(Width) Single Cantilever Gate - per each
Item F-162e	(Width) Double Cantilever Gate - per each
Item F-162f	4' Pedestrian Gate (w/Keyless Lock) - per each
Item F-162k	Remove fence – per linear foot
Item F-162p	Temporary Fence– per linear foot

MATERIAL REQUIREMENTS

AASHTO M 181	Chain-Link Fence
AASHTO M 280	Metallic-Coated (Carbon) Steel Barbed Wire

ITEM F-170 STEEL BOLLARD

DESCRIPTION

170-1.1 This item consists of replacing and/or installing new steel bollards as shown on the plans or as directed by the Engineer.

MATERIALS

170-2.1 Use materials that conform to the following:

a. **Steel Pipe.** Use standard weight, Grade B, galvanized, welded, or seamless pipe meeting ASTM A-53.

b. **Concrete.** Use commercial grade concrete with a minimum 28-day compressive strength of 2,500 psi or an approved, pre-mixed, sacked concrete.

c. **Paint.** Use single component, moisture cure, polyurethane (SC-MC-U) zinc primer. Use single component, moisture cure, alipahtic polyurethane (SC-MC-ALIP-U) safety yellow paint for the top coats.

d. **Retroreflective Bands.** Use flexible high intensity sheeting, pressure sensitive type, cut to form 6-inch wide reflector bands meeting AASHTO M 268, Type III-A. Use sheeting with a smooth sealed outer surface.

CONSTRUCTION REQUIREMENTS

170-3.1 Install bollards plumb, in hand or mechanically dug holes, backfilled with the specified material, and thoroughly compacted to the satisfaction of the Engineer.

170-3.2 Painting. Paint bollards with one coat of primer and two top coats of safety yellow. Ensure that the surfaces are free of all oil, grease, dirt, abrasive residues, and all other foreign substances prior to application of coatings. Maintain the surface to be coated at a minimum temperature of 5 degrees F above the dew point for the duration of coating application. Adhere to these preparation requirements in addition to any requirements by the coating manufacturer. Repair any nicks, scratches or other paint damage resulting from shipping and handling at the site.

170-3.3 Reflective Bands. Apply a minimum of two white retroreflective bands placed 3-4 inches from the top with a maximum of 6 inches between the bands.

METHOD OF MEASUREMENT

170-4.1

a. **Lump Sum.** No measurement of quantities will be made.

b. **Unit Prices.** By the number of bollards specified, installed and accepted as completed units in place. Where replacement is specified, each unit shall include removal and installation.

BASIS OF PAYMENT

170-5.1 Payment will include all labor, equipment, materials, and personnel to complete the work described in the plans.

Payment will be made under:

Item F-170a	Steel Bollard - per each
Item F-170b	Steel Bollards - per lump sum

ITEM F-174 SINGLE AND DOUBLE POLE SWING GATE

DESCRIPTION

174-1.1 Furnish and install single or double pole swing gates at the locations and according to the details shown on the plans. Include gate foundations, gate assemblies, installation, application of reflective tape, and all materials and incidentals necessary for complete and operational gates.

MATERIALS

174-2.1 STEEL. Provide structural steel that conforms to the requirements of ASTM A 36 (Standard specification for carbon structural steel). Use structural steel galvanized in conformance with ASTM A 123 (standard specification for hot dipped galvanized zinc coatings on iron and steel products) 2.0 OZ/SF, or in conformance with ASTM A 153 (standard specification for hot dip galvanized zinc coatings on iron and steel hardware) as appropriate. Galvanize gates and gate components after fabrication. Make repairs to damaged galvanizing in conformance with ASTM A 780 (standard practice for repair of damaged and undercoated areas of hot dip galvanized coatings). Provide high strength bolt, nut and washer material conforming to the requirements of ASTM A 325. Provide galvanized heavy hex-type bolts and nuts if components connected are galvanized. Provide galvanized machine bolts conforming to ASTM A 307.

174-2.2 CONCRETE. Provide concrete of a commercial grade with a minimum 28-day compressive strength of 2,500 psi or an approved, pre-mixed, sacked concrete.

174-2.3 LOCKS. Provide brass restricted keyway padlocks for each gate with a shackle that is 3/8-inch in diameter and a closed clearance of 2-1/4 inches. Provide locks with control key removable cores and furnish a separate replacement core for each lock. Provide cores that are keyed differently. Provide 4 keys per lock, and 2 core-removable keys.

174-2.4 REFLECTIVE MARKINGS. High intensity reflective sheeting per AASHTO M 268.

CONSTRUCTION REQUIREMENTS

174-3.1 FABRICATION. Give 15 days notice before beginning fabrication work at the shop so that inspection may be provided.

Provide workmanship and finish equal to the best practice in modern fabrication shops. Finish portions of the work exposed to view neatly. Perform shearing, flame cutting, and chipping carefully and accurately. Steel or wrought iron may be flame cut, provided a smooth surface is obtained by the use of a mechanical guide. Perform flame cutting by hand only where approved, and smooth the surface by planing, chipping, or grinding. Adjust and manipulate the cutting flame so as to avoid cutting beyond the prescribed lines. Fillet re-entrant cuts to a radius of not less than ¾-inch.

Finishing and Shaping: Provide finished members true to line and free from twists, bends, and open joints. Store structural material, either plain or fabricated, at the fabricating shop above the ground on platforms, skids, or other supports. Keep free from dirt, grease, or other foreign matter, and protect from corrosion.

Perform welding in accordance with AWS D1.1.

174-3.2 INSTALLING POSTS. Set all gate posts in concrete at the required dimensions and depths and at the spacing shown on the plans.

Properly align post holes so that there is a minimum of 3 inches of concrete on all sides of the posts. Thoroughly compact concrete around each post by tamping or vibrating and finish to a smooth surface slightly higher than the surrounding ground and sloped to drain away from the posts. Set all posts plumb and to the required grade and alignment. Do not install materials on the posts or disturb the posts within 7 days after completion of the individual post footing.

Should rock be encountered at a depth less than the planned embedment depth, drill a hole 2 inches larger than the greatest dimension of the post and to a depth of 12 inches below the planned embedment depth. After the posts are set, fill the remainder of the drilled hole with grout, composed of one part Portland cement and two parts mortar sand. Fill any remaining space above the rock with concrete in the manner described above. In lieu of drilling, the rock may be excavated to the required embedment depth.

174-3.3 INSTALLING GATES. Install gates level and plumb with the swing as indicated on the plans. Install reflective sheeting on clean, dry surfaces in accordance with the manufacturer's recommendations.

METHOD OF MEASUREMENT

174-4.1 By the number of gates of each type installed and accepted.

BASIS OF PAYMENT

174-5.1 Payment will be made at the contract unit price for each furnished, installed and accepted item.

Payment will be made under:

Item F-174a	[Width] Single Pole Swing Gate – per each
Item F-174b	20' Double Pole Swing Gate – per each

ITEM G-100 MOBILIZATION AND DEMOBILIZATION

DESCRIPTION

100-1.1 This item consists of preparatory work and operations, including but not limited to operations necessary to move personnel, equipment, supplies and incidentals to the project site; to establish offices, buildings and other facilities, except as provided under Section G-130; to perform all other work and operations, including costs incurred, before beginning work on the project; and to complete similar demobilization activities, including submittals such as as-builts, certificates, payrolls, civil rights reports, equipment warranties, etc.

METHOD OF MEASUREMENT

100-2.1 Payment for mobilization and demobilization will be made in partial payments as follows:

a. Up to sixty percent of the amount bid for mobilization and demobilization may be paid when equipment and supplies are landed in serviceable condition at the project site and other necessary preparations have been completed so that work can commence on other pay items.

b. ~~The remaining balance~~ Up to ninety-five percent (95%) of the amount bid for mobilization and demobilization may ~~will~~ be paid as contractor facilities are dismantled and equipment is removed from the airport property, with the final increment paid upon completion of the final estimate ~~demobilization~~ or as approved by the Engineer.

The Department reserves the right to require submittal of invoices, receipted bills, payrolls, and other appropriate documents to justify any or all payments under this item.

BASIS OF PAYMENT

100-3.1 Payment will be made at the contract lump sum price for mobilization and demobilization. This price and payment shall be full compensation for all costs associated with this item.

Payment will be made under:

Item G-100a Mobilization and Demobilization - per lump sum

ITEM G-120 DISADVANTAGED BUSINESS ENTERPRISE (DBE) PROGRAM
(Federal-Aid Contracts)

120-1.1 DESCRIPTION. The work consists of providing Disadvantaged Business Enterprises (DBEs), as defined in Title 49, CFR (Code of Federal Regulations), Part 26, with the opportunity to participate on an equitable basis with other contractors in the performance of contracts financed in whole, or in part, with funding through the United States Department of Transportation (USDOT). The Contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The Contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of USDOT-assisted contracts.

120-1.2 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.

120-1.3 ESSENTIAL CONTRACT PROVISION. Failure to comply with the provisions of this section will be considered a material breach of contract, which may result in the termination of this contract or such other remedy as the Department deems appropriate. The Department also considers failure to comply with this section to be so serious as to justify debarment action as provided in AS 36.30.640(4).

120-1.4 DEFINITIONS AND TERMS. The following definitions will apply.

a. **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.

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

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

(1) 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;

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

(3) has been certified by the Department according to 49 CFR, Part 26.

d. **DBE Key Employee.** Permanent employees identified by the DBE owner in its certification file in the Department's Civil Rights Office (CRO).

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

f. **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.

g. **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.

h. **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 the CRO to independently verify this contact.

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

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

(2) keeps an inventory in an amount appropriate for the type of work using that product; and

(3) 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

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

120-2.1 UTILIZATION GOAL. The DBE Utilization Goal for this contract is shown on Form 25A-324 (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 25A-325C (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 120-3.2 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 25A-325C will be reduced proportionately.

120-3.1 DETERMINATION OF COMPLIANCE.

a. **Phase I - Bid.** Each bidder must register with the CRO annually according to §§26.11 & 26.53(b)(2)(iv) of 49 CFR, Part 26. Use Form 25D-6. No contract may be awarded to a bidder that has not registered.

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

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

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

(b) The dollar amount of participation by the DBE firm;

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

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

(2) **DBE Utilization Report.** Form 25A-325C listing the certified DBEs to be used to meet the DBE Utilization Goal.

(3) **Good Faith Effort Documentation.** Summary of Good Faith Effort Documentation (Form 25A-332A and attachments) and DBE Contact Reports (Form 25A-321A) if the Contractor submits less DBE utilization on Form 25A-325C than is required to meet the DBE Utilization Goal. If accepted by the Department, this lower DBE utilization becomes the new DBE Utilization Goal. If the bidder cannot demonstrate the ability to meet the DBE Utilization Goal, and can not document the minimum required Good Faith Efforts (as outlined in Subsection 120-3.2 below), the Contracting Officer will determine the bidder to be not responsible.

c. Phase III - Construction.

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

(2) **DBE Creditable Work.** The CUF work items and creditable dollar amounts shown for a DBE on the DBE Utilization Report (Form 25A-325C) shall be included in any subcontract, purchase order or service agreement with that DBE.

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

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

(b) If the Contractor is unable to find replacement DBE participation and has adequately performed and documented the Good Faith Effort expended according to Subsection 120-3.2.

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

120-3.2 GOOD FAITH EFFORT.

a. 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.

(1) 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 25A-324) prior to bid opening. It is the bidder's responsibility to make the work listed on the subcontractable items list available to DBE firms, to facilitate DBE participation.

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

(3) Notification to all active DBEs listed for a given region in the Department's most current DBE Directory at least 7 calendar days prior to bid opening. The bidder must give the DBEs no less than five days to respond. The bidder may reject DBE quotes received after the deadline. Such a deadline for bid submission by DBEs will be consistently applied. DBEs certified to perform work items identified on Form 25A-324 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 25A-321A).

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

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

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

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

(8) 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 25A-321A).

(9) Items (3) through (8) 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.

b. 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 3 calendar days of notification it has failed to meet the requirements of this subsection. As part of this reconsideration, the bidder must provide

written documentation or argument concerning the issue of whether it met the goal or made adequate good faith efforts to do so.

(1) The decision on reconsideration will be made by the DBE Liaison Officer.

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

(3) 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.

(4) The result of the reconsideration process is not administratively appealable to USDOT.

120-3.3 COMMERCIALLY USEFUL FUNCTION (CUF).

a. **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:

(1) regular dealer;
(2) manufacturer;
(3) broker;
(4) subcontractor;
(5) joint-venture; or
(6) prime contractor.

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

(1) 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.

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

(3) The DBE is certified in the appropriate category at the time of

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

(b) 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).

(4) 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.

(5) 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.

(6) The work of the DBE firm must meet the following criteria when determining when CUF is being performed by the DBE:

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

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

(c) 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.

(d) 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.

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

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

(f) 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.

(g) 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.

(7) On a monthly basis, the Contractor shall report on Form 25A-336 (Monthly Summary of DBE Participation) to the CRO 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.

c. **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

(1) withdrawing the subcontract, purchase order or service agreement from the decertified DBE and expending Good Faith Effort (Subsection 120-3.2, Items (3) through (8) to replace it with one from a currently certified DBE for that same work or service through subcontractor substitution (GCP Subsection 30-01); or

(2) 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

(a) increasing the participation of other DBEs on the project;
(b) documenting Good Faith Efforts [Subsection 120-3.2, items (3) through (8)]; or
(c) by a combination of the above.

d. **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 CRO to the Contractor, who will notify the DBE firm.

The Engineer, in cooperation with the CRO, 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.

120-3.4 DEFAULT OF DBE. In the event that a DBE firm under contract or to whom a purchase order or similar agreement has been issued defaults on their work for whatever reason, the Contractor shall immediately notify the Engineer of the default and the circumstances surrounding the default.

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

a. 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

b. 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 **(3)** through **(8)** of Subsection 120-3.2 for the defaulted work; or

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

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

120-4.1 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:

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

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

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

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

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

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

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

h. 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.

120-5.1 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 25A-325C 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 120-3.4 item c.), the Department will also consider this unsatisfactory work. Unsatisfactory work may result in disqualification of the Contractor from future bidding under GCP Subsection 20-13 and withholding of progress payments consistent with GCP Subsection 90-06.

ITEM G-130 SERVICES TO BE FURNISHED BY THE CONTRACTOR

DESCRIPTION

130-1.1 This work consists of furnishing and maintaining facilities specified in the Contract and listed in the bid schedule for the Department's project administrative personnel to use during the project. Facilities must be fully usable for the specified service. Maintain facilities adequately to preserve their utility. Services include heat, electricity, water and any others required to operate the facility. All facilities remain your property when you complete the work. Locate the sites and acquire all permits required unless otherwise shown on the Plans or specified.

REQUIREMENTS

130-2.1 FIELD OFFICE. Furnish and maintain a suitable office for the Engineer to use during construction. If this office is part of your building, completely partition it from the rest of the structure and provide a separate outside door equipped with a lock. Provide a suitable stove or other heating device with fuel. Furnish adequate electrical lighting and 120-volt, 60-cycle power. Construct the office with at least 500 square foot of floor space and at least 60 square foot of window area, along with adequate ventilation. Provide at least 12 linear feet of shelf space. Equip the field office with sanitary facilities. Provide janitorial services at least weekly. Furnish two private telephone lines with voice/data capability for the exclusive use of the Engineer. Furnish a telephone connected to the first line and the second line is to be available for a dedicated facsimile machine~~/dial-up~~ or a shared facsimile/Internet connection. Provide a broadband Internet connection with ~~send and receive data capability supporting 56~~ a transmission capacity of at least 200 kilobytes per second or higher data transfer rate in at least one direction.

Computers and facsimiles for State personnel are furnished by the State.
~~All long-distance calls made by State personnel and the Internet service provider will be paid by the State. Local calls and all connection fees shall be paid by the Contractor.~~

Provide at least one designated handicap parking space. Make the field office accessible according to the requirements of Americans with Disabilities Act Accessibility Guidelines (ADAAG).

Make the field office available for occupancy two weeks before commencing work on the project through one week after Project Completion.

130-2.2 FIELD LABORATORY. Furnish and maintain a field laboratory for the Engineer to use exclusively throughout the contract. Provide a completely functional installation two weeks before commencing construction work through one week after Project Completion.

a. Site. Grade and compact a site for the lab acceptable to the Engineer. Locate and level the structure on this site. If subsequent ground movement causes an unlevel or unstable condition, re-level or re-locate the facility as directed.

b. Main Lab. Provide a weatherproof structure suitable to field test construction materials, with the following minimum functional requirements:

(1) Floor space of 300 square foot.
(2) Two 10 square foot windows that open and lock.
(3) Lockable door(s).
(4) Work bench(es), 30 inches X 16 feet total, 3 feet high.
(5) Shelf space, 12 inches X 16 feet.
(6) One 20-inch deep sink with attached faucet and approved drain.
(7) A ~~gravity-fed~~ 250-gallon tank with jet pump or pressurized constant water supply of acceptable quality .

(8) Electrical service and facilities as follows:

(a) Electrical current, 120/240 V (ac), 60-cycle on 24-hour basis.
(b) Wiring system to support a 40-amp user load demand. At least one 15-amp lighting circuit, and two 20-amp outlet circuits with GFI protection.
(c) Outlets, six duplex outlets conveniently spaced around the lab, consistent with local codes.
(d) Lights, switch by door and either four 100-watt incandescent or eight 40-watt fluorescent.
(e) Exhaust fan, minimum 5 cubic feet per second.

(9) Heating equipment suitable to maintain a uniform 70 °F room temperature.
(10) Storage cabinet, 3 ft X 3 ft X 3 ft, lockable, securely fixed to an inside wall with a hinged door opening outward.
(11) Office desk and 2 chairs.

If the lab is a mobile unit mounted on axles and wheels, block the structure under the frame so that the wheels do not touch the ground and the blocking rests firmly on the prepared site.

c. **Auxiliary Lab.** Provide a separate weatherproof shed within 20 feet of the main lab structure with the following minimum functional requirements:

(1) Floor 8 ft X 12 ft, ceiling height 8 ft.
(2) Door 48 inches wide and window 5 square foot that opens, both lockable.
(3) Electrical service and facilities as in b.(8), except for the following:

(a) Lighting fixtures, 2 ea.
(b) Outlets, 3 conveniently spaced around the structure.
(c) Wiring system with each circuit GFI protected to satisfy a 20-amp user load demand.

(4) Work table 3 ft X 20 in X 3 ft high, capable of supporting 250 pounds and affixed to an inside wall as directed.

(5) Concrete-slab floor, 8 ft X 8 ft X 4 inches thick, cast-in-place or pre-cast. Install anchor bolts in the floor to accommodate the mounting pattern of the Gilson sieving machine at a location as directed.

(a) Comply with a. above for slab foundation requirements.
(b) Found the slab directly on the prepared site.

d. **Access.** For all types of installations, if the entryway is located higher than a single 7-inch rise, provide the following:

(1) Stairway, 36-inch width X 11-inch tread X 7-inch rise.
(2) Landing, 4 ft X 4 ft centered on the entryway.
(3) Handrail(s) firmly affixed to the stairway.

e. **Lab Equipment and Services.** Provide the following:

(1) Propane necessary for the lab operation, including two 100-lb tanks, regulators, hoses, fittings, and incidentals for a functional system.

(2) Specialized sampling equipment such as belt templates or belt sampling devices as required.

(3) Fuel and power necessary to continuously operate the facilities.

130-2.3 CURING SHED. Furnish and maintain a suitable weather tight shed for curing concrete test cylinders, with a suitable box or bins for curing concrete test cylinders.

Provide a box large enough or enough bins to contain at least 6 test cylinders from each pour that the Contractor proposes to make during any 28-day period. Use a box or bins at least 18 inches high and constructed of sturdy wood. Line the box or bins with a canvas or plastic liner to help retain moisture in the sand. Construct a lid to provide access to the box or bins.

Provide suitable heating to maintain the temperature in the box (or shed) between 60 and 80 °F at all times when curing the test cylinders. In addition, provide a suitable room thermometer in the shed to check the temperature.

Provide enough sand at the shed to fill the box or bins to be used for curing and enough water to keep the sand in the box or bins moist during the curing period.

130-2.4 CAMP FACILITIES. Furnish and maintain suitable camp facilities for Department employees and other authorized personnel. The Special Provisions will list an estimated number of employees.

Provide the following camp facilities:

a. Lodging (Bunkhouse and Bedding)
b. Meals (Mess Hall and Kitchen)
c. Sanitary and Other Facilities

Provide all camp facilities according to the applicable chapters of the State of Alaska Department of Labor, *Occupational* and *Industrial Structures Code*, and the State of Alaska Department of Environmental Conservation, *Food Service Regulations*.

Camp facilities for your employees, that meet these requirements, may also be used for State employees.

These Specifications do not exclude the use of roadhouses or lodges located near the project that are available for your use. The Engineer may approve a roadhouse, lodge, or camp, providing the accommodations conform with contract requirements.

Provide camp facilities for use by State employees and other authorized personnel while you are engaged in work at the project site, or in material sources used to supply materials to this project.

Department employees and other authorized personnel must sign a meal and/or lodging sheet after each meal and each night's lodging.

When you use camp facilities, completely remove and dispose of all garbage and/or trash piles, cesspools, septic tanks and leach fields as required by applicable laws and regulations and as directed.

130-2.5 SCALES. When the bid schedule calls for payment for material by weight, other than the barge displacement method, provide at least one of the following:

a. Commercial weighing system. Permanently installed commercial scales.
b. Project weighing system. Acceptable automatic digital scales and scale house.

Provide a project weighing system in the project area, storage areas or staging areas to weigh materials.

Provide scales that record weight at least to the nearest 100 pounds. Maintain scale accuracy to within 0.5% of the correct weight throughout the range of use.

Do not use spring balances.

Do not use belt conveyor scales to determine pay weight. You may use belt conveyor scales to proportion plant blends and mixtures if the scales meet the general requirements for weighing equipment and are calibrated according to the manufacturer's instructions.

You may use batch weights to determine pay quantities when the batching equipment includes an approved and certified automatic weighing, cycling, and monitoring system. If doing so, tare trucks at least once per day or more as directed by the Engineer, and provide proof that their loaded weight does not exceed highway load limits.

Install and maintain platform scales with the platform level and rigid bulkheads at each end. Use a platform long enough to permit simultaneous weighing of all axle loads of the hauling vehicle, including coupled vehicles.

Maintain the accuracy of scales according to the specifications, tolerances and regulations for commercial weighing and measuring devices contained in the National Bureau of Standards, Handbook 44, as adopted by Alaska Statute, Section 45.75.050.(d). All commercial scales are subject to approval according to the Weights and Measures Act, AS 45.75. Have scales reinspected, as directed, to ensure their accuracy, and sealed to prevent tampering or other adjustment after certification.

Provide a weatherproof housing for platform scales to protect the recording equipment and allow the scale operator convenient access to the weigh indicator, scale computer, ticket printer, and the sequential printer. Furnish sanitary lavatory facilities, heating, adequate electrical lighting and 120-volt, 60-cycle power for the scale house.

Furnish competent scale operators to operate the system.

Weighing System: Provide an electronic computerized weighing system (ECWS) with the following capabilities:

a. Computer.

(1) Provide a scale computer that can store project numbers and all pay item descriptions for multiple projects and products that are weighed with the scale system.

Use a computer with a self-reading scale system that includes the scale load cell, a sealed direct reading weight indicator, scale computer, ticket printer, and sequential printer, and can record a complete shift's transaction on a 3.5-inch high-density diskette or other approved storage media.

(2) The scale computer must store the following for each hauling vehicle used on the project:

(a) Vehicle identification number marked on the vehicle
(b) Tare weight
(c) Maximum allowable gross vehicle weight (MAVW)

Make sure the scale operator tares vehicles at least once a day. Perform additional tares, as directed, during hauling operations. Perform tares in the presence of the Engineer, when requested.

The Engineer will ~~calculate the~~ check Contractor provided MAVW for each vehicle (using truck measurements provided by the Contractor) and list all vehicles and their MAVW(s) in the scale house. The MAVW is either the maximum allowable legal weight determined by the Engineer when you cannot haul overloads in the traffic stream, or the manufacturer's

recommended maximum allowable gross vehicle weight as certified by the Contractor when vehicles are allowed to haul overloads.

The scale operator should only use MAVWs that the Engineer has provided in writing. Do not issue any tickets to a vehicle until the Engineer provides the MAVW.

(3) During weighing operations, the ECWS should compare each vehicle's gross weight to its MAVW. If the vehicle exceeds its MAVW, the system must alert the scale operator that an "overload" exists. The system should not issue a ticket.

(4) Provide a battery backup for the computer and protection for power surges or brown outs. The computer system must retain all stored data during a power outage and must operate during a power outage to allow you to shut down the hard drive without losing information.

b. Tickets. Furnish a ticket printer that prints a legible, serially numbered weigh ticket for the Engineer with the following information on each ticket in the order listed. All weights must be at least to the nearest 100 pounds:

(1) Project number
(2) Item number and description
(3) Date weighed
(4) Time weighed
(5) Ticket number
(6) Vehicle Identification Number
(7) MAVW
(8) Gross weight
(9) Tare weight
(10) Net weight
(11) Subtotal item net weight for each haul unit since start of shift
(12) Accumulated item net weight for all haul units since start of shift

After printing, the weigh ticket must automatically advance to a perforation so it can be torn off and handed to the driver.

Manually weigh and record weights for up to 48 hours during a printer malfunction or break-down, when the Engineer gives you prior written authorization. The manual weighing operation must meet all other contract requirements.

Unless the Engineer gives prior written authorization, you will not receive payment for any material weighed without using the ECWS.

c. Sequential Printer. Provide a sequential printer that prints out all transactions (keystrokes) made by the computer concurrently with the ticket printer. For permanent commercial scales, the printer may print at the end of the company's daily shift with the Engineer's approval. The printer must print all scales transactions including tares, voided tickets, and data changes made by the scale operator. The printer must allow for advancing the paper manually so that the scale operator can write notes on the paper when special situations occur, such as voided tickets, incorrect vehicle identification number used, etc. The scale operator should also note these special situations in the Scales Diary.

Submit the printout to the Engineer at the end of each shift. You will not receive payment for any hauled material until the printout is submitted.

d. Data Diskettes. Provide the Engineer with a 3.5-inch high-density diskette or other approved storage media at the end of the shift. Record all ticket information produced during the shift. Store data in an approved format.

Download data from the permanent commercial vendor scale computer hard drive directly to a disk at the end of the shift. Do not convert or manipulate data. Provide conversion programs and training so that you can convert data into the information the Engineer requires.

If the diskette is not completely usable, then correct, construct, or reconstruct the data file. Use the sequential printout or other information as a data source, as directed. You will not receive payment for hauled material on a given date until you deliver an accurate "daily" data file to the Engineer. If the Engineer gives you written permission to weigh without the ECWS for a minor equipment failure, construct an acceptable data file as described above.

e. **Scale Diary.** The Scale Diary is a computer printout or bound book provided by the Engineer. The scale person must complete the Scale Diary and include the following information: dates of action, type of material, source, time the scale opened and time the scale closed, times of scale balance, ticket sequence, time the haul for each material started and stopped, voided ticket numbers, vehicle identification numbers, times of tare and tare weights, and the scale person's signature. Also include the following information on any scale used to weigh materials for payment:

(1) Owner of the scales and scale locations.

(2) Manufacturer's name, model serial number, maximum capacity, and type of scales (single beam, double beam, self-reading, etc.).

(3) Date(s) the scales were installed and/or adjusted.

(4) Scale service company inspections and accuracy checks (attach copy).

(5) Division of Measurement Standards inspections and accuracy checks (attach copy).

(6) Time and dates of notification of any malfunctions.

The Scale Diary remains the Engineer's property.

Submit the Scale Diary to the Engineer at the end of each shift. You will not receive payment for any hauled material until you deliver the Scale Diary to the Engineer.

The system must generate a report, either during or at the end of the day or shift, that summarizes the number of loads and total net weight for each date, project, and product. Submit the original report at the end of each shift.

You will not receive payment for any material hauled in a vehicle that does not conform to the requirements of Subsection 50-12, Load Restrictions, and this Subsection. Dump material from non-conforming vehicles until they conform, then reweigh the vehicles.

When a weighing device indicates less than true weight, you will not receive additional payment for material previously weighed and recorded. When a weighing device indicates more than true weight, all material received after the last previously correct weighing accuracy test will be reduced by the percentage of error that exceeds 0.5%.

If the Engineer incurs extra construction engineering expenses from checking non-machine data entries or other data irregularities, the total value of those expenses will be deducted from the value of the contract item before payment.

Platform scales, scale house and the ECWS remain your property after you complete the work.

130-2.6 NUCLEAR TESTING EQUIPMENT STORAGE SHED. Design, furnish and maintain a weatherproof, heated, and ventilated nuclear densometer/testing equipment storage shed for the Engineer to use exclusively throughout the contract. Install the building at least 15-feet from an occupied area at a location approved by the Engineer. Install the shed before commencement of construction activities and maintain it until one week after project completion. Provide sufficient floor area for the nuclear testing equipment and a portable electric heater to maintain a minimum room temperature of 50 °F in freezing weather. Design the building with enough floor area to provide sufficient clearance between the equipment, heater, and combustibles. Provide a commercial grade metal-clad exterior entrance door of 3'-0" min width by 6'-8" height with dead-bolt lockset. Hang the door so that hinge pins are not accessible from the exterior. Provide the Engineer with 2 keys to control access. Provide a 5/16" welded steel security chain securely attached inside the structure with tamperproof hardware for the Engineer to secure the testing equipment. Provide 120-volt, 60-cycle power, an interior light, and a wall receptacle for the heater. Secure the structure to the ground with tamperproof anchors to resist wind loads and prevent unauthorized movement of the building. The nuclear testing equipment storage shed remains the property of the Contractor. Remove the shed from the site following project completion.

130-2.7 STORAGE CONTAINER. Furnish, transport and maintain a weathertight, lockable, steel enclosed 20 foot long X 8 foot wide X 8 foot high wooden floored container for the storage of the Department's materials, supplies and testing equipment (but not nuclear equipment). Provide twenty equally spaced fastening points on the interior walls that are capable of securing the Department's contents. Door opening dimensions of the storage container shall be greater than 60 square feet. Supply necessary equipment to lift and move container with minimal disturbance to the Department's contents. The container shall not be moved by skidding or hook lift. The Contractor shall be listed as the shipper on all documents listing and acknowledging receipt of the Department's goods for shipment.

Deliver an empty and clean container to the Regional Materials Laboratory, or location acceptable to the Engineer, three weeks prior to transporting to the project site. Allow 7 days for the Department to load the container. Transport the loaded container to the project site. Set up container at a location approved by the Engineer prior to commencing construction work.

Provide electrical service and other facilities as follows:

- **a.** Electrical current, 120V (ac), 60 cycle on a 24 hour a day basis.
- **b.** Wiring system to support a 20 amp user load demand.
- **c.** 2 GFI protected outlets conveniently spaced on the interior walls.
- **d.** Four 100 watt incandescent or eight 40 watt fluorescent lights located for maximum illumination.
- **e.** Provide a stairway with railing, built to meet the International Building Code, if there is more than 12-inch difference in floor entry and existing ground elevation.

Return the container to the Regional Materials Laboratory, or location acceptable to the Engineer, upon project completion. Allow 7 days for the Department to unload the container. The storage container remains your property after you complete the work.

METHOD OF MEASUREMENT

130-3.1 MEAL. By each meal served to authorized personnel, based on signed meal sheets.

130-3.2 LODGING. By each night's lodging received by authorized personnel based on signed lodging sheets.

130-3.3 NUCLEAR TESTING EQUIPMENT STORAGE SHED. By the number of storage sheds specified, to include all components, installed and accepted as completed units and ready for equipment storage.

130-3.4 STORAGE CONTAINER. By the number of storage containers specified, to include all components, installed and accepted as completed units and ready for materials and equipment storage.

130-3.5 FIELD OFFICE. If a lump sum unit item appears in the bid schedule, field office quantities will not be measured for payment. Lump sum contract price will include all components and service connections, installed as completed units maintained in service accepted by the Engineer.

130-3.6 SCALES. Scales shall not be measured for separate payment but shall be subsidiary to Items requiring their use.

BASIS OF PAYMENT

130-4.1 LUMP SUM ITEMS. Payment for Items G-130a, G-130b and G-130c will be made as follows:

a. A percentage of the lump sum amount, to be determined by the Engineer, will be paid as full compensation for furnishing the facility at the site.

b. The balance of the lump sum amount will be prorated over the anticipated active construction period with a portion included as part of each interim payment, for maintenance, repairs, providing all utilities, and for removing it from the site. If anticipated construction period changes, the final increment will be held until final payment.

Item G-130a Field Office, includes initial telephone and Internet service costs to provide operational connections.

130-4.2 MEAL. Includes all labor, materials, tools, equipment and supplies required to provide meals to all authorized personnel assigned to, or associated with, the project.

130-4.3 LODGING. Includes all labor, materials, tools, equipment and supplies required to provide lodging for all authorized personnel assigned to, or associated with, the project.

130-4.4 NUCLEAR TESTING EQUIPMENT STORAGE SHED. At the contract unit price to include all labor, materials, tools, equipment and supplies required to furnish and install the shed before commencement of construction, to maintain it for the duration of the project and to remove the shed and electrical service after project completion. Electrical service and utility costs are subsidiary to this item.

130-4.5 STORAGE CONTAINER. At the contract unit price to include all labor, materials, tools, equipment and supplies required to deliver the storage shed to the regional office for loading, to deliver it to the project office, to install it before commencement of construction, to maintain it for the duration of the project, to remove the shed and electrical service after project completion, to deliver it to the regional office for unloading, and to remove the storage shed. Electrical service and utility costs are subsidiary to this item.

130-4.6 SCALES. Furnishing the following is subsidiary: platform scales, scale operators, tickets, scale house, and the ECWS, including all supplies such as weigh tickets, paper, printer ribbons, diskettes, etc., and all maintenance and repair services necessary to keep the system functional.

130-4.7 ENGINEERING COMMUNICATIONS. When pay item G-130j is included in the bid schedule, payment of periodic telephone and Internet charges for State personnel is based on paid receipts from the service provider plus 15 percent. When pay item G-130j is absent from the bid schedule, the State will pay the service provider directly for the periodic charges.

Payment will be made under:

Item G-130a	Field Office - per lump sum
Item G-130b	Field Laboratory - per lump sum
Item G-130c	Curing Shed - per lump sum
Item G-130d	Meal - per each
Item G-130e	Lodging - per each

Item G-130f Reserved
Item G-130g Nuclear Testing Equipment Storage Shed – per each
Item G-130h Storage Container – per each
Item G-130j Engineering Communications - per contingent sum

ITEM G-135 CONSTRUCTION SURVEYING AND MONUMENTS

DESCRIPTION

135-1.1 GENERAL. Perform surveying and staking essential for the completion of the project and perform the necessary calculations required to accomplish the work in conformance with the Plans and Specifications and standard survey and engineering practices.

Furnish and install survey monuments and monument cases in conformance with the Plans or as directed.

135-1.2 DEFINITIONS.

a. **Monument:** A fixed physical object marking a point on the surface of the earth; used to commence or control a survey; mark the boundaries of a parcel of land; or the centerline of a right-of-way corridor. Monuments will be Primary or Secondary, as shown on the Plans.

b. **Point:** An identified spot located on the surface of the earth. For purposes of this definition, a point can be a PK nail, wooden hub, rebar, large nail or other structure capable of being utilized as a marker.

c. **Witness Corner:** A material mark or point usually placed on a property or survey line, at a known distance from a property corner or other survey point. A witness corner is employed to witness the location of a corner/point that cannot be monumented at its true location.

d. **Reference Monument:** A material mark or point placed at a known distance and direction from a property corner or other survey point, usually not on a property or survey line. A reference monument is employed to perpetuate a corner/point that cannot be monumented at its true location or where the corner monument is subject to destruction.

e. **Surveyor:** The Contractor's Professional Land Surveyor, currently registered in the State of Alaska.

MATERIALS

135-2.1 MONUMENT CASES. Castings shall conform to AASHTO M 105, Class 30A. Castings shall be coated with a bituminous damp-proof coating. Bolting tops shall be used.

135-2.2 PRIMARY MONUMENT. A minimum 2-inch diameter nonferrous pipe at least 30 inches long, with a minimum 4-inch flange at the bottom and having magnets attached at the top and bottom. A minimum 2-1/4-inch diameter nonferrous metal cap must be permanently attached to the top. Mark the cap around the outside edge with the words "STATE OF ALASKA DOT&PF". Permanently stamp every monument with the Surveyor's registration number, the year set, and the point/corner identification. Orient cap so that the data may be read facing up-station.

135-2.3 SECONDARY MONUMENT. A minimum 5/8-inch x 30-inch rebar with a 2-inch aluminum cap attached to the top. Permanently stamp every secondary monument with the Surveyor's registration number and the year set.

CONSTRUCTION REQUIREMENTS

135-3.1 GENERAL. Use competent, qualified personnel and suitable equipment for the layout work required and furnish traffic control, stakes, templates, straight-edges and other devices necessary for establishing, checking and maintaining the required points, lines and grades.

Furnish computer services to accomplish the work. Check data received from the computer for completeness and accuracy. As soon as practical after completion of the work, and in no case later than acceptance of the project, deliver field books, computer forms and computer output data to the Engineer. This data becomes the property of the Department.

Supervise construction surveying personnel. Correct errors resulting from the operations of said personnel at Contractor expense. The Contractor is responsible for the accuracy of the work.

Work classified as Land Surveying under AS 08.48, and work involving the location, control, and monumentation of construction centerline and right-of-way, shall be performed by or under the responsible charge of a Professional Land Surveyor.

Follow the Department's Construction Surveying Requirements.

Ensure that the contract surveyor contacts the Department survey manager prior to performing survey work under this item.

DOT&PF Central Region Survey Manager
(907) 269-0558 (Phone)
(907) 269-0600 (Facsimile)

The Department will provide sufficient centerline or reference thereto, and at least one benchmark to enable the establishment of planned elevations and centerline.

Keep field notes in standard hardbound notebooks in a clear, orderly, and neat manner consistent with Departmental procedures, including titles, numbering, and indexing. Make field books available for inspection by the Engineer's project personnel at any time. Legible copies of the reduced field notes shall be made daily. Store the field books in the Engineer's Project Office during periods of non-use. Copies of the field books shall be kept in a separate secure location.

Perform the following:

a. Staking necessary to delineate clearing and/or grubbing limits.

b. Cross sections necessary for determination of excavation and embankment quantities, including intermediate and/or remeasure cross sections as needed. Take cross sections after clearing and grubbing has been completed.

c. Slope staking.

d. Staking of signs, culverts, minor drainage structures and other appurtenances, including the necessary checking to establish the proper location and grade to best fit the conditions on site.

e. Bridge staking.

f. Setting finishing stakes.

g. Measurement of pay quantities that require measurement.

h. Staking of right-of-way and material source limits ~~as deemed necessary~~.

i. Staking, referencing and other actions required to preserve or restore land monuments and property corners.

j. As-built surveying as required under Section 50-08 Survey Control. Tie as-built measurements and locations to project horizontal and vertical survey control.

k. Asphalt pavement surveying necessary to comply with subsection P-401-5.2 acceptance criteria for smoothness and grade of finished asphalt pavement surfaces.

l. Staking and hubbing of bottom of excavation and the top of each layer in the pavement structure.

m. Provide interim calculations for measured items to the Engineer prior to progress payments for each specific item. Ensure that the calculations are completed, checked, and signed by the person in responsible charge of the work.

~~j.~~n. Other surveying and staking necessary to complete the project.

Notify the Engineer immediately if a Department-established reference point is discovered to be in error or a reset point is not in ~~harmonious~~ relationship to the adjacent centerline points.

Furnish a notekeeper to record field survey notes, including documentation for quantity computations for payment. Ensure that the notekeeper is thoroughly familiar with generally accepted standards of good survey notekeeping practice and the Department's Construction Surveying Requirements.

The Engineer may randomly spot check the Contractor's surveys, staking, and computations. After the survey or staking has been completed, provide the Engineer with a minimum of 72 hours notice before performing work, and furnish the appropriate data, to allow for random spot checking. The Department assumes no responsibility for the accuracy of the work.

Measure, compute, and plot all field-measured pay item quantities, including but not limited to excavation and disposal of asphalt cement concrete (AC), portland cement concrete (PCC) pavement, and classified/unclassified excavation volumes. Stake for measurement and calculation of excavation quantities after AC and PCC pavement removal. Submit a proposed method of measuring and computing volumes to the Engineer in writing for approval before performing any field work under this item.

Provide item quantities, including computations and plots to the Engineer prior to payment for each specific item. The Department will review and accept or modify the quantities provided.

Digital terrain modeling (DTM) may be used in determining earthwork quantities as an alternative to before and after cross sections by average end area if the Engineer has agreed in writing to the DTM method prior to commencement of any field work. If DTM is approved and used, provide plotted cross-sections on 50-foot stations with elevations, offsets and computed end areas in square feet for each section prior to earthwork payments for each item. Provide these cross-sections and associated data for the entire area of earthwork computations along with the terrain model.

Accomplish staking in accordance with the following:

a. Perform the topographic survey by grid or cross section method of surveying 25 feet beyond the project match lines. Take elevation shots at 25-foot intervals, at all terrain breaks, and at topographic features.

b. Record and locate all baselines and connect them to the project's centerline, both horizontally and vertically.

c. Upon completion of the before and after survey, provide the Engineer a grid layout sheet showing the baseline, stations and all spot elevations.

d. Provide the Engineer a contour map of the original ground and an identical size map showing the final elevations with 0.5 foot contour intervals. Provide the Engineer with plotted cross-sections for each station grid with elevations and offsets shown.

e. At the end of each day's work, hand deliver a copy of the downloaded raw data from the data collector, in hard copy form, to the Engineer. This hard copy will be signed by the Contractor or Surveyor. If editing is deemed necessary, show all changes in an amended hard copy.

Provide the above products to the Engineer before payment will be made for that work. Provide as-builts and electronic data to the Engineer prior to final inspection.

135-3.2 CROSS-SECTION SURVEYS. When required, obtain right-angle cross sections to the construction centerline at the interval detailed in the Department's Construction Surveying Requirements.

The following will be supplied by the Department:

a. Construction Plans and Specifications.
b. Design Cross Sections, if any.
c. State of Alaska Land Survey Monument Record forms.
d. Department's Construction Surveying Requirements. One copy.
e. Design centerline grades.

The following shall be required of the Contractor:

a. Field Books (Level, Cross-Section, Slope Stake, etc.). Use "Rite-in-the-Rain" or similar weather resistant hardbound field books. Field books become the property of the Department upon completion of the work.

b. Label the books and number the pages. Make a heading in the appropriate book (date, weather, names and duties of crew members) at the beginning of each day's work.

c. Update the index of the appropriate book at the end of each day's work.

d. Reduce, check, and adjust level notes.

e. The notekeeper shall compute the cross-section level notes and slope stake catches and a different crew member shall check the computation on a continual basis in the field.

f. Enter the grade data, shoulder width and/or ditch distance, stationing, slope, etc., in the slope stake books.

g. Maintain the position and identifying marks of slope stakes and reference points until used for their intended purpose.

h. Correct errors by drawing a line through them and writing the correct entry directly above. Erasures will not be allowed.

i. Return field books and copies of the field books to the Project office at the end of each work day or as directed.

j. Provide copies of grade sheets and temporary bench mark elevations to the Engineer 48 hours before beginning work on unclassified excavation or embankment.

k. The Contractor's survey crews shall comply with approved traffic control plans. Coordinate crew activities with the Worksite Traffic Supervisor.

l. Keep a survey Party Chief diary, and give a copy of the diary to the Engineer each day. The diary shall contain the following information:

(1) Date.
(2) Weather.
(3) Crew members' names and duties.
(4) Type and location of work performed.
(5) Hours worked.
(6) Type of equipment used (brand) and date equipment was double centered or "peg" test was performed.
(7) Signature of person in responsible charge.

m. Submit the survey field notes, for the specific area, relating to monument referencing, before beginning clearing, grubbing or excavation.

n. Draw cross-sections and complete quantity calculations for all earthwork quantities.

135-3.3 MONUMENTS. Install primary and secondary monuments, as called for in the Plans, at the positions established by the Department. Prior to the start of construction, reference monuments, to include property markers/corners and accessories, that may be disturbed or buried during construction. In addition, reference monuments designated for referencing on the Plans. Prepare and record Monument Record Forms in the appropriate Recorder's Office before disturbing monuments. Monument Record Forms may be obtained from the Engineer. Re-establish monuments in their original position before completion of the project. Prepare and file a Monument Record Form for each reestablished monument.

Keep records and report to the Engineer evidence that a monument has been disturbed and is no longer reliable or cannot be located and is presumed to be missing. Establish a minimum of two in-line reference points, or three swing-tie reference points in situations where in-line referencing is not desirable. Set reference points outside of the construction limits. Measure distances from the monument to the nearest 0.01 foot. Record referencing of monuments in a separate field book stamped by the Surveyor.

Replace existing monuments disturbed by construction with Primary or Secondary Monuments meeting the requirements of Subsections 135-2.1 through 3. When it is impractical to establish a monument in its original position, install a witness corner (WC). Place the WC to a property corner on the property line when the other property corner that defines said line is existing or there has been sufficient retracement to define said line. In other cases, place a reference monument (RM) perpendicular to the centerline at the station of the original position and at a distance from the original position measured in whole feet.

Those monuments found that are not shown on the Plans will be recognized by the Engineer when the following is provided by the Surveyor: Field notes identifying type and location of the monument, and a description of the point the monument marks, with the reason to preserve its location. Monuments not shown on the Plans will be considered additional work and paid by Item G-135b, ~~Conditional~~ Extra Three Person Survey Party.

The Surveyor shall complete a State of Alaska Land Survey Monument Record form for each primary and secondary monument referenced, removed, installed, relocated or replaced. Provide the required survey information on the form according to statutory requirements, including section, township and range. Meet requirements for recording at the District Recorder's Office in which the project is located for each monument record. Deliver conforming copies of the recorded forms to the Engineer before monument removal or disturbance, and after setting any final monuments requiring monument records.

Set each monument and monument case accurately to lines established at the required location and in a manner as to ensure being held firmly in place. Set existing monuments and monument cases to be adjusted to new elevations in the manner and at the elevations directed.

Primary Airport Control (PAC) and Secondary Airport Control (SAC) monuments are present in the project area as shown on the Plans. This control is important and if disturbed, must be reestablished by the Contracting Agency. For this reason, the Contractor is required to employ all reasonable measures to preserve the existing control monuments in an undisturbed condition. If any PAC or SAC is disturbed by the Contractor's actions, the Contractor shall reimburse the State of Alaska for the cost of replacing monuments, performing geodetic surveys and related data processing, and filing the completed survey with the National Geodetic Surveys office. The estimated cost for reestablishing a disturbed monument is approximately $50,000, but costs will vary depending on location, season, availability of staff, and other factors.

135-3.4 OFFICE ENGINEERING. Calculate finish grades for the embankments as specified according to Plans and/or Specifications. Use information available in the field, on as-builts, or as provided by the Engineer. This work shall be performed by or under the responsible charge of a Professional Land Surveyor or a Professional Engineer currently Registered in the State of Alaska.

135-3.5 FINAL TRAVERSE. Within 30 days after the Engineer receives a letter stating that construction activities that may disturb the monuments have ceased, the Surveyor shall run a final closed traverse to verify the positional accuracy of installed survey monuments. Tie into the traverse the primary and secondary monuments placed or replaced and undisturbed Department-provided control points. Meet the requirements of a secondary monument for traverse points established during this work. The Surveyor shall sign and stamp a letter that lists each monument and its coordinates. The letter shall certify that the monuments are each located within 0.1 foot of their proposed position based on the project survey control points provided by the Department. Deliver the certification letter and field notes for this work to the Engineer.

135-3.6 EXTRA THREE PERSON SURVEY PARTY. This pay item is for extra, additional, or unanticipated work made necessary by changes in the project. Work performed under pay item G-135b may include field work, office engineering, or any work described under the construction requirements of item G-135.

135-3.7 FINISH GRADE CHECKING. Perform all survey work required to verify that the finished surface of all asphalt concrete pavement meets the requirements for grade as specified in subsection P-401-5.2, f(4), Grade Acceptance Criteria. Multiple surveys may be necessary in areas that require reworking.

METHOD OF MEASUREMENT

135-4.1 The work will be measured according to Section GCP-90, as directed by the Engineer, and as follows:

a. Lump Sum. No measurement of quantities will be made.
b. Hour. By the number of hours, as directed by the Engineer and as recorded by certified payrolls.
c. Contingent Sum. As specified by the Engineer in the Directive authorizing the work.

BASIS OF PAYMENT

135-5.1 Pay Items include all necessary personnel, equipment, transportation, and supplies to accomplish the work described in the Contract, or as directed by the Engineer.

Pay Item G-135a Construction Surveying by the Contractor, includes all Contractor surveying work described in the Contract.

Pay Item G-135b Extra Three Person Survey Party, includes payment by the hour for extra, additional or unanticipated work made necessary by changes in the project. Adjustment according to GCP-90-04 is not allowed for this pay item. Work accomplished by a three person survey party will be paid at 100% of the

contract unit price, by a two person survey party at 75% of the contract unit price, or by a one person survey party at 32% of the contract unit price, for Pay Item G-135b.

Pay Item G-135c Monuments by the Contractor, includes all monument work described in the Contract.

Pay ItemG-135d Extra Surveying by the Contractor, includes payment according to a Directive from the Engineer authorizing the work. This pay item is for extra, additional, or unanticipated work made necessary by changes in the project.

Payment will be made under:

Item G-135a	Construction Surveying by the Contractor - per lump sum
Item G-135b	Extra Three Person Survey Party - per hour
Item G-135c	Monuments by the Contractor - per lump sum
Item G-135d	Extra Surveying by the Contrafactor – per contingent sum

G-150 EQUIPMENT RENTAL

DESCRIPTION

150-1.1 This item consists of furnishing construction equipment, operated, fueled and maintained, on a rental basis for use in construction of the proposed improvements and in performing work incidental to construction at the direction of the Engineer as such work is generally defined in these Plans and Specifications. 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.

REQUIREMENTS

150-2.1 EQUIPMENT FURNISHED. The construction equipment to be provided under this contract shall be that shown in the Special Provisions and/or the bid schedule supplemented by such non-rental maintenance equipment and support equipment as the Contractor elects to provide. The equipment shall be of modern design and in good working condition and shall be maintained in good working condition throughout the life of the project. All equipment to be used in the construction of this project as noted in the Bid Schedule shall be made available for inspection by the Engineer prior to its shipment to the project site. Each item of equipment shall have company numbers clearly displayed for ready identification. The Engineer shall have the authority to prohibit the use of rental payment for any equipment which is not maintained in good working condition or which has a production capacity below construction industry standards.

150-2.2 EQUIPMENT OPERATORS. Equipment operators shall be competent and experienced and shall be capable of operating the equipment to its capacity. The Contractor shall replace those operators who, in the opinion of the Engineer, misconduct themselves, either on the job or in the community, or are incompetent or negligent in the operation of the equipment.

150-2.3 HOURS OF OPERATION AND TIMEKEEPING. The Engineer shall begin recording time for payment each shift when the equipment begins work on the project. Time during which the equipment is being serviced or repaired shall not be included. The stated equipment rental rates shall apply only to that time during which the equipment is actively engaged in construction, as directed by the Engineer. No standby payment will be made for any piece of equipment prior to, during the life of, or after the project has been completed. "Stuck Time" payment shall be made for each piece of equipment that becomes stuck while actively engaged in construction work on the airport and shall be limited to 1 hour per shift for each piece of equipment that becomes stuck.

150-2.4 CONSTRUCTION METHODS. The work shall be constructed according to the Plans, Special Provisions and as directed by the Engineer.

METHOD OF MEASUREMENT

150-3.1 The serial number and brief description of each item of equipment listed in the bid schedule will be recorded by the Engineer, and they will record the number of hours, or fractions thereof to the nearest one-quarter hour, during which the equipment is actively engaged in construction of the project. The furnishing and operating of equipment of heavier type, larger capacity, or higher horsepower than specified will not entitle the Contractor to any extra compensation over their applicable contract unit price. Each day's activity will be recorded on a separate sheet or sheets, which shall be verified and signed by the Contractor's representative at the end of each shift, and a copy will be provided to the Contractor's representative. No idle time will be recorded unless authorized by the Engineer.

BASIS OF PAYMENT

150-4.1 Payment will be made at the contract unit price bid for equipment rental per hour. This payment shall be full compensation for all fuel, operator's and mechanic's wages, parts, tools, maintenance items, shop equipment, camp, camp personnel wages, and all other incidentals necessary to keep the equipment in good condition and available for work on the project. No payment for equipment standby time resulting from unfavorable weather, or any other reason, is implied or intended and no payment therefore will be made by the Department. No payment will be made separately or directly for embankments.

Payment will be made under:

Item G-150a Equipment Rental (75 HP Dozer) - per hour

ITEM G-200 CONTRACTOR QUALITY CONTROL PROGRAM

DESCRIPTION

200-1.1 Perform work as described in Section 100 Contractor Quality Control Program.

REQUIREMENTS

200-2.1 The requirements for this work are described in Section 100 Contractor Quality Control Program.

METHOD OF MEASUREMENT

200-3.1 This item will not be measured for payment. The Engineers acceptance of the work constitutes measurement of this item.

BASIS OF PAYMENT

200-4.1 Propose a schedule percentage of payment of the lump sum based upon your implementation of the quality control program. In this schedule of payment provide a detailed list of items to be completed prior to payment of each scheduled payment. The Engineer may modify in part or reject in its entirety the proposed schedule of payment by the Contractor. In any case, the Engineer will be the final authority in determining the schedule of payment and the acceptance of the work.

Payment will be made under:

Item G-200a Contractor Quality Control Program - per lump sum

ITEM G-300 CRITICAL PATH METHOD (CPM) SCHEDULING

DESCRIPTION

300-1.1 Provide and maintain a Critical Path Method (CPM) progress schedule for the project. Use the schedule in coordinating and monitoring of all work under the Contract including activity of subcontractors, manufacturers, suppliers, and utility companies, and reviews by the Department. Update the CPM schedule, as required.

Provide work plans.

SUBMITTAL OF SCHEDULE

300-2.1 Submit a detailed initial CPM Schedule at the pre-construction conference for the Engineer's acceptance as set forth below.

The construction schedule, for the entire project, may not exceed the specified contract time.

Allow the Engineer 14 days to review the initial CPM Schedule. If revisions are required, make them promptly. The finalized CPM Schedule must be completed and accepted prior to commencement of any work on the project.

REQUIREMENTS AND USE OF SCHEDULE

300-3.1

a. **Schedule Requirements.** Prepare the CPM schedule as a Precedence Diagram Network developed in the activity-on-node format which includes:

   (1) Activity description

   (2) Activity duration

   (3) Resources required for each of the project activities, including:

      (a) Labor (showing work days per week, holidays, shifts per day, and hours per shift)

      (b) Equipment (including the number of units of each type of equipment)

      (c) Materials.

   Show on the activity-on-node diagram the sequence and interdependence of all activities required for complete performance of all items of work under this Contract, including shop drawing submittals and reviews and fabrication and delivery activities.

   No activity duration may be longer than 15 work days without the Engineer's approval.

   The Engineer reserves the right to limit the number of activities on the schedule.

   Consider that schedule float time is shared equally with the Department.

   The contract completion time will be adjusted only for causes specified in this Contract.

   As determined by CPM analysis, only delays in activities which affect milestone dates or contract completion dates will be considered for a time extension.

b. **Schedule Updates.** 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. Review progress and verify finish dates of completed activities, remaining duration of uncompleted activities, and any proposed logic and/or time estimate revisions. Submit a revised CPM schedule within 5 working days after this meeting showing the finish dates of completed activities and updated times for the remaining work, including any addition, deletion, or revision of activities required by Contract modification.

c. **Work Plans.** In addition to the CPM schedule, submit a work plan every 2 weeks during construction, detailing your proposed operations for the forthcoming two weeks. Include:

(1) Work activities
(2) Manpower involved by trade
(3) Work hours
(4) Equipment involved
(5) Location of the work to be performed

METHOD OF MEASUREMENT

300-4.1 Section 90.

BASIS OF PAYMENT

300-5.1 At the lump sum price for CPM Scheduling.

Payment will be made under:

Item G-300a CPM Scheduling - per lump sum

ITEM G-700 TRAFFIC CONTROL FOR AIRPORTS

DESCRIPTION

700-1.1 Provide suitably equipped airport flagger(s) with no other assigned duties to monitor and control the Contractor's personnel and equipment crossing or occupying any portion of the Air Operations Area of the airport, as required under Section 80-04 Limitation of Operations. Provide flaggers to maintain vehicular traffic on an existing road, street, or highway during performance of your work that is not otherwise provided for in the contract, as required under Section 40-05 Maintenance of Traffic. Provide pilot cars for use within the airport security area.

REQUIREMENTS

700-2.1 Furnish airport flaggers and all necessary equipment. Equip each airport flagger assigned to an aircraft operations area with a two-way radio that broadcasts and receives on the ANC Tower and Ground Control Frequencies (118.3 MHz and 121.9 MHz). ~~designated Common Traffic Advisory Frequency (CTAF) for the project airport as found in the Alaska Supplement of the United States Government Flight Information Publication.~~ Provide each airport flagger with a two-way radio to contact construction equipment and other airport flaggers on the project. Equip each airport flagger for vehicular traffic control with a flagging paddle that conforms to the requirements of the Alaska Traffic Manual.

Locate each airport flagger at a position as shown on the Plans or as described in the Safety Plan, or at an alternate location as directed by the Engineer. Ensure that each airport flagger maintains their assigned post at all times. Airport flagger positions will be adjusted as conditions warrant.

Use pilot cars operated by Airport Flaggers with escort authorization within the airport security area (within the fenced area of the airport). Use an automobile or pickup with your company logo prominently displayed on both sides for a pilot vehicle. Equip the pilot car with a yellow rotational flashing beacon and a two-way radio for contact with other flaggers and pilot cars as specified in Section 80-04. In addition, ensure the two-way radio broadcasts and receives on the ANC tower and ground control frequencies. Mount a G20-4 sign (Pilot Car Follow Me) on the rear of the vehicle at least 5 feet above the driving surface. Provide a daily log of pilot car use including operator name, date, and time of pilot car operation. Do not include time for transportation to and from the worksite. Pilot cars shall be used to escort not more than three vehicles at a time. Vehicles operated by drivers that do not have Airport security badges must be escorted at all times within the Airport Operations Area per Airport Security Policies.

Airport Flaggers and Pilot Cars will be approved by the Engineer before Deployment. The Engineer may direct deployment at his discretion.

METHOD OF MEASUREMENT

700-3.1 Airport flagger will be measured by the hour for the actual number of hours that each airport flagger performed as directed by the Engineer.

700-3.2 Airport pilot car will be measured by the hour for the actual number of hours operated on site, as logged, and as supported by certified payroll the Engineer has approved. The Contractor shall provide a pay unit value for one hour of Pilot Car operation with the Bid. The Engineer will authorize the use of pilot cars. All pilot car driver labor costs, fuel, maintenance, and operating costs shall be subsidiary and not measured for separate payment.

BASIS OF PAYMENT

700-4.1 Payment will be made at the contract unit price for each Airport Flagger per hour. The hourly rate for Airport Flagger is set at $58.00 per hour for this contract. The Engineer does not require a change order/directive for this pay item.

700-4.2 Payment for Airport Pilot Car will be made at pay unit value rate for each Pilot Car hour. It will include the hourly rate of $58.00 per hour for the Airport Flagger operating the pilot car. The Engineer does not require a change order/ directive for this pay item.

Payment will be made under:

Item G-700a	Airport Flagger - per contingent sum
Item G-700b	Airport Pilot Car – per hour

ITEM G-705 WATERING FOR DUST CONTROL

DESCRIPTION

705-1.1 Furnish all equipment and labor necessary to supply watering for dust control as required by the approved traffic control plans or as directed by the Engineer. This item is for dust control outside of the construction work area. Dust control within the work area is incidental to the contract and no separate payment will be made.

REQUIREMENTS

705-2.1 WATERING. Furnish, haul, and place water for dust control as directed. Use water trucks capable of adjusting the rate of water flow from the operators position. Distribute a light-water spray pumped from a tanker in a uniform spray pattern to cover a minimum 30 foot width in one pass and without causing erosion. Gravity flow will not be allowed. The Engineer will control water application.

If you take water from a lake, stream, or other natural water body, first obtain a water removal permit from the Alaska Department of Natural Resources (DNR). Comply with the Alaska Department of Fish and Game and/or DNR Office of Habitat Management and Permitting screening requirements for all water removal operations.

METHOD OF MEASUREMENT

705-3.1 By the 1,000 gallons (M-gallon) of water applied. The water will be measured by means of calibrated tanks or distributors, accurate water meters, or by weighing. If by weight, convert to gallons at 8.34 pounds per gallon. If by volume, convert to gallons at 7.48 gallons per cubic foot.

BASIS OF PAYMENT

705-4.1 The contract price includes all resources required to provide watering, as directed.

Payment will be made under:

Item G-705a Watering for Dust Control – per M-gal

ITEM L-100 RUNWAY AND TAXIWAY LIGHTING

DESCRIPTION

100-1.1 This item consists of furnishing and installing runway and taxiway lighting systems as indicated on the Plans and as specified herein.

EQUIPMENT AND MATERIALS

100-2.1 GENERAL. Obtain approval of all materials and equipment to be used or incorporated in the work, prior to their shipment to the project site. Submit to the Engineer 5 complete listings of materials and equipment specified herein and on the Plans. Clearly identify the material or equipment by item, name, or designation used on the Plans or specifications and indicate where specified. Include applicable catalog numbers, cuts, wiring diagrams, performance data, and operation and maintenance manuals. Neatly bind and clearly index the submittals. In addition, when specified, include in the submittals certificates of compliance, manufacturer's instructions and/or shop drawings, or proposed construction or installation procedures.

a. Certified Airport Lighting Equipment. The following items shall conform to the applicable FAA specifications, except as shown on the Plans and/or modified herein. The equipment shall be certified and listed under AC 150/5345-53, Airport Lighting Equipment Certification Program. This AC, the latest certified equipment list, and the address list of certified airport lighting equipment manufacturers are available on the Internet page for the FAA Office of the Associate Administrator for Airports (ARP). The internet address is http://www.faa.gov/airports_airtraffic/airports/construction/.

ITEM	FAA AC 150/
(1) Constant Current Regulator, L-828, class, style, and size as indicated on Plans, 60 Hz input, with brightness control for remote operation.	5345-10
(2) Runway Edge Light, Bi-directional High-Intensity, L-862, and Threshold Light, L-862E, with lamp, support column, metal frangible coupling, stainless steel bolts, and upper plug and cord assembly. The lens shall be clamp band style. Complete with lens coloration, lamp wattage, and specified support column height. Fixtures shall be left and right toe-in as required.	5345-46
(3) Runway Edge Light, Medium Intensity, L-861, and Threshold Light, L-861E, with incandescent 6.6 A lamp and Lexan lens with support column, metal frangible coupling with stainless steel hex head set screws, and upper plug and cord assembly with separable connector and stainless steel lens encircling clamp band. Complete with lens coloration, lamp wattage, and specified support column height.	5345-46
(4) Taxiway Edge Light, Medium Intensity, L861T, with incandescent 6.6 A lamp and Lexan lens, with support column, metal frangible coupling with stainless steel hex head set screws, and upper plug and cord assembly with separable connector and stainless steel lens encircling clamp band.	5345-46
(5) Airport Signs, L-858, internally lighted, Class 2, Mode 3, with acrylic panels and LED lamps. Panels shall be smooth and free from aberration with the exception of panel joints in modular signs. Panel joints shall not interfere with the legibility of the sign. Signs shall be assembled using Nylox type fasteners or Loctite to prevent loosening of fasteners due to vibration.	5345-44

(6) Airport Signs, L-858, unlighted. 5345-44

(7) Airport Light Base, L-867, transformer housing, Class I, Size B or D, 24 inches deep, one piece with internal grounding lug, gasket, steel cover, base extension (where required), ~~drain opening,~~ and conduit. 5345-42

(8) Airport Light Base, L-867, Watertight, transformer housing, shall be 12 inch x 24 inch, non-steel light bases, meeting the requirements for non-vehicle loading light bases, type L-867. The bases shall be made from Type III, ultra-high molecular weight, heavy-wall, high-density polyethylene pipe having a cell classification of 345434C or better according to ASTM D 3350. A conduit stub made of the same material as the light bases shall be sidewall fused to the bases using saddle fittings, or other approved method for a watertight connection. 5345-42

(9) Airport Light Base, L-868, transformer housing, Class I, Steel, Size B, 12 inches deep , two section light base assembly with grooved and "O" ringed flange ring with concrete ring. Step the top flange of the light base bottom section to fit outside the top section. Complete with any necessary spacer rings, internal grounding lug, mud plate, anti-rotational fins and conduit hubs. 5345-42

(10) Isolating Transformer, L-830, individual lamp type, series-to-series, 5000 V, 6.6 A to 6.6 A, 30/45 W or 200 W 5345-47

(11) Isolating Transformer, L-830, individual lamp type, series-to-series, 5000 V, 20 A to 6.6 A, 100 W, 200 W or 300 W. Transformers shall have leads of the length shown on the plans. 5345-47

(12) Isolating Transformer, L-830-1, individual lamp type, series-to-series, 5000 V, 6.6 A to 6.6 A, 30/45 W. 5345-47

(13) Isolating Transformer, L-830-6, individual lamp type, series-to-series, 500 V, 6.6 A to 6.6 A, 200 W. 5345-47

(14) Radio Control Equipment, L-854, Type I, with enclosure for surface mounting, antenna and feedline and set to the Common Traffic Advisory Frequency (CTAF) for the project airport as found in the Alaska Supplement of the U.S. Government Flight Publication. 5345-49

(15) Flush Taxiway Centerline Light Fixture, Uni or Bi-Directional, Type ~~L-852A, or L-852B~~ L-852C or L-852D, Class 2, Mode 1, Style 3, a flat fixture with 1/4 inch or less clearance above finish surface, with ~~30 W~~ LED lamps ~~and color filters~~, one or two plug and cord assemblies as indicated ~~assembly~~, 1/2 inch watertight connector, stainless steel bolts, vibration proof fasteners, "Dry" system with replaceable lens in the optical assembly sealed above and below with "O" rings and without optional arctic heater. 5345-46

(16) Flush Runway Light Fixture, Uni or Bi-Directional, Type L-850A or L-850B, Class 2, Mode 1, Style 3, as indicated, with 1/4 inch or less clearance above finish surface, with 48 ~~80~~ W lamps, color filters, a single 100 or 200 W transformer, plug and cord assembly, 1/2-inch watertight connector, stainless steel bolts, vibration proof fasteners, "Dry" system with replaceable lens in the optical assembly sealed above and below with "O" rings. L-850B fixtures shall be left and right toe-in as required. 5345-46

(17)Primary Handhole, L-868, class 1, size B, steel, 24 inches deep x 12 inches diameter, 1-3/8 inch N.P.T. conduit hubs (with number and location of hubs as indicated, 4 inch bottom drain hole, steel cover and gasket, internal ground lug with connector and other misc. items. Handhole and cover shall be suitable for vehicle and aircraft wheel loading. 5345-42

(18)Wind Cone Primary Handhole, L-867, class 1, size D, steel, 24 inches deep x 16 inch diameter, one piece with internal ground lug with connector, steel cover with gasket, ~~4 inch drain hole, 2-1/8 inch N.P.T. and 1-3/8 inch N.P.T.~~ conduit hubs with number, size, and location of hubs indicated, and other misc. items. 5345-42

(19)Handhole, L-867, Size B, Watertight, transformer housing shall be 12 inch x 24 inch, non-steel light bases, meeting the requirements for non-vehicle loading light bases, type L-867, with ½ inch galvanized steel cover and gasket. The bases shall be made from Type III, ultra-high molecular weight, heavy wall, high density polyethylene pipe having a cell classification of 345434C or better according to ASTM D 3350. A conduit stub made of the same material as the light bases shall be sidewall fused to the bases using saddle fittings, or other approved method for a watertight connection. 5345-42

(20)Elevated Runway Guard Light, L-804, with LED lamps, support column, metal frangible coupling, internal flasher circuitry, and upper plug and cord assembly with separable connector. 5345-46

(21)Flush Stop Bar/Runway Guard Light Fixture, Uni Directional, Type L-852G/S, Class 2, Mode 1, Style 3, a flat fixture with 1/4 or less clearance above finished surface, with 105W lamps, color filters, a single 100 W transformer, two plug and cord assemblies, 1/2 inch watertight connector, stainless steel bolts, vibration proof fasteners, "Dry" system with replaceable lens in the optical assembly sealed above and below with "O" rings. 5345-46

(22)Flush Runway Edge Light Fixture, Bi-Directional, Type L-850C, Class 2, Mode 1, Style 3, as indicated, with 1/4 inch or less clearance above finish surface with 105 W lamps, color filters, a single 200 W transformer, plug and cord assembly, 1/2-inch watertight connector, stainless steel bolts, vibration proof fasteners, "Dry" system with replaceable lens in the optical assembly sealed above and below the "O" rings. Fixtures shall be left or right toe-in as required. 5345-46

(23)Elevated Stop Bar Light, L-862S, with 150W halogen 6.6 A lamp and red lens, support column, metal frangible coupling, and upper plug and cord assembly with separable connector. 5345-46

~~**(19)**~~

b. Sealer. Adhesive sealant shall be a self-leveling silicone sealer.

c. Transformer Support Platform. When called for on the Plans, light bases equipped with L-830 type isolating transformers shall, in addition to the other specified items, be provided with 13-3/4 inch high prefabricated steel, fixed height or folding type, transformer support platforms as shown on the Plans.

d. Power Adapter. Power adapter, when called for in the plans shall be a series primary to 120 V regulated-voltage power supply suitable for use with a 3-step constant current regulator source. The power adapter shall be oil filled and include two replaceable internal fuses. Power adapter ratings shall be 670 VA at 120 V ac with ± 3% regulation @ 2.8 to 6.6 A primary current.

e. Regularly Used Commercial Items. All other regularly used commercial items of electrical equipment not covered by FAA equipment specifications shall conform to the applicable NEMA rulings and standards for equipment of its type.

f. Lock Washers. Lock washers shall be two piece cam-type lock washer.

g. Free Flowing Insulating Material. Insulating material for filling of light bases shall be an inorganic, non-flammable, free-flowing granular material. The material shall be chemically treated to be hydrophobic. It shall be free of asbestos. The material shall have a density of 40 to 42 lb/ft3, and a load bearing strength of 83 psi.

h. Lubricant and Sealant. Lubricant and sealant shall be a general purpose "O"-ring and valve lubricant. Temperature range shall be -40 °F to +400 °F.

i. Soft Gasket. Gaskets to be installed between the base plate and base in watertight lighting systems shall be soft neoprene.

j. Pedestals. The power and communications pedestals shall be fiberglass enclosures constructed to meet the requirements of ANCI C 57.12.28 Standard for Pad-mounted Equipment Enclosure Integrity, an attachment to ANSI C 37.72. Construction details and overall dimensions shall be according to the Plans.

k. Junction Box, Type II. Junction boxes shall be pre-cast reinforced concrete boxes of the size and details shown on the Plans. Junction boxes shall have metal covers. The covers shall be effectively grounded with a 3-foot copper braid.

l. Concrete. Conform to Item P-610 Structural Portland Cement Concrete, 1-inch maximum size coarse aggregate.

m. Fixture Bolts. Bolts for securing flush-mounted light fixtures shall be fully threaded and shall be a maximum of 3 inches long.

100-2.2 AIRFIELD LIGHTING CONTROL SYSTEM (ALCS). Provide all labor and materials required to update the existing ADB Airfield Lighting Control System (ALCS). Update ALCS graphics to reflect changes to the airfield configuration. Add a stop bar control screen and system programming required to interface with the Individual Lamp Control and Monitoring System (ILCMS) for stop bar control. Remove access to the FAA systems controls from all control locations except for the ATCT, including the regulator vault, maintenance center, operations center, and new roaming maintenance center.

Complete installation and configuration of wireless communication system to support backup communication between the air traffic control tower (ATCT) and regulator vault. Radios and antennas have been installed in the ATCT and regulator vault, in accordance with ADB installation drawings produced during the 2010 Runway 7R project, but have not been activated. Replace the omni-directional antennas at the ATCT and regulator vault with directional yagi antennas.
Complete installation of the roaming maintenance center using the existing maintenance laptop. Coordinate with DOT IT system personnel to provide secure access to the ALCS from the roaming maintenance laptop through the existing wireless system on the airfield. Provide programming and setting changes to the laptop software for access to the existing wireless system through the use of the internal wireless card in the laptop. Provide additional cabling and any other hardware as required to connect the existing vault ALCS computer to the existing wireless network in the regulator vault.

Install ILCMS for the Taxiway J stop bar, runway guard lights, and taxiway centerline lights, including single- and dual-channel remote control modules mounted in the light bases and master controllers mounted in the regulator switchgear. Program master controller and interface with ALCS. Monitoring shall be capable of determining the number of lights that are not functional and whether the failed lights are adjacent. Master

controllers will be State-furnished. Package and ship State-furnished master controllers to ADB for programming and to be included in the factory acceptance testing.

The ALCS stop bar control screen shall include controls for activation of the stop bar sequence and a sensor override button. It shall also indicate the actual status of the stop bar lights and any communication or system failures. The stop bar control screen shall be designed to facilitate the addition of future stop bars.

Taxiway J Stop Bar – Sequence of Operations

Above 1200ft RVR:	Stop bar lights off.
	Runway guard lights flashing.
	Taxiway centerline lead-off lights on.
	Taxiway centerline lead-on light segments #1 and #2 on.
	Local device/component failure: Affected fixture off, remaining runway guard lights flashing.
	System/communications failure: Stop bar lights off, runway guard lights flashing.
Below 1200ft RVR:	Runway guard lights off.
	Stop bar lights on.
	Taxiway centerline lead-off lights on.
	Taxiway centerline lead-on light segments #1 and #2 off.
	When stop bar button is activated, stop bar turns off, taxiway centerline lead-on light segments #1 and #2 turn on, 45 second and 2 minute backup timers start.
	When sensor #1 or 45 second timer is activated, stop bar turns on, taxiway centerline lead-on light segment #1 turns off.
	When sensor #2 or 2 minute timer is activated, taxiway centerline lead-on light segment #2 turns off. If sensor #1 or 45 second timer have not been activated, stop bar turns on, taxiway centerline lead-on light segment #1 turns off.
	When stop bar and sensor override buttons are activated together, stop bar turns off, taxiway centerline lead-on light segments #1 and #2 turn on. Sensor #1, sensor #2, and 45 second backup timers are disabled. When 2 minute timer is activated, stop bar turns on, taxiway centerline lead-on light segments #1 and #2 turn off.
	Local device/component failure: Affected fixture off, remaining stop bar lights function normally.
	System/communications failure: Stop bar lights on, runway guard lights off.

Microwave aircraft/vehicle sensors shall be rated for outdoor use down to -35 deg F. Sensors shall be pole mounted with adjustable hardware and shall be served from an ILCMS sensor module incorporating a low-voltage power supply to provide power from the series lighting circuit. Sensors shall be resistant to false triggers from rain, snow, and vibration and shall have an adjustable range cutoff of 100-400ft to eliminate detection of objects beyond the desired distance. Install an L-810 obstruction light on top of the mounting pole and serve from a power supply module powered from the series lighting circuit. Provide one spare sensor assembly, including all above grade components (sensor, conduit, mounting pole and hardware, frangible couplings, obstruction light), ILCMS sensor remote, ILCMS power supply remote, and sensory Y-connector box.

CONSTRUCTION METHODS

100-3.1 GENERAL. All work in connection with the airport lighting system shall be according to the applicable provisions of the current NEC of the National Fire Protection Association and all State and local codes. Location of all new fixtures, conduit, cables, etc., shall be as shown on the Plans.

Level and align light fixtures according to manufacturer's instructions. Level to within 1 degree. Align to within 1/2 inch at right angles to centerline and to within 1 inch parallel to centerline.

Where electrical cable or duct is required, such work will be covered under Item L-108 or L-110, as applicable.

Where remote relay assembly and/or remote control panel is required, such work will be covered under item L-109.

Provide all labor, materials, systems, equipment, facilities, and other incidental items as may be required to provide temporary electrical power for construction and testing of all contract work.

Refer to P-610 for requirements regarding all work and materials to place concrete.

Contact ADB Airfield Solutions (Attention: Rick Lafferty, phone 1-800-275-3087) for upgrading of the ALCS and installation of the wireless communication and ILCMS. Upgrade ALCS hardware and software as indicated. Install wireless hardware and configure software as indicated. Install and program ILCMS as indicated and adjust microwave sensors to provide coverage required while minimizing false triggers. Test wireless communications and verify operation of all systems, including automatic transfer of communications to the wireless system when the primary communication path is disrupted. Provide training to DOT and FAA personnel on the use and maintenance of systems. Provide new O&M manuals or updates to the existing O&M manuals.

Test the existing fiber optic ALCS communication pathways for performance in accordance with TIA/EIA-568-B.3. Submit test results in wiring to the Engineer along with notification of any deficiencies noted during testing. Schedule all communication outages with the Engineer. Testing shall include all fiber strands currently in use between ALCS network transceivers, all other strands of the (2) 48-strand MM cables between the regulator vault and the North Terminal, and all other strands of the (1) 48-strand MM cable between the North Terminal and the Field Maintenance Facility.

100-3.2 INSTALLATION OF NON-WATERTIGHT EDGE LIGHTS. The light base shall be placed on a layer of bedding material of minus 1/4 inch material that is not less than 6 inches in depth. Bedding material shall be, sand, gravel, crushed aggregate, or other suitable material containing no organic, frozen, or other deleterious material. If the light base is placed in the structural section (P-154, P-208, P-209) of a pavement such as for a runway or taxiway, the Contractor shall construct the backfill according to the specifications for the material in which the duct is placed. The material shall be compacted to the requirements of the material into which it is placed. The light base shall be placed to between 3/8 inch and 3/4 inch of finished grade. The base shall be level to within ±1/4 inch.

Connect the insolating transformer with L-823 connector kits and heat shrink tubing. Ensure that all field installed primary cable connectors have the plug pin connectors and receptacle socket connectors properly positioned within their respective connector bodies, as detailed by the connector manufacturer, prior to the shrinking of heat shrink tubing at the cable-connector interface.

Install isolating transformers in the light bases as shown on the Plans. Where called for on the Plans, install isolating transformers in all light bases by placing on top of a 14 inch (extended height) approved transformer supporting platform as specified. Train all connections to the isolating transformer to lay in the upper section of the light base, above the transformer platform and below the cover flange, as shown on the Plans. Provide adequate primary and secondary cable slack in each light base to assure that all connectors can be grouped and trained in the upper section of the light base without subjecting the connector to tension.

Label each edge light assembly with the letter and number designation as indicated on the Plans. Label by permanently die-stamping the letter and number designation onto the light base and base cover plate with 1/4 inch figures.

Install the light fixtures with stainless steel hardware and coat the bolts and frangible couplings with a suitable corrosion inhibitor prior to being installed. Install the light fixtures with lamp, clean the lenses, align and adjust each optical system according to the manufacturer's instructions.

100-3.3 INSTALLATION OF FLUSH LIGHTS. Install flush light fixtures according to the Plans and specifications.

Install flush runway edge and centerline light fixtures and taxiway centerline light fixtures after the old pavement has been cold planed, and before the asphalt is placed. Install flush taxiway and runway centerline and touchdown zone light fixtures on new runways or taxiways ~~after~~ before the first asphalt lift ~~and before the final lift~~.

Core remaining asphalt at the runway centerline light base locations a minimum diameter of ~~24~~ 36 inches and remove the base course material to the depth shown. Compact the bottom of the cored hole before pouring concrete.

Use a setting jig to install the bottom section of the light base assembly, as shown in the Plans. The bottom of the light base shall be at least ~~6~~ 12 inches above the bottom of the excavation. Provide no more than 4 threaded hubs for the bottom section of the light base, as shown on the Plans. Connect the bottom section of the light bases to the rigid steel conduit system, using rubber grommets or waterproof nipples and couplings. Usually one waterproof sealtite flexible coupling will suffice for each two-hubbed light base.

Call for inspection of the light base assembly prior to the backfilling of the excavations. Backfill with poured PCC meeting the requirements of Item P-610. Fill the excavation only to the level shown. Allow a ~~3~~ 5 inch thickness of asphalt pavement over the PCC and over the light base mudplate.

After the PCC has cured at least 72 hours (or as otherwise directed by the Engineer), apply tack coat and overlay with Asphalt Concrete Pavement.

Plug the conduit ends during the course of construction to prevent accumulation of water or debris in the conduit.

When ready to install the inset lights, determine the location of the light base and drill a small diameter core hole to locate the center of the mud plate. Next, drill a 16 inch diameter core hole over the center of the mud plate (± 1/4 inch). Use a coring machine of adequate stability to prevent "wobble". After removing the core, mud plate, plywood cover, and any water or debris that has accumulated, apply a thin layer of self-leveling silicone sealer between the bottom flange of the top section and the top flange of the bottom section and bolt the top section using 18-8, 410, or 416 stainless steel all-thread bolts. Coat the bolts with a suitable corrosion inhibitor prior to installing. Use two-piece cam-type lock washers and torque the bolts to 180 inch-pounds or as recommended by the manufacturer.

Make a "dry system" light fixture installation, using a grooved flange ring, "O" ring, and concrete ring. If the actual elevation of the pavement overlay does not equal the estimated elevation, provide spacer rings or flange rings of different thickness. Bolt the fixture to the top section using 18-8, 410, or 416 stainless steel bolts. Coat the bolts with a suitable corrosion inhibitor prior to installing. Use two piece cam-type lock washers, and torque the bolts to 180 inch-pounds, or as recommended by the manufacturer. Set the outboard edge of the fixture ~~1/4 to 3/8 inch~~ 1/8 inch (± 1/16 inch) below the adjacent finished pavement.

Install the light fixtures per the Plans and the specifications and the manufacturers recommended procedure. Do not deviate from these procedures, or the materials shown or specified, without the prior approval of the Engineer.

100-3.4 INSTALLATION OF WATERTIGHT EDGE LIGHTS. Place the light base on a layer of bedding material that is not less than 6 inches in depth and backfill around the lighting base with bedding material. Use bedding material that meets requirements for the applicable lift of material (P-152, P-154, P-208, P-209) except that 100% of the bedding material will pass a 1 inch sieve.

Test the base assemblies, saddle fittings, and plastic duct as a complete system or in sections to insure that it is watertight. If a pneumatic test is performed to meet this requirement, the minimum pressure shall be ~~10~~ 5 psi for a minimum of 10 minutes.

Base assemblies shall be sealed watertight and conduit openings and any holes shall be caulked with duct seal to prevent any water from entering the base assemblies. After the connection of the isolating transformer with L-823 connector kits the light bases shall be completely filled with free flowing insulating material.

The light base assemblies shall be sealed watertight using the following method and materials or approved equal:

a. Spot weld the weep hole in the bottom of the base plate hub, if present.

b. To insure that no water leaks into the can, use a soft neoprene gasket under the base plate. The gasket shall be covered on both sides with a generous coating of lubricant and sealant to prevent water seepage during freeze-thaw cycles.

c. Install seal washers with stainless steel cups under the bolt heads. The torque on the six bolts should be approximately 25 plus or minus 5 inch-pounds. A torque wrench must be used.

d. After installation of the base plate, plug in the edge light. Using clear adhesive sealant, coat the threads of the frangible coupling and screw into place. Plug the weep hole with adhesive sealant. Put adhesive sealant around the bottom of the frangible coupling at the junction with the base plate.

e. Install the edge light stem securely. Then, using more adhesive sealant, fill the space between the edge light stem and the inside diameter of the frangible coupling. Install the light fixtures with lamp, clean the lenses, align and adjust each optical system according to the manufacturer's instructions.

100-3.5 INSPECTION. Notify the Engineer in writing and request inspection at least 48 hours prior to installing lighting fixtures, making any splices, or covering any buried or concealed work. Immediately correct any deficiencies found during the inspection.

Obtain inspections by the Municipality of Anchorage for electrical work other than the constant current airfield lighting system. Coordinate the MOA inspections with the Engineer. Obtain all permits and pay all fees required. Immediately correct any deficiencies found during the inspection.

100-3.6 RECORD DOCUMENTS. Maintain at the project site a complete set of contract Plans, specifications and approved changes thereto. In addition to the above, 2 complete sets of electrical plans shall be maintained for as-built purposes upon which all changes, connections, part numbers and conductor routings shall be legibly shown and noted. Where changes to Plans are involved, make notations to show the dates and authorities approving the changes. Permanently store one set of annotated electrical plans in a dry, secure location at the project site. Deliver the second set to the Engineer.

As-built plans shall show locations of all buried items such as conduit, including any existing active lines encountered. All dimensions shall be from runway and taxiway centerlines or other permanent objects. As-built plans shall include complete wiring diagrams, (both power and control), identifying terminals, cables, and connections. As-built plans shall be kept current as the work progresses.

100-3.7 GUARANTEE. Furnish a written guarantee that any materials or workmanship found defective within one year of final acceptance shall be replaced at no additional cost to the Department, promptly upon notification and to the satisfaction of the Engineer.

The airport sign manufacturer shall provide the following written guarantee:

This sign is manufactured under AC/150-5345-44H, *Specification for Runway and Taxiway Signs*, and warranted for 2 years after the installation date. Any defects in material or workmanship will be corrected or the sign replaced by the manufacturer at no cost to the airport owner.

100-3.8 SPARE PARTS. Provide a quantity of spare light fixtures and transformers equal to 10 percent (rounded down) of the installed quantity of each type of fixture and size of transformer, but not less than one of each size or type. Deliver spare parts to airport maintenance as directed by the Engineer.

100-4.1 METHOD OF MEASUREMENT.

a. Lump Sum. No measurement of quantities will be made.

b. Unit Prices. The quantity to be paid for will be the number of units installed, complete, in place, accepted, and ready for operation, or the number of units acceptably removed.

~~**b.**~~**c. Contingent Sum.** Contingent sum items will be measured in the manner specified in the directive authoring the work.

BASIS OF PAYMENT

100-5.1 ITEMS OF WORK PAID IN OTHER SECTIONS. All work and materials required to install cable, conduit, and ground rods is paid for under Items L-108, and L-110.

All work and materials required to install remote relay assembly and remote control panel are paid for under item L-109.

100-5.2 ITEMS OF WORK PAID IN THIS SECTION. At the contract lump sum, contingent sum, or unit prices for the completed and accepted job.

Refer to Item P-610 for requirements regarding all work and materials to place portland cement concrete. Portland cement concrete is subsidiary to L-100 items requiring its use.

Item L-100a, Airport Lighting: Includes all work required under this item to provide the complete airport lighting system, except work listed above which is paid for under other items.

Item L-100b, Regulator, L-828: Includes mounting, electrical connection (with all input control and output circuits), painting and stenciling. Size as indicated on Plans.

Item L-100c, High Intensity Runway Edge and Threshold Light, L-862 and L-862E: Includes L-868 base assembly, gasket, frangible coupling, L-830-6, 200 W isolating transformer, and L-823 cable connectors.

Item L-100d, Medium Intensity Runway Edge and Threshold Light, L-861 and L-861E: Includes L-867 base assembly, grounding lug and connector, cover, gasket, support column, frangible coupling, 30/45 W L-830-1 isolating transformer, transformer mounting platform (when shown on Plans), and L-823 cable connectors.

Item L-100e, Taxiway Edge Light, L-861T: Includes L-867 base assembly, grounding lug and connector, cover, gasket, support column, frangible coupling, 30/45 W L-830-1 isolating transformer, transformer mounting platform (when shown on Plans), and L-823 cable connectors.

Item L-100f, Wind Cone Handhole, L-867, Size D: Includes steel cover and gasket, grounding lug and connector, L-823 primary and secondary cable connectors, and ~~PA-4 power adapter~~ isolation transformer (when specified on the Plans).

Item L-100g, Primary Handhole, L-868, Size B: Includes traffic rated steel cover and gasket, grounding lug and connector.

Item L-100h, Remove ~~existing~~ Runway and Taxiway Light: Includes removal of fixtures, transformers, and bases, and all other components as shown or described in the Plans.

Item L-100i, Flush Runway Centerline Light, L-850A or L-850B: Includes L-868 base assembly, spacer rings, flange ring, steel cover, concrete work, asphalt patching and sealing.

Item L-100j, Flush Taxiway ~~Centerline~~ Light, ~~L-852A, L-852B, L-852E~~ L-852D or L-852G/S: Includes L-868 base assembly, spacer rings, flange ring, L-830 isolating transformer, L-823 Cable connectors, concrete work, asphalt patching and sealing.

Item L-100j(1), Flush Taxiway Light, L-852C or L-852D, (Trim Out Only): Includes L-830 isolating transformer, L-823 cable connectors, and removal of existing fixture and transformer.

Item L-100k, Flush Runway Edge Light, L-850C: Includes L-868 base assembly, spacer rings, flange ring, L-830 isolating transformer, L-823 Cable connectors, concrete work, asphalt patching and sealing.

Item L-100l, Relocate ~~Existing~~ Airport Sign, Type L-858: Includes L-867 base, frangible couplings, transformer, concrete base, and sign faces as shown, and remove of existing foundation (where required).

Item L-100m, Runway Guard Light, L-804: Includes integral flash controller, L-867 base assembly, grounding lug, cover, gasket, support column, frangible coupling, L-830 isolating transformer, and L-823 cable connectors.

Item L-100n, Airport Sign, Type L-858: Includes sign, ~~L-867 base,~~ frangible couplings, transformer, concrete base, sign faces as shown, and removal of existing sign and foundation (where required).

Item L-100o, Power or Communications Pedestal: Includes anchor stake and conduits as shown.

Item L-100p, Handhole, L-867, Size B: Includes grounding lug, steel cover, and gasket.

Item L-100q, Junction Box, Type II.

Item L-100u, Adjust Runway and Taxiway Light: Includes removal and reinstallation of existing top section, spacer rings, flange ring, and fixture, and installation of temporary covers and shorting caps as required.

Item L-100ab, Individual Lamp Control and Monitoring System: Includes single- and dual-channel remote control modules installed where indicated on the Plans, master controllers installed in existing regulator switchgear and connected to existing ALCS, and microwave sensors and associated remote control modules, power supplies, obstruction lights, and mounting hardware installed as indicated on the Plans.

Item L-100ae, Reconfigure Airfield Lighting Control System: Includes installation of updated Airfield Lighting Control System (ALCS) software with revised airfield graphics and new stop bar controls, programming of the Individual Lamp Control and Monitoring System master controllers, installation of wireless equipment for secondary ATCT communications link and roaming maintenance center, testing and verification of operations, training, and performance testing of the fiber optic cables.

Item L-100ak, Stop Bar Light, L-862S: Includes L-867 base assembly, grounding lug, cover, gasket, support column, frangible coupling, L-830 isolating transformer, and L-823 cable connectors.

Item L-100ap, Spare Parts: Includes spare light fixtures and transformers.

Payment will be made under:

Item L-100a	Airport Lighting - per lump sum
Item L-100b	Regulator, L-828 - per each

Item L-100c	High Intensity Runway Edge and Threshold Light, L-862 and L-862E - per each
Item L-100d	Medium Intensity Runway Edge and Threshold Light, L-861 and L-861E - per each
Item L-100e	Taxiway Edge Light, L-861T - per each
Item L-100f	Wind Cone Handhole, L-867, Size D - per each
Item L-100g	Primary Handhole, L-868, Size B – per each
Item L-100h	Remove ~~existing~~ Runway and Taxiway Light - per each
Item L-100i	Flush Runway Centerline Light, L-850A or L-850B - per each
Item L-100j	Flush Taxiway ~~Centerline~~ Light, ~~L-852A, L-852B, L-852E~~ L-852D or L-852G/S - per each
Item L-100j(1)	Flush Taxiway Light, L-852C or L-852D, (Trim Out Only) – per each
Item L-100k	Flush Runway Edge Light, L-850C - per each
Item L-100l	Relocate ~~Existing~~ Airport Sign, Type L-858 - per each
Item L-100m	Runway Guard Light, L-804 - per each
Item L-100n	Airport Sign, Type L-858 - per each
Item L-100o	Power or Communications Pedestal – per each
Item L-100p	Handhole, L-867, Size B – per each
Item L-100q	Junction Box, Type II – per each
Item L-100u	Adjust Runway and Taxiway Light – per each
Item L-100ab	Individual Lamp Control and Monitoring System – per lump sum
Item L-100ae	Reconfigure Airfield Lighting Control System – per contingent sum
Item L-100ak	Stop Bar Light, L-862S – per each
Item L-100ap	Spare Parts – per lump sum

MATERIAL REQUIREMENTS

AC 150/5345-10	*Constant Current Regulators and Regulator Monitors*
AC 150/5345-42	*Airport Light Bases, Transformer Houses, Junction Boxes and Accessories*
AC 150/5345-44	*Taxiway and Runway Signs*
AC 150/5345-46	*Runway and Taxiway Light Fixtures*
AC 150/5345-47	*Isolation Transformers for Airport Lighting Systems*
AC 150/5345-49	*L-854, Radio Control Equipment*
AC 150/5345-53	*Airport Lighting Equipment Certification Program*
ASTM D 1557	Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-lb. Rammer and 18-in Drop

ITEM L-107 WIND CONE

DESCRIPTION

107-1.1 This item shall consist of furnishing and installing lighted and unlighted airport wind cones according to these specifications and according to the dimensions, design, and details shown in the Plans. This item shall also include removal of existing wind cones and foundations.

For lighted wind cones, the work shall include the furnishing and installation of a support for mounting the wind cone, the furnishing and installing of the specified wire from the wind cone to the ~~electrical control panel~~ wind cone handhole, and a concrete foundation. The item shall also include all cable connections, the furnishing and installing of the conduit and conduit fittings from the wind cone base to the first hand hole, the furnishing and installation of all lamps, ground rod and ground connection, the testing of the installation, and all incidentals necessary to place the wind cone in operation as a completed unit to the satisfaction of the Engineer.

For unlighted wind cones, the work shall include the furnishing and installation of a support for mounting the wind cone and a concrete foundation.

EQUIPMENT AND MATERIALS

107-2.1 GENERAL.

a. Airport lighting equipment and materials covered by FAA specifications shall be certified and listed under AC 150/5345-53, Airport Lighting Equipment Certification Program. This AC, the latest certified equipment list, and the address list of certified airport lighting equipment manufacturers are available on the Internet home page for the FAA Office of the Associate Administrator for Airports (ARP). The internet address is http://www.faa.gov/airports_airtraffic/airports/construction/.

b. All other equipment and materials covered by other referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification when requested by the Engineer.

107-2.2 WIND CONES. The 8-foot and 12-foot wind cones and assemblies shall conform to the requirements of AC 150/5345-27, Specification for Wind Cone Assemblies. The pole shall be a steel pole hinged in the middle.

a. Type L-807, Style I-A, Size 1, externally lighted wind cone.
b. Type L-807, Style 1-B, Size 1, internally lighted wind cone.
~~**b.**~~**c.** Type L-807, Style I-A, Size 2, externally lighted wind cone.
d. Type L-807, Style 1-B, Size 2, internally lighted wind cone.
~~**c.**~~**e.** Type L-807, Style II, Size 1, unlighted wind cone.
~~**d.**~~**f.** Type L-807, Style II, Size 2, unlighted wind cone.

107-2.3 WIRE. Wire in conduit rated up to 5,000 V shall conform to AC 150/5345-7, Specification for L-824 Underground Cable for Airport Lighting Circuits, Type C cross-linked polyethylene insulated wire. For ratings up to 600 V, cross-linked polyethylene insulated wire type XHHW, shall be used. The wires shall be of the type, size, number of conductors, and voltage shown in the Plans.

107-2.4 CONDUIT. Rigid steel conduit and fittings shall conform to the requirements of UL Standard 6, 514, and 1242.

107-2.5 CONCRETE. Design the foundation based on the soil bearing capacity of the soils located at the pole site, pole mechanics, and wind loads. Provide a foundation that will allow adjustment of the pole with a

wrench by tightening or loosening bolts and a pole adjustment range of 5 degrees minimum without compromising the pole wind rating.

Design the foundation as necessary to resist pole lateral, uplift, and overturning forces. Submit calculations stamped by a Professional Engineer to the Engineer for approval. The concrete for foundations shall be proportioned, placed, and cured according to Item P-610, Structural Portland Cement Concrete.

107-2.6 PAINT.

a. Primer for ungalvanized metal surfaces shall be a high solids alkyd primer conforming to Federal Specification TT-P-664D.

b. Primer for galvanized metal surfaces shall be zinc dust-zinc oxide primer paint conforming to MIL-P-24441/19B. If necessary, thin with not more than 1/2 pint of turpentine per gallon of primer.

c. Orange paint for the body and the finish coats on metal surfaces shall consist of a ready-mixed nonfading paint meeting the requirements of Fed. Spec. TT-E-489. The color shall be according to Federal Standard 595, Aviation Gloss Orange, Number 12197.

107-2.7 WIND CONE. The wind cone fabric shall be standard international orange.

CONSTRUCTION METHODS

107-3.1 INSTALLATION. The hinged pole shall be installed on the concrete foundation ~~as shown in the Plans~~ in accordance with these specifications and the manufacturer's drawings. Do not grout between the base plate and the foundation to allow for air circulation and inhibit corrosion inside the pole.

a. Notify the Engineer at least 24 hours prior to placement of concrete. Allow concrete bases to cure for 7 days after pouring before installing the hinged pole

b. Backfill. Material used as backfill around the footing of the lighted wind cone shall be gravel or sand consisting of crushed or naturally occurring granular material. All materials shall be free of frozen lumps and clay particles.

107-3.2 COUNTERWEIGHT. The Contractor shall furnish and install a counterweight on the hinged support for the 12-foot wind cone. The counterweight may consist of lead weights which may be furnished with the "A" frame assembly or it may consist of concrete poured around the bottom of the hinged support. Where concrete is used, the counterweight shall be approximately 12 inches wide by 2 feet deep and should weigh approximately 500 pounds. The counterweight shall be 25 to 50 pounds less than the weight needed to balance the assembly. The counterbalancing must operate to the satisfaction of the Engineer.

107-3.3 ELECTRICAL CONNECTION. The Contractor shall furnish all labor and materials and shall make complete electrical connections according to the wiring diagram furnished with the Plans.

If underground cable from the transformer vault to the wind cone site and duct for this cable installation under paved areas is required, the cable and duct will be paid for as part of the wind cone pay item.

107-3.4 BOOSTER TRANSFORMER. If shown in the Plans or specified in the Special Provisions, a booster transformer to compensate for voltage drop to the lamps shall be installed in a suitable weatherproof housing. The booster transformer shall be installed as indicated in the Plans and described in the Special Provisions. If the booster transformer is required for installation in the transformer vault, it will be paid for as part of the wind cone pay item.

107-3.5 GROUND CONNECTION AND GROUND ROD. The Contractor shall furnish and install a ground rod, grounding cable, and ground clamps for grounding the "A" frame of the 12-foot assembly or pipe support

of the 8-foot support near the base. The ground rod shall be of the diameter and length specified in the Plans and shall be copper or copper clad. The ground rod shall be driven into the ground adjacent to the concrete foundation so that the top is at least 0.5 foot below grade. The grounding cable shall consist of No. 8 AWG bare stranded copper wire or larger and shall be firmly attached to the ground rod by means of a ground connector or clamp. The other end of the grounding cable shall be securely attached to a leg of the "A" frame or to the base of the pipe support with noncorrosive metal and shall be of substantial construction. The resistance to ground shall not exceed 25 ohms.

107-3.6 PAINTING. Three coats of paint shall be applied (1 prime, 1 body, and 1 finish) to all exposed material installed under this item except the fabric cone, obstruction light globe, and lamp reflectors. The wind cone assembly, if painted on receipt, shall be given 1 finish coat of paint in lieu of the 3 coats specified above.

107-3.7 LAMPS. The Contractor shall furnish and install lamps, as required, conforming to the following requirements and as indicated on the drawings:

a. Incandescent. Provide four 200-W, 115-V general lighting service lamps in the reflectors for the 12-foot cone or four 150-W, 115-V lamps for the 8-foot cone. A clear 100-W, 107-W, or 116-W, 115-V traffic signal lamp with a medium screw base, or a 100-W. A 69 W, L-810, 115 V, medium prefocus base lamp shall be furnished and installed in the obstruction light as required.

b. LED. Provide LED fixtures with independent lamp circuits for general illumination of the wind cone. Furnish and install an L-810, LED, ~~120-V~~ obstruction light as required. LED fixtures and obstruction light shall be maintain a constant brightness when powered from the series lighting circuit.

107-3.8 WINCH AND PADLOCK. The Contractor shall furnish and install a suitable locking ratchet winch for lowering and raising the hinged top section.

A padlock shall also be furnished by the Contractor on the 8-foot wind cone for securing the hinged top section to the fixed lower section. Three keys for the padlock shall be delivered to the Engineer.

107-3.9 TESTING. Furnish all necessary labor, equipment and appliances for testing all material and equipment as specified herein. No work will be accepted until all applicable tests have been performed. Tests shall not begin until the work has been approved by the Engineer. All tests shall be neatly tabulated on a reproducible "Test Sheet" which shall be signed and dated by the Contractor upon completion of the test. Test and demonstrate to the Engineer the following:

a. That all lighting, power, and control circuits are continuous, and free from short circuits.

b. That all circuits are free from unspecified grounds.

c. That the resistance to ground of all non-ground 5000 V circuits is not less than ~~50~~ 2,000 megohms. Where additions are made to existing circuits, only the new section shall be tested. The resistance to ground of 600 V capacity shall be ~~10~~ 1,000 megohms for the insulation test.

d. That all circuits are properly connected according to applicable wiring diagrams.

e. That all circuits are operable.

107-3.10 GUARANTEE. Furnish a written guarantee that any materials or workmanship found defective within 1 year of final acceptance shall be replaced at the Contractor's expense, promptly upon notification and to the satisfaction of the Engineer.

METHOD OF MEASUREMENT

107-4.1 The quantity to be paid for will be the number of wind cones installed as completed units in place, accepted, and ready for operation.

107-4.2 Removal of wind cones shall be subsidiary to the installation of new wind cones and no separate payment will be made.

BASIS OF PAYMENT

107-5.1 Payment will be made at the contract unit price for each completed and accepted job.

Payment will be made under:

Item L-107a	8-foot Lighted Wind Cone, in place - per each
Item L-107b	12-foot Lighted Wind Cone, in place - per each
Item L-107c	8-foot Unlighted Wind Cone, in place - per each
Item L-107d	12-foot Unlighted Wind Cone, in place - per each

MATERIAL REQUIREMENTS

AC 150/5345-7	L-824 Underground Cable for Airport Lighting Circuits
AC 150/5345-27	Wind Cone Assemblies
ASTM A 615	Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
Commercial Item Description A-A-3067	Paint: Alkyd, Exterior, Low VOC
Fed. Spec. J-C-30	Cable and Wire, Electrical (Power, Fixed Installation)
Fed. Spec. TT-E-489	Enamel, Alkyd, Gloss, Low VOC Content
Fed. Spec. W-P-115	Panel, Power Distribution
Fed. Std. 595	Colors
MIL-P-24441/19B	Paint, Epoxy-Polyamide, Zinc Primer, Formula 159, Type III
UL Standard 6	Rigid Metal Conduit
UL Standard 514	Fittings For Conduit and Outlet Boxes
UL Standard 1242	Intermediate Metal Conduit

ITEM L-108 UNDERGROUND CABLE

DESCRIPTION

108-1.1 This item shall consist of furnishing and installing underground cable according to these specifications at the locations shown in the Plans. This item shall include the excavation and backfill of the trench, where direct buried cable is specified, and the installation of cable, grounding and counterpoise wire in trench, duct or conduit. It shall include splicing, cable marking, and testing of the installation and all incidentals necessary to place the cable in operating condition as a completed unit to the satisfaction of the Engineer. This item shall not include the installation of the duct or conduit. Other work shall include the removal of underground cable as shown and described in the Plans and installation of government-furnished materials.

EQUIPMENT AND MATERIALS

108-2.1 GENERAL.

a. Airport lighting equipment and materials covered by FAA specifications shall be certified and listed under AC 150/5345-53, Airport Lighting Equipment Certification Program. This AC, the latest certified equipment list, and the address list of certified airport lighting equipment manufacturers are available on the Internet home page for the FAA Office of the Associate Administrator for Airports (ARP). The internet address is http://www.faa.gov/airports_airtraffic/airports/construction/.

b. All other equipment and materials covered by other referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification, when requested by the Engineer.

108-2.2 CABLE. Underground cable shall conform to the requirements of AC 150/5345-7, Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits, and meet the following requirements.

5000 V non-shielded cable shall be ~~non-shielded,~~ single conductor, FAA type C, with cross-linked polyethylene insulation or FAA type B, ICEA S-19-81 ozone-resistant butyl rubber insulated with overall jacket of heavy duty neoprene. Conductor shall be lead alloy coated, soft annealed stranded copper.

5000 V shielded cable shall be single conductor, FAA type C, with cross-linked polyethylene insulation, copper tape shield, and overall PVC jacket. Conductor shall be soft annealed stranded copper.

600 V cable shall be non–shielded, single conductor, with stranded annealed copper conductor, rated 190 °F, with cross-linked polyethylene insulation classified as XHHW ~~UL type 2 and FAA type C~~.

Underground Electrical Cable shall be No. 14 AWG, 2 Conductor, copper, 600 V, Type SOOW-A/SOOW. Cable shall remain flexible down to -40 °F. The cable connectors shall be secondary connector kits for the plug and the receptacle meeting specification L-823.

If telephone control cable is specified, copper shielded, polyethylene insulated and jacketed, No. 19 AWG telephone cable conforming to ICEA-S-85-625, Standard, Aircore, Polyolefin, Copper Conductor Telecommunications Cable for direct burial, shall be used.

Where counterpoise conductors are to be installed and where soil conditions would adversely affect bare copper wire, cross-linked polyethylene wire conforming to Fed. Spec. J-C-30, Type XHHW, 600 volt, may be used.

Cable type, size, number of conductors, strand and service voltage will be specified in the Plans and/or specifications.

108-2.3 BARE COPPER WIRE (COUNTERPOISE OR GROUNDING). Bare copper wire for counterpoise or grounding installations shall be solid or stranded wire conforming to ASTM B 3 and B 8.

108-2.4 CABLE CONNECTIONS. In-line connections of underground primary cables shall be of the type called for in the Plans or in the specifications, and shall be one of the types listed below. When the Plans or the specifications permit a choice of connection, the Contractor shall indicate in the bid the type of connection they propose to furnish.

a. Cast Splice. A cast splice, employing a plastic or metal mold and using epoxy resin manufactured by Minnesota Mining and Manufacturing Company, "Scotchcast" Kit No. 82B, or approved equal, is to be used for potting the splice. This means of splicing is the only type approved for telephone control cable and airfield lighting home runs in duct banks.

b. Vulcanized Splice. A vulcanized splice with proper molds for various cable sizes shall be used.

c. Field-attached Plug-in Splice. Figure 3 of AC 150/5345-26, Specification for L-823 Plug and Receptacle, Cable Connectors, employing connector kits, is approved for field attachment to single conductor cable. 600 V cord sets shall include a Type II, Class A, Style I plug on a 16/2 SJO cord. 600 V secondary receptacles shall be Type II, Class B, Style II. 600 V plugs shall be Type II, Class B, Style 4. 5000 V plugs shall be Type I, Class B, Style 3. 5000 V receptacles shall be Type I, Class B, Style 10.

d. Factory-Molded Plug-in Splice. Specification for L-823 Connectors, Factory-Molded to Individual Conductors, are approved.

e. Taped Splice. Taped splices employing field-applied rubber, or synthetic rubber tape covered with plastic tape are approved. The rubber tape should meet the requirements of ASTM D 4388 and the plastic tape should comply with Mil. Spec. MIL-I-24391 or Commercial Item Description A-A-55809. In all the above cases, connections of cable conductors shall be made using crimp connectors utilizing a crimping tool designed. T to make a complete crimp before the tool can be removed. No. 19 AWG telephone control wires may be connected by means of wrapped and soldered splice, 3M Company Moisture Proof UR Type Connector, or approved equal, or by a method approved by the Engineer. Electrical insulating tape shall be "Scotch" No. 88 or approved equal.

108-2.5 CONCRETE. Concrete for cable markers shall conform to Specification Item P-610, "Structural Portland Cement Concrete."

108-2.6 MARKER TAPE. Marker tape shall be APWA-ULCC compliant, red polyethylene plastic, printed "Caution - Buried Electric Line Below".

108-2.7 INTERSTICE FILLER. When called for on the Plans underground conduit runs shall contain, in addition to the specified conductor(s), one or more runs of compressible interstice filler (as shown on the Plans). Compressible interstice filler shall be 5/8-inch closed cell backer rod (caulk backer).

110-2.11 GOVERNMENT-FURNISHED MATERIALS. FAA will furnish fiber optic cable for installation in new duct bank. Materials will be available for pickup on airport property at a location to be determined. Contractor shall provide all other materials and equipment required for installation and testing of fiber optic cables, including pull strings, pull ropes, cable lubricant, and testing equipment.

CONSTRUCTION METHODS

108-3.1 GENERAL. The Contractor shall install the specified cable at the approximate locations indicated in the airport lighting layout plans. The Engineer will indicate specific locations.

Notify the Engineer in writing and request inspection at least 48 hours prior to installing cables, making any splices, or covering any buried or concealed work. Immediately correct any deficiencies found during the inspection. Install cable in a manner to prevent harmful stretching of the conductors, injury to the insulation, damage to tapes and fillers or damage to the outer protective jacket or covering.

Label the circuit conductors in each manhole or handhole by attaching a heat stamped nylon identification tag bearing the circuit designation "R" or "T", as required.

Cable connections between lights will be permitted only at the light locations for connecting the underground cable to the primary leads of the individual insulating transformers. The Contractor shall be responsible for providing cable in continuous lengths for home runs or other long cable runs without connections, unless otherwise authorized in writing by the Engineer or shown in the Plans.

Install new fiber optic cables in continuous lengths between manholes located at connection points to existing cabling. Leave a single maintenance loop of cable in innerduct in each manhole and a 50-foot coil of spare cable in the manhole at each end of the new cable. Cable splicing will be performed by FAA.

108-3.2 INSTALLATION IN DUCT OR CONDUIT. This item includes the installation of the cable in duct or conduit as described below. The maximum number and voltage ratings of cables installed in each single duct or conduit, and the current-carrying capacity of each cable shall be according to the latest NEC, or the code of the local agency having jurisdiction.

The Contractor shall make no connections or joints of any kind in cables installed in conduits or ducts. Provide and install cables in continuous lengths free of splices between the points of connection indicated on the Plans.

The duct or conduit shall be installed as a separate item according to Item L-110, "Underground Electrical Duct." The Contractor shall make sure that the duct is open, continuous, and clear of debris before installing cable. The cable shall be installed in a manner to prevent harmful stretching of the conductor, injury to the insulation, or damage to the outer protective covering. The ends of all cables shall be sealed with moisture-seal tape before pulling into the conduit and it shall be left sealed until connections are made. Where more than one cable is to be installed in a duct under the same contract, all cable shall be pulled in the duct at the same time. The pulling of a cable through ducts or conduits may be accomplished by hand winch or power winch with the use of cable grips or pulling eyes. Pulling tensions should be governed by recommended standard practices for straight pulls or bends. A lubricant recommended for the type of cable being installed shall be used where pulling lubricant is required. Duct or conduit markers temporarily removed for excavations shall be replaced as required.

Compressible interstice filler (when shown on the Plans and as specified) shall be installed in place with the cable(s). It shall be taped as required to attach and secure it to the conductor(s) during installation.

Where runway and taxiway series lighting circuit conductors are to be installed together through the same conduit, identify the individual conductors at both ends of the duct by applying identification ties which have been heat stamped with the circuit identification "R", "T1" or "T2" as needed.

Assemble connections in the runway and taxiway series lighting cable at the light assemblies using approved L-823 connector kits. The male end shall be coated with silicone compound. Properly seat both plug and receptacle ends onto cable and check for proper connector pin positioning prior to taping. When completed, wrap the L-823 connection with 2 layers of electrical insulating tape, 1/2 lapped extending at least 1-1/2 inch on each side of the joint. Install heat shrinkable tubing with internal adhesive as shown on Plans. Leave sufficient slack in the cables at points of connection consistent with standard trade practices; and, in the case

of the runway and taxiway series lighting cable, leave sufficient slack at each light assembly to permit the connection to be made ~~1 foot~~ 2 feet above grade.

108-3.3 TRENCHING. Where turf is well established and the sod can be removed, it shall be carefully stripped and properly stored. Trenches for cables may be excavated manually or with mechanical trenching equipment. Walls of trenches shall be essentially vertical so that a minimum of shoulder surface is disturbed. Road patrols or graders shall not be used to excavate the trench with their blades. The bottom surface of trenches shall be essentially smooth and free from coarse aggregate. Unless otherwise specified, cable trenches shall be excavated to a minimum depth of 1.5 feet below finished grade, except as follows:

a. When off the airport or crossing under a roadway or driveway, the minimum depth shall be 3 feet unless otherwise specified.

b. Minimum cable depth when crossing under a railroad track, shall be 3.5 feet unless otherwise specified.

The Contractor shall excavate all cable trenches to a width not less than 6 inches. The trench shall be widened where more than two cables are to be installed parallel in the same trench. Unless otherwise specified in the Plans, all cables in the same location and running in the same general direction shall be installed in the same trench.

When rock excavation is encountered, the rock shall be removed to a depth of at least 3 inches below the required cable depth and it shall be replaced with bedding material of earth or sand containing no mineral aggregate particles that would be retained on a 1/4 inch sieve. The Contractor shall ascertain the type of soil or rock to be excavated before bidding. All excavation shall be unclassified.

108-3.4 INSTALLATION IN TRENCHES. The Contractor shall not use a cable plow for installing the cable. Mechanical cable-laying equipment may be used in conjunction with a trenching machine if specified on project Plans and specifications; and it should provide for physical inspection of cable prior to backfilling. Sharp bends or kinks in the cable will not be permitted.

Cables shall be unreeled in place alongside or in the trench and shall be carefully placed along the bottom of the trench. Inspect cable as it is removed from the reel to determine that the cable is free of visible defects. Support reel so that it turns easily and without undue strain on the cable. The cable shall not be unreeled and pulled into the trench from one end.

Where two or more cables are laid parallel in the same trench, they shall be placed laterally a minimum distance of 3 inches apart, and the trench shall be widened sufficiently to accomplish this.

Cables crossing over each other shall have a minimum of 3 inch vertical displacement with the topmost cable depth at or below the minimum required depth below finished grade.

Not less than 12 inches of cable slack shall be left on each side of all connections, insulating transformers, light units, and at all other points where cable is connected to field equipment. The slack cable shall be placed in the trench in a series of S-curves. Additional slack cable shall be left in runway light bases, handholes, manholes, etc., where it is required to bring the cable above ground level to make connections. The amount of slack cable will be stipulated by the Engineer, or as shown in the Plans and specifications.

108-3.5 BACKFILLING. After the cable has been installed, the trench shall be backfilled. The initial layer of backfill material shall be 3 inches deep, loose measurement, and shall be either earth or sand containing no mineral aggregate particles that would be retained on a 1/4-inch sieve. This layer shall not be compacted. The second layer shall be 5 inches deep, loose measurement, and shall contain no particles that would be retained on a 1-inch sieve. The remainder of the backfill shall be excavated or imported mineral and shall not contain stone or aggregate larger than 4 inches maximum diameter. The third and subsequent layers of the backfill shall not exceed 8 inches in maximum depth, loose measurement.

The second, and subsequent layers shall be thoroughly tamped and compacted to at least the density of the adjacent undisturbed soil, and to the satisfaction of the Engineer. If necessary to obtain the desired compaction, the backfill material shall be moistened or aerated as required.

Trenches shall not be excessively wet and shall not contain pools of water during backfilling operations. The trench shall be completely backfilled and tamped level with the adjacent surface, except that when sod is to be placed over the trench, the backfilling shall be stopped at a depth equal to the thickness of the sod to be used, with proper allowance for settlement. Any excess excavated material shall be removed and disposed of according to instructions issued by the Engineer.

108-3.6 RESTORATION. Where sod has been removed, it shall be replaced as soon as possible after the backfilling is completed. All areas disturbed by the trenching, storing of dirt, cable laying, pad construction, and other work shall be restored to its original condition. The restoration shall include any necessary topsoiling, fertilizing, liming, seeding, sodding, sprigging or mulching. All such work shall be performed according to the FAA standard turfing specifications. The Contractor will be held responsible for maintaining all disturbed surfaces and replacements until final acceptance.

108-3.7 CABLE MARKERS. The location of runway light circuits shall be marked by a concrete slab marker, 2 feet square and 4 inches thick, extending approximately 1 inch above the surface. Each cable run from the line of runway lights to the equipment vault shall also be marked at approximately every 200 feet along the cable run, with an additional marker at each change of direction of cable run. All other cable buried directly in the earth shall be marked in the same manner. The Contractor shall not install slab markers where cable lies in straight lines between obstruction light poles which are spaced 300 feet apart, or less. Cable markers shall be installed immediately above the cable. The Contractor shall impress the word "CABLE" and directional arrows on each cable marking slab. The letters shall be approximately 4 inches high and 3 inches wide, with width of stroke 1/2 inch and 1/4 inch deep.

The location of each underground cable connection, except at lighting units or insulating transformers, shall be marked by a concrete marker slab placed above the connection. The Contractor shall impress the word "SPLICE" on each slab. The Contractor also shall impress additional circuit identification symbols on each slab if so desired by the Engineer.

108-3.8 SPLICING. Connections of the type shown in the Plans shall be made by experienced personnel regularly engaged in this type of work and shall be made as follows:

a. Cast Splices. These shall be made by using crimp connectors for jointing conductors. Molds shall be assembled, and the compound shall be mixed and poured according to manufacturer's instructions and to the satisfaction of the Engineer.

b. Vulcanized Splices. These shall be made by using crimp connectors for joining conductors. The splice shall be made, using compounds furnished by the manufacturer, according to their instructions and to the satisfaction of the Engineer.

c. Field-attached Plug-in Splices. These shall be assembled according to manufacturer's instructions. These splices shall be made by plugging directly into mating connectors. In all cases the joint where the connectors come together shall be wrapped with at least one layer of rubber or synthetic rubber tape and one layer of plastic tape, one-half lapped, extending at least 1-1/2 inches on each side of the joint.

d. Factory-Molded Plug-in Splices. These shall be made by plugging directly into mating connectors. In all cases, the joint where the connectors come together shall be wrapped with at least one layer of rubber or synthetic rubber tape and one layer of plastic tape, one-half lapped, extending at least 1-1/2 inches on each side of the joint.

e. Taped Splices. A taped splice shall be made in the following manner:

Bring the cables to their final position and cut so that the conductors will butt. Remove insulation and jacket allowing for bare conductor of proper length to fit compression sleeve connector with 1/4 inch of bare conductor on each side of the connector. Use a sharp knife to pencil insulation and jacket at approximately the same angle as a pencil point. Care must be taken to avoid nicking or injuring the conductor during removal of insulation or penciling. Do not use emery paper on splicing operation since it contains metallic particles. The copper conductors shall be thoroughly cleaned. Join the conductors by inserting them equidistant into the compression connection sleeve. Crimp conductors firmly in place with crimping tool that requires a complete crimp before tool can be removed. Test the crimped connection by pulling on the cable. Scrape the insulation to assure that the entire surface over which the tape will be applied (plus 3 inches on each end) is clean. After scraping wipe the entire area with a clean lint-free cloth. Do not use solvents.

Apply high-voltage rubber tape one-half lapped over bare conductor. This tape should be tensioned as recommended by the manufacturer. Voids in the connector area may be eliminated by highly elongating the tape stretching it just short of its breaking point. Throughout the rest of the splice less tension should be used. Always attempt to exactly half-lap to produce a uniform buildup. Continue buildup to 1-1/2 times cable diameter over the body of the splice with ends tapered a distance of approximately 1 inch over the original jacket. Cover rubber tape with two layers of vinyl pressure-sensitive tape one-half lapped. Do not use glyptol or lacquer over vinyl tape as they react as solvents to the tape. No further cable covering or splice boxes are required.

If shielded cable is to be spliced, prepare cable as for a regular taped splice, except that the neoprene jacket shall be removed a distance not less than 5 inches from the beginning of the penciled portion. Carefully unwrap the shielding tape from that portion where jacket has been removed and cut off so that it extends about 1 inch from end of the jacket. Proceed with the taped splice as described above and tape up to 1/4 inch from the shield on both ends. Build up rubber tape to a thickness equal to the insulation thickness or 5/16 inch over connector.

Next wrap one-half lapped layer of semi-conducting tape, conforming to ASTM D 4388, Type IV, over splicing tape and 1/4 inch onto the shielding tape. Wrap a fine, flat shielding braid one-half lapped over the splice extending 1/2 inch onto the metallic shielding. Solder ends of braid to metallic shielding tape. A bonding wire, (Minimum No. 14 Stranded Copper) equal to the current carrying capacity of the metallic shield, should have the individual strands wrapped around the metallic shield at both ends of the splice. These strands should be tack soldered to the shield in several places. The cable sheath should be replaced by wrapping with two one-half lapped layers of vinyl tape extending 2 inches onto the cable jacket.

The above described splice is for a straight-through splice with continuity of shielding.

108-3.9 BARE COUNTERPOISE WIRE INSTALLATION AND GROUNDING FOR LIGHTNING PROTECTION. If shown in the Plans or specified in job specifications, a stranded bare copper wire, No. 8 AWG minimum size, shall be installed for lightning protection of the underground cables. The bare counterpoise wire shall be installed in the same trench for the entire length of the insulated cables it is designed to protect, and shall be placed at a distance of approximately 4 inches from the insulated cable. The counterpoise wire shall be securely attached to each light fixture base, or mounting stake. The counterpoise wire shall also be securely attached to copper or copper-clad ground rods installed not more than 1,000 feet apart around the entire circuit. The ground rods shall be of the length and diameter specified in the Plans, but in no case shall they be less than 8 feet long nor less than 5/8 inch in diameter.

The counterpoise system shall terminate at the transformer vault or at the power source. It shall be securely attached to the vault or equipment grounding system. The connections shall be made as shown in the project Plans and specifications.

108-3.10 GROUNDING SYSTEM. If shown in the Plans or specified in specifications, a stranded bare copper wire, No. 8 AWG minimum size, shall be installed as grounding for the lighting system. The bare

ground wire shall be installed in the same ~~trench for the entire length of the insulated cables or~~ conduit it is designed to protect~~, and shall be placed at a distance of approximately 4 inches from the insulated cable or conduit~~. The ground wire shall be securely attached to each light fixture base. The ground wire shall also be securely attached to copper or copper-clad ground rods using exothermic connections and installed not more than 1,000 feet apart around the entire circuit. The ground rods shall be of the length and diameter specified in the Plans, but in no case shall they be less than 8 feet long nor less than 5/8 inch in diameter.

The ground system shall terminate at the transformer vault or at the power source. It shall be securely attached to the vault or equipment grounding system. The connections shall be made as shown in the project Plans and specifications.

108-3.11 TESTING. The Contractor shall furnish all necessary equipment and appliances for testing the underground cable circuits after installation. The Contractor shall test and demonstrate to the satisfaction of the Engineer the following:

a. That all lighting power and control circuits are continuous and free from short circuits.

b. That all circuits are free from unspecified grounds.

c. That the insulation resistance to ground of all nongrounded series circuits is not less than ~~50~~ 2,000 megohms. Where additions to existing circuits, only the new section shall be tested. The resistance to ground of 600 V capacity shall be ~~10~~ 1,000 megohms for the insulation test.

d. That the insulation resistance to ground of all nongrounded conductors of multiple circuits is not less than ~~50~~ 2,000 megohms.

e. That all circuits are properly connected according to applicable wiring diagrams.

f. That all circuits are operable. Operate each control not less than 10 times and operate each lighting and power circuit continuously for not less than 1/2 hour.

~~**f.**~~**g.** Transmission performance of new FAA fiber optic cables shall be tested in accordance with TIA/EIA-568-B.3 prior to connection to existing cables. Testing shall be witnessed by FAA and test results shall be submitted in writing to FAA and the Engineer.

METHOD OF MEASUREMENT

108-4.1 Trenching will not be measured for payment. Excavation, backfill, bedding, and reconditioning will be subsidiary.

108-4.2 Cable, ground or counterpoise wire by unit price installed in trench shall be measured by the number of linear feet of cable, ground or counterpoise wire installed in trenches, ready for operation, and accepted as satisfactory. Separate measurement will be made for each cable or counterpoise wire installed in trench.

108-4.3 Cable, ground or counterpoise wire, and interstice filler by unit price installed in duct or conduit shall be measured by the number of linear feet measured in place, completed, ready for operation, and accepted as satisfactory. Separate measurement will be made for each cable, ground or counterpoise wire installed in duct or conduit.

108-4.4 The quantity of ground rods to be paid for under this item shall be the number of ground rods in place, completed, ready for operation, and accepted as satisfactory.

108-4.5 Lump sum items will not be measured for payment.

108.4.6 Temporary jumper by unit price shall be measured by the number of linear feet of new temporary jumper cable measured in place, ready for operation, and accepted as satisfactory. The unit price shall include all terminations, securing of cables, disconnections, and reconnections required for relocation of the jumpers due to construction activities, and maintenance of the jumpers for the duration of the project.

BASIS OF PAYMENT

108-5.1 Payment will be made at the contract unit price or lump sum price for the items listed below and shown in the Bid Schedule.

Removal of underground cable shall be subsidiary to the removal of the associated equipment served by the cable as shown and described in the Plans, unless otherwise indicated.

Payment will be made under:

Item L-108a Underground Cable [Gauge] AWG, copper, 5 kV FAA ~~type "B" or~~ type "C" ~~(as specified on Plans)~~, L-824 - per linear foot*

Item L-108b Underground Cable [Gauge] AWG, copper, 5 kV FAA type "B" or type "C" (as specified on Plans), L-824 - per lump sum

Item L-108c [Gauge] Bare Copper Ground Conductor - per linear foot*

Item L-108d [Gauge] Bare Copper Ground Conductor - per lump sum

Item L-108e Underground Cable, [Gauge] AWG Copper, 600 V, Type "C", L-824 - per linear foot*

Item L-108f Underground Cable, [Gauge] AWG Copper, 600 V, Type "C", L-824 - per lump sum

Item L-108g Ground Rod - per each

Item L-108h Underground cable #14 AWG, 2 Conductor, copper, 600V, Type "SOOW-A/SOOW", - per linear foot*

Item L-108i Underground cable #14 AWG, 2 Conductor, copper, 600V, Type "SOOW-A/SOOW", - per lump sum

Item L-108j Interstice Filler - per linear foot*

Item L-108k Interstice Filler - per lump sum

Item L-108r Remove Ductbank Conductors – per contingent sum

Item L-108s Temporary Jumper – per linear foot

Item L-108t Install Fiber Optic Cable – per linear foot*

Item L-108u Underground Cable [Gauge] AWG, shielded, copper, 5 kV FAA type "C", L-824 - per linear foot*

* For payment purposes, 4% will be added to the straight line measurements for cable and ground conductor wire.

MATERIAL REQUIREMENTS

AC 150/5345-7	*L-824 Underground Electrical Cable for Airport Lighting Circuits*
AC 150/5345-26	*L-823 Plug and Receptacle Cable Connectors*
ASTM B 3	Soft or Annealed Copper Wire
ASTM B 8	Concentric-Lay-Stranded Cooper Conductor, Hard, Medium-Hard, or Soft
ASTM D 4388	Rubber Tapes, Nonmetallic Semi-Conducting and Electrically Insulating
Commercial Item Description A-A-55809	Insulation Tape, Electrical, Pressure-Sensitive Adhesive, Plastic
Fed.Spec. J-C-30	Cable and Wire, Electrical Power, Fixed Installation
MIL-I 24391	Insulation Tape, Electrical, Plastic, Pressure Sensitive

ITEM L-110 UNDERGROUND ELECTRICAL DUCT

DESCRIPTION

110-1.1 This item shall consist of underground electrical ducts installed according to this specification at the locations and according to the dimensions, designs, and details shown in the Plans. This item shall include the installation of all underground electrical ducts or underground conduits. It shall also include all trenching, marking, backfilling, removal, and restoration of any paved areas; manholes, concrete encasement, mandreling installation of steel drag wires and duct markers, capping, and the testing of the installation as a completed duct system ready for installation of cables, to the satisfaction of the Engineer. Work includes locating and exposing all existing duct banks located in the project area and encasing and backfilling with concrete where required. Other work includes installing drain conduits and drywells, removing underground ducts as shown and described in the Plans, and installation of government-furnished materials.

EQUIPMENT AND MATERIALS

110-2.1 GENERAL. All equipment and materials covered by referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification when so requested by the Engineer.

110-2.2 BITUMINOUS FIBER DUCT. Bituminous fiber duct and fittings shall conform to the requirements of UL Standard 543.

- **a.** Type I, for concrete encasement.
- **b.** Type II, for direct burial.

110-2.3 ASBESTOS CEMENT DUCT. Asbestos cement duct and fittings shall conform to the requirements of Fed. Spec. W-C-571 and shall be one of the following, as specified in the proposal:

- **a.** Type I, for concrete encasement.
- **b.** Type II, for direct burial.

110-2.4 STEEL CONDUIT. Rigid steel conduit and fittings shall conform to the requirements of UL Standard 6, 514, and 1242.

110-2.5 CONCRETE. Concrete shall conform to Item P-610, Structural Portland Cement Concrete, 1 inch maximum size coarse aggregate. Concrete used to backfill below existing ducts is not limited to the use of 1 inch maximum size coarse aggregate.

110-2.6 PLASTIC CONDUIT. Plastic conduit and fittings shall conform to the requirements of Fed. Spec. W-C-1094 Type I, suitable for underground use either directly in the earth or encased in concrete. The conduit shall be one of the following as shown on the Plans:

- **a.** Underground Plastic Duct shall be rigid, non-metallic, conduit, Schedule 40 PVC conforming to UL Standard 651 and NEMA TC-2, nominal size as indicated on the Plans. All fittings such as ~~elbows,~~ couplings, connectors, expansion joints, adapters, etc., used in the installation shall be Schedule 40 PVC conforming to UL Standard 514 and NEMA TC-3.

- **b.** Underground Plastic Duct shall be Type III, rigid, HDPE pipe, schedule 40. The material shall have a cell classification of 334420C or better according to ASTM D 3350, and shall have a third party, nationally recognized testing lab listing. The nominal size shall be as indicated on the Plans ~~with a minimum wall thickness of 5/32 inch~~. All fittings such as saddle fittings, ~~elbows,~~ couplings, connectors, adapters, etc., used in the installation shall be HDPE and shall be of the same material as the duct.

110-2.7 FLEXIBLE METAL CONDUIT. Flexible metal conduit shall be water-tight, listed for exposed or direct bury per UL-360, as a grounding conductor per NEC Article 351-9, and rated for temperatures between -67 °F and +220 °F.

110-2.8 TAPES.

- **a.** Pipe sealing tape shall be Teflon, "Scotch" No. 48 or approved equal.
- **b.** Corrosion preventive tape shall be "Scotch" No. 50 or approved equal.

110-2.9 ELECTRICAL MANHOLES. Electrical manholes shall be constructed using precast or cast-in-place concrete. Concrete strength and reinforcing steel shall be as required to meet loading requirements indicated in the Plans. Provide cable pulling eyes, drain knockouts, ground rod knockouts, and adjustable galvanized steel cable racks as indicated in the Plans. Provide conduit knockouts on all sides of the manhole.

Manhole cover frames shall be cast into the manhole lid. Covers and frames shall be hinged and made of cast iron or galvanized steel with sizes and ratings as indicated in the Plans. Cast iron manhole covers shall be provided with a spring-assist mechanism for opening.

Covers, frames, and concrete sections used for adjustment of existing manholes shall meet the requirements of this section.

110-2.10 DRYWELLS. Drywells shall consist of buried drain rock surrounded by filter fabric installed at the ends of drain conduits to provide free drainage of excess water in the conduit system. Filter fabric shall conform to the requirements of AASHTO M288, Class 2.

TABLE 1. GRADATION OF DRYWELL DRAIN ROCK

Sieve Designation (square openings)	Percentage by Weight Passing Seives
3”	100
1”	0-10
No. 200	0-5

110-2.11 GOVERNMENT-FURNISHED MATERIALS. FAA will furnish materials required to construct new fiber optic duct bank, including 4-inch PVC pipe, conduit supports and spacers, 1-1/4” inner duct, and precast concrete manholes. Materials will be available for pickup on airport property at a location to be determined. Contractor shall provide all other materials required for installation of duct bank including, but not limited to, concrete, backfill material, guard wire, ground rods, and warning tape.

CONSTRUCTION METHODS

110-3.1 GENERAL. The Contractor shall install underground ducts at the approximate locations indicated in the airport layout plans. The Engineer shall indicate specific locations as the work progresses. Ducts shall be of the size, material, and type indicated in the Plans or specifications. Where no size is indicated in the Plans or specifications, the ducts shall be not less than 3 inches inside diameter. All duct lines shall be laid so as to grade toward handholes, manholes and duct ends for drainage. Grades shall be at least 3 inches per 100 feet. On runs where it is not practicable to maintain the grade all one way, the duct lines shall be graded from the center in both directions toward manholes, handholes, or duct ends. Pockets or traps where moisture may accumulate shall be avoided.

Seal all joints in the rigid steel conduit runs with Teflon pipe sealing tape applied to the threaded couplings. Wrap the completed joint with 2 layers of corrosion preventative tape, 1/2 lapped and extending 1-1/2 inches on both sides of the joints.

After the conduit run has been completed, pull a standard flexible mandrel not less than 12 inches long, having a diameter approximately 1/4 inch less than the inside diameter of the conduit, through the entire length of the conduit run, after which a brush with stiff bristles of at least the diameter of the inside of the conduit shall be pulled through the entire length of the conduit run to make certain that no particles of earth, sand, or gravel have been left in the line.

All ducts installed shall be provided with a No. 10 gauge galvanized iron or steel drag wire for pulling the permanent wiring. Sufficient length shall be left in manholes or handholes to bend the drag wire back to prevent it from slipping back into the duct. Where spare ducts are installed, as indicated on the Plans, the open ends shall be plugged with removable tapered plugs, designed by the duct manufacturers, or with hardwood plugs conforming accurately to the shape of the duct and having the larger end of the plug at least 1/4 inch greater in diameter than the duct.

All ducts shall be securely fastened in place during construction and progress of the work and shall be plugged to prevent seepage of grout, water, or dirt. Any duct section having a defective joint shall not be installed.

~~All ducts, except steel conduit, installed under runways, taxiways, aprons, and other paved areas shall be encased in a concrete envelope.~~Encase all ducts installed in structural paved areas in a concrete envelope.

Where turf is well established and the sod can be removed, it shall be carefully stripped and properly stored.

Trenches for ducts may be excavated manually or with mechanical trenching equipment. Walls of trenches shall be essentially vertical so that a minimum of shoulder surface is disturbed. Blades of road patrols or graders shall not be used to excavate the trench. The Contractor shall ascertain the type of soil or rock to be excavated before bidding. All excavation shall be unclassified.

Trenches for burial of duct or conduit shall be of sufficient width to provide a minimum of ~~2~~ 4 inches of lateral clearance between the duct or conduit and trench walls on both sides ~~as shown on the Plans~~. Trenches for burial of duct or conduit shall be of sufficient depth as to assure 1.5 feet minimum duct or conduit burial depth below finished grade, plus ~~2~~ 4 inches minimum of below duct or conduit bedding ~~as shown on the Plans~~, plus adequate over excavation depth as required to slope and grade all duct or conduit installations to drain toward light bases or hand holes.

~~The bottom of all trenches shall be sloped and lined with a layer of bedding material of minus 1/4-inch material that is not less than 2 inches in depth, before placing any duct or conduit in the trenches. Bedding material shall be, sand, gravel, crushed aggregate, or other suitable material containing no organic, frozen, or other deleterious material.~~

Manholes shall be installed on a layer of compacted subbase material 12 inches thick. Geotextile separation fabric shall be placed between the undisturbed soil and the subbase material. Conduit openings shall be grouted solid with non-shrink grout after installation of conduits but prior to backfilling. When adjusting existing manholes or installing new manholes, manhole covers and frames shall be installed flush with the surrounding finish grade on all sides.

Excavate foundations, footings, slabs, pads, manholes, handholes, ducts and/or duct banks, or light base assemblies so as to permit the placing or construction of the full width, length, and depth of the structure or object and the layer of bedding material, whenever bedding is required.

110-3.2 DUCTS ENCASED IN CONCRETE. Unless otherwise shown in the Plans, concrete-encased ducts shall be installed so that the top of the concrete envelope is not less than 1.5 feet below the finished subgrade where installed under runways, taxiways, aprons, or other paved areas, and not less than 1.5 feet below finished grade where installed in unpaved areas. Ducts under paved areas shall extend at least 3 feet beyond the edges of the pavement or 3 feet beyond any underdrains which may be installed alongside the

paved area. Trenches for concrete-encased ducts shall be opened the complete length before concrete is laid so that if any obstructions are encountered, proper provisions can be made to avoid them. All ducts for concrete encasements shall be placed on a layer of concrete not less than 3 inches thick prior to its initial set. Where two or more ducts are encased in concrete, the Contractor shall space them not less than 1-1/2 inches apart (measured from outside wall to outside wall) using spacers applicable to the type of duct. As the duct laying progresses, concrete not less than 3 inches thick shall be placed around the sides and top of the duct bank. End bells or couplings shall be installed flush with the concrete encasement where required.

When specified, the Contractor shall reinforce the bottom side and top of encasements with steel reinforcing mesh or fabric or other approved metal reinforcement. When directed, the Contractor shall supply additional supports where the ground is soft and boggy, where ducts cross under roadways, or where otherwise shown on the Plans under such conditions, the complete duct structure shall be supported on reinforced concrete footings, piers, or piles located at approximately 5-foot intervals.

When clay or soapstone ducts are specified, they shall be installed with concrete encasement as described above. Clay conduit shall be of the single-bore type. Where the self-centering socket-joint type of single clay duct is used, conduit shall be built up, tier by tier, and separated only by sufficient mortar or fine aggregate concrete to bed the ducts evenly and fill all voids between ducts. Single ducts shall be jointed together and the joints grouted with Portland cement mortar. A suitable gasket (of rubber or other approved material) shall first be placed in the receptacle end of the duct, prior to the joining operation, in order to exclude all mortar from the duct.

Where the square bore butt joint type of clay duct, single or multicell, is used, sections shall be aligned with at least 4 steel dowel pins and joints wrapped with duct tape 6 inches wide and lapped 6 inches. All joints in a bank of single-bore ducts shall be staggered, beginning evenly from the manhole or handhole, by means of short lengths 6, 8, 9, 12, and 15 inches long. Cement mortar shall be troweled around each and every joint. Voids in the duct bank, caused by the external shape of the corners of the conduit, shall also be filled with mortar. The joining and joints of soapstone duct shall be done according to the manufacturer's recommendations.

When existing duct banks exposed in the project area do not reveal concrete encasement meeting the requirements of this subsection, provide new encasement meeting these requirements.

110-3.3 DUCTS WITHOUT CONCRETE ENCASEMENT. Trenches for single-duct lines shall be not less than 6 inches nor more than 12 inches wide, and the trench for 2 or more ducts installed at the same level shall be proportionately wider. Trench bottoms for ducts without concrete encasement shall be made to conform accurately to grade so as to provide uniform support for the duct along its entire length.

Where PE (HDPE) or steel conduit is specified, place a layer of bedding material, at least 4 inches thick (loose measurement) in the bottom of the trench to bed the duct. Use bedding material that meets the requirements for the applicable lift of material (P-152, P-154, P-208, P-209) except that 100% of the bedding material will pass a 1 inch sieve.

~~A~~ Where conduit other than PE or steel is specified, a layer of sand, at least 4 inches thick (loose measurement) shall be placed in the bottom of the trench as bedding for the duct. The bedding material shall consist of sand, and it shall contain no particles that would be retained on a 1/4-inch sieve. The bedding material shall be tamped until firm.

Unless otherwise shown in Plans, ducts for direct burial shall be installed so that the tops of all ducts are at least 1.5 feet below the finished grade.

When two or more ducts are installed in the same trench without concrete encasement, they shall be spaced not less than 2 inches apart (measured from outside wall to outside wall) in a horizontal direction and not less than 6 inches apart in a vertical direction.

Trenches shall be opened the complete length before duct is installed so that if any obstructions are encountered, proper provisions can be made to avoid them.

110-3.4 PVC CONDUIT. Install PVC conduit where indicated on the Plans.

Fabricate the conduit runs as recommended by the conduit manufacturer. Make all joints square, tight, and leakproof. Do not allow bends or breaks in the joints. Use only solvents and cements, which are specifically recommended by the conduit manufacturer. Join together the complete run between each light base alongside the trench. Place in the trench and connect to the base assembly after the minimum cure time of the joint cement has elapsed and after inspection and approval is granted by the Engineer.

Make field cuts of the conduit true and square with a tool or lathe designed for the purpose. Debur and ream the conduit as required.

Bend PVC conduit at the job site only with a "Hot Box" or as recommended by the conduit manufacturer. Heat the conduit uniformly to obtain smooth bends without overheating. Conduit with a brown appearance shall not be used. Conduit with extremely sharp bends, kinks in the bends or which exhibits a significant visual defect shall not be used. Make changes in direction and stub-ups to equipment using factory rigid steel conduit elbows.

Install expansion fittings in each run of conduit between light base assemblies, at spacing not exceeding 60 feet. The expansion fitting shall be of the same manufacturer as the conduit and shall be installed according to the manufacturer's instruction. Expansion joints shall be installed a maximum of 10 feet from the edge light bases or hand holes and shall be installed with joints 1/4 inch expanded, resulting in a minimum requirement of four expansion joints per 190-foot run of conduit.

After the conduit run has been completed, pull a standard flexible mandrel not less than 12 inches long, having a diameter approximately 1/4 inch less than the inside diameter of the conduit, through the entire length of the conduit run, after which a brush with stiff bristles of at least the diameter of the inside of the conduit shall be pulled through the entire length of the conduit run to make certain that no particles of earth, sand, or gravel have been left in the line.

110-3.5 HDPE CONDUIT. Assemble high-density polyethylene conduit into runs on the surface and install in trenches after coupling of the section. Butt-weld the duct using the manufacturer's recommended procedures and equipment. Assure that the conduit is open, continuous and free of water and debris prior to installing cable. In underground conduit, pull a stiff bristle brush through the entire length of the conduit run immediately prior to the cable being installed. Make changes in direction and stub-ups to equipment using factory rigid steel conduit elbows. Where HDPE conduit is terminated inside light bases or handholes, debur conduit end to remove sharp edges that could damage conductors during installation.

HDPE conduit shall be removed from the reel using a conduit straightening mechanism to remove the reel memory from the conduit.

110-3.6 DUCT MARKERS. Place marker tape 0.5 foot below final grade or below bottom of Crushed Aggregate Base Course in paved areas for the full length of the trenches above all ducts installed as indicated on the Plans.

When called for in the Plans, the location of the ends of all ducts shall be marked by a concrete slab marker 2 feet square and 4 inches thick extending approximately 1 inch above the surface. The markers shall be located above the ends of all ducts or duct banks, except where ducts terminate in a handhole, manhole, or building.

The Contractor shall impress the word “DUCT” on each marker slab, and shall also impress on the slab the number and size of ducts beneath the marker. The letters shall be 4 inches high and 3 inches wide with width of stroke 1/2 inch and 1/4 inch deep or as large as the available space permits.

110-3.7 BACKFILLING. Backfill only after the duct has been placed, inspected and accepted by the Engineer.

After concrete-encased ducts have been properly installed and the concrete has had time to set, the trench shall be backfilled in at least two layers with excavated material not larger than 2 inches in diameter and thoroughly tamped and compacted to at least the density of the surrounding undisturbed soil. If necessary to obtain the desired compaction, the backfill material shall be moistened or aerated as required. If duct is placed in the structural section (P-154, P-208, P-209) of a pavement such as for a runway or taxiway, the Contractor shall construct the backfill according to the specifications for the material in which the duct is placed.

Trenches shall not be excessively wet and shall not contain pools of water during backfilling operations.

The trench shall be completely backfilled and tamped level with the adjacent surface: except that, when sod is to be placed over the trench, the backfilling shall be stopped at a depth equal to the thickness of the sod to be used, with proper allowance for settlement.

Any excess excavated material shall be removed and disposed of according to instructions issued by the Engineer.

For ducts without concrete envelope, ~~sand~~ bedding material shall be placed around the ducts and carefully tamped around and over them with hand tampers. ~~Sand shall be non frost susceptible with no particle larger than 1/4 inch.~~ Use bedding material that conforms to the requirements specified in subsection 110-3.3 for the type of conduit that is used. ~~Sand~~ Bedding material shall be placed to provide a minimum of ~~2~~ 4 inches of cover when compacted over and to the sides of the duct. The remaining trench may be filled with regular run of excavated material and thoroughly tamped as specified above. If duct is placed in the structural section (P-154, P-208, P-209) of a pavement such as for a runway or taxiway, the Contractor shall construct the backfill according to the specifications for the material in which the duct is placed.

110-3.8 RESTORATION. Where sod has been removed, it shall be replaced as soon as possible after the backfilling is completed. All areas disturbed by the trenching, storing of dirt, cable laying, pad construction and other work shall be restored to its original condition. The restoration shall include any necessary topsoil, fertilizing, liming, seeding, sprigging, or mulching. All such work shall be performed according to the FAA Standard Turfing Specifications. The Contractor shall be held responsible for maintaining all disturbed surfaces and replacements until final acceptance.

110-3.9 DRYWELLS. Drywells shall be excavated to a minimum depth of 24 inches below the drain conduit. The excavated hole shall be lined with filter fabric and filled with drain rock. The drain rock shall be hand tamped, the fabric wrapped over the top of the drain rock, and the hole backfilled. In areas within the project limits, backfill shall be in accordance with the material sections shown in the Plans. In other areas, backfill shall consist of the removed material, unless deemed unsuitable by the Engineer.

METHOD OF MEASUREMENT

110-4.1 Underground duct shall be measured by the linear foot of duct installed, measured in place, completed, and accepted. Separate measurement shall be made for the various types and sizes.

110-4.2 Items shown as lump sum will not be measured for payment.

110-4.3 The quantity of new manholes, adjusted manholes, and drywells to be paid for will be the number of units in place, completed, ready for operation, and accepted as satisfactory.

BASIS OF PAYMENT

110-5.1 Payment will be made at the contract unit price for each type and size of single-way or multi-way duct completed and accepted. This price shall be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete this item.

Refer to Item P-610 for requirements regarding all work and materials to place portland cement concrete. Portland cement concrete is subsidiary to L-110 items requiring its use. Concrete used for encasement of existing ductbanks and backfill below existing ductbanks shall be paid for under Item P-610a.

Removal of underground duct shall be subsidiary to the removal of the associated equipment served by the duct as shown and described in the Plans, unless otherwise indicated.

Payment will be made under:

Item L-110a	~~2-1/8~~ 2-inch Rigid Steel Conduit - per linear foot
Item L-110b	~~2-1/8~~ 2-inch Rigid Steel Conduit - per lump sum
Item L-110c	2-inch PVC Conduit - per linear foot
Item L-110d	2-inch PVC Conduit - per lump sum
Item L-110e	1-1/4 inch PVC Conduit - per linear foot
Item L-110f	1-1/4 inch PVC Conduit - per lump sum
Item L-110g	2-inch PE Conduit - per linear foot
Item L-110h	2-inch PE Conduit - per lump sum
Item L-110i	Multi-Way Duct in Concrete (# of conduit) - per linear foot
Item L-110j	Multi-Way Duct in Concrete (# of conduit) - per lump sum
Item L-110n	Electrical Manhole, Type AIA – per each
Item L-110w	Drywell – per each
Item L-110y	Install Multi-Way Duct in Concrete (#-size of conduit) – per linear foot
Item L-110z	Install Manhole – per each

MATERIAL REQUIREMENTS

Fed. Spec. W-C-571	Conduit and Fittings, Nonmetal, Rigid; (Asbestos-Cement or Fire-Clay Cement), (For Electrical Purposes)
Fed. Spec. W-C-1094	Conduit and Fittings; Nonmetallic, Rigid, (Plastic)
UL Standard 6	Rigid Metal Conduit
UL Standard 514	Fittings for Conduit and Outlet Boxes
UL Standard 543	Impregnated-Fiber Electrical Conduit

UL Standard 1242 Intermediate Metal Conduit

ITEM L-130 SURFACE SENSORS

DESCRIPTION

130-1.1 Furnish and install an upgrade to the existing SCAN sensor system to monitor weather and pavement surface conditions. Plans show the location of sensors, cables, and remote processing units (RPU). Work shall include an upgrade to the entire surface SCAN system, including upgrading RPUs (5 units) and associated software, and replacing and adding weather sensors. Existing pavement sensors shall be reconnected to the upgraded RPUs except where new sensors are shown on the Plans. Provide all necessary hardware and software components and commissioning by a factory representative for an operational system.

Installation of weather sensors, internal components of RPUs, and software shall be performed by a factory representative.

MATERIALS

130-2.1 SENSOR SYSTEM COMPONENTS. Provide sensors and other components necessary to complete an operational system. Conform to the following:

a. Surface Sensor. Provide sensors with molded, sealed, and integral cables, sensors capable of operating at extended cable lengths of up to 2500 feet from the RPU, designed to sustain weather conditions, airplane traffic, or ice control chemicals without degrading performance, thermally passive, single solid-state sensors with thermal characteristics similar to common asphalt pavement, top sensor surface that is approximately the same color and texture as the asphalt pavement, operating temperature range of –22 degrees F to 122 degrees F, and capable of withstanding a temperature range of –35 degrees F to 175 degrees F without sustaining damage. Provide epoxy bedding and encapsulating compounds for installing sensors as approved by the manufacturer.

Provide sensors capable of electronically sampling the following pavement conditions:

(1) Surface temperature
(2) Dry pavement
(3) Wet pavement above 32 degrees F
(4) Wet but not frozen pavement at or below 32 degrees F
(5) Snowy or icy pavement at or below 32 degrees F
(6) Freezing point temperature of commonly used moisture/ice-control chemical solution
(7) Depth of moisture/ice-control chemical solution up to 0.5 inches
(8) Percentage of ice particles in moisture/ice-control chemical solution

Provide Surface Sensor Model FP-2000 as manufactured by Vaisala Inc., 194 South Taylor Avenue, Louisville, CO 80027, Telephone: (800) 325-7226, or approved equal.

b. Surface Sensor Extension Cable. Use 6 pair, 19AWG PE39 gel filled, aluminum shielded telephone cable. Provide General Cable part number 7524507 as manufactured by General Cable Inc., 4 Tesseneer Drive, Highland Heights, Kentucky 41076-9753, telephone (859) 572-8000 or approved equal.

c. Splice Kits And Splice Tools. Provide cable splice kits and cable splice tools to include crimper and swaging tool. Provide Surface Systems splice kit with tools part number 24051015 and splice kit part number 24051020 or approved equal.

d. Sealing Material for Asphalt Pavement. Provide a one-part, cold-applied, self-leveling silicone joint sealant meeting ASTM D 5893-96 for filling of cable kerf cuts in asphalt pavement. Provide Dow Corning 890-SL or approved equal.

e. Conduit, Handholes. Conform to the requirements of items L-100 and L-110.

f. RPU Upgrades. Complete replacement of the existing internal hardware and software designed for installation in the existing enclosures. Upgrades shall be compatible with the existing radio communication equipment and server hardware and software.

g. Weather Sensors. Sensors shall include all mounting accessories and connecting cables required:
- **(1)** Relative Humidity/Air Temperature Sensor
- **(2)** Ultrasonic Wind Sensor
- **(3)** Optical Infrared Y/N Precipitation Sensor

h. Concrete. Conform to the requirements of item P-610.

CONSTRUCTION REQUIREMENTS

130-3.1 Accomplish pavement grooving prior to installation of surface sensors.

Coordinate with airfield maintenance personnel and turn off and lock out power to existing sensors and probes prior to demolition or installation of new equipment. Correct any damage resulting from your failure to disconnect power at no additional expense to the State.

Install 1-inch rigid steel conduit from the sensor location to the first handhole. Cut the 1-inch conduit into the asphalt before placing the final lift. Install conduit, cables, and handholes as shown on the plans and in accordance with items L-100 and L-110.

Install surface sensors in the finished asphalt surface at the locations shown on the plans using epoxy bedding and encapsulating materials in accordance with the manufacturer's instructions. Identify sensors and calibration information by station and offset. Provide copy of installation instructions and calibration instructions to the Engineer.

Remove existing RPU internal components and weather sensors and install new equipment at the existing locations. Reconnect upgraded RPUs to existing power supplies, surface sensors, and radio communications equipment. This work shall be accomplished by a factory representative.

Remove and replace existing RPU foundation and remove and reinstall existing RPU enclosure and support structure as indicated in the Plans. Reroute/extend existing conduits and power and sensor cables to reinstalled RPU enclosure.

130-3.2 TESTING. Run new sensor lead-in and surface sensor extension cable to the hand-holes and the RPU locations as shown on the plans. Splicing and connecting the cables to the RPU unit and final testing shall be completed by a factory representative.

130-3.3 TRAINING. After installation is complete, provide a minimum of 4 hours of on-site training by a factory representative. Schedule training with airport maintenance personnel.

METHOD OF MEASUREMENT

130-4.1 Section 90.

BASIS OF PAYMENT

130-5.1 At the contract lump sum price for installation of upgraded RPUs, software, weather sensors, surface sensors, conduit, concrete, handholes, cables, and other components necessary to provide an operational system. Asphalt cutting and filling of kerfs, all conduit, power cables, and splicing are subsidiary to this item and no additional payment will be made. The lump sum price is full compensation for furnishing all supplies, material and labor required to prepare the sites and to install all equipment and software to complete this item, including all installation, connections , testing, and commissioning by a factory representative.

Payment will be made under:

Item L-130a Surface Sensor System – per lump sum

ITEM L-132 APPROACH LIGHTING AIDS

DESCRIPTION

132-1.1 Furnish and install new light bases, conduit, and junction boxes and handholes to construct infrastructure to support an Approach Lighting System with Sequenced Flashing Lights (ALSF) and a Precision Approach Path Indicator (PAPI) as shown on the Plans and FAA system drawings. Remove portions of existing ALSF, ALSF generator, and PAPI after FAA has removed salvagable equipment and dispose of existing equipment, buildings, foundations, conductors, conduit, and other components as indicated on the Plans.

Excavation and backfill required is included in this work.

Wherever the words “this Contract” are found in the specifications attached, it is understood to denote “this work”.

This work is affected by access limitations set forth in Section 80-04.

MATERIALS

132-2.1 Contractor-furnished materials shall be in accordance with the Plans, this Section, and Sections L-100, L-108, and L-110 as applicable.

Concrete shall conform to Item P-610 Structural Portland Cement Concrete, 1-inch maximum size coarse aggregate.

CONSTRUCTION REQUIREMENTS

132-3.1 Install ALSF light bases and connect them with new conduit, junction boxes, and handholes in accordance with the Plans and Specifications. Remove existing equipment and dispose of buildings, foundations, conductors, conduit, and other components as described on the Plans.

Install conduit, light bases, junction boxes, and other components in accordance with the Plans and Sections L-100, L-108, and L-110 as applicable. Grounding and bonding shall be installed in accordance with the Plans, Specifications, and FAA STD-019e.

METHOD OF MEASUREMENT

132-5.1 This item will not be measured for payment. Lump sum payment includes the cost of all materials, work, and equipment required to complete the work, including removal and disposal of existing equipment. See NAVAID Construction Responsibilities table in the Plans for additional information regarding each pay item.

Conduit infrastructure to support new PAPI system is paid for under L-110 pay items.

Refer to Item P-610 for requirements regarding all work and materials to place Portland cement concrete. Portland cement concrete is subsidiary to L-132 items requiring its use.

BASIS OF PAYMENT

132-6.1 Payment will be made at the contract price for removal and construction of the approach lighting systems.

Payment will be made under:

Item L-132a(1) Install Approach Lighting Aids, ALSF-2, RW 7R – per lump sum

Item L-132b(1) Remove Approach Lighting Aids, ALSF-2, RW 7R – per lump sum

Item L-132b(2) Remove Approach Lighting Aids, PAPI, RW 7R – per lump sum

ITEM L-135 FAA EQUIPMENT

DESCRIPTION

135-1.1 Furnish and install all new foundations, new conduit, new cable, new junction boxes and handholes, mounting hardware, and incidentals to relocate the existing Non-directional Beacon (NDB) equipment as shown on the Plans. Remove portions of existing NDB system, Glide Slope, Runway Visual Range (RVR), Inner Marker, Middle Marker, MTI Reflector, and Far-field Monitors after FAA has removed salvagable equipment and dispose of existing equipment, buildings, foundations, conductors, conduit, and other components as indicated on the Plans.

Excavation and backfill required is included in this work.

Wherever the words “this Contract” are found in the specifications attached, it is understood to denote “this work”.

This work is affected by access limitations set forth in Section 80-04.

MATERIALS

135-2.1 Contractor-furnished materials shall be in accordance with the Plans, this Section, and Sections L-100, L-108, L-110, and S-142 as applicable.

NDB signal cable shall be 50-ohm RG-331/U coaxial cable or approved equivalent cable. Cable shall have a solid inner copper-clad aluminum conductor, PE foam dielectric, smooth aluminum shield, and an overall polyethylene jacket. Cable shall have an overall diameter of approximately 0.625-inch and a minimum inner conductor diameter of 0.162-inch. NDB signal cables shall contain no splices.

Concrete shall conform to Item P-610 Structural Portland Cement Concrete, 1-inch maximum size coarse aggregate.

CONSTRUCTION REQUIREMENTS

135-3.1 Install new foundations in the new locations. Install new and relocated equipment on new foundations and connect them with new conduit, cables, junction boxes, and handholes in accordance with the Plans and Specifications. Remove existing equipment and dispose of buildings, foundations, conductors, conduit, and other components as described on the Plans.

Install conduit, light bases, junction boxes, and other components in accordance with the Plans and Sections L-100, L-108, and L-110 as applicable. Construct new NDB building in accordance with the Plans and Section S-142. Grounding and bonding shall be installed in accordance with the Plans, Specifications, and FAA STD-019e.

Work on portions of the NDB system located off of airport property shall not proceed without prior approval from the Engineer after FAA has established property access agreements.

METHOD OF MEASUREMENT

135-5.1 This item will not be measured for payment. Lump sum payment includes the cost of all materials, work, and equipment required to complete the work, including removal and disposal of existing equipment. See NAVAID Construction Responsibilities table in the Plans for additional information regarding each pay item.

Refer to Item P-610 for requirements regarding all work and materials to place Portland cement concrete. Portland cement concrete is subsidiary to L-135 items requiring its use.

Construction of the new NDB building will be paid for under Item S-142.

BASIS OF PAYMENT

135-6.1 Payment will be made at the contract price for removal and construction of the approach lighting systems.

Payment will be made under:

Item L-135f	Relocate NDB – per lump sum
Item L-135g	Remove Inner Marker/Far-field Monitor 1 – per lump sum
Item L-135i	Remove Glide Slope – per lump sum
Item L-135j	Remove Middle Marker/Far-field Monitor 2 – per lump sum
Item L-135k	Remove RVR – per lump sum

ITEM L-160 ELECTRICAL LOAD CENTERS

DESCRIPTION

160-1.1 Furnish and install load center assemblies at the locations indicated in the Plans. Modify existing load centers when indicated.

Use load centers of the following types as shown on the load center detail sheets:

Type 1:	Pad mounted with underground service (large)
Type 1A:	Pad mounted with underground service (small)
Type 2:	Post mounted with underground service
Type 3:	Pole mounted with overhead service

MATERIALS

160-2.1 Conform to the standards of NEC, the NESC, and local safety codes as adopted and amended by the authority having jurisdiction. Use materials that conform to applicable NEMA and ANSI standards, the Materials Certification List, the Plans, specifications, and the following:

a. Concrete. Concrete shall conform to the requirements of P-610.

b. Grout. Use non-shrink, non-corrosive, non-metallic, cement-based grout meeting ASTM C-1107, Type C. Meet the requirements of ATM 520. Develop a 28-day compressive strength of 9,000 psi.

c. Wood Posts. Construction grade, 6 x 6 inch nominal dimension S4S Douglas Fir, Hem-Fir, Western Larch, Western Hemlock, Mountain Hemlock or Southern Pine meeting *Standard Grading and Dressing Rules*, West Coast Lumber Inspection Bureau. Treat posts using preservatives and treatment processes in accordance with AASHTO M133 and *Best Management Practices for the Use of Treated Wood in Aquatic Environments* (BMPs), published by the Western Wood Preservers Institute, 601 Main Street, Suite 405, Vancouver, WA 98660 (Phone: 800-279-9663).

d. Load Center. NEMA 3R enclosure constructed of zinc-coated A60 finish sheet steel per ASTM A 653 and ASTM A 924, with no external screws, bolts, or nuts.

Shop coat cabinet components with a 2-part urethane paint undercoat and 2-part urethane finish coats. Finish coats must be standard white for removable panels and non-gloss silver-gray, closely matching FSS No. 5950 Color No. 36622, for the enclosure.

The load center must be labeled as a unit by an approved independent electrical testing laboratory (such as UL, ETL, CSA, etc.) defined by ANSI Standard Z34.1 *Third-Party Certification Programs for Products Processes and Services* and conform to applicable published standards noted herein, the Plans, and Special Provisions. The load center must be labeled as service entrance equipment.

e. Panelboards. Load panels in load centers must conform to FSS W-P-115C, Type 1 - Circuit Breaker Panelboards; UL 67 - *Panelboards*; and NEMA PB1 - *Panelboards with Molded Case Circuit Breakers*. The rated voltage of the panels must be as noted on the load center summary in the Plans, 120/240 volts or 240/480 volt single phase or 120/208 volt or 277/480 volt three-phase. The ampacity rating of panels must not be less than the ampacity noted on the load center summary, 100 amps minimum, at rated voltage.

f. Circuit Breakers. Use bolt-in type circuit breakers with a copper bus. Provide separate neutral and ground busses. The series rated interrupting capacity of the circuit breakers in the panels must not be less than shown on the load center summary, or 10,000 AIC minimum, at rated voltage.

Use circuit breakers that are molded-case thermal-magnetic types with single-trip indicating switch handle. They must have an enclosed toggle type operating mechanism with quick-make/quick-break action and have a trip-free disconnect from the switch handle that will prevent the contacts from being held in the closed position. The circuit breakers must have the frame size, interrupting capacities, and trip rating clearly marked on the breaker. Multi-pole circuit breakers must have a common trip mechanism. Contacts must be silver alloy enclosed in an arc quenching chamber. Overload trip ratings must be self compensating for ambient temperatures from 14 °F to 140 °F. Circuit breakers must be 240 or 277 volt maximum rated for 120/240/277 volt circuits, which ever is applicable, and have an interrupting capacity (RMS - symmetrical) of not less than 10,000 amperes. They must have not less than 480 volt rated for circuits above 277 volts and have an interrupting capacity (R.M.S.- symmetrical) of not less than 14,000 amperes.

g. Contactor. Electrically-held type consisting of an operating coil, a laminated armature, contacts, and terminals. Contacts must be fine silver, silver alloy, or superior alternative material rated to switch the specified load, 30 ampere minimum at rated voltage, and be normally open, unless otherwise noted. Contactor coils must be rated for operation at 240 VAC.

h. Meters. Equip all meter sockets mounted in Type-1 and Type-1A load centers with internal mounted meters with manual circuit closing devices. The devices may be either the link or lever type. Do not use the horn and sliding types. Equip all load centers with internal mounted meters with safety sockets (that is, provisions for de-energizing the meter jaws). The test section cover must be sealable with a 0.047-inch stainless steel bail.

i. Transformers. Transformers in load centers containing load panels of different nominal voltages must be isolated winding type with primary and secondary voltages and KVA ratings as noted on the Plans. Transformers must carry rated volt amperes continuously without exceeding a 240 °F temperature rise above a 100 °F ambient temperature.

Where installed outside of the load center enclosure, use a non-ventilated transformer fabricated from aluminum, stainless steel, or galvanized steel and filled with high-melting point, thermal setting, or epoxy insulating compounds to prevent moisture from entering the winding enclosure. Coat enclosures fabricated from sheet metal with moisture-resistant paint. Insulate transformer leads with non-hygroscopic material and extend them 9 inches beyond the winding chamber seal.

j. Conductors. Stranded copper with either type XHHW-2 or RHW insulation.

k. Conduit. Galvanized rigid conduit made of mild steel meeting UL standard UL-6.

l. Terminals. Size all terminals according to the amperage ratings of the conductor used. They must be suitable for termination of copper and aluminum conductors.

m. Photoelectric Controls. Use photoelectric controls rated for operation at 240 VAC.

n. Galvanizing. Hot-dip galvanize all anchor bolts, nuts, washers, tie-rods, clamps, and other miscellaneous ferrous parts in conformance with AASHTO M 232. After galvanizing, ensure that the bolt threads accept galvanized standard nuts without requiring tools or causing removal of protective coatings.

Galvanize rigid metal conduit in conformance with AASHTO M 232.

Hot-dip galvanize structural steel shapes, plates, bars and their products according to AASHTO M 111.

Repair damage to galvanized coatings per AASHTO M 36.

o. Equipment List(s) and Drawings. Within 30 days after the Contract award, submit 8 collated copies of a portfolio of equipment and materials proposed for installation to the Department for review and approval. Include a table of contents in the portfolio(s) that includes each item's intended use(s) and the following:

(1) Materials on the *Approved Products List*: A description that includes product name, manufacturer, model or part number, and the conditions listed for approval.

(2) Materials Not on the *Approved Products List*: Catalog cuts that include the manufacturer's name, type of product, size, model number, conformance specifications, and other data as may be required, including manufacturer's maintenance and operations manuals, or sample articles.

(3) Materials Not Requiring Certification: Incidental materials incorporated into the work (such as nuts, ties, bolts, washers, etc.) must meet all applicable Specifications and be installed per all manufacturer's recommendations. Certification is not needed unless required by the Special Provisions or requested by the Engineer.

CONSTRUCTION REQUIREMENTS

160-3.1 Install load centers at the location and position shown on the Plans. Any deviation from the plan location must be coordinated with and approved by the serving utility and the Engineer.

Furnish conduit, conductors, contactors, breakers, transformers, and all other necessary materials at all new and modified load centers to complete the installation.

Install a rigid metal conduit of the size shown in the Plans at a 30-inch depth from the load center and extend it to a location 2 feet from the power source. Install a pull rope in the conduit, cap the end, and mark the terminus with a 2- x 4-inch stake or 1-inch rebar, 3 feet long. Extend the end of the stake or bar 1 inch above the ground. When the servicing utility requires the complete conduit and weather head to be in place on the designated service pole, furnish and install all materials required by the utility. The additional work and materials are subsidiary to the load center bid item.

Where the service is to be installed on a utility-owned pole, coordinate the positioning of the riser and service equipment with the service utility.

House circuit breakers, switches, and contactors in a NEMA 3R type enclosure listed by an approved independent electrical testing laboratory as service equipment with a hinged and locking front cover. Indelibly label panel covers with the circuit number. Legend plates, labels, and signs must be engraved plastic or metal fastened with screws, non-cold-susceptible adhesive, or component mounting hardware.

Size and wire load center cabinets to serve the combination of highway lighting, traffic signal, and thaw wire circuits shown in the Plans. Each cabinet must be a single box subdivided to form compartments as required. Include hinged lockable door(s) or panel cover(s) with provision for a padlock with a 5/16-inch diameter shackle for each compartment. Circuit breaker ratings must be as shown in the load center summary for each location.

Wire and equip load centers with commonly metered thaw wire and lighting circuits with separate contactors, selector switches, and terminal blocks for lighting and thaw wire circuits. Control the thaw wires as described in Item D-760.

Where a meter is required, furnish and install a meter socket that is acceptable to the serving utility, complete with sealing rings. Do not mount the meter socket on doors or removable panels.

Load centers containing contactors must have contactor control switches mounted in the load distribution section. Control switches for systems having automatic controls (for example, photo cell, thermostats, or time controls) must be 3-position types with the positions labeled “On”, “Off” and “Auto”. Control switches for manual control only must be a 2-position type with positions labeled “On” and “Off”. Label each switch to identify function being controlled.

Mount transformer fuses in dead-front fuse holders with lighted blown fuse indicators, where required. Label them to indicate function and fuse amp rating.

Install a 3/4-inch x 10-foot copper clad ground rod inside the base readily accessible thru the removable cover, or adjacent supporting post. Connect ground rod to neutral bus with a soft-drawn copper conductor sized per NEC, No. 6 AWG minimum. Bond all non-current carrying metal parts of the load center to the ground bus.

Locate the photo cell for lighting control on the nearest light standard or top of the load center as shown on the load center summary. Orient it to the unobstructed northern sky. Submit for approval the method of attachment of the conduit to the load center. Use a 5-conductor No. 14 AWG wire to connect the photo cell to the load center. When the photo cell is on a lighting standard with a slip base or frangible coupling style base, use an approved break-away disconnect in the base of the light standard. Restrain the cable in a similar manner as the lumination cable in the pole base.

Provide a typed circuit directory for each load panel inside of the load center door, protected with a plastic cover, describing each circuit, with even and odd numbered circuit breaker positions shown on separate parts of the directory. Provide a power and control one-line diagram protected by a laminated plastic cover inside the load center. Include the following information on the directory and one-line diagram: Load center identification (A, B, etc.), Project Name, Project number (Federal/State) and Service Voltage.

METHOD OF MEASUREMENT

160-4.1 By the actual number of load centers, modified load centers, and transformers completed and accepted shown on the Plans or as directed.

BASIS OF PAYMENT

160-5.1 Load circuits, consisting of conduits and conductors attached to the load centers and photoelectric controls, and terminations of field wiring, are subsidiary to other items of work.

Payment will be made under:

Item L-160a	Load Center, Type 1 – per each
Item L-160b	Load Center, Type 1A – per each
Item L-160c	Load Center, Type 2 – per each
Item L-160d	Load Center, Type 3 – per each
Item L-160e	Modify Load Center – per each
Item L-160f	Transformer, [Size] KVA – per each

ITEM P-151 CLEARING AND GRUBBING

DESCRIPTION

151-1.1 This item shall consist of clearing or clearing and grubbing, including the disposal of materials, for all areas within the limits designated on the Plans or as required by the Engineer.

Clearing shall consist of the cutting and removal of all trees, stumps, brush, logs, hedges, the removal of fences and other loose or projecting material from the designated areas. The grubbing of stumps and roots will not be required.

Clearing and grubbing shall consist of clearing the surface of the ground of the designated areas of all trees, stumps, down timber, logs, snags, brush, undergrowth, hedges, heavy growth of grass or weeds, fences, structures, debris, and rubbish of any nature, natural obstructions or such material which in the opinion of the Engineer is unsuitable for the foundation of strips, pavements, or other required structures, including the grubbing of stumps, roots, matted roots, foundations, and the disposal from the project of all spoil materials resulting from clearing and grubbing by burning or otherwise.

Selective tree removal requires the hand cutting (topping) of all types of trees either by chain saw or by other approved conventional hand clearing methods. Lay the fallen tree next to the stump.

CONSTRUCTION METHODS

151-2.1 GENERAL. The areas ~~denoted on the Plans~~ to be cleared or cleared and grubbed shall be staked or otherwise marked on the ground at the direction of the Engineer. The Engineer will flag or mark each tree designated for selective tree removal. The clearing and grubbing shall be done far enough ahead of the earthwork operation to permit cross-sectioning prior to excavation or embankment. Mechanical brush cutting equipment may be used for clearing. Dozers or other mechanical equipment not specifically designed for brush cutting may not be used.

Comply with seasonal construction limitations in subsection 80-04 to prevent impacts to migratory bird nesting areas.

~~Debris from mechanical brush cutting equipment less than 4 feet long by 4 inches in diameter may remain in place outside of Runway and Taxiway Safety Area surfaces except as specified in areas to be embanked.~~ All other spoil materials generated by clearing or by clearing and grubbing shall be disposed of by burning, when permitted by local laws, or by removal to approved disposal areas. When burning of material is permitted, it shall be burned under the constant care of competent watchmen so that the surrounding vegetation and other adjacent property will not be jeopardized. Burning shall be done according to all applicable laws, ordinances, and regulations. Before starting any burning operations, the Contractor shall notify the agency having jurisdiction.

As far as practicable, waste concrete and masonry shall be placed on slopes of embankments or channels. When embankments are constructed of such material, this material shall be placed according to requirements for formation of embankments. Any broken concrete or masonry which cannot be used in construction, and all other materials not considered suitable for use elsewhere, shall be disposed of by the Contractor. In no case shall any discarded materials be left in windrows or piles adjacent to or within the airport limits. The manner and location of disposal of materials shall be subject to the approval of the Engineer and shall not create an unsightly or objectionable view. When the Contractor is required to locate a disposal area outside the airport property limits at their own expense, the Contractor shall obtain and file with the Engineer, permission in writing from the property owner for the use of private property for this purpose.

If the Plans or the Specifications require the saving of merchantable timber, the Contractor shall trim the limbs and tops from designated trees, saw them into suitable lengths, and make the material available for removal by others.

Any blasting necessary shall be done at the Contractor's responsibility, and the utmost care shall be taken not to endanger life or property.

The Contractor shall remove existing structure and utilities that are identified to be removed or demolished, except when another entity is identified in the Contract to accomplish the work.

151-2.2 CLEARING. The Contractor shall clear the staked or indicated area of all objectionable materials. Trees unavoidably falling outside the specified limits must be cut up, removed, and disposed of in a satisfactory manner. In order to minimize damage to trees that are to be left standing, trees shall be felled toward the center of area being cleared. The Contractor shall preserve and protect from injury all trees not to be removed. The trees, stumps, and brush shall be cut to a height of not more than 12 inches above the ground. The grubbing of stumps and roots will not be required.

Fences shall be removed and disposed of when directed by the Engineer. Fence wire shall be neatly rolled and the wire and posts stored on the airport if they are to be used again, or stored at a designated location if the fence is to remain the property of a local owner.

151-2.3 CLEARING AND GRUBBING. In areas designated to be cleared and grubbed, all stumps, roots, buried logs, brush, grass, and other unsatisfactory materials shall be removed, except where embankments exceeding 4.0 feet in depth are to be made outside of paved areas. In cases where such depth of embankments is to be made, all unsatisfactory materials shall be removed, but sound trees, stumps, and brush can be cut off within 6 inches above the ground and allowed to remain. Tap roots and other projections over 1.5 inches in diameter shall be grubbed out to a depth of at least 18 inches below the finished subgrade or slope elevation.

Any buildings and miscellaneous structures that are shown on the Plans to be removed shall be demolished or removed, and all materials therefrom shall be disposed of either by burning or otherwise removed from the site. The remaining or existing foundations, wells, cesspools, and all like structures shall be destroyed by breaking down the materials of which the foundations, wells, cesspools, etc., are built to a depth at least 2 feet below the existing surrounding ground. Any broken concrete, blocks, or other objectionable material which cannot be used in backfill shall be removed and disposed of. The holes or openings shall be backfilled with acceptable material and properly compacted.

All holes remaining after the grubbing operation in embankment areas shall have the sides broken down to flatten out the slopes, and shall be filled with suitable material, moistened and properly compacted in layers to the density required in Item P-152. The same construction procedure shall be applied to all holes remaining after grubbing in excavation areas where the depth of holes exceeds the depth of the proposed excavation.

METHOD OF MEASUREMENT

151-3.1 Measure according to Section GCP-90 and the following:

a. **Acre.** The area acceptably cleared, or cleared and grubbed, measured on the ground surface. Only areas shown on the Plans, or areas cleared at the Engineer's direction will be measured. Islands of existing cleared areas, such as lakes, ponds, existing stream beds, and roads and trails within the clearing limits of more than 60 square yards will not be included as pay areas.

b. **Each.** The number of designated trees acceptably removed, regardless of size.

BASIS OF PAYMENT

151-4.1 ~~The accepted quantities of clearing or clearing and grubbing will be paid for at the contract unit price, per unit of measurement~~At the contract lump sum or unit price, for each of the pay items listed below that are shown in the bid schedule.

Payment will be made under:

Item P-151a	Clearing - per acre
Item P-151b	Clearing - lump sum
Item P-151c	Clearing & Grubbing - per acre
Item P-151d	Clearing & Grubbing - lump sum
Item P-151e	Selective Tree Removal – per each

ITEM P-152 EXCAVATION AND EMBANKMENT

DESCRIPTION

152-1.1 This item consists of excavation, hauling, embankment (or waste disposal), placement, grading and compaction of all materials required to construct runway safety areas, taxiway safety areas, runways, taxiways, aprons, drainage, buildings, roadways, parking, and other work. Construct according to the specifications, and conform to the dimensions and typical sections shown on the Plans.

MATERIALS

152-2.1 MATERIAL DEFINITIONS. The Contract will designate material to be removed from within the project lines and grades as classified excavation (common, rock or muck) or as unclassified excavation. Material obtained from outside the project lines and grades is borrow.

All material shall be described as defined below, but no quantity of material shall be defined or paid in more than one category:

a. **Unclassified Excavation.** All material, regardless of its nature, which is not paid for under another contract item. May include common, rock or muck.

b. **Common Excavation.** Suitable material such as silt, sand, gravel, and granular material that does not require blasting or ripping. Not rock or muck. Located as shown on the plans.

c. **Rock Excavation.** Rock that cannot be excavated without blasting or ripping, and boulders containing a volume of more than 0.5 cubic yard.

d. **Muck Excavation.** Soil, organic matter, and other material not suitable for embankment or foundation material, including material that will decay or produce subsidence in the embankment such as stumps, roots, logs, humus, or peat.

e. **Drainage Excavation.** Excavation made for the primary purpose of controlling drainage including: intercepting, inlet or outlet ditches; temporary levee construction; perforated underdrain pipes, outlet pipes, manholes, culverts and appurtenances outside the structural sections or any other type as shown on the Plans.

f. **Borrow.** Suitable material that is required for the construction of embankment or for other portions of the work. Borrow material shall be obtained from sources within the limits of the airport property but outside the project lines and grades, or from sources outside the airport property.

g. **Foundation Soil.** In-situ soil or undisturbed ground.

h. **Ditch Linear Grading.** Final shaping of designated ditches, swales and slopes for drainage as shown on the plans.

i. **Area Grading.** Reshaping areas to smooth the areas and provide finish to grade or elevations as shown on the plans.

152-2.2 UNSUITABLE MATERIAL. Material that doesn't meet the testing criteria for suitable material. Material containing vegetable or organic matter, such as muck, peat, organic silt, or sod is considered unsuitable for use in embankment construction. Material that is contaminated by hazardous substances, including fuel or oil, in greater quantity than state and federal standards allow is considered unsuitable for use.

152-2.3 SUITABLE MATERIAL. Suitable material may be obtained from classified excavation, unclassified excavation, or borrow. The Engineer will approve material as "suitable" for use in embankment when the material meets the following criteria:

a. Sand, rock, gravel, silt, concrete, asphalt pavement, and other inorganic material;
b. Gradation of 100% by weight passing 6 inch screen; and

c. ~~Meets definition of Non-Frost Susceptible in Subsection GCP 10-03, except delete "6%" and replace with "10%" (passing No. 200 screen).~~

The Engineer may, in their discretion, approve oversize material as "suitable" for use in embankment when the material meets the following criteria:

a. Sand, rock, gravel, silt, concrete, asphalt pavement, and other inorganic material;

b. Gradation of 100% by weight passing 24 inch screen;

c. ~~Meets definition of Non-Frost Susceptible in Subsection GCP 10-03, except delete "6%" and replace with "10%" (passing No. 200 screen); and~~

d. Rock is well graded with an even distribution of rock sizes, and can be compacted with a minimal amount of voids.

CONSTRUCTION METHODS

152-3.1 GENERAL. Perform all necessary clearing and grubbing in accordance with Item P-151, and construction surveying in accordance with Item G-135, including staking of lines and grades, prior to beginning excavation, grading, and embankment operations in any area.

The suitability of material to be placed in embankments shall be subject to approval by the Engineer. Material with organics, when approved by the Engineer as suitable to support vegetation, may be used on top of the embankment slope.

Unsuitable material shall be disposed of in waste areas shown on the Plans or in locations acceptable to the Engineer. Material contaminated by hazardous substances shall require special handling and disposal, performed according to Subsection GCP 70-11.d. and using methods acceptable to the Engineer.

a. Waste Areas. All waste areas shall be graded to allow positive drainage of the area and of adjacent areas. The surface elevation of waste areas shall not extend above the surface elevation of adjacent usable areas of the airport, unless specified on the Plans or approved by the Engineer. Unsuitable material shall not be left in windrows or piles, and shall not extend into the Obstacle-Free Zone (as defined in AC 150/5300-13, Subsection 306).

All waste areas shall be protected from erosion according to the SWPPP. Areas where seeding is called for, in which the top layer of soil material has become compacted, by hauling or other activities of the Contractor shall be scarified and disked to a depth of 4 inches, in order to loosen and pulverize the soil.

The Contractor shall obtain all permits required for placing waste in areas they choose, and which are not covered by Department obtained permits. When the Contractor is required to locate a disposal area outside the airport property limits at his/her own expense, he shall obtain and file with the Engineer, permission in writing from the property owner for the use of private property for this purpose.

b. **Utility Work.** Utility work shall be performed, and compensation claims for utility work made, according to Subsection GCP 50-06. If it is necessary to work thorough or around existing utilities or associated structures, the Contractor shall be responsible for and shall take all necessary precautions to preserve the utilities or provide temporary services. When utilities not shown on the Plans are encountered, the Contractor shall immediately notify the Engineer, and the Engineer will determine the disposition of the utility. The Contractor shall, at no additional cost to the Department, satisfactorily repair or pay the cost of all damage to utilities or associated structures which may result from any of the Contractor's operations.

152-3.2 EXCAVATION. No excavation shall be started until the Contractor has construction surveyed the work, including staking the lines and grades, and the Engineer has reviewed stakes, elevations and measurements of the ground surface. As required in GCP 40-04, all Useable Excavation of suitable material shall be used in the formation of embankment or for other purposes shown on the Plans. All unsuitable material shall be disposed of in waste areas as shown on the Plans or as directed by the Engineer.

When the volume of the Useable Excavation exceeds that required to construct the embankments to the grades indicated, the excess material shall be used to grade the areas of ultimate development or disposed of as directed. When the volume of Useable Excavation is not sufficient for constructing the fill to the grades indicated, borrow shall be used to make up the deficiency.

The grade shall be maintained so that the surface is well drained at all times. When necessary, temporary drains and drainage ditches shall be installed to intercept or divert surface water that may affect the work. All temporary drains and drainage ditches shall be constructed and maintained according to the SWPPP.

In cuts, all loose or protruding rocks on the back slopes shall be scaled or otherwise removed to line of finished grade of slope. All cut-and-fill slopes shall be uniformly dressed to the slope, cross section, and alignment shown on the Plans or as directed by the Engineer.

a. **Selective Grading.** When selective grading is required, the more suitable material as designated by the Engineer shall be used in constructing the upper layers of the embankment or pavement structure. If, at the time of excavation, it is not possible to place this material in its final location, it shall be stockpiled in approved areas.

b. **Undercutting.** Rock, shale, hardpan, loose rock, boulders, or other material unsatisfactory for runways, taxiways, safety areas, subgrades, roads, shoulders, or any areas intended for turfing shall be excavated to a minimum depth of 12 inches, or to the depth directed by the Engineer, below the top of subgrade. Muck, peat, matted roots, or other yielding material that is unsatisfactory for foundation soil compaction, shall be removed to the depth specified. Unsuitable materials shall be disposed of at locations shown on the Plans. The excavated area shall be refilled with suitable material, obtained from the grading operations or borrow areas and thoroughly compacted as specified. Where rock cuts are made and refilled with suitable material, any pockets created in the rock surface shall be drained according to the details shown on the Plans. The material removed will be paid as Unclassified Excavation.

c. **Overbreak.** Overbreak, including slides, is that portion of any material displaced or loosened beyond the finished work, as planned or authorized by the Engineer. The Engineer shall determine if the displacement of such material was unavoidable and their decision shall be final. All overbreak shall be graded or removed by the Contractor and disposed of as directed; however, payment will not be made for the removal and disposal of overbreak which the Engineer determines as avoidable. Unavoidable overbreak that must be removed will be paid as Unclassified Excavation.

d. **Removal of Structures and Utilities.** The Contractor shall accomplish the removal of existing structures and utilities that are specified to be removed or demolished, except when another entity is identified in the Contract to accomplish the work. All existing structural foundations shall be excavated and removed to a depth at least 2 feet below the top of subgrade or as indicated on the

Plans, and the material disposed of as directed. Holes left after removing foundations shall be backfilled with suitable material and compacted as specified. The material will be paid as Unclassified Excavation.

e. **Foundation Soil Compaction Requirements.** In areas of excavation, the top 6 inches of foundation soil under areas serving aircraft or vehicle traffic loadings shall be compacted to a density of not less than ~~100% for non-cohesive soils (95% for cohesive soils)~~ 95% of the maximum density as determined by WAQTC FOP for AASHTO T 99/T 180 or ATM 212. The in-place field density and moisture content shall be determined according to WAQTC FOP for AASHTO T 310. ~~The in-place moisture shall be determined by WAQTC FOP for AASHTO T 255/T 265 when using other than the nuclear gauge method for density.~~

Compaction of the foundation soil is a subsidiary cost to excavation.

The Engineer may direct the Contractor to over excavate foundation soil that is soft or compresses excessively, and to backfill excavation with compacted suitable material. The material will be paid as Unclassified Excavation.

f. **Blasting.** Blasting will not be permitted on airport property. ~~only when proper precautions are taken for the safety of all persons, the work, and the property. The Contractor is responsible for blasting operations including the requirements of Subsection GCP 70-10. All damage done to the work or property shall be repaired at the Contractor's expense. All operations of the Contractor in connection with the transportation, storage, and use of explosives shall conform to all federal, state, local regulations, explosive manufacturers' instructions, and approved permits.~~

~~The Contractor shall submit a Safety Plan that includes descriptions of road and runway closures, warning signals; and plans for notification of affected local, state, and federal agencies, the airport manager, and other interested parties. Discuss in the Safety Plan methods for protection of life and health, public and private property, new work or existing work on the project, nearby structures, wetlands, waters and wildlife. When working within airport property include an emergency response contingency to clear runways of debri, to repair damaged navigational or visual aids; and get a NOTAMs before blasting. Hold a safety meeting prior to commencement of blasting operations to address safety issues.~~

~~In each distinct blasting area the Contractor shall submit a blasting plan, prepared by a qualified blaster, to the Engineer. This plan must consist of hole size, depth, spacing, burden, type of explosives, type of delay sequence, maximum amount of explosive on any one delay period, depth of rock, and depth of overburden if any. The maximum explosive charge weights per delay included in the plan shall not be increased without submitting a revised blasting plan to the Engineer.~~

~~When blasting on airport property, the Safety Plan and the Blasting Plan shall conform to Executive Order 7400.2E *Procedures for Handling Airspace Matters*, Chapter 27, and AC 150/5370-2 *Operational Safety on Airports During Construction.*~~

~~The Contractor shall keep a record of each blast fired, its date, time, and location; the amount of explosives used, maximum explosive charge weight per delay period, and, where necessary, seismograph records identified by instrument number and location. These records shall be made available daily to the Engineer.~~

~~The Engineer will keep the submitted plans and records, and has authority to review and reject plans.~~

152-3.3 BORROW SOURCES. Borrow sources within the airport property are identified on the Plans. Excavation of borrow on airport property shall be made only at these identified locations and within the lines and grades staked.

Borrow sources outside of airport property may be identified in the Contract according to GCP 60-02. The Contractor shall furnish additional borrow sources if necessary.

Removal of overburden and waste material, permit costs, mineral royalties, and other costs of material source development are subsidiary and shall be included in the unit price for borrow.

152-3.4 DRAINAGE EXCAVATION. Drainage excavation for intercepting, inlet or outlet drains; for temporary levee construction; or for any other type as designed or as shown on the Plans. The work shall be performed in the proper sequence with the other construction and according to the SWPPP. All suitable material shall be placed in fills; unsuitable material shall be placed in waste areas or as directed. Intercepting ditches shall be constructed prior to starting adjacent excavation operations. All necessary work shall be performed to secure a finish true to line, elevation, and cross section.

The Contractor shall maintain ditches constructed on the project to the required cross section and shall keep them free of debris or obstructions until the project is accepted.

152-3.5 PREPARATION OF EMBANKMENT AREA. Where an embankment is to be constructed to a height of 4 feet or less, or where the embankment supports asphalt or concrete paving, all sod and vegetable matter shall be removed from the surface upon which the embankment is to be placed, and the cleared surface shall be completely broken up by plowing or scarifying to a minimum depth of 6 inches. Compact this area as indicated in Subsection 152-3.2.e.

When new embankment is placed against existing embankments or on slopes steeper than 4:1, the existing ground shall be continuously benched over the areas as the work is brought up in layers. Benching shall be of sufficient width to permit placing of material and compacting operations. Each horizontal cut shall begin at the intersection of the original ground and the vertical side of the previous bench. Material thus cut out and deemed suitable shall be blended and incorporated into the new embankment.

No direct payment shall be made for the work performed under this section. The necessary clearing and grubbing and the quantity of excavation removed will be paid for under the respective items of work.

152-3.6 FORMATION OF EMBANKMENTS. Embankments shall be formed in successive horizontal layers of not more than 8 inches in loose depth for the full width of the cross section, unless otherwise approved by the Engineer.

The grading and compaction operations shall be conducted, and the various soil strata shall be placed, to produce an embankment as shown on the typical cross section or as directed by the Engineer. Materials such as brush, hedge, roots, stumps, grass and other unsuitable material, shall not be incorporated or buried in the embankment.

a. **Suspension of Operations.** Operations on earthwork shall be suspended at any time when satisfactory results cannot be obtained because of rain, freezing, moisture content or other unsatisfactory conditions of the field. The Contractor shall drag, blade, or slope the embankment to provide proper surface drainage.

b. **Soft Foundations.** When embankments are to be constructed across wet or swampy ground, which will not support the weight of heavy hauling and spreading equipment, the Contractor shall use methods of embankment construction, and use hauling and spreading equipment, that will least disturb the soft foundation (defined as having a California Bearing Ratio less than 3). When soft foundations are encountered, and when approved by the Engineer, the lower part of the fill may be constructed by dumping and spreading successive vehicle loads in a uniformly distributed layer of a thickness not

greater than that necessary to support the vehicle while placing subsequent layers, after which the remainder of the embankment shall be constructed in layers and compacted as specified. The Contractor shall not be required to compact the soft foundation, and at the Engineer's option, may not be required to clear and grub.

c. **Moisture.** The material in the layer being placed shall be within ±2% of optimum moisture content before rolling to obtain the prescribed compaction. In order to achieve a uniform moisture content throughout the layer, wetting or drying of the material and manipulation shall be performed when necessary. Should the material be too wet to permit proper compaction or rolling, all work on all of the affected portions of the embankment shall be delayed until the material has dried to the required moisture content. Watering of dry material to obtain the proper moisture content shall be done with approved equipment that will sufficiently distribute the water. Sufficient equipment to furnish the required water shall be available at all times.

d. **Compaction.** Rolling operations shall be continued until the embankment is compacted to not less than 95% of maximum density as determined by WAQTC FOP for AASHTO T 99/T 180 or ATM 212. ~~Under all areas serving aircraft or vehicle traffic loadings, the embankment shall be compacted to the depth shown on the Plans and to a density of not less than 100% of the maximum density as determined by WAQTC FOP for AASHTO T 99/T 180 or ATM 212.~~ The in-place field density and moisture content shall be determined according to WAQTC FOP for AASHTO T 310. ~~The in-place moisture shall be determined by WAQTC FOP for AASHTO T 255/T 265 when using other than the nuclear gauge method for density.~~

Keep dumping and rolling areas separate. Do not cover any layer by another until the proper density is obtained.

During construction of the embankment, the Contractor shall route their equipment at all times, both when loaded and when empty, over the layers as they are placed and shall distribute the travel evenly over the entire width of the embankment. The equipment shall be operated in such a manner that hardpan, cemented gravel, clay, or other chunky soil material will be broken up into small particles and become incorporated with the other material in the layer.

In the construction of embankments, layer placement shall begin in the deepest portion of the fill and progress in layers approximately parallel to the finished pavement grade line. Stones or fragmentary rock larger than 3 inches in their greatest dimensions will not be allowed in the top 6 inches of the embankment.

e. **Oversize Material.** At the Engineer's discretion and direction, the Contractor may use oversize material or rockfill, as defined in Subsection 152-2.3, in the embankment. Place material in layers up to 2 feet thick. Fill voids with finer material. Level and smooth each layer with suitable leveling equipment. Use compaction equipment and construction methods that can form a dense, well-compacted embankment. Do not use oversize material within 2 feet of the top of finished subgrade.

Rock or boulders larger than 2 feet in thickness shall either be disposed of outside the excavation or embankment areas, in places and in the manner designated by the Engineer; or they may be crushed to less than 2 feet thickness and used in the embankment.

f. **Subsidiary Costs.** Excavation and embankment is a single pay item; there will be no separate measurement or payment. The costs for material source development, blasting, excavation, hauling, placing in layers, compacting, disking, watering, mixing, sloping, grading, and other necessary operations for construction of embankments, are subsidiary and shall be included in the contract unit prices for excavation, borrow, or other pay items.

g. **Frozen Material.** Frozen material shall not be placed in the embankment nor shall embankment be placed upon frozen material, unless this construction method is identified in the special provisions, or is part of a Contractor's Progress Schedule that the Engineer has approved.

152-3.7 FINISHING AND PROTECTION OF SUBGRADE. After the subgrade has been substantially completed, the full width shall be conditioned by removing any soft or other unstable material that will not compact properly. The resulting areas and all other low areas, holes or depressions shall be brought to finish subgrade elevation with suitable material. Scarifying, blading, rolling and other methods shall be performed to provide a thoroughly compacted subgrade, whose top is shaped to the lines and grades shown on the Plans. Proof roll the entire finished surface with three (3) coverages of either a pneumatic roller ballasted to 25 ton or a vibratory roller having a static weight of 25,000 pounds operating at maximum dynamic capacity before final density acceptance by the Engineer.

Grading of the top of subgrade shall be performed so that it will drain readily. The Contractor shall take all precautions necessary to protect the subgrade from damage. The Contractor shall limit hauling over the finished subgrade to that which is essential for construction purposes.

All ruts, ponds or rough places that develop in a completed subgrade shall be repaired, smoothed and recompacted before another layer is placed on top of the subgrade.

No subbase, or surface course shall be placed on the subgrade until the subgrade has been approved by the Engineer. Erosion and sediment control shall be done according to the SWPPP. Work described in this subsection is subsidiary and shall be included in the contract unit prices.

152-3.8 ~~RESERVED~~ DITCH LINEAR GRADING AND AREA GRADING. Grading with a small dozer, motor grader or other suitable means approved by the Engineer to shape or reshape structures and areas to elevations or grades identified in the plans whose grading is not required by other work. Clearing and grubbing shall not be required. Finish surfaces shall be graded to drain away from pavement structures, toward ditches or sheet drainage areas.

152-3.9 TOLERANCES. In those areas upon which a subbase or base course is to be placed, the top of the subgrade shall be of such smoothness that, when tested with a 12-foot straightedge applied parallel and at right angles to the centerline, it shall not show any deviation in excess of 1/2 inch, or shall not be more than 0.05 foot from true grade as established by grade hubs or pins. Any deviation in excess of these amounts shall be corrected by loosening, adding, or removing materials; reshaping; and recompacting by watering and rolling.

On Runway Safety Areas, intermediate and other designated areas, the surface shall be of such smoothness that it will not vary more than 0.10 foot from true grade as established by grade hubs. Any deviation in excess of this amount shall be corrected by loosening, adding or removing materials, and reshaping.

METHOD OF MEASUREMENT

152-4.1 The quantity of unclassified excavation, common excavation, rock excavation, and muck excavation, will be measured in cubic yards of excavated material, measured in its original position. Pay quantities will be computed to the neat lines staked, by the method of average end areas of materials acceptably excavated. Measurement will not include the quantity of materials excavated without authorization beyond project lines and grades, or the quantity of material used for purposes other than those directed or approved by the Engineer.

With the Engineer's written approval, excavation may be measured by any method described in Subsection 152-4.2.

All insulation and geotextiles found within the limits of excavation will be separated, removed and disposed of off airport. These materials will not be measured separately but shall be subsidiary to excavation pay items.

Ditch linear grading, whether flatbottom or "V" ditch, will be measured for payment by the linear foot along the center of the ditch for each ditch designated, constructed and accepted by the Engineer.

Area grading will be measured for payment by the square yard for areas designated, constructed and accepted by the Engineer.

Clearing and Grubbing for Drainage Excavation will not be measured separately but shall be subsidiary.

Payment will be full compensation for furnishing equipment, labor, tools, and incidentals to provide the preparation, excavation and shaping necessary to complete the work.

Seeding and mulching for excavated and graded areas shall be measured and paid under Item T-901.

152-4.2 The quantity of Borrow material to be paid will be by calculated by one of the following methods of measurement, as described in the Bid Schedule.

If Borrow is paid by source volume, the quantity will be measured in cubic yards of material, measured in its original position at the borrow source, after stripping of overburden and waste. Pay quantities will be computed by the method of average end areas from cross sections taken before and after borrow excavation. No shrink or swell factor will be used.

If Borrow is paid by design volume, the quantity will be measured in cubic yards of material, measured in its final compacted position. Pay quantities will be computed by the method of average end areas, as determined from original ground cross sections before placement (after clearing and grubbing) and to the neat lines staked and verified by the Engineer after placement. No allowance will be made for subsidence of the subgrade or for material placed outside the staked neat line limits. The quantity to be paid for will be the cubic yards of material placed and accepted in the completed embankment. No shrink or swell factor will be used.

If Borrow is paid by weight, the quantity will be measured in tons, by weighing system or by barge displacement method.

BASIS OF PAYMENT

Excavation and embankment (or waste disposal) is a single pay item. The costs for material source development, blasting, excavation, hauling, placing in layers, compacting, disking, watering, mixing, sloping, grading, and other necessary operations for construction of embankments, or waste disposal, are subsidiary and shall be included in the contract unit prices.

152-5.1 For "Unclassified Excavation" payment will be made at the contract unit price per cubic yard.

152-5.2 For "Common Excavation" payment will be made at the contract unit price per cubic yard.

152-5.3 For "Rock Excavation" payment will be made at the contract unit price per cubic yard.

152-5.4 For "Muck Excavation" payment will be made at the contract unit price per cubic yard.

152-5.5 For "Drainage Excavation" payment will be made at the contract unit price per cubic yard.

152-5.6 For "Borrow" payment will be made at the contract unit price per cubic yard. If by weight, payment will be made at the contract unit price per ton.

152-5.7 For "Ditch Linear Grading" payment will be made at the contract unit price per linear foot.

152-5.8 For "Area Grading" payment will be made at the contract price per square yard.

Payment will be made under:

Item P-152a	Unclassified Excavation - per cubic yard
Item P-152a(1)	Common Excavation - per cubic yard
Item P-152b	Rock Excavation - per cubic yard
Item P-152c	Muck Excavation - per cubic yard
Item P-152d	Drainage Excavation - per cubic yard
Item P-152e	Reserved
Item P-152f	Reserved
Item P-152g	Reserved
Item P-152h(1)	Borrow measured at Source- per cubic yard
Item P-152h(2)	Borrow measured in Final Position- per cubic yard
Item P-152i	Borrow - per ton
Item P-152ag	Ditch Linear Grading – per linear foot
Item P-152ah	Area Grading- per square yard

TESTING REQUIREMENTS

ATM 212	Standard Density of Coarse Granular Materials using the Vibratory Compactor
WAQTC FOP for AASHTO T 99/T 180	Moisture-Density Relations of Soils
WAQTC FOP for AASHTO T 255/T 265	Moisture Content of Aggregate and Soils
WAQTC FOP for AASHTO T 310	In-place Density and Moisture Content of Soil and Soil-Aggregate by Nuclear Methods

ITEM P-154 SUBBASE COURSE

DESCRIPTION

154-1.1 This item shall consist of a subbase course composed of granular materials constructed on a prepared subgrade or underlying course according to these Specifications, and in conformity with the dimensions and typical cross section shown on the Plans.

MATERIALS

154-2.1 MATERIALS. The subbase material shall consist of hard durable particles or fragments of granular aggregates. This material will be mixed or blended with fine sand, clay, stone dust, or other similar binding or filler materials produced from approved sources. This mixture must be uniform and shall comply with the requirements of these Specifications as to gradation, soil constants, and shall be capable of being compacted into a dense and stable subbase. The material shall be free from vegetable matter, lumps or excessive amounts of clay, and other objectionable or foreign substances. The coarse aggregate shall have a minimum degradation value of 40 when tested according to ATM 313 and a percent of wear not more than 50 at 500 revolutions as determined by AASHTO T 96. Pit-run material may be used, provided the material meets the requirements specified.

Aggregate gradation shall meet the requirements of Table 1, determined according to WAQTC FOP for AASHTO T 27/T11.

TABLE 1. AGGREGATE GRADATION REQUIREMENTS

Sieve designation (Square opening)	**Percentage by weight passing sieves**
3 inch	90-100
No. 4	20-55
~~No. 8~~	~~30-70~~
~~No. 50~~	~~0-30~~
No. 200	0-6

The percent passing the No. 200 sieve will be determined on minus 3-inch material.

The portion of the material passing the No. 40 sieve shall have a liquid limit of not more than 25 and a plasticity index of not more than 6 when tested according to WAQTC FOP for AASHTO T 89 and T 90.

The gradations shall be well graded from coarse to fine and shall not vary from the low limit on one sieve to the high limit on the adjacent sieves, or vice versa.

CONSTRUCTION METHODS

154-3.1 GENERAL. The subbase course shall be placed where designated on the Plans or as directed by the Engineer. The material shall be shaped and thoroughly compacted within the tolerances specified.

Granular subbases which, due to grain sizes or shapes, are not sufficiently stable to support the movement of construction equipment, shall be mechanically stabilized to the depth necessary to provide such stability as directed by the Engineer. The mechanical stabilization shall principally include the addition of a fine-grained medium to bind the particles of the subbase material sufficiently to furnish a bearing strength, so that the course will not deform under the traffic of the construction equipment. The addition of the binding medium to the subbase material shall not increase the soil constants of that material above the limits specified.

154-3.2 PREPARING UNDERLYING COURSE. Before any subbase material is placed, the underlying course shall be prepared and conditioned as specified. The course shall be checked and accepted by the Engineer before placing and spreading operations are started.

To protect the subgrade and to ensure proper drainage, the spreading of the subbase shall begin along the centerline of the pavement on a crowned section or on the high side of pavements with a one-way slope.

154-3.3 MATERIALS ACCEPTANCE IN EXISTING CONDITION. When the entire subbase material is secured in a uniform and satisfactory condition, such approved material may be moved directly to the spreading equipment for placing. The material may be obtained from gravel pits, stockpiles, or may be produced from a crushing and screening plant with the proper blending. The materials from these sources shall meet the requirements for gradation, quality, and consistency. The moisture content of the material shall be approximately that required to obtain maximum density. The final operation shall be blading or dragging, if necessary, to obtain a smooth uniform surface true to line and grade.

154-3.4 GENERAL METHODS FOR PLACING. When materials from several sources are to be blended and mixed, the subbase material, together with any blended material, shall be thoroughly mixed prior to placing on grade.

The subbase course shall be constructed in layers. Any layer shall be not less than 3 inches nor more than 8 inches of compacted thickness. The material, as spread, shall be of uniform gradation with no pockets of fine or coarse materials. No material shall be placed in snow or on a soft, muddy, or frozen course.

When more than one layer is required, the construction procedure described herein shall apply similarly to each layer.

During the placing and spreading, sufficient caution shall be exercised to prevent the incorporation of subgrade, shoulder, or foreign material in the subbase course mixture.

154-3.5 FINISHING AND COMPACTING. After spreading or mixing, the subbase material shall be thoroughly compacted. Sufficient compactors shall be furnished to adequately handle the rate of placing and spreading of the subbase course. The moisture content of the material shall be approximately that required to obtain maximum density.

The field density of the compacted material shall be not less than 100% of the maximum density if not indicated on the plans or otherwise directed by the Engineer, as determined according to WAQTC FOP for AASHTO T 99/T 180 or ATM 212. ~~According to~~ The in-place field density and moisture content shall be determined according to WAQTC FOP for AASHTO T 310.

The course shall not be rolled when the underlying course is soft or yielding or when the rolling causes undulation in the subbase. When the rolling develops irregularities that exceed 1/2 inch when tested with a 12-foot straightedge, the irregular surface shall be loosened and then refilled with the same kind of material as that used in constructing the course and again rolled as required above.

Along places inaccessible to rollers, the subbase material shall be tamped thoroughly with mechanical or hand tampers.

Watering during rolling, if necessary, shall be in the amount and by equipment approved by the Engineer. Water shall not be added in such a manner or quantity that free water will reach the underlying layer and cause it to become soft.

154-3.6 SURFACE TEST. Proof roll the entire finished surface with three (3) coverages of either a pneumatic roller ballasted to 25 ton or a vibratory roller having a static weight of 25,000 pounds operating at maximum dynamic capacity before final density acceptance by the Engineer. After the course is completely compacted, the surface shall be tested for smoothness and accuracy of grade and crown; any portion found

to lack the required smoothness or to fail in accuracy of grade or crown shall be scarified, reshaped, recompacted, and otherwise manipulated as the Engineer may direct until the required smoothness and accuracy is obtained. The finished surface shall not vary more than 1/2 inch when tested with a 12-foot straightedge applied parallel with, and at right angles to, the centerline.

154-3.7 PROTECTION. Work on subbase course shall not be conducted during freezing temperature nor when the subgrade is wet. When the subbase material contains frozen material or when the underlying course is frozen, the construction shall be stopped.

154-3.8 MAINTENANCE. Following the final shaping of the material, the subbase shall be maintained throughout its entire length by the use of standard motor graders and rollers until, in the judgment of the Engineer, the subbase meets all requirements and is acceptable for the construction of the next course.

METHOD OF MEASUREMENT

154-4.1 Subbase Course will be weighed by the ton or measured by the cubic yard in final position according to Subsection GCP-90-02.

Subbase materials will not be included in any other excavation quantities.

BASIS OF PAYMENT

154-5.1 Subbase Course will be paid for at the contract price, per unit of measurement, accepted in place.

Hauling and placing of these materials is subsidiary.

Payment will be made under:

Item P-154a	Subbase Course - per cubic yard
Item P-154b	Subbase Course - per ton

TESTING REQUIREMENTS

AASHTO T 96	Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ATM 212	Standard Density of Coarse Granular Materials using the Vibratory Compactor
ATM 313	Degradation Value of Aggregate
WAQTC FOP for AASHTO T 27/T 11	Sieve Analysis of Aggregates & Soils
WAQTC FOP for AASHTO T 89	Liquid Limit of Soils
WAQTC FOP for AASHTO T 90	Plastic Limit and Plasticity Index of Soils
WAQTC FOP for AASHTO T 99/T 180	Moisture-Density Relations of Soils
WAQTC FOP for AASHTO T 310	In-Place Density and Moisture Content of Soil and Soil-Aggregate by Nuclear Methods

ITEM P-157 EROSION, SEDIMENT, AND POLLUTION CONTROL

157-1.1 DESCRIPTION. Provide project administration and Work relating to control of erosion, sedimentation, and discharge of pollutants, according to this section and applicable local, state, and federal requirements, including the Construction General Permit.

157-1.2 DEFINITIONS. These definitions apply only to Section P-157.

Alaska Certified Erosion and Sediment Control Lead (AK-CESCL). A person who has completed training, testing, and other requirements of and has received certification as an AK-CESCL from an AK-CESCL Training Program. The Department recognizes AK-CESCLs as "qualified personnel" required by the CGP. An AK-CESCL must be recertified every three years.

Alaska Department of Environmental Conservation (ADEC). The state agency authorized by EPA to administer the Clean Water Act's National Pollutant Discharge Elimination System.

Alaska Pollutant Discharge Elimination System (APDES). Administered by ADEC.

Best Management Practices (BMPs). Temporary or permanent structural and non-structural devices, schedules of activities, prohibition of practices, maintenance procedures, and other management practices to prevent or minimize the discharge of pollutants to waters of the United States. BMPs also include, but are not limited to, treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from material storage.

Certified Professional in Erosion and Sediment Control (CPESC). Individual having training, expertise, and experience in controlling erosion and sedimentation as provided and certified by EnviroCert International, Inc.

Clean Water Act (CWA). Federal Water Pollution Control Act (33 U.S.C. 1251 et seq.).

Consent Decree. A decree entered by the United States District Court for the District of Alaska on September 21, 2010, regarding implementation of the CGP by the Operators at Department of Transportation and Public Facilities Construction Projects, with stipulated penalties for non-compliance.

This document is available online at:
http://www.dot.state.ak.us/stwddes/desenviron/resources/stormwater.shtml

Construction Activity. Physical activity and support activity by the Contractor, subcontractor or utility company at the Project; that may result in erosion, sedimentation, or a discharge of pollutants in storm water. Construction Activity includes, but is not limited to, soil disturbing activities (e.g. clearing, grading, excavating); and construction materials or equipment storage or maintenance (e.g. material piles, borrow area, concrete truck washdown, fueling); and other industrial storm water directly related to the construction process (e.g. concrete or asphalt batch plants).

Construction General Permit (CGP). Authorizes storm water discharges from construction activities where those discharges enter surface waters of the United States or a municipal separate storm water system leading to surface waters of the United States subject to the conditions set forth in the permit.

Electronic Notice of Intent (eNOI & NOI). Submitted to ADEC, to apply to obtain coverage under the CGP. Make submittals in electronic form; provide paper copy only where specified herein or requested.

Electronic Notice of Termination (eNOT & NOT). Submitted to ADEC, to end coverage under the CGP. Make submittals in electronic form; provide paper copy only where specified herein or requested.

Erosion and Sediment Control Plan (ESCP). The Department's project specific document that illustrates measures to control erosion and sediment on the project. The ESCP provides bidders with the basis for cost estimating and guidance for developing an acceptable Storm Water Pollutant Prevention Plan (SWPPP).

Final Stabilization. As defined in the CGP.

Hazardous Material Control Plan (HMCP). The Contractor's detailed project specific plan for prevention of pollution from storage, use, transfer, containment, cleanup, and disposal of hazardous material (including, but are not limited to, petroleum products related to construction activities and equipment). The HMCP is included as an appendix to the SWPPP.

Operator(s). The party or co-parties associated with a regulated activity that has responsibility to obtain storm water permit coverage. "Operator" for the purpose of the CGP and in the context of storm water associated with construction activity, means any party associated with a construction project that meets either of the following two criteria:

1. The party has operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications; or
2. The party has day to day operational control of those activities at a project which are necessary to ensure compliance with a SWPPP for the site or other permit conditions (e.g. they are authorized to direct workers at a site to carry out activities required by the SWPPP or comply with other permit conditions).

Pollutant. Any substance or item meeting the definition of pollutant contained in 40 CFR 122.2.

Project Zone. The physical area provided by the Department for Construction. The Project Zone includes project staging and equipment areas, areas of utility work associated with the project, and material and disposal sites; when those areas and sites are provided by the Department.

Records. Any record, report, information, document, or photograph required to be created or maintained pursuant to the requirements of, the CGP, the CGP storm water requirements of the Clean Water Act; or applicable local, state, and federal laws and regulations regarding document preservation.

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

Spill Response Field Representative. The Contractor's representative with authority and responsibility for managing, implementing, and executing the HMCP and SPCC Plan, and other applicable federal, state, and local laws and regulations related to hazardous materials.

Storm Water Pollution Prevention Plan (SWPPP). The Contractor's detailed project specific plan to minimize erosion and contain sediment within the Project Zone, and to prevent discharge of pollutants that exceed applicable water quality standards. The SWPPP includes, but is not limited to, amendments, records of activities, inspection schedules and reports, qualifications of key personnel, and all other documentation, required by the CGP and this specification, and other applicable local, state, and federal laws and regulations.

Subcontractor Spill Response Coordinator. The subcontractor's representative with authority and responsibility for coordinating the subcontractor's activities in compliance with the HMCP and SPCC.

Subcontractor SWPPP Coordinator. The Subcontractor's representative with authority to direct the subcontractor's work, and who is responsible for coordination with the Superintendent and SWPPP Manager, and for the Subcontractor's compliance with the SWPPP.

Superintendent. The Contractor's duly authorized representative in responsible charge of the work. The Superintendent has responsibility and authority for the overall operation of the Project and for Contractor furnished sites and facilities directly related to the Project.

SWPPP Amendment. A revision or document that adds to, deletes from, or modifies the SWPPP.

SWPPP Manager. The Contractor's qualified representative who conducts Inspections and has authority to suspend work and to implement corrective actions required for CGP compliance.

SWPPP Preparer. The Contractor's qualified representative who is responsible for developing the initial SWPPP.

Utility Spill Response Coordinator. The Utility's representative with authority and responsibility for coordinating the utility's activities in compliance with HMCP and SPCC Plan.

Utility SWPPP Coordinator. The Utility's representative with authority to direct the Utility's work, and who is responsible for coordination with the Superintendent and SWPPP Manager, and for the Utility's compliance with the SWPPP.

157-1.3 PLAN AND PERMIT SUBMITTALS. For plans listed in subsection GCP-80-03, paragraph f, use the Contractor submission and Department review deadlines identified in this section.

Partial and incomplete submittals will not be accepted for review. Any submittal that is re-submitted or revised after submission, but before the review is completed, will restart the submittal review timeline.

1. SWPPP. Submit three hard copies of the SWPPP to the Project Engineer (Engineer) for approval. Deliver these documents to the Engineer at least 21 calendar days before beginning Construction Activity. Organize and bind the SWPPP and related documents for submittal according to the requirements of subsection P-157-2.1, paragraph 2.

   The Department will review the SWPPP submittals within 14 calendar days after they are received. Submittals will be returned to the Contractor, and marked as either requiring revisions or as approved by the Department. The 14 day review period will restart when the contractor submits to the Engineer the revised SWPPP. Upon the Engineers' approval, also provide an electronic copy on CD or Portable Document Format (.pdf) of the complete SWPPP and related documents.

   Sign and certify the Department-approved SWPPP.

2. HMCP. Submit an electronic copy and three hard copies of the HMCP, as an appendix to the SWPPP, to the Engineer for approval. The HMCP submittal and review timeline, and signature requirements are the same as the SWPPP.

3. SPCC Plan. When a SPCC Plan is required under subsection P-157-2.3, submit an electronic copy and three signed hard copies of the SPCC Plan to the Engineer. Deliver these documents to the Engineer at least 21 calendar days before beginning Construction Activity. The Department reserves the right to review the SPCC Plan and require modifications.

4. CGP Coverage. Following Department approval of the SWPPP and prior to beginning Construction Activity, submit an eNOI with the required fee to ADEC for coverage under the Construction General Permit (CGP). Submit a copy of the eNOI to the Engineer when the eNOI is submitted to ADEC.

   Construction Activity shall not begin until the conditions listed in subsection P-157-3.1, paragraph 1 are completed.

   The Engineer will provide the Contractor with a copy of the Department's eNOI. Include the Department's eNOI in the SWPPP.

5. Ending CGP Coverage. Within 30 days after the Engineer has determined that Final Stabilization has been established in the Project Zone, submit an eNOT to ADEC and submit a copy of this eNOT to the Engineer. The Department will then submit an eNOT to ADEC and a copy to the Contractor.

6. ADEC SWPPP Review. When CGP, Part 5.13 requires ADEC SWPPP review:
   a. Transmit a copy of the Department-approved SWPPP to ADEC using delivery receipt confirmation;
   b. Transmit a copy of the delivery receipt confirmation to the Engineer within seven (7) calendar days of receiving the confirmation;
   c. Include a copy of delivery receipt confirmation in the SWPPP;

7. Local Government SWPPP Review. When CGP, Part 5.13 requires local government review:
   a. Transmit a copy of the Department-approved SWPPP to local government, with the required fee using delivery receipt confirmation;
   b. Transmit a copy of the delivery receipt confirmation to the Engineer within seven (7) calendar days of receiving the confirmation;
   c. Transmit a copy of any comments by the local government to the Engineer within seven (7) days of receipt;
   d. Amend the SWPPP as necessary to address local government comments and transmit SWPPP Amendments to the Engineer within seven (7) days of receipt of the comments; and
   e. Include a copy of local government SWPPP review letter in the SWPPP.

157-1.4 PERSONNEL QUALIFICATIONS. The SWPPP Preparer must meet at least one of the following qualifications:

- Current certification as a Certified Professional in Erosion and Sediment Control (CPESC)
- Current certification as AK-CESCL, and at least three years experience in erosion and sediment control (provide documentation including project names, project timelines, and work responsibilities demonstrating the experience requirement)
- Professional Engineer registered in the State of Alaska with current certification as AK-CESCL

The Superintendent must meet all the following qualifications:

- Current certification as AK-CESCL
- Duly authorized representative, as defined in the CGP, Appendix F, Part 1.12.3

The SWPPP Manager must hold current certification as AK-CESCL.

The Department accepts people holding any of the following certificates as equivalent to AK-CESCL, if the certificates are current according to the sponsoring organization's policies and in no case more than three years old:

- CPESC, Certified Professional in Erosion and Sediment Control
- CISEC, Certified Inspector in Sediment and Erosion Control
- CESCL, Washington Department of Ecology Certified Erosion and Sediment Control Lead (Through Nov. 30, 2011 only. Will not be accepted as an equivalent substitution after Nov. 30, 2011)

157-1.5 SIGNATURE/CERTIFICATION REQUIREMENTS AND DELEGATIONS.

1. eNOI and eNOT. The eNOI and eNOT must be signed and certified by a responsible corporate officer according to CGP Appendix F, Part 1.12.2. Signature and certification authority for the eNOI and eNOT cannot be delegated.

2. Delegation of Signature Authority for Other SWPPP Documents and Reports. Use Form 25D-108 to delegate signature authority and certification authority to the Superintendent position, according to CGP Appendix F, Part 1.12.3, for the SWPPP. Inspection reports and other reports required by the CGP. The Engineer will provide the Department's delegation Form 25D-107, which the Contractor must include in the SWPPP.

3. Subcontractor Certification. Subcontractors must certify that they have read and will abide by the CGP and the conditions of the project SWPPP.

157-1.6 RESERVED.

157-1.7 RESPONSIBILITY FOR SWPPP PERMIT COVERAGE.

1. The Department and the Contractor are jointly responsible for permitting and permit compliance within the Project Zone, including concurrent utility relocation activities as outlined in subsection GCP-50-06.

2. The Contractor is responsible for permitting and permit compliance outside the Project Zone. The Contractor has sole responsibility for compliance with ADEC and other applicable federal, state, and local requirements, and for securing all necessary clearances, rights, and permits. Areas where the Contractor has sole responsibility for compliance shall not be incorporated or covered under the Project SWPPP, but will require a separate SWPPP and eNOI as part of a larger project. If the area must be covered by the industrial storm water permit, note that there is a 30-day waiting period for the eNOI to become active. Document the name of each operator, and the locations of these areas in the Project SWPPP.

3. An entity that owns or operates, a commercial plant (as defined in subsection GCP-80-01, paragraph c.) or material source or disposal site outside the Project Zone, is responsible for permitting and permit compliance. The Contractor has sole responsibility to verify that the entity has a permit and is complying with their permit. Subsection GCP-70-02 describes the requirement to obtain permits, and to provide permit documents to the Engineer.

4. The Department is not responsible for permitting or permit compliance, and is not liable for fines resulting from noncompliance with permit conditions:

   a. In areas outside the Project Zone; and
   b. For commercial plants, commercial material sources, and commercial disposal sites.

5. A Utility company is not an Operator when utility relocation is performed concurrently with the Project, as outlined in subsection GCP-50-06. The Department maintains operational control over the Utility's plans and specifications for coordination with project construction elements, and the Contractor has day-to-day control over the various utility construction activities that occur in support of the Project. A Utility company is considered a subcontractor for concurrent relocation.

   After the Contractor has an active NOI for the Project, a Utility Company performing advance relocation work no longer has Operator status and files the NOT for the Utility Company's SWPPP covering only the completed utility work. Remaining utility relocation work is included in and performed under the Project SWPPP.

157-2.1 SWPPP REQUIREMENTS.

1. SWPPP Preparer and Pre-Construction Site Visit.

   The SWPPP shall be prepared by a SWPPP preparer that is qualified according to the requirements of this specification. The SWPPP shall include the SWPPP Preparer's name, qualifications (including the expiration date of any certifications), title and company name.

   The SWPPP Preparer must conduct a pre-construction inspection at the Project site before Construction Activity begins. The SWPPP Preparer must be accompanied by the Contractor and Engineer.

   During the pre-construction inspection, the SWPPP Preparer must identify, or if a draft of the SWPPP has already been prepared verify that the SWPPP fully addresses and describes:

   a. Opportunities to phase construction activities;
   b. Appropriate BMPs and their sequencing; and
   c. Sediment controls that must be installed prior to beginning Construction Activities.

   Document the SWPPP Preparer's pre-construction inspection in the SWPPP on Form 25D-106, SWPPP Pre-Construction Site Visit, including the names of attendees and the date.

2. Developing the SWPPP.

   Use the Department's ESCP as a starting point for developing the SWPPP. The approved SWPPP replaces the ESCP.

   Develop the SWPPP according to the EPA's SWPPP Template for Authorized States with additional information as required.

   When using the EPA's SWPPP template:

   - In Section 3 (Good Housekeeping), add a subsection to describe dedicated asphalt plants and/or dedicated concrete plants, give their locations and identify the BMPs that will be used to minimize pollutants from them. If there are no dedicated asphalt or concrete plants, then state that in the SWPPP.

   - Include the following appendices:

     - Appendix A – General Location Map
     - Appendix B – Site Maps
     - Appendix C – Construction General Permit
     - Appendix D – NOI(s) and Acknowledgement Letter from State
     - Appendix E – Inspection Reports
     - Appendix F – Corrective Action Log
     - Appendix G – SWPPP Amendment Log
     - Appendix H – Subcontractor Certifications/Agreements
     - Appendix I – Grading and Stabilization Activities Log
     - Appendix J – Training Log
     - Appendix K – Delegation of Authority
     - Appendix L – Additional Information (i.e. Department acquired permits, Contractor acquired permits)

   - Add appendices for:

- Appendix M – Endangered Species Act and historic preservation documents
  - Use the documents obtained by the Department, see SWPPP Considerations and Contents below
- Appendix N – HMCP
- Appendix O – BMP Descriptions/Drawings
- Appendix P – SWPPP Preparer's Site Visit
- Appendix Q – Personnel qualification & training certifications for:
  - Superintendent
  - SWPPP Preparer
  - SWPPP Manager
  - Department Engineer and Storm Water Inspector
  - Qualified personnel must be described in a list with names and dates in positions
- Appendix R – Rainfall logs
- Appendix S – Correspondence with ADEC and local government including:
  - ADEC delivery receipt of SWPPP
  - ADEC SWPPP review letter
  - ADEC non-domestic wastewater plan review non-objection letter when required (use the letter obtained by the Department)
  - Local SWPPP review letter when required
- Appendix T – NOT forms

- Use the following Department forms for recording information in the SWPPP:

  - SWPPP Amendment Log ..... (25D-114)
  - SWPPP Certification for Contractor ..... (25D-111)
  - SWPPP Construction Site Inspection Report .....(25D-100 Parts 1&2)
  - SWPPP Corrective Action Log ..... (25D-112)
  - SWPPP Daily Record of Rainfall ..... (25D-115)
  - SWPPP Delegation of Signature Authority – Contractor ..... (25D-108)
  - SWPPP Grading and Stabilization Activities Log ..... (25D-110)
  - SWPPP Pre-Construction Site Visit ..... (25D-106)
  - SWPPP Subcontractor Certification ..... (25D-105)
  - SWPPP Training Log ..... (25D-125)
  - SWPPP Delegation of Signature Authority – DOT&PF ..... (25D-107)
  - SWPPP Certification for DOT&PF ..... (25D-109)
  - SWPPP Delayed Action Item Report ..... (25D-113)

  Department forms are updated annually and available on the Internet at:

  http://www.dot.state.ak.us/stwddes/dcsconst/resources.shtml#

Compile the SWPPP in three ring binders with tabbed and labeled dividers for each section and appendix.

3. SWPPP Considerations and Contents.

The SWPPP must provide erosion and sediment control measures for all Construction Activity. The SWPPP must consider the activities of the Contractor and all subcontractors and utility companies performing work for the Project. The SWPPP must describe the roles and responsibilities of the Contractor, subcontractors, utility companies, and the Department with regard to implementation of the SWPPP. The SWPPP must identify all operators for the Project, and identify the areas:

a. Over which each operator has operational control; and
b. Where the Department and Contractor are co-operators.

The SWPPP must identify specific areas where potential erosion, sedimentation, or pollution may occur. The potential for wind erosion and erosion at drainage structures must be addressed. Include in the "Stabilize Soils" section of the SWPPP, a description of how you will minimize the amount of disturbed and un-stabilized ground in the fall season and how you will stabilize areas when it is close to or past the seasonal time of snow cover or frozen conditions. Include a plan for complete temporary stabilization for seasonal suspension of work and final stabilization. Refer to CGP, Appendix A, for definitions of Final Stabilization.

Describe BMPs in the SWPPP and in SWPPP Amendments, including source controls, sediment controls, discharge points, and all temporary and permanent stabilization measures. Describe the design, placement, installation, and maintenance of each BMP, using words and drawings as appropriate. Provide a citation to the BMP Manual or publication used as a source for the BMP, including the title of the BMP Manual or publication, the author (individual or agency), and date of publication. If no published source was used to select or design a BMP, then the SWPPP or SWPPP amendment must state that "No published BMP manual was used for this design." Include a drawing and description when designing a BMP.

Describe the sequence and timing of activities that disturb soils and of BMP implementation and removal. Phase earth disturbing activities to minimize un-stabilized areas, and to achieve temporary or final stabilization quickly. Whenever practicable construct un-stabilized areas directly into final stabilization.

Identify the inspection schedule in the SWPPP. Inspections shall be conducted at least once every seven days during construction.

The SWPPP must cite and incorporate applicable requirements of the Project permits, environmental commitments, and commitments related to historic preservation. Make additional consultations or obtain permits as necessary for Contractor specific activities which were not included in the Department's permitting and consultation.

Keep the SWPPP current by noting installation, modification, and removal of BMPs, and by using amendments, SWPPP amendment logs, inspection reports, corrective action logs, records of grading and stabilization, and any other records necessary to document storm water pollution prevention activities and to satisfy the requirements of the CGP and this specification. See subsection P-157-3.3 for more information.

4. Recording Personnel and Contact Information in the SWPPP.

Include in the SWPPP copies of the AK-CESCL cards for the Superintendent and SWPPP Manager, and for any acting Superintendent and acting SWPPP Managers. If the Superintendent or SWPPP Manager is replaced permanently or temporarily, by an acting Superintendent or acting SWPPP Manager; record in the SWPPP the names of the replacement personnel, the date of the replacement, and for temporary personnel their beginning and ending dates.

Provide 24 hour contact information for the Superintendent and SWPPP Manager. The Superintendent and SWPPP Manager must have 24 hour contact information for all Subcontractor and Utility SWPPP Coordinators.

The Department will provide Records of AK-CESCL cards for the Engineer and the SWPPP Inspectors, and names and dates they are acting in that position. Include the Department's Records in the SWPPP.

157-2.2 HMCP REQUIREMENTS. Prepare the HMCP for prevention of pollution from storage, use, containment, cleanup, and disposal of all hazardous material, including petroleum products related to

construction activities and equipment. Include the HMCP as an appendix to the SWPPP. Compile Material Safety Data Sheets in one location and reference that location in the HMCP.

Designate a Contractor's Spill Response Field Representative with 24 hour contact information. Designate a Spill Response Coordinator for each subcontractor or utility. The Superintendent and Contractor's Spill Response Field Representative must have 24 hour contact information for each Subcontractor and Utility Spill Response Coordinators.

List and give the location and estimated quantities of hazardous materials (including materials or substances listed in 40 CFR 117 and 302, and petroleum products) to be used or stored on the Project. Hazardous materials must be stored in covered storage areas. Include secondary containment for all hazardous material storage areas.

Identify the locations where fueling and maintenance activities will take place, describe the activities, and list controls to prevent the accidental spillage of petroleum products and other hazardous materials. Controls include placing absorbent pads or other suitable containment under fill ports while fueling and under equipment during maintenance or repairs. Secondary containment must be installed under all stationary equipment that contains petroleum products.

List the types and approximate quantities of response equipment and cleanup materials available on the Project. Include a list and location map of cleanup materials, at each different work site and readily available off site (materials sources, material processing sites, disposal sites, staging areas, etc). Spill response materials must be stored in sufficient quantity at each work location, appropriate to the hazards associated with that site.

Describe procedures for containment and cleanup of hazardous materials. Describe a plan for the prevention, containment, cleanup, and disposal of soil and water contaminated by spills. Describe a plan for dealing with contaminated soil and water encountered during construction.

Describe methods of disposing of waste petroleum products and other hazardous materials generated by the Project, including routine maintenance. Identify haul methods and final disposal areas. Assure final disposal areas are permitted for hazardous material disposal.

Describe methods of complying with the requirements of 18 AAC 75 and AS 46, Oil and Hazardous Substances Pollution Control. Include contact information for reporting hazardous materials and petroleum product spills to the Engineer and reporting to federal, state, and local agencies.

157-2.3 SPCC PLAN REQUIREMENTS. Prepare and implement an SPCC Plan when required by 40 CFR 112; when both of the following conditions are present on the Project:

- Oil or petroleum products from a spill may reach navigable waters (as defined in 40 CFR 112); and

- Total above ground storage capacity for oil and any petroleum products is greater than 1,320 gallons (not including onboard tanks for fuel or hydraulic fluid used primarily to power the movement of a motor vehicle or ancillary onboard oil-filled operational equipment, and not including containers with a storage capacity of less than 55 gallons)

Reference the SPCC Plan in the HMCP and SWPPP.

157-2.4 RESPONSIBILITY AND AUTHORITY OF THE SUPERINTENDENT AND SWPPP MANAGER. The Superintendent is responsible for the overall operation of the Project and all Contractor furnished sites and facilities directly related to the Project. The Superintendent shall sign and certify the SWPPP, Inspection reports, and other reports required by the CGP, except the NOI and NOT. The Superintendent

may not delegate the task or responsibility of signing and certifying the SWPPP submitted under subsection P-157-1.3, paragraph 1, Inspection reports, and other reports required by the CGP.

The Superintendent may assign certain duties to the SWPPP Manager; those duties may include:

1. Ensuring Contractor's compliance with the SWPPP and CGP;
2. Ensuring the control of erosion, sedimentation, or discharge of pollutants;
3. Directing and overseeing installation, maintenance, and removal of BMPs;
4. Performing Inspections; and
5. Updating the SWPPP including adding amendments and forms.

The Superintendent and SWPPP Manager shall be knowledgeable in the requirements of this section, the SWPPP, CGP, BMPs, HMCP, SPCC Plan, environmental permits, environmental commitments, and historic preservation commitments.

The Superintendent and SWPPP Manager shall have the Contractor's complete authority to suspend Construction Activities that do not conform to the SWPPP or CGP.

157-2.5 MATERIALS. Use materials suitable to withstand hydraulic, wind, and soil forces, and to control erosion and trap sediments according to the requirements of the CGP and the Specifications.

Use an Oregon Scientific RGR126 Wireless Rain Gauge with Temperature, or Taylor 2751 Digital Wireless Rain Gauge with Thermometer, or approved equivalent.

157-3.1 CONSTRUCTION REQUIREMENTS.

Comply with the requirements of the SWPPP and CGP.

1. Before Construction Activity may Begin.

    - The SWPPP Preparer, Contractor, and Engineer must visit the Project, the visit must be documented in the SWPPP, and the SWPPP must be developed (or amended) with findings from the visit
    - The SWPPP must be approved by the Engineer
    - The Contractor must be authorized to begin construction activity by the Engineer
    - Submit Department approved SWPPP to ADEC
    - The Project eNOIs for the Department and for the Contractor, as well as any other eNOIs if there are additional operators, must be listed as Active Status on the ADEC website

    Post notices containing the following information:

    - Copy of all eNOIs related to this project
    - Name and phone number of SWPPP Manager
    - Where the SWPPP is located

    Post notices on the outside wall of the Contractor's project office, and near the main entrances of the construction project. Protect postings from the weather and locate so the public can read them without obstructing construction activities (for example, at an existing pullout). Do not use retro-reflective signs for the SWPPP posting. Do not locate SWPPP signs in locations where the signs may be confused with traffic control signs or devices.

    Install an outdoor rain gauge in an approved and readily accessible location on the Project.

    Install sediment controls and other BMPs that must be placed prior to the initiation of Construction Activity.

2. During Construction.

Include SWPPP Subcontractor Certifications as an appendix to the SWPPP. Coordinate with subcontractors and utility companies doing work in the Project Zone so BMPs, including temporary and permanent stabilization are installed, maintained, and protected from damage.

Provide on-going training to employees, utilities, and subcontractors, on control measures at the site and applicable storm water pollution prevention procedures. Document on the SWPPP Training Log, Form 25D-125, the dates and attendees to these trainings. Include the SWPPP Training Log as an appendix to the SWPPP.

Place absorbent pads or other suitable containment under fill ports while fueling and under equipment during maintenance or repairs. Install secondary containment under all stationary equipment that contains petroleum products.

Keep the SWPPP current (refer to subsection P-157-2.1, paragraph 3, SWPPP Considerations and Contents).

3. Pollutant and Hazardous Materials Reporting Requirements.

If there has been an incident of non-compliance with the CGP that may endanger health or the environment, immediately report the incident to ADEC according to the CGP, Appendix F. Notify the Engineer immediately and to the extent possible coordinate reports to ADEC with the Engineer. The report must include:

- A description of the noncompliance and its causes
- The exact dates and times of noncompliance
- If not yet corrected the anticipated time the project will be brought back into compliance
- The corrective action taken or planned to reduce, eliminate and prevent reoccurrence

Report spills of petroleum products or other hazardous materials to the Engineer and as required by law. Use the HMCP and SPCC Plan (if available) for contact information to report spills to regulatory agencies.

4. Corrective Action and Maintenance of BMPs.

Implement corrective action:

- If an incident of non-compliance with the SWPPP, or CGP is identified
- If an Inspection identifies the SWPPP or any part of the SWPPP is ineffective in preventing erosion, sedimentation or the discharge of pollutants
- If the Engineer determines the SWPPP or any part of the SWPPP is ineffective in preventing the erosion, sedimentation, or the discharge of pollutants
- If any BMP is damaged, undercut, or unable to effectively perform the intended function
- Before sediment or debris fills any BMP (including sediment traps, ponds and silt fences) to 50% of its design storage capacity (or manufacturer's specifications, whichever is lower)
- Whenever there is a change in conditions, design, construction, operation, or maintenance that could result in erosion, sedimentation, or the discharge of pollutants

Implement corrective actions so that all of the following time requirements are satisfied:

- Corrective action is completed as soon as possible
- Corrective action is completed before the next storm event
- Corrective action is completed in time to protect water quality

- Corrective action is completed no later than the end of the day, six calendar days following the day of an Inspection identifying the need for corrective action

If a corrective action is not implemented within the time requirements of this section, document the situation in the SWPPP, notify the Engineer and implement alternative BMPs as soon as possible.

5. Stabilization.

Stabilization may be accomplished using temporary or permanent measures. Initiate stabilization of disturbed areas, stockpiles, disposal sites, and of erodible aggregate layers so that all of the following conditions are satisfied:

- As soon as practicable
- As soon as necessary to avoid erosion, sedimentation, or the discharge of pollutants
- As identified in the SWPPP
- No later than 14 days after the temporary or permanent cessation of land-disturbing activities on a portion of the site, according to the CGP

Land may be disturbed and stabilized multiple times during a project. Coordinate work to minimize the amount of area open at any one time. Do not disturb more area than you can stabilize with the resources available.

The Contractor is responsible for control measures associated with stockpiles.

Temporarily stabilize from wind and water erosion portions of disturbed soils, portions of stockpiles, and portions of disposal sites, that are not in active construction. Temporary stabilization measures may require a combination of measures including but not limited to vegetative cover, mulch, stabilizing emulsions, blankets, mats, soil binders, non-erodible cover, dust palliatives, or other approved methods.

6. Ending SWPPP Activities and SWPPP Maintenance.

The Engineer will determine SWPPP activities have ended when all of the following requirements are met:

- Land disturbing activities have ceased
- Final Stabilization has been achieved (including at Department furnished material sources, disposal sites, staging areas, equipment areas, etc.)
- Temporary BMPs have been removed

Submit eNOT after written notice from the Engineer and according to subsection P-157-1.3, paragraph 5.

The Department will provide a copy of its eNOT to the contractor for inclusion in the SWPPP.

7. Transmit final SWPPP.

Transmit one copy of the final SWPPP, including all amendments and appendixes, to the Engineer when the project eNOTs are filed. Transmittal must be both electronic and hard copy.

157-3.2 SWPPP DOCUMENTS, LOCATION ON-SITE AND RECORD RETENTION. Keep the approved SWPPP, HMCP and SPCC Plan at the on-site project office. If there is not an on-site project office, keep the documents at a locally available location approved by the Engineer. Provide the Department with copies of all Records.

Retain Records and a copy of the SWPPP, for at least three years after the date of eNOT. If EPA or ADEC inspects the project, issues a Notice of Violation (NOV), or begins investigation for a potential NOV before the retention period expires, retain the SWPPP and all Records related to the SWPPP and CGP until at least three years after EPA and/or ADEC has determined all issues related to the investigation are settled.

157-3.3 SWPPP INSPECTIONS, AMENDMENTS, REPORTS, AND LOGS. Perform Inspections, prepare Inspection reports, and prepare SWPPP amendments in compliance with the SWPPP and the CGP. Update SWPPP Corrective Action Log, SWPPP Amendment Log, SWPPP Grading and Stabilization Logs, and SWPPP Daily Record of Rainfall forms.

1. Inspection during Construction.

   Inspections shall be conducted at least once every seven (7) days.

   Following a storm event of 1/2" or greater rainfall in a 24 hour period recorded at the project site rain gauge, the responsible parties should conduct an informal inspection of the Project to ensure all BMP's are working properly and perform any necessary corrective actions as soon as possible.

   Inspections required by the CGP and SWPPP must be performed by the Contractor SWPPP Manager and the Department SWPPP Inspector jointly, unless impracticable. For this paragraph, "impracticable" means when both inspectors must fly to a remote area in the winter or when one inspector is sick or unable to travel to the site due to weather. When this is the case, the Operator who conducts the Inspection must provide a copy of the Inspection report to the other Operator within three days of the Inspection date and document the date of the report transmittal.

2. Inspection Reports.

   Use only the DOT&PF SWPPP Construction Site Inspection Report, Form 25D-100 to record Inspections. Changes or revisions to Form 25D-100 are not permitted. Complete all fields included on the Inspection report form; do not leave any field blank.

   Unless otherwise directed or approved by the Engineer, insert as the date each corrective action will be completed by the date that is (1) six calendar days after the date of the Inspection, or (2) a date that complies with the time requirements listed in subsection P-157-3.1, paragraph 4, whichever is sooner. The Superintendent must provide the report to the Engineer the same day.

   Prior to the Engineer certifying the report, submit electronic copies of the SWPPP Inspection Report, Working Site Maps/Plan Sheets, SWPPP Amendment Log, SWPPP Amendments since the last Inspection, SWPPP Corrective Action Log, SWPPP Grading and Stabilization Logs, and SWPPP Daily Record of Rainfall forms as directed by the Engineer for Quality Assurance review.

   Quality Assurance has two (2) working days to review the reports. As directed by the Engineer, correct all items and complete certification with the signature of the Superintendent within one (1) working day. The Engineer will review and certify the report and return the original to the Contractor within one (1) working day.

   If subsequent corrections to the dually signed Inspection report are needed, document the corrections in a supplement that addresses only the omitted or erroneous portions of the original Inspection report. The Superintendent and the Engineer must both sign and certify the supplement.

3. Inspection before Seasonal Suspension of Work.

   Conduct an Inspection before seasonal suspension of work to confirm BMPs are installed, functioning and Project Zone is 100% temporarily stabilized, according to the requirements of the SWPPP and CGP.

4. Reduced Inspection Frequencies.

Conduct Inspections according to the inspection schedule indicated in the approved SWPPP. Any change in inspection frequency must be approved by the Engineer, and beginning and ending dates documented as an amendment to the SWPPP.

Inspection frequency during winter work or seasonal suspension of work may be reduced to at least one Inspection every month if approved by the Engineer and either of the following requirements is met:

- The entire site is temporarily stabilized, or
- Runoff is unlikely due to winter conditions (e.g. the site is covered with snow, ice or the ground is frozen, and water flow or seepage is not likely to occur)

The Engineer may waive winter monthly Inspection requirements until one month before thawing conditions are expected to result in a discharge, if all the following requirements are met:

- Frozen conditions are anticipated to continue for more than one month
- Land disturbance activities have been suspended

Historical weather information is available at:
http://www.wrcc.dri.edu/summary/climsmak.html

The Engineer may waive requirements for updating the Grading and Stabilization Activities Log and Daily Record of Rainfall during seasonal suspension of work. If so, resume collecting and recording weather data on the Daily Record of Rainfall form one month before thawing conditions are expected to result in runoff. Resume recording land disturbance and stabilization activities on the Grading and Stabilization Activities Log when Construction Activity resumes.

5. Stabilization before Seasonal Thaw.

Construction Activities within the Project Zone must be stabilized with appropriate BMPs prior to seasonal thaw. Seasonal thaw is the annual (first) recurrence of snow and ice melting after a prolonged period of freezing conditions.

6. Inspection before Project Completion.

Conduct Inspection to ensure Final Stabilization is complete throughout the Project, and temporary BMPs that are required to be removed are removed. Temporary BMPs that are biodegradable and are specifically designed and installed with the intent of remaining in place until they degrade, may remain in place after project completion.

7. Items and Areas to Inspect.

Conduct Inspections of the areas required by the CGP and SWPPP.

8. SWPPP Amendments and SWPPP Amendment Log.

The Superintendent and the SWPPP Manager are the only persons authorized to amend the SWPPP and update the SWPPP Amendment Log, Form 25D-114. The Superintendent or the SWPPP Manager must sign amendments to the SWPPP and updates to the SWPPP Amendment Log.

SWPPP Amendments must be approved by the Engineer.

Amendments must occur:

- Whenever there is a change in design, construction operation, or maintenance at the construction site that has or could cause erosion, sedimentation or the discharge of pollutants that has not been previously addressed in the SWPPP
- If an Inspection identifies that any portion of the SWPPP is ineffective in preventing erosion, sedimentation, or the discharge of pollutants
- Whenever an Inspection identifies a problem that requires additional or modified BMPs
- Whenever a BMP is added, removed, or modified
- If the Inspection frequency is modified (note beginning and ending dates)
- When there is a change in personnel who are named in the SWPPP, according to subsection P-157-2.1, paragraph 4

Amend the SWPPP narrative as soon as practicable after any change or modification, but in no case, later than seven (7) calendar days following identification of the need for an amendment. Every SWPPP Amendment must be dated. Cross-reference the amendment number with the Corrective Action Log or SWPPP page number, as applicable. When a BMP is modified or added, describe the BMP according to subsection P-157-2.1, paragraph 3.

Keep the SWPPP Amendment Log current. Prior to performing each scheduled Inspection, submit to the Engineer a copy of the pages of the Amendment Log that contain new entries since the last submittal. Include copies of any documents amending the SWPPP.

Keep the SWPPP Amendment Log as an appendix to the SWPPP.

9. Drawings.

Document planned SWPPP activities such as installation and removal of BMPs, by making notes in the SWPPP drawings. Include the date and the recording person's initials by these notes.

10. Corrective Action Log.

The Superintendent and SWPPP Manager are the only persons authorized to make entries on the SWPPP Corrective Action Log, Form 25D-112.

Modification or replacement of a BMP, installation of a new BMP, or overdue maintenance (after a sediment trap exceeds 50% of design capacity) is a corrective action and must be documented on the Corrective Action Log.

After each Inspection report has been signed and certified, update the corrective action log to include all corrective actions noted on the inspection report.

After the corrective action has been accomplished, note the action taken, and date and initial the entry.

Keep the Corrective Action Log current and submit a copy to the Engineer prior to performing each scheduled SWPPP Inspection.

Keep the Corrective Action Log as an appendix to the SWPPP.

11. Grading and Stabilization Log.

The Superintendent and SWPPP Manager are the only persons authorized to date and initial entries on the SWPPP Grading and Stabilization Activities Log, Form 25D-110. Use the SWPPP Grading and Stabilization Activities Log, to record land disturbance and stabilization activities.

Keep the Grading and Stabilization Activities Log current and submit a copy to the Engineer prior to performing each scheduled SWPPP Inspection.

Keep the Grading and Stabilization Activities Log as an appendix to the SWPPP.

12. Daily Record of Rainfall.

Use SWPPP Daily Record of Rainfall, Form 25D-115, to record weather conditions at the Project. Update the form daily and include the initials of the person recording each day's entry. Submit a copy to the Engineer prior to performing each scheduled Inspection.

Keep the Daily Record of Rainfall as an appendix to the SWPPP.

157-3.4 RESERVED.

TABLE 157-2, RESERVED.

157-3.5 NON-COMPLIANCE. The Engineer has authority to suspend work and withhold monies, for an incident of non-compliance with the CGP or SWPPP. If the suspension is to protect workers, the public, or the environment from imminent harm, the Engineer may orally order the suspension of work. Following an oral order of suspension, the Engineer will promptly give written notice of suspension. In other circumstances, the Engineer will give the Contractor written notice of suspension before suspension of work. A notice of suspension will state the defects or reasons for a suspension, the corrective actions required to stop suspension, and the time allowed to complete corrective actions. If the Contractor fails to take the corrective action within the specified time, the Engineer may:

1. Suspend the work until corrective action is completed;
2. Withhold monies due the Contractor until corrective action is completed;
3. Assess Price Adjustments against the Contract Amount;
4. Employ others to perform the corrective action and deduct the cost from the Contract amount.

Reasons for the Engineer to take action under this section include but are not limited to failure to:

- Meet requirements of the CGP, SWPPP, or other permits, laws, and regulations related to erosion, sediment, or pollution control and perform the duties according to the requirements of Item P-157 including but not limited to:

  - Perform SWPPP Administration
  - Perform timely Inspections
  - Update the SWPPP
  - Transmit SWPPP, Inspection reports, and other SWPPP forms that are updated weekly to the Engineer
  - Maintain effective BMPs to control erosion, sedimentation, and pollution in accordance with the SWPPP, the CGP, and applicable local, state, and federal requirements

Price Adjustments depend on the non-compliance issue, and range from $750 to $5,000 per occurrence with additional Price Adjustments for each day until compliance is achieved.

Price Adjustment for an incident of non-compliance that results in violation, as determined by the Engineer, will be withheld from the pay estimate pending billing from the Department to the Contractor. These are Liquidated Damages which represent violation penalties or fines assessed to the Department by Regulatory Agencies. After separate payment is received by the Department from the Contractor satisfying violation penalties, the equal amount of Price Adjustment withheld will be released in the next pay estimate.

Regulatory agencies may separately penalize or fine the Contractor and/or the Department for much higher amounts for Permit violations (for example federal penalties may be up to $37,500 per day per violation and state penalties may be up to $100,000 per violation). The Contractor is responsible for the payment of any and all penalties and fines levied against the Department or Contractor by other entities (including agencies).

No additional Contract time or additional compensation will be allowed due to delays caused by the Engineer's suspension of work under this subsection.

157-4.1 METHOD OF MEASUREMENT. Section 90, Item T-901, Item T-908, Item P-680, and as follows:

Items P-157b and P-157d will be measured as specified in the Contract or Directive authorizing the work.

Item P-157e will be measured and deductions determined by the Department.

157-5.1 BASIS OF PAYMENT. See subsection P-157-3.5 Failure to Perform Work, for additional work and payment requirements.

Item P-157a Erosion, Sediment, and Pollution Control Administration. At the contract lump sum price for administration of all work under this Section. Includes, but is not limited to, SWPPP and HMCP and SPCC Plan preparation, agency fees for SWPPP reviews, SWPPP Manager, SWPPP amendments, pre-construction Inspections, Inspections, monitoring, reporting, and Record keeping or copying Records related to the SWPPP and required by the CGP, and Record retention.

Work required by the HMCP and SPCC Plan including hazardous material storage, containment, removal, cleanup and disposal, are subsidiary to Pay Item P-157a Erosion, Sediment and Pollution Control Administration.

The SWPPP Manager and rain/temperature gauge are subsidiary to Pay Item P-157a.

Item P-157b Temporary Erosion, Sediment, and Pollution Control. At the contingent sum prices for all labor, supervision, material, equipment, and incidentals to install, maintain, remove, and dispose of approved temporary erosion, sedimentation, and pollution control BMPs required to implement the SWPPP and SPCC Plan. Prices for this item will be for time and materials according to subsection GCP-90-05, or by mutual agreement between the Engineer and Contractor.

Item P-157c Temporary Erosion, Sediment, and Pollution Control. At the contract lump sum price for all labor, supervision, material, equipment, and incidentals to install, maintain, remove, and dispose of temporary erosion, sedimentation, and pollution control BMPs identified in the SWPPP and SPCC Plan.

Item P-157d Temporary Erosion, Sediment, and Pollution Control by Directive. At the contingent sum prices specified in the Directive using time and materials to authorize the work, for all labor, supervision, materials, equipment, and incidentals to install, maintain, remove and dispose of temporary erosion, sedimentation, and pollution control BMPs. Prices for this item will be for time and materials according to subsection GCP-90-05, or by mutual agreement between the Engineer and Contractor. All additional Erosion, Sediment, and Pollution Control Administration necessary due to this item will not be paid for separately but will be subsidiary to other bid items.

Item P-157e SWPPP Price Adjustment. Withholding according to subsection P-157-3.5 and Liquidated Damages equal to any penalties and fines levied against the Department by local, state or federal agencies for pollutant violations, including violations of the CWA, CGP, and any other Permit, except when due to the Department's sole negligence. The Contractor is also responsible for the payment of any and all penalties and fines levied against the Department or Contractor by entities (including agencies) other than the Department.

Work under other pay items. Work that is paid for directly or indirectly under other pay items will not be measured and paid for under Item P-157. This work includes but is not limited to:

- Dewatering
- Shoring
- Bailing
- Permanent seeding
- Installation and removal of temporary work pads
- Temporary accesses
- Temporary drainage pipes and structures
- Diversion channels
- Settling impoundment
- Filtration

Permanent erosion, sediment, and pollution control measures will be measured and paid for under other Contract items, when shown on the bid schedule.

Work at the Contractor's Expense. Temporary erosion, sediment, and pollution control measures that are required due to carelessness, negligence, or failure to install temporary or permanent controls as scheduled or directed by the Engineer, or for the Contractor's convenience, are at the Contractor's expense.

Payment will be made under:

Item P-157a Erosion, Sediment, and Pollution Control Administration – per Lump Sum
Item P-157b Temporary Erosion, Sediment, and Pollution Control – per Contingent Sum
Item P-157c Temporary Erosion, Sediment, and Pollution Control – per Lump Sum
Item P-157d Temporary Erosion, Sediment, and Pollution Control by Directive – per Contingent Sum
Item P-157e SWPPP Price Adjustment - per Contingent Sum

SECTION P-161 RECYCLED ASPHALT PAVEMENT

DESCRIPTION

161-1.1 Excavate and process existing asphalt cement concrete (AC) pavement for use as Recycled Asphalt Pavement (RAP) or use in Recycled Hot Mix Asphalt. Haul and place RAP on a prepared foundation, to the lines, grades, and depths shown on the plans or as directed by the Engineer.

MATERIAL AND CONSTRUCTION REQUIREMENTS

161-2.1 PROCESSING. Crush or pulverize existing pavement to meet the requirements of Table 161-1 for use as Recycled Asphalt Pavement (RAP). Process RAP to provide an asphalt content of 2.5 – 5.5 percent by weight.

Saw cut pavement edges to remain and process the full depth of existing pavement in areas shown on the plans or as directed by the Engineer. Excavate to the minimum depth necessary for removal of all existing pavement. Up to one inch of underlying base course material may be excavated along with the AC pavement. Remove pavement before excavating the substrate to prevent mixing. Existing asphalt treated base shall not be reclaimed as Rap.

TABLE 161-1

RAP GRADATION REQUIREMENTS

Sieve Size	Percent Passing
2 in.	100
1 in.	90-100

161-2.2 PLACEMENT AND SPREADING. Place RAP in 4-inch thick maximum lifts on the approved surface as required to achieve the depth shown on the plans after compaction.

Excess RAP is the property of the State. Place excess RAP in stockpiles located and shaped as shown on the plans, or as directed by the Engineer. Stockpiles shall be regular in shape and cross section as approved by the Engineer to allow for measurement. Sides shall be sloped @ 4:1 not to exceed 30 ft in height. The top of stockpiles shall be crowned @ 2% minimum to drain.

161-2.3 COMPACTION. Thoroughly compact the RAP layer, then proof roll the entire finished surface with three (3) coverages of either a pneumatic roller ballasted to 25 ton or a vibratory roller having a static weight of 25,000 pounds operating at maximum dynamic capacity before final density acceptance by the Engineer. Density acceptance will be based on the control strip in accordance with ATM 412 to determine a density standard. Compact to a density not less than 100% of the density standard, if not indicated on the plans or otherwise directed by the Engineer.

161-2.4 RAP PROTECTION. Do not perform work on the RAP course during freezing temperatures, when the subgrade is wet, or when rain is expected. Hauling equipment may be routed over the finished RAP course, provided no damage results and provided that equipment is routed over the full width of the RAP surface to avoid rutting or uneven compaction. The Engineer has authority to stop all hauling over completed or partially completed RAP when, in his opinion, such hauling is causing damage. Repair at your expense, any damage to the RAP course resulting from the routing of equipment over RAP surfaces.

161-2.5 PROTECTION OF EXISTING STRUCTURES. Take all precautions necessary to ensure that existing structures within pavement removal areas are not damaged. If damage to any structure occurs, repair the damage at no cost to the Department.

161-2.6 DRAINAGE. Maintain drainage at all times. Install temporary drains and drainage ditches, when directed, to intercept or divert surface water that may affect the prosecution or condition of the work.

161-2.7 EXISITNG PAVEMENT SURFACE GRINDING. Grind the existing pavement surface in areas shown on the plans or directed by the Engineer to remove grade variations and provide a smooth transition to the new work.

161-2.8 USE IN STRUCTURAL SECTION. When RAP is used in the structural section in lieu of crushed aggregate base course, it shall comply with the applicable requirements of Section P-209.

METHOD OF MEASUREMENT

161-3.1 Section 90. If RAP by unit area appears in the bid schedule, the item will be measured in original position before excavation. If RAP by unit volume appears in the bid schedule, the item will be measured in final position after processing and placement. RAP stockpiles in excess of requirements that are accepted by the Engineer will be paid as RAP in final position. Existing Pavement Surface Grinding will be paid as RAP by unit volume. Underlying base course material excavated along with the AC pavement will not be included in the measurement for payment of RAP measured by unit volume.

BASIS OF PAYMENT

161-4.1 At the contract unit price for recycled asphalt pavement accepted in place.

Payment will be made under:

Item P-161a	Recycled Asphalt Pavement – per square yard
Item P-161b	Recycled Asphalt Pavement – per cubic yard

TESTING REQUIREMENTS

ATM 412	Relative Standard Density by the Control Strip Method

ITEM P-165 REMOVAL OF STRUCTURES

DESCRIPTION

165-1.1 Remove and dispose of or salvage existing structures as specified. Backfill the resulting holes and pits.

CONSTRUCTION REQUIREMENTS

165-2.1 GENERAL. Obtain utility locates in the vicinity of the designated items. Work around and preserve any facilities within the work limits. Backfill all excavations with approved embankment or excavated materials and compact in accordance with item P-152.

a. **Removed Structures Designated for Disposal.** Removed structures designated for disposal become your property. Excavate, load, and haul structures to an approved disposal site off of airport property in accordance with applicable Federal and State regulations. ~~Items for disposal include: 13 electrical manholes and 1,700 ft. of electrical duct.~~ FAA facilities designated for removal on the plan shall be coordinated with local FAA staff. The contractor shall allow FAA to remove and/or salvage usable equipment from existing facility locations that are to be removed.

b. **Removed Structures Designated for Salvage.** Removed structures designated for salvage remain the property of the State. *[List specific structures designated for salvage and describe where each salvaged structure is to be delivered.]*

METHOD OF MEASUREMENT

165-3.1 This item will not be measured for payment. The Engineer's acceptance constitutes measurement.

BASIS OF PAYMENT

165-4.1 Payment will be made at the contract price for work acceptably completed. No separate payment will be made for hauling or transportation. All work associated with removal of specified items, including but not limited to labor, equipment, tools, hauling, transportation, backfill and incidentals will be included in the contract price for removal of structures.

Payment will be made under:

Item P-165a Removal of Structures - per lump sum

ITEM P-209 CRUSHED AGGREGATE BASE COURSE

DESCRIPTION

209-1.1 This item consists of a base course composed of crushed aggregates constructed on a prepared course according to these Specifications and to the dimensions and typical cross section shown on the Plans.

MATERIALS

209-2.1 AGGREGATE. Aggregates shall consist of clean, sound, durable particles of crushed stone or crushed gravel and shall be free from vegetable matter, excess coatings of clay, silt, and other objectionable materials and shall contain no clay balls.

Fine aggregate passing the No. 4 sieve shall consist of fines from the operation of crushing the coarse aggregate. If necessary, fine aggregate may be added to produce the correct gradation. The fine aggregate shall be produced by crushing stone and gravel that meet the requirements for wear and soundness specified for coarse aggregate.

The crushed aggregate portion which is retained on the No. 4 sieve shall have at least 75% by weight with 2 fractured faces as determined by WAQTC FOP for AASHTO TP 61.

The percentage of wear shall not be greater than 45% when tested according to AASHTO T 96. The sodium sulfate soundness loss shall not exceed 12%, after 5 cycles, when tested according to AASHTO T 104. Aggregates shall have a minimum degradation value of 45 when tested according to ATM 313.

The fraction passing the No. 40 sieve shall have a liquid limit no greater than 25 and a plasticity index of not more than 4 when tested according to WAQTC FOP for AASHTO T 89 and T 90. The fine aggregate shall have a minimum sand equivalent value of 35 when tested according to WAQTC FOP for AASHTO T 176.

a. **Sampling and Testing.** The Engineer will sample aggregates for quality testing before the start of production. The Engineer, at no expense to the Contractor, will make all tests necessary to determine whether aggregate quality is in compliance with the specifications.

   The Engineer will sample aggregates for acceptance according to WAQTC FOP for AASHTO T 2, and test aggregates for acceptance according to WAQTC FOP for AASHTO T 27/T 11.

b. **Gradation Requirements.** The gradation of the final mixture shall fall within the range indicated in Table 1, when tested according to WAQTC FOP for AASHTO T 27/T 11. The final gradation shall be continuously well graded from coarse to fine and shall not vary from the low limit on one sieve to the high limit on an adjacent sieve or vice versa.

TABLE 1. REQUIREMENTS FOR GRADATION OF AGGREGATE

Sieve Designation (Square Openings)	Percentage by weight passing sieves	
	C-1	D-1
1-1/2 in	100	--
1.00 in	70-100	100
3/4 in	60-90	70-100
3/8 in	45-75	50-80
No.4	30-60	35-65
No. 8	22-52	20-50
No. 50	8-30	8-30
No. 200	0-6	0-6

Note: Unless otherwise specified, Gradation D-1 shall be used.

CONSTRUCTION METHODS

209-3.1 PREPARING UNDERLYING COURSE. Placing and spreading operations shall not commence until the underlying course has been accepted, in writing, by the Engineer. Any ruts or soft areas shall be corrected and compacted to the required density before placing the base course. Crushed aggregate base course shall not be placed on frozen material.

209-3.2 MIXING. The aggregate shall be uniformly blended during crushing operations or mixed in a plant. The plant shall blend and mix the materials to meet the Specifications.

209-3.3 PLACING. The crushed aggregate base material shall be placed on the approved subgrade in uniform, equal-depth layers, each not exceeding 6 inches of compacted depth.

The previously constructed layer shall be cleaned of loose and foreign material prior to placing the next layer. The surface of the compacted material shall be kept moist until covered with the next layer.

209-3.4 COMPACTION. Immediately upon completion of the spreading operations, the aggregate shall be thoroughly compacted to the required density. The moisture content of the material shall be approximately that required to obtain maximum density.

209-3.5 ACCEPTANCE SAMPLING AND TESTING FOR DENSITY. Base course will be accepted for density when the field density is not less than 100% of the maximum density, as determined according to WAQTC FOP for AASHTO T 99/T 180 or ATM 212. The in-place field density and moisture content will be determined according to WAQTC FOP for AASHTO T 310. If the specified density is not attained, the material shall be reworked and/or recompacted until the specified density is reached.

209-3.6 FINISHING. The surface of the aggregate base course shall be finished by blading or with automated equipment specifically designed for this purpose.

In no case shall thin layers of material be added to the top of base course to meet grade. If the compacted elevation of the top layer is 0.05 foot or more below grade, it shall be scarified to a depth of at least 3 inches, new material added, and the layer shall be blended and compacted to bring it to grade. If the finished surface is above plan grade, it shall be cut back to grade and recompacted.

209-3.7 SURFACE TEST. After the course has been completely compacted, the surface will be tested by the ~~Engineer~~ Contractor for smoothness ~~and accuracy of grade and crown~~. The finished surface shall not vary more than 3/8 inch from a ~~12~~ 16-foot straightedge when applied to the surface parallel with, and at right

angles to, the centerline. ~~Any portion lacking the required smoothness or failing in accuracy of grade or crown shall be corrected to within the specified tolerances~~.

The work area shall be divided into sample lot areas not less than 2000 square yards unless approved by the Engineer. The lot size for each sample area shall be all the measurements taken within that area.

Sample lines shall be laid out in a grid at a maximum of 50' spacing longitudinally and transversely. In areas covered by design grading plans the locations of grid sampling points shall match the points shown on the plans. Additional sample lines shall be located at offsets as determined by the Engineer. The grid angles may be adjusted and grid intervals decreased at the Engineers discretion.

Sample measurements shall be made at maximum 4' intervals along the sampling grid lines and at any other points as directed by the Engineer. The sample measurement shall be made at the center of the 16' straight edge with the straight edge centered over the sample point.

All measurements shall be recorded in a bound note book. Records for each area's inspections shall include the location, date, air temperature, wind direction and approx speed, cloud condition, precipitation, and operators' names. Records for each measurement shall include Station and Offset, measured distance between the 16' straightedge and the finish surface to the nearest 1/8 inch (.01 foot').

Grade and Crown. The finished surface of the material shall not vary from the grade line elevations and cross sections shown on the plans by more than +/- 0.04 foot.

Grade and crown shall be checked by the Engineer for compliance with the plans.

The work area shall be divided into sample lot areas not less than 2000 square yards unless approved by the Engineer. The lot size for each sample area shall be all the measurements taken within that area. The number of measurements taken shall determined by the Engineer.

Corrections for smoothness, grade or crown shall be made by the Contractor when more than 15 percent of all the measurements within a lot are outside the specified tolerance, or if any one shot within the lot deviates 0.06 foot or more from planned grade. If additional material is required after compaction, the compacted material shall be scarified to a depth of 3 inches or full layer depth before placing additional material and blended. The material shall be re-compacted and surface retested.

Corrections shall be at no cost to the Department in accordance with the limitations noted above.

209-3.8 THICKNESS CONTROL. The thickness of the finished base course will be determined by the Engineer by taking before and after elevation measurements, or by depth tests, at random locations. The completed thickness of the base course shall be within 1/2 inch of the design thickness. Where the thickness is deficient by more than 1/2 inch, it shall be corrected to within the specified tolerances.

209-3.9 MAINTENANCE. The base course shall be maintained in a condition that will meet all specification requirements until the work is accepted. Equipment used in the construction of an adjoining section may be routed over completed portions of the base course, provided no damage results and provided that the equipment is routed over the full width of the base course to avoid rutting or uneven compaction.

METHOD OF MEASUREMENT

209-4.1 Crushed Aggregate Base Course will be weighed by the ton or measured by the cubic yard in final position according to Subsection GCP-90-02.

BASIS OF PAYMENT

209-5.1 Crushed Aggregate Base Course will be paid for at the contract price, per unit of measurement, accepted in place.

Payment will be made under:

Item P-209a	Crushed Aggregate Base Course - per cubic yard
Item P-209b	Crushed Aggregate Base Course - per ton

TESTING REQUIREMENTS

ATM 212	Determining the Standard Density of Coarse Granular Materials Using the Vibratory Compactor
ATM 313	Degradation Value of Aggregates
AASHTO T 96	Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
AASHTO T 104	Soundness of Aggregate by Use of Sodium Sulfate or Magnesium Sulfate
WAQTC FOP for AASHTO T 2	Sampling Aggregates
WAQTC FOP for AASHTO T 27/T 11	Sieve Analysis of Aggregates & Soils
WAQTC FOP for AASHTO T 89	Liquid Limit of Soils
WAQTC FOP for AASHTO T 90	Plastic Limit and Plasticity Index of Soils
WAQTC FOP for AASHTO T 99/T 180	Moisture-Density Relations of Soils
WAQTC FOP for AASHTO T 176	Sand Equivalent
WAQTC FOP for AASHTO T 310	In-Place Density and Moisture Content of Soil and Soil-Aggregate by Nuclear Methods
WAQTC FOP for AASHTO TP 61	Percentage of Fracture in Coarse Aggregate

ITEM P-401 PLANT HOT MIX ASPHALT

DESCRIPTION

401-1.1 This item shall consist of mineral aggregate and asphalt cement, mixed in a central mixing plant and placed on a prepared surface according to these Specifications; and shall conform to the lines, grades, thicknesses, and typical cross sections shown on the Plans. Each layer shall be constructed to the depth, typical section, or elevation required by the Plans and shall be rolled, finished, and approved before the placement of the next layer.

401-1.2 ACRONYMS.

AASHTO	American Association of State Highway and Transportation Officials
ATM	Alaska Test Method
CPF	Composite Pay Factor
DPF	Density Pay Factor
HMA	Hot Mix Asphalt
JMD	Job Mix Design
MSG	Theoretical Maximum Specific Gravity
PAB	Price Adjustment Base
PRF	Pay Reduction Factor
RAP	Reclaimed Asphalt Pavement
TV	Target Value
WAQTC	Western Alliance for Quality in Transportation Construction

401-1.3 DEFINITIONS. These definitions apply only to Section P-401.

1. **Panel.** The paving pass between joints or between a joint and an edge.

MATERIALS

401-2.1 AGGREGATE. Aggregates shall consist of crushed stone or crushed gravel with or without sand or other inert finely divided mineral aggregate. The portion of materials retained on the No. 4 sieve is coarse aggregate. The portion passing the No. 4 sieve and retained on the No. 200 sieve is fine aggregate, and the portion passing the No. 200 sieve is mineral filler. Remove all natural fine aggregates passing the No. 4 sieve before crushing aggregates for hot mix asphalt. Separate the crushed aggregate into a minimum of three stockpiles, blend mineral filler or natural sand if necessary to produce the Job Mix Design gradation for hot mix asphalt.

a. **Coarse Aggregate.** Coarse aggregate shall consist of sound, tough, durable particles, free from adherent films of matter that would prevent thorough coating and bonding with the asphalt cement and be free from organic matter and other deleterious substances. The percentage of wear shall not be greater than 40% when tested according to AASHTO T 96. The sodium sulfate soundness loss shall not exceed 10%, or the magnesium sulfate soundness loss shall not exceed 13%, after 5 cycles, when tested according to AASHTO T 104. The aggregate shall have a minimum degradation value of 30 when tested according to ATM 313.

   The blended coarse aggregate shall have at least 90% by weight 2 fractured faces as determined by WAQTC FOP for AASHTO TP 61 and contain not more than 8%, by weight, of flat and elongated particles, when tested according to ATM 306. The ratio of the calipers used to determine flat and elongated particles will be set to 1:5.

   The blended coarse aggregate for hot mix asphalt, Type V, shall have at least 98% by weight 2 fractured faces as determined by WAQTC FOP for AASHTO TP 61 and contain not more than

8% and 20%, by weight, of flat and elongated particles with the ratio of the calipers set to 1:5 and 1:3 respectively as determined by ATM 306.

b. **Fine Aggregate.** Fine aggregate shall consist of clean, sound, durable, angular shaped particles produced by crushing stone, slag, or gravel that meets the requirements for wear and soundness specified for coarse aggregate. The aggregate particles shall be free from coatings of clay, silt, or other objectionable matter and shall contain no clay balls.

Natural (nonmanufactured) sand may be used to obtain the gradation of the aggregate blend or to improve the workability of the hot mix asphalt. The amount of sand to be added shall be adjusted to produce hot mix asphalt conforming to requirements of this specification. The fine aggregate shall not contain more than 20% natural sand by weight of total aggregates. The fine aggregate for hot mix asphalt, Type V, shall not contain more 10% natural sand by weight of total aggregates.

The blended fine aggregate shall have a liquid limit of not more than 25 and a plasticity index of not more than 6 when tested according to WAQTC FOPs for AASHTO T 89 and AASHTO T 90, and sand equivalent values of 35 or greater when tested according to WAQTC FOP for AASHTO T 176.

c. **Sampling.** The Engineer will sample according to WAQTC FOP for AASHTO T 2 for coarse and fine aggregate, and according to AASHTO T 127 for mineral filler.

401-2.2 MINERAL FILLER. If filler, in addition to that naturally present in the aggregate, is necessary, it shall meet the requirements of AASHTO M 17.

401-2.3 ASPHALT CEMENT. Asphalt cement shall meet the following property requirements:

TABLE 1. ASPHALT CEMENT PROPERTY REQUIREMENTS

Performance Grade AASHTO M 320	Mix Design Class	Softening Point AASHTO T 53	Toughness ASTM D 5801	Tenacity ASTM D 5801
PG 52-34~~28~~	A, B	N/A	N/A	N/A
PG 58-28	C, D	120° F, min.	110 in lbs, min.	75 in lbs, min.
PG 64-34~~28~~	E, F, S	125° F, min.	110 in lbs, min.	75 in lbs, min.

The Contractor shall furnish a vendor's certificate of compliance and certified test reports for each lot of asphalt cement shipped to the project. The test reports shall also note the storage tanks used for each lot. Anti-strip additives required by the job mix design shall be added during load out for delivery to the project and a printed weight ticket for anti-strip shall be included with the asphalt cement weight ticket. The location where anti-strip is added may be changed with the written approval of the Engineer.

The following documents shall be furnished at delivery:

a. Manufacturer's certificate of compliance.
b. Certified test reports for the lot.
c. Lot number, storage tanks, and shipping containers (if applicable) used.
d. Date and time of load out for delivery.
e. Type, grade, temperature, and quantity of asphalt cement loaded.
f. Type and percent of anti-strip added.

All excess asphalt cement shall remain the property of the Contractor. Removal of excess asphalt cement from the project area is subsidiary to the contract and no separate payment will be made.

401-2.4 PRELIMINARY MATERIAL ACCEPTANCE. Prior to delivery of materials to the job site, the Contractor shall submit certified test reports to the Engineer for the following materials:

a. **Coarse Aggregate.**
   (1) Percent of wear.
   (2) Soundness.
   (3) Degradation.
   (4) Percent of fracture.
   (5) Percent of flat and elongated particles.

b. **Fine Aggregate.**
   (1) Liquid limit.
   (2) Plastic index.
   (3) Sand equivalent.
   (4) Uncompacted void content for hot mix asphalt, Type V.

c. **Mineral Filler.**
   (1) Gradation
   (2) Plastic Index
   (3) Organic content

d. **Asphalt Cement.** The certification(s) shall show the appropriate test(s) for each material, the test results, and a statement that the material meets the specification requirement.

The Engineer will collect samples for testing, prior to and during hot mix asphalt production, to verify the quality of the materials and to ensure conformance with the applicable specifications.

COMPOSITION

401-3.1 COMPOSITION OF HOT MIX ASPHALT. The hot mix asphalt shall be composed of a mixture of well-graded aggregate, mineral filler if required, and asphalt cement. The several aggregate fractions shall be sized, handled in a minimum of three separate size stockpiles (coarse, intermediate, fine), and combined in such proportions that the resulting mixture meets the grading requirements of the job mix design.

401-3.2 JOB MIX DESIGN. No hot mix asphalt for payment shall be produced until a job mix design (JMD) has been approved by the Engineer. The hot mix asphalt (HMA) shall be designed using procedures contained in ATM 417, "Chapter 5, *Marshall Method of Mix Design*, of the Asphalt Institute's Manual Series No. 2 (MS-2), *Mix Design Methods for Asphalt Concrete*", and shall meet the requirements of Tables 2 and 3.

The hot mix asphalt, Type V, shall be designed using procedures contained in AASHTO R-35 and shall meet the requirements of Table 4. Upon completion of the JMD, determine the Marshall stability and Marshall air voids at the design asphalt cement content using a 75-Blow Marshall from procedures contained in ATM 417.

Anti-stripping agent shall be added to the asphalt cement in the amount determined by ATM 414. Anti-stripping agent is subsidiary to the asphalt cement pay item.

Contractor Furnished Job Mix Design. The Contractor may elect to furnish JMDs for each Type and Class of HMA specified. The Department will furnish all JMDs for hot mix asphalt, Type V. The JMDs shall be

submitted in writing by the Contractor to the Engineer at least 15 calendar days prior to the start of paving operations and shall include as a minimum:

a. Target gradation – percent passing each sieve size.
b. Optimum asphalt cement content.
c. Asphalt cement performance grade.
d. Number of blows of hammer compaction per side of molded specimen.
e. Mixing temperature range – from temperature-viscosity relationship, or manufacturers recommendations.
f. Compaction temperature range.
g. Plot of the combined gradation on the Federal Highway Administration (FHWA) 45 power gradation curve.
h. Graphical plots of stability, flow, air voids, voids in the mineral aggregate, and unit weight versus asphalt cement content.
i. Percent natural sand.
j. Percent fractured faces.
k. Percent flat and elongated.
l. Brand and percentage of antistrip agent (if required).
m. Theoretical Maximum Specific Gravity (MSG).
n. Signature of a Professional Engineer registered in the State Of Alaska.

The Engineer has authority to review submitted JMDs and to reject JMDs that do not meet specifications. The Contractor shall submit samples to the Engineer, upon request, for JMD verification testing.

Department Designed Job Mix Design. The JMD may be designed by the Department. The Contractor shall submit representative samples of all materials at least 15 calendar days prior to the start of paving operations along with the hot mix asphalt target gradation and aggregate blend ratio.

The Contractor shall:

a. Furnish representative samples from each aggregate size group in the proportions required for the proposed JMD gradation for a total of 500 pounds. Include gradations for the individual aggregate stockpiles and supporting process control information.
b. Furnish 5 separate 1-gallon samples of the asphalt cement proposed for use in the JMD with conformance test reports, a Manufacturer's certificate of compliance, current Material Safety Data Sheet (MSDS), and a temperature-viscosity relationship or Manufacturer's recommended mixing and compaction temperatures.
c. Furnish a minimum of one-half pint of the anti-strip additive proposed for use in the JMD with Manufacturer's data sheet and current MSDS.

The Department will furnish one JMD, that meets specifications, for each Type and Class of HMA specified. If additional JMDs are required, the Engineer will assess a fee of $2,500.00 under Contract Item P-401b, Hot Mix Asphalt Price Adjustment, for each additional JMD furnished.

Job Mix Design Requirements.

TABLE 2. MIX DESIGN REQUIREMENTS

Test Property	Class A, C, E Pavements Designed for Aircraft Gross Weights of 60,000 Lbs. or More or Tire Pressures of 100 Psi or More	Class B, D, F Pavements Designed for Aircraft Gross Weight Less Than 60,000 Lbs. or Tire Pressure Less Than 100 Psi
Number of blows	75	50
Stability, pounds	2150	1350
Flow, 0.01 inch	10-14	10-18
Air voids %	2.8-4.2	2.8-4.2

Voids in mineral aggregate, %, min.	See Table 3	See Table 3
Asphalt Cement Content, %, min. @ 4% Air Voids	5.0	5.0

TABLE 3. MINIMUM PERCENT VOIDS IN MINERAL AGGREGATE

Maximum Particle Size Inch	Voids in Mineral Aggregate, %, Minimum
1/2	14.0
3/4	13.0
1	12.0

TABLE 4 HOT MIX ASPHALT TYPE V MIX DESIGN REQUIREMENTS

Mix Design Class S Pavements for gross aircraft weights of 60,000 pounds or more.	
Test Property	**Design Criteria ¾" Nominal Maximum Aggregate Size**
Initial Number of Gyrations (N_{ini})	8
Design Number of Gyrations (N_{des})	75
Maximum Number of Gyrations (N_{max})	130
Air voids @ N_{des}	4
Voids in Mineral Aggregate @ N_{des}, %	13.0 min.
Voids filled with Asphalt @ N_{des}, %	65-78
Dust to effective asphalt ratio	0.6 -1.2
Uncompacted Void Content	45 min
% G_{mm} @ N_{ini}	≤ 90.50
% G_{mm} @ N_{max}	≤ 98.00
Asphalt Cement Content, %, min. @ 4.0% VTM	5.0
Marshall Stability 75 blow (average of 3 specimens)	Report
Marshall Air Voids – 75 blow (average of 3 specimens)	Report
Rut Index, Max., ATM 419	3

The mineral aggregate shall be of such size that the percentage composition by weight, as determined by laboratory screens, will conform to the gradation or gradations specified in Table 45 when tested according to WAQTC FOP for AASHTO T 27/T 11.

The gradations in Table 45 represent the limits that shall determine the suitability of aggregate for use from the sources of supply. The aggregate, as selected (and used in the JMD), shall have a gradation within the limits designated in Table 45 and shall not vary from the low limit on one sieve to the high limit on the adjacent sieve, or vice versa, but shall be well graded from coarse to fine when tested according to WAQTC FOP for AASHTO T 27/T 11.

For acceptance testing, the asphalt cement content and aggregate gradation from the JMD will have the full tolerance limits for individual measurements as specified in Table ~~6~~7 applied. Except for the No. 200 sieve, the limits apply even if they fall outside the master grading band in Table 45. The limits for the No. 200 sieve will be confined by the master grading band in Table 45. Tolerance limits will not be applied to the largest sieve specified.

The maximum size aggregate used shall not be more than one-half of the thickness of the layer being constructed.

TABLE 45. HOT MIX ASPHALT AGGREGATE

Sieve Size	Percentage by Weight Passing Sieves			
	Type I 1.00 inch max	Type II 0.75 inch max	Type III 0.50 inch max	Type V 0.75 inch max
1 in.	100	--	--	--
3/4 in.	80-90	100	--	100
1/2 in.	60-84	75-90	100	65-90
3/8 in.	48-78	60-84	80-90	55-80
No. 4	28-63	33-70	44-81	40-60
No. 8	14-55	19-56	26-70	≤45
No.16	9-44	10-44	16-59	≤ 35
No.30	6-34	7-34	9-49	≤ 25
No.50	5-24	5-24	6-36	≤ 20
No.100	4-16	4-16	4-22	≤ 12
No.200	3-~~7~~	3-~~7~~	3-~~7~~	3-8

The aggregate gradations shown are based on aggregates of uniform specific gravity. The percentages passing the various sieves shall be corrected when aggregates of varying specific gravities are used, as indicated in the Asphalt Institute Manual Series No. 2 (MS-2), Appendix A.

Changing the Job Mix Design. If the HMA fails to conform to Table 2 and 3, or if there are changes in the source of asphalt cement, source of aggregates, aggregate quality, aggregate gradation, or blend ratio, then a new JMD may be required by the Engineer. The Contractor shall submit changes and new samples, when required or directed, in the same manner as the original submittal.

No payment for material for which a new JMD is required, will be made until the new JMD is approved. Approved changes apply only to asphalt mixture produced after the submittal of the changes.

401-3.3 RECYCLED HOT MIX ASPHALT. Recycled hot mix asphalt shall consist of reclaimed asphalt pavement (RAP), aggregate, mineral filler if necessary, asphalt cement, and recycling agent if necessary. Recycled hot mix asphalt may be used for all layers except the top layer.

The RAP shall be of a consistent gradation and asphalt content. The Contractor may obtain the RAP from the job site or from a Contractor supplied source.

All new aggregates used in the recycled hot mix asphalt shall meet the requirements of Subsection 401-2.1. New asphalt cement shall meet the requirements of Subsection 401-2.3. Recycling agents shall meet the requirements of AASHTO R 14.

The recycled hot mix asphalt shall be designed using procedures contained in the Asphalt Institute's Manual Series Number 20 (MS-20), *Asphalt Hot-Mix Recycling*, in conjunction with MS-2 and ATM 417.

The JMD shall meet the requirements of Subsection 401-3.2. In addition to the requirements of Subsection 401-3.2, the JMD shall indicate the percent of RAP, the percent and performance grade of new asphalt cement, the percent and grade of recycling agent (if used), and the properties (including the performance grade) of the asphalt cement blend.

The Contractor shall submit documentation to the Engineer, indicating that the mixing equipment proposed for use is adequate to mix the percent of RAP shown in the JMD and meet all local and national environmental regulations.

The recycled hot mix asphalt will be evaluated separately but will be sampled, tested, and paid for the same as hot mix asphalt.

401-3.4 TEST SECTION. Prior to full production, the Contractor shall prepare and place a test section consisting of a quantity of hot mix asphalt that conforms to the JMD. The location of the test section will be shown on the Plans, or as directed by the Engineer. The test section shall be 300 feet long, 20 to 40 feet wide, placed in two lanes, with a longitudinal cold joint. The test section shall be of the same thickness specified for the construction of the layer that it represents. The underlying surface or pavement structure upon which the test section is to be constructed shall be the same as the remainder of the project represented by the test section. The equipment used in construction of the test section shall be the same type and weight to be used on the remainder of the project represented by the test section.

Three random samples of the hot mix asphalt will be taken by the Engineer and tested by the Department for aggregate gradation and asphalt cement content according to Subsection 401-5.1. The three samples will be evaluated according to Subsection 401-8.1.a., except a determination for outliers will not be performed. If the Composite Pay Factor is less than 1.00, the test section is unacceptable.

Three 6-inch diameter core samples shall be cut from the finished hot mix asphalt by the Contractor, at the locations marked by the Engineer. The core samples will be tested by the Department for density according to Subsection 401-5.1. The Target Value for mat density is 94% of the theoretical maximum specific gravity (MSG) of the JMD. The three samples will be evaluated according to Subsection 401-8.1.a., except a determination for outliers will not be performed. If the Density Pay Factor is less than 1.00, the test section is unacceptable.

Three longitudinal joint cores centered on the longitudinal joint shall be cut by the Contractor, at the locations marked by the Engineer. The core samples will be tested by the Department according to Subsection 401-5.1. The Target Value for joint density is 92% of the JMD MSG. If the average density of the three joint cores is below ~~90~~ 91%, the test section is unacceptable.

If the initial test section is unacceptable, the Contractor shall make necessary adjustments to the JMD, plant operation, placing procedures, or compaction efforts. Additional test sections, as required, shall be constructed and evaluated for conformance to the specifications. All sections that are not acceptable shall be removed at the Contractor's expense.

Full production shall not begin until an acceptable test section has been constructed and approved by the Engineer.

The Department will not pay for hot mix asphalt and asphalt cement, in test sections that are not acceptable, except the initial test section. The initial test section whether acceptable or unacceptable, and any subsequent test section that is acceptable, will be paid for at the contract unit prices for hot mix asphalt and asphalt cement. Test sections will be evaluated separately and not as part of a lot.

Hot mix asphalt quality control testing shall be performed by the Contractor at the start of plant production and in conjunction with the calibration of the plant for the JMD. If aggregates produced by the plant do not satisfy the gradation requirements or produce hot mix asphalt that meets the JMD, then it will be necessary to reevaluate and redesign the JMD using plant-produced aggregates. Specimens should be

prepared and the optimum asphalt cement content determined in the same manner as for the original design tests. If the Department redesigns the JMD the Contractor will be assessed a fee according to Subsection 401-3.2.

401-3.5 TESTING LABORATORY. The laboratory used to develop the JMD shall meet the requirements of ASTM D 3666. A certification signed by the manager of the laboratory stating that it meets these requirements shall be submitted to the Engineer prior to the start of construction. The certification shall contain as a minimum:

a. Qualifications of personnel; laboratory manager, supervising technician, and testing technicians.
b. A listing of equipment to be used in developing the job mix design.
c. A copy of the laboratory's quality control system.
d. Evidence of participation in the AASHTO Materials Reference Laboratory (AMRL) program

CONSTRUCTION METHODS

401-4.1 WEATHER LIMITATIONS. Hot mix asphalt shall not be placed upon a wet surface, when the base material is frozen, or when the surface temperature of the underlying layer is less than specified in Table ~~5~~6. The top layer of hot mix asphalt must be placed before September 15th unless approved in writing by the Engineer.

TABLE ~~5~~6. BASE TEMPERATURE LIMITATIONS

Mat Thickness	Base Temperature (Minimum)
Greater than 1 inch	40 °F
1 inch or less	50 °F

401-4.2 HOT MIX ASPHALT PLANT. Plants may ~~not~~ be placed on airport property in the location indicated on the Construction Safety Plan. Plants used for the preparation of hot mix asphalt shall conform to the requirements of AASHTO M 156 with the following changes:

a. Truck Scales. The hot mix asphalt shall be weighed on approved certified scales furnished by the Contractor, or on certified public scales at the Contractor's expense. Scales shall be inspected and sealed as often as the Engineer deems necessary to assure their accuracy. Scales shall conform to the requirements of Subsection G-130-2.5.

b. Testing Facilities. The Contractor shall provide laboratory facilities at the plant or job site for the Contractor's quality control testing, according to Subsection 401-6.2.

c. Inspection of Plant. The Engineer shall have access, at all times, to all areas of the plant for checking adequacy of equipment; inspecting operation of the plant: verifying weights, proportions, and material properties; and checking the temperatures maintained in the preparation of the hot mix asphalt.

d. Storage Bins and Surge Bins. Delete provision 5 of AASHTO M 156. Use of surge bins or storage bins for temporary storage of hot mix asphalt will be permitted as follows:

(1) The hot mix asphalt may be stored in surge bins for not longer than 3 hours.

(2) The hot mix asphalt may be stored in insulated storage bins for not longer than 24 hours.

The bins shall be such that hot mix asphalt drawn from them meets the same requirements as hot mix asphalt loaded directly into trucks.

If the Engineer determines that there is an excessive amount of heat loss, segregation or oxidation of the hot mix asphalt, no storage will be allowed.

e. **Sampling Locations.** Provide a tap on the asphalt cement supply line just before it enters the plant (after the 3-way valve) for sampling asphalt cement. Aggregate and asphalt cement sampling locations shall meet OSHA safety requirements.

f. **Scalping Screen.** A scalping screen shall be provided on the hot mix asphalt plant to prevent oversize material or debris from being incorporated into the hot mix asphalt.

401-4.3 HAULING EQUIPMENT. Trucks used for hauling hot mix asphalt shall have tight, clean, and smooth metal beds. To prevent the hot mix asphalt from adhering to them, the truck beds shall be lightly coated with a minimum amount of paraffin oil, lime solution, or other approved material. Each truck shall have a suitable cover to protect the mixture from adverse weather. When necessary, to ensure that the mixture will be delivered to the site at the specified temperature, truck beds shall be insulated or heated and covers shall be securely fastened, as directed by the Engineer.

401-4.4 HOT MIX ASPHALT PAVERS. Hot mix asphalt pavers shall be self-propelled, with an activated screed, heated as necessary, and shall be capable of spreading and finishing layers of hot mix asphalt which will meet the specified thickness, width, smoothness, and grade. The paver shall have sufficient power to propel itself and the hauling equipment without adversely affecting the finished surface.

The paver shall have a receiving hopper of sufficient capacity to permit a uniform spreading operation. The hopper shall be equipped with a distribution system to place the hot mix asphalt uniformly in front of the screed without segregation. The screed shall effectively produce a finished surface of the required evenness and texture without tearing, shoving, or gouging the hot mix asphalt layer.

If an automatic grade control device is used, the paver shall be equipped with a control system capable of automatically maintaining the specified screed elevation. The control system shall be automatically actuated from either a reference line and/or through a system of mechanical sensors or sensor-directed mechanisms or devices that will maintain the paver screed at a predetermined transverse slope and at the proper elevation to obtain the required surface. The transverse slope controller shall be capable of maintaining the screed at the desired slope within plus or minus 0.1%.

The controls shall be capable of working in conjunction with any of the following attachments:

a. Ski-type device of not less than 30 feet in length.
b. Taut stringline (wire) set to grade.
c. Short ski or shoe.
d. Laser control.

401-4.5 ROLLERS. The Contractor shall use rollers of the vibratory, steel wheel, and pneumatic-tired type. Pneumatic-tired rollers shall be fully skirted. Rollers shall be in good condition, capable of operating at slow speeds to avoid displacement of the hot mix asphalt. The number, type, and weight of rollers shall be sufficient to compact the hot mix asphalt to the required density while it is still in a workable condition.

The use of equipment that causes excessive crushing of the aggregate, pickup of the mix, washboard, uneven compaction, or other undesirable results, will not be permitted.

401-4.6 PREPARATION OF ASPHALT CEMENT. The asphalt cement shall be heated in a manner that will avoid local overheating and provide a continuous supply of the asphalt cement to the mixer at a uniform temperature. The temperature of the asphalt cement delivered to the mixer shall be sufficient to provide for adequate coating of the aggregate particles, but shall not exceed 335 °F or exceed manufacturers' recommendations.

401-4.7 PREPARATION OF MINERAL AGGREGATE. The aggregate for the hot mix asphalt shall be heated and dried prior to introduction into the mixer. The maximum temperature and rate of heating shall be such that no damage occurs to the aggregates. The temperature of the aggregate and mineral filler shall not exceed 350 °F when the asphalt cement is added. Particular care shall be taken that aggregates high in calcium or magnesium content are not damaged by overheating. The temperature shall not be lower than is required to obtain complete coating and uniform distribution on the aggregate particles and to provide hot mix asphalt of satisfactory workability.

401-4.8 PREPARATION OF HOT MIX ASPHALT. The aggregates and the asphalt cement shall be weighed or metered and introduced into the mixer in the amount specified by the JMD.

The combined materials shall be mixed until the aggregate obtains a uniform coating of asphalt cement and is thoroughly distributed throughout the hot mix asphalt. For batch plants, the wet mixing time shall be the shortest time that will produce a satisfactory mixture, but not less than 25 seconds. For continuous mix plants, the minimum mixing time shall be determined by dividing the weight of its contents at operating level by the weight of the mixture delivered per second by the hot plant. The mixing time for all plants shall be established by the Contractor, based on the procedure for determining the percentage of coated particles described in AASHTO T 195, for each individual plant and for each type of aggregate used. The mixing time will be set to achieve a minimum of 98% coated particles. The moisture content of all hot mix asphalt upon discharge shall not exceed 0.5% of the total weight of hot mix asphalt, as determined by WAQTC FOP for AASHTO T 329.

401-4.9 PREPARATION OF THE UNDERLYING SURFACE. Immediately before placing the hot mix asphalt, the underlying layer shall be cleaned of all dust and debris. A prime coat or tack coat shall be applied according to Sections P-602 or P-603, if required by the contract Specifications.

401-4.10 TRANSPORTING, PLACING, AND FINISHING. The hot mix asphalt shall be transported from the mixing plant to the site in vehicles conforming to the requirements of Subsection 401-4.3. Deliveries shall be scheduled so that placing and compacting of hot mix asphalt is uniform with minimum stopping and starting of the paver. Adequate artificial lighting shall be provided for night placements. Hauling over freshly placed hot mix asphalt will not be permitted until it has been compacted, as specified, and allowed to cool to ambient temperature. The Contractor may elect to use a material transfer vehicle to deliver hot mix asphalt to the paver.

Upon arrival, the hot mix asphalt shall be placed to the full width by a hot mix asphalt paver. It shall be struck off in a uniform layer of such depth that, when the work is completed, it shall have the required thickness and conform to the grade and contour indicated. The speed of the paver shall be regulated to eliminate pulling and tearing of the hot mix asphalt mat. Unless otherwise permitted, placement of the hot mix asphalt shall begin along the centerline of a crowned section or on the high side of areas with a one-way slope. The hot mix asphalt shall be placed in consecutive adjacent strips having a minimum width of 20 feet except where edge lanes require less width to complete the area.

The hot mix asphalt shall be placed and initial breakdown compaction started at a surface temperature greater than 235 °F. Compaction shall be finished before the surface temperature reaches 160 °F.

On areas where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impractical, the hot mix asphalt may be spread by hand tools.

401-4.11 COMPACTION OF MIXTURE. After placing, the hot mix asphalt shall be thoroughly and uniformly compacted by rolling. The surface shall be compacted as soon as possible when the hot mix asphalt has attained sufficient stability so that the rolling does not cause undue displacement, cracking or shoving. The sequence of rolling operations shall be at the discretion of the Contractor. The speed of the rollers shall, at all times, be sufficiently slow to avoid displacement of the hot mix asphalt and be effective

in compaction. Any displacement occurring as a result of reversing the direction of the roller, or from any other cause, shall be corrected at once.

Sufficient rollers shall be furnished to handle the output of the plant. Rolling shall continue until the surface is of uniform texture, true to grade and cross section, and the required field density is obtained.

To prevent adhesion of the hot mix asphalt to the roller, the wheels shall be kept properly moistened (and scrapers used), but excessive water will not be permitted.

In areas not accessible to the roller, the hot mix asphalt shall be thoroughly compacted with hand operated compaction equipment.

401-4.12 JOINTS. The formation of all joints shall be made in such a manner as to ensure a continuous bond and obtain the required density. All joints shall have the same texture as other sections of the layer and meet the requirements for smoothness and grade.

The longitudinal joint in one layer shall offset the longitudinal joint in the layer immediately below by at least 12 inches; however, the joint in the top layer shall be at the centerline of the pavement. Transverse joints in one layer shall be offset by at least 10 feet from transverse joints in the previous layer. Transverse joints in adjacent lanes shall be offset a minimum of 10 feet.

The roller shall not pass over the unprotected end of the freshly laid hot mix asphalt except when necessary to form a transverse joint. When forming a transverse joint, it shall be made by means of placing a bulkhead or by tapering the layer. The tapered end shall be cut back to its full depth and width on a straight line to expose a vertical face prior to placing additional hot mix asphalt. When forming a transverse joint in the final lift, apply Crafco Pavement Joint Adhesive No. 34524, or Deery Cold Joint Adhesive, or approved equal, to the joint surface before placing any fresh hot mix asphalt against the joint.

All longitudinal joints in the final lift shall be formed in such a manner that the joint meets density requirements of this specification. Joints that are irregular, damaged, uncompacted or otherwise defective shall be cut back to expose a clean, sound surface. When forming a longitudinal joint in the final lift, apply Crafco Pavement Joint Adhesive No. 34524, or Deery Cold Joint Adhesive, or approved equal, to the joint surface before to placing any fresh hot mix asphalt against the joint. Joint edge preparation, and joint adhesive application temperature, thickness, and method shall be per the manufacturer's recommendations.

Joint sealant shall be applied over joints in the final lift of hot mix asphalt according to Subsection 401-5.2.f.(2). Joint sealant shall be applied over joints in the final lift formed by two panels of hot mix asphalt composed of different type or class of mix; or of new against existing hot mix asphalt pavement. Joint surface preparation, joint sealant application temperature, thickness, and method shall be per the manufacturer's recommendations.

All costs associated with joint preparation, applying joint sealant, and applying joint adhesive are subsidiary to the hot mix asphalt pay item.

401-4.13 SURFACE REQUIREMENTS AND TOLERANCE. The finished surfaces of the hot mix asphalt shall not vary more than the requirements of Subsection 401-5.2.f.(4).

The finished surface of asphalt concrete paving shall match dimensions shown on the Plans for horizontal alignment and width, profile grade and elevation, crown slope, and paving thickness. Water shall drain without puddles, across the pavement surface. The surface shall be of uniform texture and without ridges, humps, depressions, and roller marks. The surface shall be free of raveling, cracking, tearing, rutting, asphalt cement bleeding, and aggregate segregation. The asphalt concrete mixture shall be free of foreign material, uncoated aggregate and oversize aggregate.

Any finished surface area that does not meet the requirements of this Subsection is deemed unacceptable according to Subsection GCP 50-11. The Engineer will determine whether the unacceptable asphalt concrete mixture shall either be corrected, or removed and replaced. Submit correction methods to the Engineer for approval prior to correction work commencing. Skin patching shall not be allowed. This work is subsidiary and shall be done at the Contractor's expense.

MATERIAL ACCEPTANCE

401-5.1 ACCEPTANCE SAMPLING AND TESTING. All acceptance sampling and testing necessary to determine conformance with the requirements specified in this section will be performed by the Engineer at no cost to the Contractor. Testing organizations performing these tests will meet the requirements of ASTM D 3666.

Hot Mix Asphalt lots. The quantity of each type of hot mix asphalt produced and placed will be divided into lots and the lots evaluated individually for acceptance. The Department has the exclusive right and responsibility for determining the acceptability of all materials incorporated into the project. The results of the acceptance testing performed by the Engineer will be made available to the Contractor.

5,000 ton lot size. A lot of hot mix asphalt will be 5,000 tons, except as noted below. The lot will be divided into 10 equal 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 if 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 and the price adjustment computed 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.

1,500 to 4,999 ton lot size. If the total Contract quantity of hot mix asphalt is between 1,500 tons and 4,999 tons, the total Contract quantity will be considered one lot. The lot will be divided into sublots of 500 tons and randomly sampled for asphalt cement content, density and gradation according to this subsection except a determination for outliers will not be performed. The lot will be evaluated for price adjustment according to Subsection 401-5.2 except as noted.

Hot mix asphalt quantities of less than 300 tons remaining after dividing the last 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.

Under 1,500 ton lot size. If the total Contract quantity of hot mix asphalt is less than 1,500 tons, the hot mix asphalt will be accepted for payment based on: the Engineer's approval of a JMD, placement and compaction of the hot mix asphalt to the specified thickness and density, meeting finished surface requirements and tolerances, and material testing.

The Engineer reserves the right to perform any testing required in order to determine acceptance. Hot mix asphalt that does not conform to the approved JMD shall be removed and replaced, or at the Engineer's discretion a pay adjustment will be made according to Subsection GCP 50-03. Removal and replacement of defective hot mix asphalt shall be at no additional cost to the Department.

Joint lot size. The lot size for longitudinal joint density in the final lift of hot mix asphalt will be the total length of longitudinal joint constructed by a lot of hot mix asphalt.

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

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

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

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

Two separate samples will be taken, one for acceptance testing and one held in reserve for retesting if applicable.

(2) **Aggregate Gradation.** Samples for the determination of aggregate gradation will be taken randomly, as directed by the Engineer, according to WAQTC FOP for AASHTO T 2. Two separate samples will be taken, one for acceptance testing and one held in reserve for retesting if applicable. The samples will be taken from one of the following locations:

(a) The same location as specified for the determination of asphalt cement content;

(b) For hot mix asphalt drum plants from the combined aggregate cold feed conveyor via a diverter device, a sampling device, or from the stopped conveyor belt. Diverter devices shall divert aggregate from the full width of the conveyor system and shall be maintained to provide a representative sample of aggregate incorporated into the hot mix asphalt; or

(c) For hot mix asphalt batch plants from the dry batched aggregates in a manner that provides a representative sample of aggregate incorporated into the hot mix asphalt.

(3) **Density.** A separate set of random numbers, different from those used for mix acceptance, will be used to determine acceptance density locations. The Contractor shall cut full depth core samples ~~with a diameter of six inches,~~ from the finished HMA within 24 hours of final rolling. Neatly cut one 6-inch-diameter core sample with a core drill at each location marked by the Engineer. Use a core extractor to prevent damage to the core. Backfill and compact voids left by coring with new HMA within 24 hours. Densities will not be measured at milled edge of existing pavement. ~~The Contractor shall cut one core sample from each HMA mat sublot, and core samples from the longitudinal joint in locations described below, for density acceptance testing. In addition, six-inch diameter core samples for assurance testing shall be cut as directed by the Engineer. The core samples shall be neatly cut by a core drill at the random locations marked by the Engineer. A core extractor shall be used to prevent damage to the cores. All holes left by sampling shall be backfilled with new hot mix asphalt and~~

~~compacted within 24 hours of sampling.~~ Failure to cut core samples or backfill the holes left by sampling within the specified period will result in a deduction of $100.00 per sample/hole per day. The accrued amount will be subtracted under Item P-401b, Hot Mix Asphalt Price Adjustment.

Core samples for mat density shall not be taken closer than one foot from a transverse or longitudinal joint.

Core samples for longitudinal joint density shall be centered on the ~~longitudinal joint of~~ intersection at the top ~~layer~~ surface of the two new hot mix asphalt panels, at ~~each location~~ the same station where the panel completing the joint is cored for mat density acceptance testing. Cores shall be taken by the Contractor in the presence of the Engineer. The Engineer will take immediate possession of the samples.

(4) **Asphalt Cement Property.** Asphalt cement will be randomly sampled for acceptance testing according to WAQTC FOP for AASHTO T 40. Three separate samples from each lot will be taken, one for acceptance testing, one for Contractor retesting, and one held by the Engineer in reserve for referee testing if applicable.

b. Testing.

(1) **Asphalt Cement Content.** At the direction of the Engineer, the asphalt cement content will be determined according to ATM 405 or WAQTC FOP for AASHTO T 308. The method selected will be used for the duration of the project, including retests if applicable.

(2) **Aggregate Gradation.** Cold feed or dry batched aggregate gradations will be tested according to WAQTC FOP for AASHTO T 27/T 11. Hot mix asphalt gradations will be determined according to WAQTC FOP for AASHTO T 30 from aggregate remaining after the ignition oven (WAQTC FOP for AASHTO T 308) has burned off the asphalt cement.

(3) **Density.** The Target Value for mat density will be ~~94%~~95% of the MSG for all mixes except Type V, Class S which will have a target value of 96% of the MSG as determined by WAQTC FOP for AASHTO T 209. For the first lot of hot mix asphalt, the MSG will be determined by the JMD. For additional lots, the MSG will be determined from the randomly selected sample from the first sublot. The Target Value for longitudinal joint density in the final lift will be 92% of the MSG of the panel completing the joint. No adjustment will be made to the MSG or any other material property, due to application of joint adhesive, in evaluating joint density.

Core samples will be tested according to WAQTC FOP for AASHTO T 166/T 275.

(4) **Asphalt Cement Property.** Asphalt cement will be tested for conformance to the requirements specified in Subsection 401-2.3 and evaluated for acceptance according to Subsection 401-8.2.

401-5.2 ACCEPTANCE CRITERIA.

a. General. Acceptance will be based on the following characteristics of the hot mix asphalt as well as the implementation of the Contractor's Quality Control plan:

(1) Aggregate gradation
(2) Asphalt cement content
(3) Mat density
(4) Longitudinal Joint density
(5) Thickness
(6) Smoothness

(7) Asphalt Cement Property

Aggregate gradation, asphalt cement content, and mat density will be evaluated for acceptance on a lot basis using the method of estimating percentage of material within specification limits (PWL). Acceptance using PWL considers the variability (standard deviation) of the material and the testing procedures, as well as the average (mean) value of the test results to calculate the percentage of material that is above the lower specification tolerance limit (L) or below the upper specification tolerance limit (U).

Thickness will be evaluated by the Engineer for compliance according to Subsection 401-5.2.f.(3). Acceptance for smoothness will be based on the criteria contained in Subsection 401-5.2.f.(4).

The Engineer may at any time reject and require the Contractor to dispose of any batch of hot mix asphalt which is rendered unfit for use due to contamination, segregation, incomplete coating of aggregate, or improper mix temperature. Such rejection may be based on only visual inspection or temperature measurements. In the event of such rejection, the Contractor may request that a representative sample of the rejected hot mix asphalt be tested. If all test results are within tolerance limits, payment will be made for the hot mix asphalt at the contract unit price. If any of the test results fall outside of the tolerance limits, no payment will be made on the batch of rejected hot mix asphalt, and the cost of the testing will be subtracted under Contract Item P-401b, Hot Mix Asphalt Price Adjustment. The batch of rejected hot mix asphalt will be evaluated separately and not as part of a lot. All costs associated with disposal of rejected hot mix asphalt are the responsibility of the Contractor.

b. **Aggregate Gradation, Asphalt Cement Content.** Evaluation for acceptance of each lot of plant-produced hot mix asphalt for aggregate gradation and asphalt cement content will be based on PWL.

c. **Mat Density.** Evaluation for acceptance of each lot of in-place hot mix asphalt for mat density will be based on PWL.

d. **Longitudinal Joint Density.** Evaluation for acceptance of each lot of in-place final lift hot mix asphalt for longitudinal joint density will be based on the average of the longitudinal joint densities within the lot.

e. **Percentage of Material Within Specification Limits (PWL).** The PWL will be determined according to procedures specified in Section 110 of the General Provisions. The sample average (X) is rounded to the nearest tenth for density and all sieves except the No. 200, and to the nearest hundredth for asphalt cement content and the No. 200 sieve. The sample standard deviation (S_n) is rounded to the nearest hundredth for density and all sieve sizes except the No. 200 sieve. The sample standard deviation (S_n) is rounded to the nearest .001 for asphalt content and the No. 200 sieve. The specification tolerance limits (L) and (U) are contained in Table ~~6~~7.

f. **Acceptance Criteria.**

(1) **Mat Density, Aggregate Gradation, and Asphalt Cement Content.** Acceptance and payment for the lot will be determined according to Subsection 401-8.1.

(2) **Longitudinal Joint Density.** For the final lift of hot mix asphalt, ~~if the average longitudinal joint density of a lot is less than 90%,~~ the longitudinal joint shall be sealed with Asphalt Systems GSB-78, or approved equal, while the hot mix asphalt is still clean, free of moisture, at a temperature of not less than 150 degrees F., and before striping. All costs associated with sealing the joints are subsidiary to the hot mix asphalt pay item. Longitudinal joint lots will be evaluated for payment according to Subsection 401-8.3.

Longitudinal joint sealing shall be per the sealant manufacturer's recommendations. The sealant application shall be at least ~~6~~ 12 inches wide and centered on the longitudinal joint.

(3) **Thickness.** Thickness will be evaluated for compliance by the Engineer to the requirements shown on the Plans. Measurements of thickness will be made by the Engineer using the cores extracted from the mat for each sublot for density measurement.

(4) **Smoothness.** ~~The finished surfaces of the hot mix asphalt shall not vary more than 1/4 inch for the surface layer when tested with a 12-foot straightedge. High points may be ground off, but skin patching will not be allowed.~~

The final surface shall be free from roller marks.

The finished surfaces of each course of the pavement, except the finished surface of the final course, shall not vary more than 3/8 inch when evaluated with a 16 foot straightedge. The finished surface of the final course of pavement shall not vary more than 1/4 inch when evaluated with a 16 foot straightedge.

The work area shall be divided into sample lot areas not less than 2000 square yards unless approved by the Engineer. The lot size for each sample area shall be all the measurements taken within that area.

Sample lines shall be laid out in a grid at a maximum of 50' spacing longitudinally and transversely. Additional sample lines shall be located at the middle of each paving lane, pavement edges, pavement joints and at offsets as determined by the Engineer. The grid angles may be adjusted and grid intervals decreased at the Engineers discretion.

Sample measurements shall be made at maximum 4' intervals along the sampling grid lines, at the intersection of all sample lines, and at any other points as directed by the Engineer. The sample measurement shall be made at the center of the 16' straight edge with the straight edge centered over the sample point.

All measurements shall be recorded in a bound note book. Records for each area's inspections shall include the location, date, air temperature, wind direction and approx speed, cloud condition, precipitation, and operators' names. Records for each measurement shall include Station and Offset, measured distance between the 16' straightedge and the pavement surface to the nearest 1/8 inch.

Smoothness measurements shall not be made across designated grade breaks. At warped transition areas, straightedge position shall be adjusted to measure surface smoothness and not designed grade transitions.

When more than 15 percent of all measurements within a lot exceed the specified tolerance, or if any one measurement within the lot deviates more than 1/2 inch from the straightedge, the Contractor shall remove the deficient area as identified by the Engineer to the depth of the final course of pavement and replace with new material. Skin patching shall not be permitted. Grader tight-blading shall not be permitted. Any pavement showing evidence of such scrape marks shall be removed and replaced as directed by the Engineer. Isolated high points may be ground off providing the remaining course thickness is within 1/4" of the thickness specified on the plans. The surface of the ground pavement shall have a texture consisting of grooves between 0.090 and 0.130 inches wide. The peaks and ridges shall be approximately 1/32 inch higher than the bottom of the grooves. The pavement shall be left in a clean condition. The removal of all of the slurry resulting from the grinding operation shall be continuous. The grinding operation should be controlled so the residue from the operation does not flow across other lanes of pavement. High point grinding will be limited to 15 square

yards. Areas in excess of 15 square yards will require removal and replacement of the pavement.

Repairs, removal and replacement of pavement shall be at no cost to the Department in accordance with the limitations noted above.

(5) **Asphalt Cement Property.** Acceptance and payment for asphalt cement will be determined according to Subsection 401-8.2.

(6) **Grade.** The finished surface of the pavement shall not vary from the grade line elevations and cross sections shown on the plans by more than +/- 0.04 foot in areas of 1% slope or more and +/- 0.02 foot in areas of less than 1% slope.

The work area shall be divided into sample lot areas not less than 2000 square yards unless approved by the Engineer. The lot size for each sample area shall be all the measurements taken within that area.

Sample lines shall be laid out in a grid at a maximum of 50' spacing longitudinally and transversely. In areas covered by design grading plans the locations of grid sampling points shall match the points shown on the plans . Additional sample lines shall be located at grade breaks, pavement edges, pavement joints and at offsets as determined by the Engineer. The grid angles may be adjusted and grid intervals decreased at the Engineers discretion.

Measurements shall be made at the intersection of all sample lines and as directed by the Engineer.

The Contractor shall pay the cost of surveying of the level runs that shall be performed by a licensed surveyor. The documentation, stamped and signed by a licensed surveyor, shall be provided by the Contractor to the Engineer. All measurements shall be recorded in a bound note book. Records for each area's measurements shall include the location, date, air temperature, wind direction and approx speed, cloud condition, precipitation, and operators' names. Records for each measurement shall include Station, Offset, and elevations to the nearest 0.01 foot.

When more than 15 percent of all the measurements within a lot area exceeds the specified tolerance, or if any one shot within the lot deviates from planned grade 0.06 foot or more in areas of 1% slope or more than +/- 0.03 foot in areas less than 1%, the Contractor shall remove the deficient area as identified by the Engineer to the depth of the final course of pavement and replace with new. Skin patching shall not be permitted. Grader tight-blading shall not be permitted. Any pavement showing evidence of such scrape marks shall be removed and replaced as directed by the Engineer. Isolated high points may be ground off providing the remaining course thickness is within 0.02 foot of the thickness specified on the plans. The surface of the ground pavement shall have a texture consisting of grooves between 0.090 and 0.130 inches wide. The peaks and ridges shall be approximately 1/32 inch higher than the bottom of the grooves. The pavement shall be left in a clean condition. The removal of all of the slurry resulting from the grinding operation shall be continuous. The grinding operation should be controlled so the residue from the operation does not flow across other lanes of pavement. High point grinding will be limited to 15 square yards. Areas in excess of 15 square yards will require removal and replacement of the pavement.

Repairs, removal and replacement of pavement shall be at no cost to the Department in accordance with the limitations noted above.

g. **Outliers.** All individual tests for asphalt cement content, aggregate gradation, and mat density will be checked for outliers (test criterion) according to ATM SP-7 except as noted in Subsection 401-5.1. Outliers will be discarded, and the PWL will be determined using the remaining test values.

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

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

TABLE ~~6~~7. LOWER SPECIFICATION TOLERANCE LIMIT (L) AND UPPER SPECIFICATION TOLERANCE LIMIT (U)

Measured Characteristics	L	U
3/4 in. sieve	TV -6.0	TV +6.0
1/2 in. sieve	TV -6.0	TV +6.0
3/8 in. 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	TV-2.0	TV +2.0
Asphalt Cement %	TV-0.4	TV+0.4
Mat Density*	92%	98%
Joint Density	~~90~~ 91%	98%

TV (Target Value) = Job Mix Design value for gradation and asphalt cement content.
* Mat Density for Type V, Class S: change values to L=93 and U=99

401-5.3 RETESTS.

a. **General.** Retesting of a sample which is outside the limits specified in Table ~~6~~ 7, will be allowed if requested by the Contractor, in writing, within 7 days of receipt of the final test of the lot ~~after receiving the written test results from the Engineer~~. Only one retest per sample will be permitted. The Engineer will mark the sample location for the density retest within a two-foot radius of the original core. The original test result 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.

Except for the first lot, when gradation and asphalt cement content are determined from the same sample, retesting for gradation or asphalt cement content from the first sublot of a lot will include

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

(1) A redefined PWL will be calculated for the lot.
(2) The cost for resampling shall be borne by the Contractor.

b. **Payment for Resampled Lots.** The redefined PWL for a lot will be used to calculate the payment for that lot according to Table ~~7~~8.

401-5.4 LEVELING COURSE. Any layer identified in the Plans as a leveling course, or any base layer approved by the Engineer for truing and leveling, shall meet the requirements of Subsections 401-3.2 and 401-5.2b, but will not be subject to the density requirements of Subsections 401-5.2.c and 401-5.2.d. The leveling layer shall be compacted with the same effort used to achieve density of the test section. The truing and leveling layer shall not exceed a nominal thickness of 1-1/2 inches.

CONTRACTOR QUALITY CONTROL

401-6.1 GENERAL. The Contractor shall develop a Quality Control Program according to the General Contract Provisions Section GCP-100, except that Subsection GCP-100-03 will not apply when Hot Mix Asphalt Contract quantities are less than 5,000 tons. The program shall address all elements that affect the quality of the hot mix asphalt including, but not limited to:

a. Mix Design	**f.** Mixing and Transportation
b. Aggregate Grading	**g.** Placing and Finishing
c. Quality of Materials	**h.** Joints
d. Stockpile Management	**i.** Compaction
e. Proportioning	**j.** Surface smoothness

The Contractor shall submit a paving and plant control plan at the pre-paving meeting scheduled by the Engineer a minimum of 5 working days before paving operations begin. The plan shall specifically address the sequence of operations and joint construction. In addition, steps to ensure product consistency, to minimize segregation, and to prevent premature cooling of the hot mix asphalt shall be addressed.

401-6.2 TESTING LABORATORY. The Contractor shall provide a fully equipped hot mix asphalt laboratory located at the plant or job site.

The effective working area of the laboratory shall be a minimum of 150 ft^2 with a ceiling height of not less than 7.5 feet. Lighting shall be adequate to illuminate all working areas. It shall be equipped with heating and air conditioning units to maintain a temperature of 70 °F ± 5 °F.

Laboratory facilities shall be kept clean and all equipment shall be maintained in proper working condition. The Engineer shall be permitted unrestricted access to inspect the Contractor's laboratory facility and witness quality control activities. The Engineer will advise the Contractor in writing of any noted deficiencies concerning the laboratory facility, equipment, supplies, or testing personnel and procedures. When the deficiencies are serious enough to be adversely affecting test results, the incorporation of the materials into the work will be suspended immediately and will not be permitted to resume until the deficiencies are satisfactorily corrected.

401-6.3 QUALITY CONTROL TESTING. The Contractor shall perform all quality control tests necessary to control the production and construction processes applicable to these Specifications and as set forth in the Quality Control Program. The testing program shall include, but not necessarily limited to, tests for the control of asphalt cement content, aggregate gradation, temperatures, aggregate moisture, field compaction, and surface smoothness. All testing shall be according to the standard procedures specified

in the contract and the options selected by the Engineer. A Quality Control Testing Plan shall be developed as part of the Quality Control Program.

a. **Asphalt Cement Content.** A minimum of four asphalt cement content tests shall be performed per lot according to Subsection 401-5.1b(1).

b. **Gradation.** Aggregate gradations shall be determined a minimum of four times per lot according to WAQTC FOP for AASHTO T 30 or WAQTC FOP for AASHTO T 27/T 11.

c. **Moisture Content of Aggregate.** The moisture content of aggregate used for production shall be determined a minimum of twice per lot according to WAQTC FOP for AASHTO T 255/T 265.

d. **Moisture Content of Hot Mix Asphalt.** The moisture content of the hot mix asphalt shall be determined a minimum of twice per lot according to WAQTC FOP for AASHTO T 329.

e. **Temperatures.** Temperatures shall be checked, at least four times per lot, at necessary locations to determine the temperatures of the dryer, the asphalt cement in the storage tank, the hot mix asphalt at the plant, and the hot mix asphalt at the job site.

f. **In-Place Density Monitoring.** The Contractor shall conduct any necessary testing to ensure that the specified density is being achieved. A nuclear gauge may be used to monitor the hot mix asphalt density according to WAQTC TM 8.

g. **Additional Testing.** Any additional testing that the Contractor deems necessary to control the process may be performed at the Contractor's option.

h. **Monitoring.** The Engineer reserves the right to monitor any or all of the above testing.

401-6.4 SAMPLING. When directed by the Engineer, the Contractor shall sample and test any hot mix asphalt that appears inconsistent with similar material being sampled, unless such material is voluntarily removed and replaced or deficiencies corrected by the Contractor. All sampling shall be according to standard procedures specified.

401-6.5 CONTROL CHARTS. The Contractor shall maintain linear control charts both for individual measurements and range (i.e., difference between highest and lowest measurements) for aggregate gradation and asphalt cement content.

Control charts shall be posted in a location satisfactory to the Engineer and shall be kept current. As a minimum, the control charts shall identify the project number, the contract item number, the test number, each test parameter, the Action and Suspension Limits applicable to each test parameter, and the Contractor's test results. The Contractor shall use the control charts as part of a process control system for identifying potential problems and assignable causes before they occur. If the Contractor's projected data during production indicates a problem and the Contractor is not taking satisfactory corrective action, the Engineer may suspend production or acceptance of the material.

a. **Individual Measurements.** Control charts for individual measurements shall be established to maintain process control within tolerance for aggregate gradation and asphalt cement content. The control charts shall use the JMD target values as indicators of central tendency for the following test parameters with associated Action and Suspension Limits:

CONTROL CHART LIMITS FOR INDIVIDUAL MEASUREMENTS

Sieve	Action Limit	Suspension Limit
3/4 in.	0%	0%
1/2 in.	+/-6%	+/-9%

3/8 in.	+/-6%	+/-9%
No. 4	+/-6%	+/-9%
No. 16	+/-5%	+/-7.5%
No. 50	+/-3%	+/-4.5%
No. 200	+/-2%	+/-3%
Asphalt Cement Content	+/-0.45%	+/-0.70%

The action and suspension limits for the largest sieve specified are 0%.

b. Range. Control charts for range shall be established to control process variability for the test parameters and Suspension Limits listed below. The range shall be computed for each lot as the difference between the two test results for each control parameter. The Suspension Limits specified below are based on a sample size of n = 4.

CONTROL CHART LIMITS BASED ON RANGE
(Based on n = 4)

Sieve	Suspension Limit
1/2 in.	14%
3/8 in.	14%
No. 4	14%
No. 16	11%
No. 50	8%
No. 200	4.5%
Asphalt Cement Content	1%

c. Corrective Action. The Quality Control Plan shall indicate that appropriate action shall be taken when the process is believed to be out of tolerance. The Plan shall contain sets of rules to gauge when a process is out of control and detail what action will be taken to bring the process into control. As a minimum, a process shall be deemed out of control and production stopped and corrective action taken, if:

(1) One point falls outside the Suspension Limit line for individual measurements or range; or
(2) Two points in a row fall outside the Action Limit line for individual measurements.

METHOD OF MEASUREMENT

401-7.1 Hot Mix Asphalt. The quantity of hot mix asphalt will be measured by the number of tons used in the accepted work, based on recorded truck scale weights. No deduction will be made for the weight of asphalt cement in the hot mix asphalt.

401-7.2 Asphalt Cement. The quantity of asphalt cement will be measured by the number of tons used in the accepted hot mix asphalt, determined as follows:

a. Supplier's invoices minus waste, diversion and excess left over. This method may be used on projects where deliveries are made in sealed tankers and the plant is producing material for one project only. Method b. will be used to compute left over. Waste and diversion will be computed in a manner determined by the Engineer.

b. Volume measure (tank stickings) of actual daily uses. It is the Contractor's responsibility to notify the Engineer whenever material is to be added to the calibrated volume measure or whenever material from the volume measure is to be used for work other than that specified in this contract.

c. Percent of asphalt cement for each sublot as determined by ATM 405 or WAQTC FOP for AASHTO T 308 multiplied by the weight represented by that sublot. The same tests used for acceptance testing of asphalt cement content will be used for calculation of the asphalt cement quantity. If retesting of a sample for asphalt cement content is performed, the retest result will be used for calculating the asphalt cement quantity.

Method c. will be used for determining asphalt cement quantity unless otherwise directed in writing by the Engineer. No payment will be made for a portion of asphalt cement that is more than 0.4% above the optimum asphalt cement content specified in the JMD. When acceptance testing is not required because of the small quantity of hot mix asphalt used, the percent of asphalt cement used in the calculation will be the optimum asphalt cement content specified in the JMD.

The method initially used will be used for the duration of the project.

401-7.3 Longitudinal Joint. The quantity of joint will be measured by the lineal foot of longitudinal joint in the accepted top layer. A joint is defined as the vertical intersection of two new hot mix asphalt panels. Transverse joints in any layer, and longitudinal joints in underlying layers, are not included. Joints next to buildings, sidewalks, existing asphalt pavement, or curb and gutter are not included.

BASIS OF PAYMENT

401-8.1 HOT MIX ASPHALT. Payment for an accepted lot of hot mix asphalt will be made at the contract unit price per ton for hot mix asphalt. The quantity of hot mix asphalt paid for will not exceed 105 percent of the weight determined on the basis of average core density, the specified neat line thickness, and the completed area of hot mix asphalt.

The Engineer will adjust Contract Item P-401b ~~for hot mix asphalt according to~~ Hot Mix Asphalt Price Adjustment according to Subsection 401-8.1.a.

The price will be compensation for furnishing all materials, for all preparation, mixing, placing, and compaction of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

a. **Basis of Adjusted Payment for Hot Mix Asphalt.** The total hot mix asphalt price adjustment is the sum of the individual lot price adjustments, and will be added or deducted under Item P-401b, Hot Mix Asphalt Price Adjustment.

   The lot Pay Factors for density, gradation and asphalt cement content are determined from Table ~~7~~8 using Percent Within Limits (PWL) calculated from Section 110 of the General Provisions. The tolerance limits for the largest sieve specified will be plus 0 and minus 1 when performing PWL calculations. The maximum pay factor for the largest sieve size for gradation will be 1.00. The price adjustment will be based on the Composite Pay Factor (CPF) for asphalt cement content and aggregate gradation or the Density Pay Factor (DPF), whichever is the lowest value. CPF and DPF is rounded to the nearest hundredth. Table ~~8~~9 is used to determine the weight factor (f) for each sieve size and asphalt cement content.

   The hot mix asphalt Composite Pay Factor (CPF) is computed for asphalt cement content and all sieves using the following formula:

$$\text{CPF} = \frac{\left|f_{3/4in}\left(PF_{3/4in}\right)+f_{1/2in}\left(PF_{1/2in}\right)+\ldots\ldots f_{ac}\left(PF_{ac}\right)\right|}{\Sigma f}$$

TABLE ~~7~~ 8. PRICE ADJUSTMENT SCHEDULE

Percentage of Material Within the Specification Limit (PWL)	Pay Factor (PF)
96-100	1.05
90-95	0.01 PWL + 0.10
75-89	0.005 PWL + 0.55
55-74	0.014 PWL - 0.12
Below 55	0*

* If the Composite Pay Factor or the Density Pay Factor falls below 0.65, the lot shall be removed and replaced. If the Engineer decides that the lot can be left in place, the Pay Factor for the lot will be 0.50.

TABLE ~~8~~ 9. WEIGHT FACTORS

Sieve Size	Type I	Type II and Type V	Type III
	Factor "f"	Factor "f"	Factor "f"
1 in.	4		
¾ in.	4	4	
½ in.	4	5	4
3/8 in.	4	5	5
No. 4	4	4	5
No. 8	4	4	5
No. 16	4	4	5
No. 30	4	5	6
No. 50	4	5	6
No. 100	4	4	4
No. 200	20	20	20
Asphalt %	40	40	40

The price adjustment for each individual lot will be calculated as follows:

Price Adjustment = [(CPF or DPF)* -1] x (tons in lot) x (PAB)

PAB = Price Adjustment Base per ton (for mix including asphalt cement)

~~PAB for Hot Mix Asphalt with PG 52-28 = $45.00~~
~~PAB for Hot Mix Asphalt with PG 58-28 = $55.00~~
~~PAB for Hot Mix Asphalt with PG 64-28 = $60.00~~

PAB = Price Adjustment Base = $128.00 per ton Hot Mix Asphalt Type II, Class A
PAB = Price Adjustment Base = $128.00 per ton Hot Mix Asphalt Type V, Class S

* Composite Pay Factor (CPF) or Density Pay Factor (DPF), whichever is lower value.

401-8.2 ASPHALT CEMENT. Payment for an accepted lot of asphalt cement will be made at the contract unit price per ton for asphalt cement.

The Engineer will adjust Contract Item P-401b for asphalt cement property according to Subsection 401-8.2.a. The Engineer will adjust Contract Item P-401b for asphalt cement content according to Subsection 401-8.1.a.

The price will be compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the item.

a. **Basis of Adjusted Payment for Asphalt Cement Property.** Asphalt cement property pay reduction factors for each lot will be determined from Table ~~9~~ 10. The total asphalt cement price adjustment is the sum of the individual lot price adjustments, and will be deducted under Item P-401b, Hot Mix Asphalt Price Adjustment.

TABLE ~~9~~ 10. ASPHALT CEMENT PROPERTY 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	0.10	0.25	Reject or Engr Eval
Tests On Original Binder										
Viscosity	≤3 Pa-s	≤3		>3						
Dynamic Shear	≥1.00 kPa	≥1.00		0.88-0.99				0.71-0.87	0.50-0.70	<0.50
Toughness	≥110 in-lbs	≥93.5	90.0-93.4	85.0-89.9	80.0-84.9	75.0-79.9	70.0-74.9			<70.0
Tenacity	≥75 in-lbs	≥63.8	61.0-63.7	58.0-60.9	55.0-57.9	52.0-54.9	48.0-51.9			<48.0
Tests On RTFO										
Mass Loss	≤1.00 %	≤1.00		1.001-1.092				1.093-1.184	1.185-1.276	>1.276
Dynamic Shear	≥2.20 kPa	≥2.20		1.816-2.199				1.432-1.815	1.048-1.431	<1.048
Test On PAV										
Dynamic Shear	≤5000 kPa	≤5000		5001-5289				5290-5578	5579-5867	>5867
Creep Stiffness, S	≤300 Mpa	≤300		301-338				339-388	389-450	>450
Creep Stiffness, m-value	≥0.300	≥0.300		0.287-0.299				0.274-0.286	0.261-0.273	<0.261
~~Direct Tension~~	~~≥1.0 %~~	~~≥1.0~~		~~0.86-0.99~~				~~0.71-0.85~~	~~0.56-0.70~~	~~<0.56~~

Asphalt Cement Property Price Adjustment for each lot = 5 x PAB x Qty X PRF (Always a deduct.)

PAB = Price Adjustment Base (See Subsection 401-8.1.a.)
Qty = Quantity of asphalt cement represented by lot
PRF = Pay Reduction Factor from Table ~~9~~10

~~Failing asphalt cement test results will be re-evaluated if requested. Submit a written request within 14 calendar days of receiving a failing asphalt cement test result. Include all quality control test results for the project and the test results from an AASHTO accredited laboratory for the Contractor sample collected at the same time the sample for acceptance testing was collected. All costs associated with this testing are subsidiary to the Hot Mix Asphalt pay item. Accreditation will be in the applicable test methods. The Engineer will review the data and decide if the price reduction remains.~~

~~The Engineer's decision may be contested, in which case the referee sample will be sent to a mutually agreed upon independent AASHTO accredited laboratory for testing. The resulting test results will be binding. If the sample fails to meet specifications, all costs associated with this testing will be deducted under Item P-401b, Hot Mix Asphalt Price Adjustment.~~

Asphalt Cement Appeal Procedure. Once notified of a failing test result of an asphalt cement sample, you may elect to submit a written appeal within 21 days. The appeal must be accompanied by all contractor quality control test results and a test result of your sample of this lot tested by an asphalt laboratory that is

AASHTO accredited in the test procedure in question. All costs associated with this testing are subsidiary to the Hot Mix Asphalt pay item. The Engineer will review these test results and use ASTM D 3244 to determine a test value upon which to base a price reduction. If you challenge this value, then the referee sample held by the Engineer will be sent to a mutually agreed upon independent AASHTO accredited laboratory for testing. This test result will be incorporated into the ASTM D 3244 procedure to determine a test value upon which to base a price reduction. If this final value incurs a price adjustment, the results are binding and you will pay for the cost of testing the referee sample as a deduction under item P-401b Hot Mix Asphalt Price Adjustment.

401-8.3 LONGITUDINAL JOINT. The cost for all joints is subsidiary to hot mix asphalt, no payment will be made.

The Engineer will adjust Contract Item P-401b for longitudinal joint density according to Subsection 401-8.3.a.

The subsidiary cost includes furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the item.

a. **Basis of Adjusted Payment for Longitudinal Joints.** Longitudinal joint density lots in the top layer that average less than ~~90~~91% of MSG will be assessed a price adjustment of $5.00 per foot. The accrued amount will be deducted under Item P-401b, Hot Mix Asphalt Price Adjustment.

Longitudinal joint density lots in the top layer that average greater than ~~92~~91% of MSG will have an incentive of $1.00 per foot applied. The accrued amount will be added under Item P-401b, Hot Mix Asphalt Price Adjustment.

401-8.4 PAYMENT. Payment will be made under:

Item P-401a(1)	Hot Mix Asphalt Type V, Class S- per ton
Item P-401a(2)	Hot Mix Asphalt Type II, Class A - per ton
Item P-401b	Hot Mix Asphalt Price Adjustment - contingent sum
Item P-401c(1)	Asphalt Cement PG 64-34 - per ton
Item P-401c(2)	Asphalt Cement PG 52-34 - per ton
Item P-401e	Asphalt Cement Price Adjustment – contingent sum

401-9.1 ASPHALT MATERIAL PRICE ADJUSTMENT. This subsection provides a price adjustment for asphalt material by: (1) additional compensation to the contractor or (2) a deduction from the contract amount. The terms "asphalt material" and "asphalt cement" are used interchangeably as they apply to the asphalt material price adjustment.

1. This provision shall apply to asphalt material meeting the criteria of Section 401-2.3, and is included in items listed in the bid schedule of Sections P-602, P-603, P-609, and P-626.

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

3. The asphalt material price adjustment will only apply when:

   a. There is more than 500 tons of asphalt material in the bid schedule of Sections described in Item 1; and

   b. There is more than a seven and one half percent (7.5%) increase or decrease in the Alaska Asphalt Material Price Index, AAMPI, from the date of bid opening to the date the asphalt material is incorporated into the project.

4. The AAMPI is calculated bi-monthly on the first and third Friday of each month, and is in effect from the day of calculation until the next bi-monthly calculation. The AAMPI is posted on the Department's Statewide Materials website and is calculated according to the formula posted there. Posting of new AAMPI values after the first and third Friday of each month is typically delayed one to several days. Any delay in the Department's posting of an updated AAMPI value shall not constitute grounds for using any value other than the value in effect as described in this specification.

5. Price adjustment will be cumulative and calculated with each progress payment.

   For projects where asphalt material is purchased from a commercial plant serving multiple customers, use the AAMPI in effect on the last day of the pay period to calculate price adjustment for asphalt material incorporated into the project during that pay period. For projects where the asphalt material is purchased in advance of incorporating it into the project, use the AAMPI in effect on the last day of the pay period when the asphalt material was purchased. Submit the asphalt material purchase invoice, showing the date purchased, to the Engineer to identify the pay period when the asphalt material was purchased. The Department will increase or decrease payment under this contract by the amount determined with the following asphalt material price adjustment formula:

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

   Where:
   Q = Quantity of Asphalt Material incorporated into project during the pay period, in tons
   IB = Index at Bid: the Bi-monthly AAMPI in effect on date of bid, in dollars per ton
   IPP = Index at Pay Period: the Bi-monthly AAMPI in effect on the last day of the pay period, in dollars per ton

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

7. Basis of payment is:

   Item P-401e Asphalt Cement Price Adjustment — Contingent Sum

TESTING REQUIREMENTS

WAQTC FOP for AASHTO T 2	Sampling Aggregates
WAQTC FOP for AASHTO T 27/T 11	Sieve Analysis of Aggregate and Soils
WAQTC FOP for AASHTO T 30	Mechanical Analysis of Extracted Aggregate
WAQTC FOP for AASHTO T 40	Sampling Bituminous Materials
WAQTC FOP for AASHTO TP 61	Percentage of Fracture in Coarse Aggregate
WAQTC FOP for AASHTO T 89	Liquid Limit of Soils
WAQTC FOP for AASHTO T 90	Plastic Limit and Plasticity Index of Soils

WAQTC FOP for AASHTO T 166/T 275 Bulk Specific Gravity and Percent Compaction of Bituminous Mixes

WAQTC FOP for AASHTO T 168 Sampling Bituminous Mixes

WAQTC FOP for AASHTO T 176 Sand Equivalent

WAQTC FOP for AASHTO T 209 Maximum Specific Gravity of Bituminous Mixes

WAQTC FOP for AASHTO T 255/T 265 Moisture Content of Aggregate and Soils

WAQTC FOP for AASHTO T 308 Asphalt Binder Content of Bituminous Mixes by Ignition Method

WAQTC FOP for AASHTO T 329 Moisture Content of Hot-Mix Asphalt (HMA) by Oven Method

WAQTC TM 8 In-Place Density of Bituminous Mixes using the Nuclear Moisture-Density Gauge.

ATM 306 Flat and Elongated

ATM 313 Degradation Value of Aggregate

ATM 405 Asphalt Cement Content of Asphalt Concrete Mixtures by the Nuclear Method

ATM 414 Anti-Strip Requirements of Hot Mix Asphalt

ATM 417 Hot Mix Asphalt Design by the Marshall Method

ATM SP-7 Determination of Outlier Test Results

AASHTO T 53 Softening Point of Bitumen (Ring-and-Ball Apparatus)

AASHTO T 96 Resistance to Degradation of Small-size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine

AASHTO T 104 Soundness of Aggregate by Use of Sodium Sulfate or Magnesium Sulfate

AASHTO T 127 Sampling and Amount of Testing of Hydraulic Cement

AASHTO M 156 Requirements for Mixing Plants for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures

AASHTO T 195 Determining Degree of Particle Coating of Bituminous-Aggregate Mixtures

AASHTO M 320 Performance-Graded Asphalt Binder

ASTM D 3244 Utilization of Test Data to Determine Conformance with Specifications

ASTM D 5801 Test Method for Toughness and Tenacity of Bituminous Materials

The Asphalt Institute *Mix Design Methods for Asphalt Concrete Manual No. 2 (MS-2)*

The Asphalt Institute *Hot-Mix Recycling Manual No. 20 (MS-20)*

MATERIAL REQUIREMENTS

AASHTO R 14 Classifying Hot-Mix Recycling Agents

AASHTO M 17 Mineral Filler for Bituminous Paving Mixtures

ITEM P-501 PORTLAND CEMENT CONCRETE PAVEMENT

DESCRIPTION

501-1.1 This work shall consist of pavement composed of portland cement concrete, without reinforcement, constructed on a prepared underlying surface according to these specifications and shall conform to the lines, grades, thickness, and typical cross sections shown on the Plans.

MATERIALS

501-2.1 AGGREGATES.

a. **Fine Aggregate.** Fine aggregate shall conform to the requirements of AASHTO M 6, Class A, except part a in Table 2 is deleted. Gradation shall meet the requirements of Table 1 when tested according to WAQTC FOP for AASHTO T 27/T 11, except as may otherwise be qualified under Section 5.

b. **Coarse Aggregate.** Coarse aggregate shall conform to the requirements of AASHTO M 80, Class B. Gradations shall meet the requirements of AASHTO M 43, Number 57 or 67, when tested according to WAQTC FOP for AASHTO T 27/T 11.

Aggregates delivered to the mixer shall consist of crushed stone, crushed or uncrushed gravel, crushed recycled concrete pavement, or a combination thereof. The aggregate shall be composed of clean, hard, uncoated particles and shall meet the requirements for deleterious substances contained in AASHTO M 80, Class A. Dust and other coating shall be removed from the aggregates by washing, if necessary. The aggregate in any size group shall not contain more than 8% by weight of flat and elongated pieces when tested according to ATM 306. The percentage of wear shall be no more than 40 when tested according to AASHTO T 96.

c. **Reactivity: Fine and Coarse aggregates to be used in all concrete shall be evaluated and tested by the Contractor for alkali-aggregate reactivity in accordance with ASTM C 1260. The laboratory conducting the tests shall be accredited under ASTM C 1077. Fine and coarse aggregates shall be evaluated separately in accordance to the standard ASTM C 1260 and a modified method of ASTM C 1260 which substitutes a 50% (by weight) potassium acetate soak solution as described in FAA Engineering Brief No. 70. In addition each aggregate source shall be evaluated separately. Test results that have a measured expansion of less than 0.10 percent at 28 days meet the requirements of these specifications. Should any of the test data indicate an expansion of greater than 0.10 percent, the aggregates shall be rejected or additional testing, by the Contractor utilizing ASTM C 1567 shall be performed.**

ASTM C 1567 shall be used to include one of the three options (or approved combinations of the options) below for each individual fine and coarse aggregates. The test requires at least one comparator reading every 3 or 4 days and a comparator reading at 28 days after the zero reading. The report shall include a graph of percent length change data at each reading from the time of the zero reading to the end of the 28-day period.

(1). Proportioning of Mortar. Utilize the contractor's proposed low alkali Portland cement and Class "F" flyash in combination for the test proportioning. The laboratory shall use 1 part of cementitious materials (the contractor's proposed percentage of Portland cement plus flyash) to 2.25 parts of graded aggregate. Use a water-cementitious materials ratio equal to 0.47 by mass. The cementitious material combination shall be determined that will meet all the requirements of these specifications and that which will lower the expansion to

less than 0.10 percent at 28 days for each individual aggregate. Class "F" flyash shall be used at a minimum rate of 20 percent of the total cementitious material by mass.

(2). Proportioning of Mortar. Utilize the contractor's proposed low alkali Portland cement and ground granulated blast furnace (GGBF) slag cement in combination for the test proportioning. The laboratory shall use 1 part of cementitious materials (the contractor's proposed percentage of Portland cement plus GGBF slag) to 2.25 parts of graded aggregate. Use a water-cementitious materials ratio equal to 0.47 by mass. The cementitious material quantity shall be that which will meet all the requirements of these specifications and that which will lower the expansion to less than 0.10 percent at 28 days for each individual aggregate.

(3). Proportioning of Mortar. May utilize a high alkali Portland cement (0.9% total alkali +/- 0.1%) and a lithium nitrate admixture. The lithium nitrate admixture may be used in combination with either Class "F" flyash, Class N pozzolan, or ground granulated blast furnace (GGBF) slag, at a dosage rate as recommended by the supplier. The dosage rate is defined in terms of percent of the standard dose. (100% of the standard dose is equal to 0.74 moles of lithium ion per mole of the sum of the sodium plus potassium ions supplied by the Portland cement. This is equivalent to 0.55 gallon of the lithium nitrate-based admixture described below for every pound of sodium equivalent in the Portland cement. The sodium equivalent is the mass of sodium oxide plus 0.658 times the mass of potassium oxide in the Portland cement. The metric equivalent is 4.6 liters of the lithium nitrate-based admixture per kilogram of sodium equivalent supplied by the Portland cement.) The lithium admixture shall be a nominal 30 percent aqueous solution of Lithium nitrate, with a density of 1.2 kilograms per liter, 10 pounds per gallon, and shall have the approximate chemical form as shown below:

Constituent Limit (Percent by Mass)
LiNO3 (Lithium Nitrate) 30 +/- 0.5
SO (Sulfate Ion) 0.1 (max)
Cl (Chloride Ion) 0.2 (max)
Na (Sodium Ion) 0.1 (max)
K (Potassium Ion) 0.1 (max)

The lithium-nitrate admixture supplier shall provide a trained representative to supervise the lithium nitrate admixture dispensing and mixing operations.

The laboratory shall use 1 part of cementitious materials (the contractor's proposed percentage of cement, flyash, pozzolan, and/or slag) to 2.25 parts of graded aggregate. To maintain the 0.47 w/c, the water content of the lithium nitrate admixture shall be included as part of the total mixing water. This is equal to 70% of the weight of the lithium nitrate admixture if done on a mass basis, or 85% of the volume of the lithium nitrate admixture if done on a volume basis.

In addition, include the lithium nitrate admixture in the NaOH soak solution at 0.37 Li: 1.0 Na molar ratio times the decimal equivalent of the percentage of the standard dose used in the mortar, while maintaining the NaOH concentration at 1 normal. (71 ml of the lithium nitrate admixture contains 0.37 mole of Li ion. 40 g of NaOH equals one mole of Na ion. Thus the modified soak solution will contain 40 g of NaOH, and 71, multiplied by the decimal equivalent of the standard dose, ml of the lithium admixture per liter.)
(Note - The mass of sodium equivalent in the mortar, which is used to calculate the volume of lithium admixture to add to the mortar, is based on the mass of sodium equivalent from the

Portland cement only, and does not include the mass of sodium equivalent from any supplementary cementitious components.)
(Note – the molar sodium equivalent is the number of moles of Na plus the number of moles of K. On a weight basis, the sodium equivalent equals the total alkali content of the cement, i.e., the wt% Na2O + 0.658 * K2O. Thus the number of moles of sodium equivalent in the cement equals the grams of sodium equivalent divided by 31 (Na2O has a molecular weight of 62, and contains 2 moles of Na per mole). The number of moles of Li in a 30 wt% aqueous solution is 4.35 moles per kg of solution, or 5.22 moles per liter of solution.)

If any of the above testing options does not lower the expansion to less than 0.10 percent at 28 days for individual aggregate the aggregate shall be rejected and the contractor shall submit new aggregate sources and retest. The results of testing shall be submitted to the Engineer for evaluation and acceptance

501-2.2 CEMENT. Cement shall conform to the requirements of AASHTO M 85 including the low-alkali requirement.

If for any reason, cement becomes partially set or contains lumps of caked cement, it shall be rejected. Cement salvaged from discarded or used bags shall not be used.

501-2.3 CEMENTITIOUS MATERIALS.

a. Fly ash shall meet the requirements of AASHTO M 295, Class ~~C~~ N or Class F, except that the moisture content shall be 1% maximum and the amount retained on the No. 325 sieve when wet-sieved is 30% maximum and loss of ignition, shall be less than 6 percent. The supplementary optional chemical and physical properties shall apply. Fly ash such as is produced in furnace operations utilizing liming materias or soda ash (sodium carbonate) as an additive will not be acceptable. The contractor shall furnish vendor's certified test reports for each shipment of Fly Ash used in the project. The vendor's certified test report can be used for acceptance or the material may be tested independently by the Engineer.
b. Blast Furnace Slag. Ground Granulated Blast Furnace Slag (GGBF) shall meet the requirements of ASTM C 989, Grade 100 or 120. GGBF shall be used only at a rate between 25 and 55 percent of the total cementitious material by mass.

501-2.4 PREMOLDED JOINT FILLER. Premolded joint filler for expansion joints shall conform to the requirements of AASHTO M 213 and shall be punched to admit the dowels where called for on the Plans. The filler for each joint shall be furnished in a single piece for the full depth and width required for the joint, unless otherwise specified by the Engineer. When the use of more than one piece is required for a joint, the abutting ends shall be fastened securely and held accurately to shape by stapling or other positive fastening means satisfactory to the Engineer.

501-2.5 JOINT SEALER. The joint sealer for the joints in the concrete pavement shall meet the requirements of Item P-605 and shall be of the type(s) specified in the Plans.

501-2.6 STEEL REINFORCEMENT. Reinforcing shall consist of Welded Steel Wire Fabric conforming to the requirements of AASHTO M 55 or Deformed Bars conforming to the requirements of AASHTO M 31, Grade 60. Welded wire fabric shall be furnished in flat sheets only.

501-2.7 DOWEL AND TIE BARS. Tie bars shall be deformed steel bars and conform to the requirements of AASHTO M 31 or AASHTO M 322.

Dowel bars shall be plain steel bars conforming to AASHTO M 31 or AASHTO M322, and shall be free from burring or other deformation restricting slippage in the concrete. High strength dowel bars shall conform to AASHTO M 31, Bare Finish. Before delivery to the construction site each dowel bar shall be painted on all

surfaces with one coat of paint meeting ~~Federal Specification TT-P-664~~ SSPC-Paint 25. If plastic or epoxy-coated steel dowels are used no paint coating is required, except when specified for a particular situation on the contract Plans. Coated dowels shall conform to the requirements of AASHTO M 254.

The sleeves for dowel bars used in expansion joints shall be metal or other type of an approved design to cover 2 to 3 inches of the dowel, with a closed end and with a suitable stop to hold the end of the bar at least 1 inch from the closed end of the sleeve. Sleeves shall be of such design that they will not collapse during construction.

501-2.8 WATER. Water used in mixing or curing shall be clean and free of oil, salt, acid, alkali, sugar, vegetable, or other substances injurious to the finished product. Water will be tested according to the requirements of AASHTO T 26. Water known to be of potable quality may be used without testing.

501-2.9 COVER MATERIAL FOR CURING. Curing materials shall conform to one of the following specifications:

a. Liquid membrane-forming compound conforming to AASHTO M 148, Type 2, Class B.
b. White polyethylene film conforming to AASHTO M 171.
c. White burlap-polyethylene sheeting conforming to AASHTO M 171.
d. Waterproof paper conforming to AASHTO M 171

501-2.10 ADMIXTURES. The use of any material added to the concrete mix shall be approved by the Engineer. The Contractor shall submit certificates indicating that the material to be furnished meets all of the requirements indicated below. In addition, the Engineer may require the Contractor to submit complete test data from an approved laboratory showing that the material to be furnished meets all of the requirements of the cited specifications. Subsequent tests may be made of samples taken by the Engineer from the supply of material being furnished or proposed for use on the work to determine whether the admixture is uniform in quality with that approved.

a. Air-Entraining Admixtures. Air-entraining admixtures shall meet the requirements of AASHTO M 154 and shall consistently entrain the air content in the specified ranges under field conditions. The air-entrainment agent and any chemical admixtures shall be compatible.

b. Chemical Admixtures. Water-reducing, set retarding, and set-accelerating admixtures shall meet the requirements of AASHTO M 194, including the flexural strength test.

501-2.11 EPOXY-RESIN. Epoxy-resin used to anchor dowels and tie bars in pavements shall conform to the requirements of AASHTO M 235, Type I, Grade 3, Class C. Class A or B shall be used when the surface temperature of the hardened concrete is below 60 °F.

501-2.12 SURFACE SEALER. Provide a liquid applied, water soluble hydrophobic pore lining impregnate that is specifically formulated to protect concrete from the detrimental effects of moisture intrusion, freeze-thaw cycles, chloride ion penetration, and deicing chemicals. Provide Pavix CCC100 manufactured by Chem-Crete, Hydrozo Enviroseal 40 by Chemrex, or an Engineer approved product containing 40 percent silane meeting AASHTO T 259 ASTM C 642, and ASTM C 672.

501-~~2.12~~2.13 MATERIAL ACCEPTANCE. Prior to use of materials, the Contractor shall submit certified test reports to the Engineer for those materials proposed for use during construction. The certification shall show the appropriate ~~ASTM~~ AASHTO test(s) for each material, the test results, and a statement that the material passed or failed.

The Engineer may request samples for testing, prior to and during production, to verify the quality of the materials and to ensure conformance with the applicable specifications.

MIX DESIGN

501-3.1 PROPORTIONS. Concrete shall be ~~normal weight concrete~~ designed to achieve a ~~28~~ 28-day flexural strength of ~~735~~ 730 psi. The mix shall be designed using the procedures contained in the Portland Cement Association's manual, *Design and Control of Concrete Mixtures.* ~~according to the American Concrete Institute (ACI) Pub. 301 Section 4, and ACI Pub. 214 using the absolute volume method per ACI Pub. 211.1.~~ Acceptance of the concrete will be based on a 28-day flexural strength of ~~645~~ 650 psi.

The Contractor shall note that to ensure that the concrete actually produced will meet or exceed the acceptance criteria for the specified strength, the mix design average strength must be 730 psi or higher than the specified strength. The amount of overdesign necessary to meet specification requirements depends on the producer's standard deviation of flexural test results and the accuracy which that value can be estimated from historic data for the same or similar materials.

The minimum cementitious material (cement plus fly ash) shall be ~~564~~ 565 lbs/yd^3. The ratio of water to cementitious material, including free surface moisture on the aggregates but not including moisture absorbed by the aggregates shall not be more than ~~0.50~~ 0.45 by weight.

Prior to the start of paving operations and after approval of all material to be used in the concrete, the Contractor shall submit a mix design showing the proportions and flexural strength obtained from the concrete at 7 and 28 days. The mix design shall include copies of test reports, including test dates, and a complete list of materials including type, brand, source, and amount of cement, fly ash, coarse aggregate, fine aggregate, water, and admixtures. The fineness modulus of the fine aggregate and the air content shall also be shown. The mix design shall be submitted to the Engineer at least 40 days prior to the start of operations. Production shall not begin until the mix design is approved in writing by the Engineer.

Should a change in sources be made, or admixtures added or deleted from the mix, a new mix design must be submitted to the Engineer for approval.

Flexural strength test specimens shall be prepared according to WAQTC FOP for AASHTO T 23 and tested according to AASHTO T 97. Rigid steel molds shall be used in forming beams.

501-3.2 CEMENTITIOUS MATERIALS. ~~Fly ash may be used in the mix design. When fly ash is used as a partial replacement for cement, the minimum cement content may be met by considering portland cement plus fly ash as the total cementitious material. The fly ash replacement rate shall be 1.0-1.25 for Class C and 1.25 for Class F. Fly ash substitution shall not exceed 20% by weight of the portland cement.~~

a. Fly Ash. Fly ash may be used in the mix design. When fly ash is used as a partial replacement for cement, the minimum cement content may be met by considering Portland cement plus fly ash as the total cementitious material. The replacement rate shall be determined from laboratory trial mixes, but shall be between 20 and 30 percent by weight of the total cementitious material. If fly ash is used in conjunction with ground granular blast furnace slag the maximum replacement rate shall not exceed 10 percent by weight of total cementitious material.

b. Ground Slag. Ground blast-furnace slag may be used in a mix design containing Type I or Type II cement. The slag, or slag plus fly ash if both are used, may constitute between 25 to 55 percent of the total cementitious material by weight. If the concrete is to be used for slipforming operations and the air temperature is expected to be lower than 55 degrees F (13 degrees C) the percent slag shall not exceed 30 percent by weight.

501-3.3 ADMIXTURES.

a. **Air-Entraining.** Air-entraining admixture shall be added in such a manner that will insure uniform distribution of the agent throughout the batch. The air content of freshly mixed air-entrained concrete shall be based upon trial mixes with the materials to be used in the work adjusted to produce

concrete of the required plasticity and workability. The percentage of air in the mix shall be 5-8. Air content shall be determined by testing according to WAQTC FOP for AASHTO T 152.

b. **Chemical.** Water-reducing, set-controlling, and other approved admixtures shall be added to the mix in the manner recommended by the manufacturer and in the amount necessary to comply with the specification requirements. Tests shall be conducted on trial mixes, with the materials to be used in the work, according to AASHTO M 194.

501-3.4 TESTING LABORATORY. The laboratory used to develop the mix design shall meet the requirements of ASTM C 1077. A certification that it meets these requirements shall be submitted to the Engineer prior to the start of mix design and shall contain as a minimum:

a. Qualifications of personnel; laboratory manager, supervising technician, and testing technicians.

b. A statement that the equipment used in developing the mix design is in calibration.

c. A statement that each test specified in developing the mix design is offered in the scope of the laboratory's services.

d. A copy of the laboratory's quality control system.

501-3.5 PRE-PAVING MEETING. A pre-paving meeting will be conducted after approval of the mix design and before constructing the test sections. This meeting will be attended by the Contractor, material suppliers, subcontractors associated with the concrete, the Engineer and the testing laboratory. The mix design, paving plan, procedures for construction, curing process to be used, calibration and inspection of equipment, testing and inspection of the test sections, and full production paving will be discussed. The chain of command for both the Contractor and the State will be outlined. Contingency scenarios will also be discussed.

501-3.6 PAVING PLAN. The Contractor shall submit a paving plan that includes all paving operations, at the Notice to Proceed, to the Engineer. The plan shall detail the paving sequence of operations, locations, methods of forming specific areas, approximate materials quantities and other project work that must be completed before paving. The plan shall indicate interconnections will the master project schedule. The plan shall be signed and dated by the Contractor's Project Manager.

501-3.7 TEST SECTION. Following review and approval of the pavement mix designs, the Contractor shall construct a test section for each of the mix designs as follows:

During the construction of the test sections, the Contractor shall demonstrate to the Engineer's satisfaction all requirements listed in this specification.

The test sections shall be part of the initial concrete placement in the first paving operation. It shall be approximately 100 feet in length and the width of the Contractor's maximum proposed paving lane width. The test sections shall have the same depth as specified for the construction of the course.

The grade or pavement structure underlying the test sections and the conditions of placed shall be the same as is specified in the work areas represented by the test section. The equipment and personnel used to construct the test sections shall be the same used in the remainder of the represented course.

The test sections shall cure in-place for 5 days before full paving operations will be approved.

If the test sections should prove to be unsatisfactory, the necessary adjustments to the mix design, plant operations and/or placing procedures shall be made. Additional test sections, as required, shall be constructed and evaluated for conformance to the specifications. When test sections do not conform to the

specification requirements, the pavement shall be removed and replaced at the Contractor's expense. If the test sections are acceptable the concrete will be paid for at the specified contract unit price. Full production shall not begin without the Engineer's approval of the test section.

CONSTRUCTION METHODS

501-4.1 EQUIPMENT. The Contractor shall furnish all equipment and tools necessary for handling materials and performing all parts of the work.

a. **Batch Plant and Equipment.** The batch plant and equipment shall conform to the requirements of AASHTO M 157.

b. **Mixers and Transportation Equipment.**

(1) **General.** ~~Concrete may be mixed at a central plant, or wholly or in part in truck mixers. Each mixer shall have attached in a prominent place a manufacturer's nameplate showing the capacity of the drum in terms of volume of mixed concrete and the speed of rotation of the mixing drum or blades.~~ Concrete shall be mixed at a central plant.

(2) **Central Plant Mixer.** Central plant mixers shall conform to the requirements of AASHTO M 157.The mixer shall be examined daily for changes in condition due to accumulation of hard concrete or mortar or wear of blades. The pickup and throwover blades shall be replaced when they have worn down 3/4 inch or more. The Contractor shall have a copy of the manufacturer's design on hand showing dimensions and arrangement of blades in reference to original height and depth.

(3) **Truck Mixers and Truck Agitators.** Truck mixers used for mixing and hauling concrete and truck agitators used for hauling central-mixed concrete shall conform to the requirements of AASHTO M 157.

(4) **Nonagitator Trucks.** Nonagitating hauling equipment shall conform to the requirements of AASHTO M 157.

c. **Finishing Equipment.** ~~The finishing equipment shall be of sufficient weight and power for proper finishing of the concrete. The finishing machine shall be designed and operated to strike off, screed and consolidate the concrete such that laitance on the surface is less than 1/8 inch thick.~~
The standard method of constructing concrete pavements shall be with an approved slip-form paving equipment designed to spread, consolidate, screed, and float-finish the freshly placed concrete in one complete pass of the machine so a dense and homogeneous pavement is achieved with a minimum of hand finishing. The paver-finisher shall be a heavy duty, self propelled machine designed specifically for paving and finishing high quality concrete pavements. It shall weigh at least 2200 lbs. per foot of paving lane width and powered by an engine having at least 6.0 horsepower per foot of lane width. In individual placement areas of less than 200 square yards, or irregular areas at locations inaccessible to slip-form paving equipment, Portland cement concrete pavement may be placed with approved placement and finishing equipment utilizing stationary side forms. Hand screeding and float finishing may only be utilized on small irregular areas as allowed by the Engineer.

d. **Vibrators.** Vibrator shall be either internal type with immersed tube or multiple spuds, or surface type vibrating pan or screed. For pavements 8 inches or more thick, internal vibrators shall be used. They may be attached to the spreader or the finishing machine, or they may be mounted on a separate carriage. Operating frequency for internal vibrators shall be between 8,000 and 12,000 vibrations per

minute. Average amplitude for internal vibrators shall be 0.025-0.05 inches. For pavements less than 8 inches thick, vibrating surface pans or screeds shall be allowed. Operating frequencies for surface vibrators shall be between 3,000 and 6,000 vibrations per minute.

The number, spacing, and frequency shall be as necessary to provide a dense and homogeneous pavement. Adequate power to operate all vibrators shall be available on the paver. The vibrators shall be automatically controlled so that they shall be stopped as forward motion ceases.

~~Hand held vibrators may be used in irregular areas.~~ Hand held vibrators shall be used only in irregular areas, against forms in reinforced slabs, around light fixtures, and other structures in the pavement, as necessary to achieve concrete consolidation where it cannot be achieved by equipment mounted vibrators. Use shall meet the recommendations of ACI 309, Guide for Consolidation of Concrete.

e. **Concrete Saws.** The Contractor shall provide sawing equipment adequate in number of units and power to complete the sawing to the required dimensions. The Contractor shall provide at least one standby saw in good working order and a supply of saw blades at the site of the work at all times during sawing operations.

f. **Side Forms.** Straight side forms shall be made of steel and shall be furnished in sections not less than 10 feet in length. Forms shall have a depth equal to the pavement thickness at the edge. Flexible or curved forms of proper radius shall be used for curves of 100 foot radius or less. Forms shall be provided with adequate devices for secure settings so that when in place they will withstand, without visible spring or settlement, the impact and vibration of the consolidating and finishing equipment. Forms with battered top surfaces and bent, twisted or broken forms shall not be used. Built-up forms shall not be used, except as approved by the Engineer. The top face of the form shall not vary from a true plane more than 1/8 inch in 10 feet, and the upstanding leg shall not vary more than 1/4 inch. The forms shall contain provisions for locking the ends of abutting sections together tightly for secure setting. Wood forms may be used under special conditions, when approved by the Engineer.

g. **Pavers.** The paver shall be fully energized, self-propelled, and designed for the specific purpose of placing, consolidating, and finishing the concrete pavement, true to grade, tolerances, and cross section. It shall be of sufficient weight and power to construct the maximum specified concrete paving lane width as shown in the Plans, at adequate forward speed, without transverse, longitudinal or vertical instability or without displacement. The paver shall be equipped with electronic or hydraulic horizontal and vertical control devices. The Contractor shall provide a certification from the manufacturer that the paver is designed for the proposed concrete paving lane width.

501-4.2 FORM SETTING. Forms shall be set sufficiently in advance of the concrete placement to insure continuous paving operation. After the forms have been set to correct grade, the underlying surface shall be thoroughly tamped, either mechanically or by hand, at both the inside and outside edges of the base of the forms. Forms shall be staked into place sufficiently to maintain the form in position for the method of placement.

Form sections shall be tightly locked and shall be free from play or movement in any direction. The forms shall not deviate from true line by more than 1/8 inch at any joint. Forms shall be so set that they will withstand, without visible spring or settlement, the impact and vibration of the consolidating and finishing equipment. Forms shall be cleaned and oiled prior to the placing of concrete.

The alignment and grade elevations of the forms shall be checked and corrections made by the Contractor immediately before placing the concrete.

501-4.3 CONDITIONING OF UNDERLYING SURFACE, SLIP-FORM CONSTRUCTION. The compacted underlying surface on which the pavement will be placed shall be widened approximately 3 feet to extend beyond the paving machine track to support the paver without any noticeable displacement. After the underlying surface has been placed and compacted to the required density, the areas which will support the paving machine and the area to be paved shall be trimmed or graded to the plan grade elevation and profile by means of a properly designed machine. The grade of the underlying surface shall be controlled by a positive grade control system using lasers, stringlines, or guide wires. If the density of the underlying surface is disturbed by the trimming operations, it shall be corrected by additional compaction and retested at the option of the Engineer before the concrete is placed except when stabilized subbases are being constructed. If damage occurs on a stabilized subbase, it shall be corrected full depth by the Contractor. ~~If traffic is~~ No traffic will be allowed to use the prepared grade, the grade shall be checked and corrected immediately before the placement of concrete. The prepared grade shall be moistened with water, without saturating, immediately ahead of concrete placement to prevent rapid loss of moisture from concrete. The underlying surface shall be protected so that it will be entirely free of frost when concrete is placed.

501-4.4 CONDITIONING OF UNDERLYING SURFACE, SIDE-FORM AND FILL-IN LANE CONSTRUCTION. The prepared underlying surface shall be moistened with water, without saturating, immediately ahead of concrete placement to prevent rapid loss of moisture from the concrete. Damage caused by hauling or usage of other equipment shall be corrected and retested at the option of the Engineers. If damage occurs to a stabilized subbase, it shall be corrected full depth by the Contractor. A template shall be provided and operated on the forms immediately in advance of the placing of all concrete. The template shall be propelled only by hand and not attached to a tractor or other power unit. Templates shall be adjustable so that they may be set and maintained at the correct contour of the underlying surface. The adjustment and operation of the templates shall be such as will provide an accurate retest of the grade before placing the concrete thereon. All excess material shall be removed and wasted. Low areas shall be filled and compacted to a condition similar to that of the surrounding grade. The underlying surface shall be protected so that it will be entirely free from frost when the concrete is placed. The use of chemicals to eliminate frost in the underlying surface shall not be permitted.

The template shall be maintained in accurate adjustment, at all times by the Contractor, and shall be checked daily.

501-4.5 HANDLING, MEASURING, AND BATCHING MATERIAL. The batch plant site, layout, equipment, and provisions for transporting material shall assure a continuous supply of material to the work. Stockpiles shall be constructed in such a manner that prevents segregation and intermixing of deleterious materials.

Aggregates that have become segregated or mixed with earth or foreign material shall not be used. All aggregates produced or handled by hydraulic methods, and washed aggregates, shall be stockpiled or binned for draining at least 12 hours before being batched. Rail shipments requiring more than 12 hours will be accepted as adequate binning only if the car bodies permit free drainage.

Batching plants shall be equipped to proportion aggregates and bulk cement, by weight, automatically using interlocked proportioning devices of an approved type. When bulk cement is used, the Contractor shall use a suitable method of handling the cement from weighing hopper to transporting container or into the batch itself for transportation to the mixer, such as a chute, boot, or other approved device, to prevent loss of cement. The device shall be arranged to provide positive assurance that the cement content specified is present in each batch.

501-4.6 MIXING CONCRETE. The concrete may be mixed at the work site, in a central mix plant or in truck mixers. The mixer shall be of an approved type and capacity. Mixing time shall be measured from the time all materials, except water, are emptied into the drum. All concrete shall be mixed and delivered to the site according to the requirements of AASHTO M 157. Mixed concrete from the central mixing plant shall be transported in truck mixers, truck agitators, or nonagitating trucks. The elapsed time from the addition of cementitious material to the mix until the concrete is deposited in place at the work site shall not exceed 30 minutes when the concrete is hauled in nonagitating trucks, nor 90 minutes when the concrete is hauled in truck mixers or truck agitators. Retempering concrete by adding water or by other means will not be

permitted, except when concrete is delivered in transit mixers. With transit mixers additional water may be added to the batch materials and additional mixing performed to increase the slump to meet the specified requirements provided the addition of water is performed within 45 minutes after the initial mixing operations and provided the water/cementitious ratio specified in the mix design is not exceeded.

501-4.7 LIMITATIONS ON MIXING AND PLACING. No concrete shall be mixed, placed, or finished when the natural light is insufficient, unless an adequate and approved artificial lighting system is operated.

Unless authorized in writing by the Engineer, mixing and concreting operations shall be discontinued when a descending air temperature in the shade and away from artificial heat reaches 40 °F and shall not be resumed until an ascending air temperature in the shade and away from artificial heat reaches 35 °F.

The aggregate shall be free of ice, snow, and frozen lumps before entering the mixer. The temperature of the mixed concrete shall not be less than 50 °F at the time of placement. Concrete shall not be placed on frozen material nor shall frozen aggregates be used in the concrete.

When concreting is authorized during cold weather, water and/or the aggregates may be heated to not more than 150 °F. The apparatus used shall heat the mass uniformly and shall be arranged to preclude the possible occurrence of overheated areas which might be detrimental to the materials.

501-4.8 PLACING CONCRETE. ~~The Contractor has the option of side (fixed) form or slip-form paving.~~ The standard method of constructing concrete pavements shall be with an approved slip-form paving equipment. In individual placement areas of less than 200 square yards, or irregular areas at locations inaccessible to slip-form paving equipment, Portland cement concrete pavement may be placed with approved placement and finishing equipment utilizing stationary side forms. Hand screeding and float finishing may only be utilized on small irregular areas as allowed by the Engineer. At any point in concrete conveyance, the free vertical drop of the concrete from one point to another or to the underlying surface shall not exceed 3 feet.

Hauling equipment or other mechanical equipment can be permitted on adjoining previously constructed lots of pavement when the concrete strength reaches a flexural strength of 550 psi, based on the average of three specimens, with no individual specimen below 525 psi when tested according to AASHTO T 97. Subgrade and subbase planers, concrete pavers, and concrete finishing equipment may be permitted to ride upon the edges of previously constructed pavement when the concrete has attained a minimum flexural strength of 400 psi, based on the average of three field cured specimens per 1000 square yards of concrete placed.

a. **Side-form Method.** For the side-form method, the concrete shall be deposited on the moistened grade to require as little rehandling as possible. Unless truck mixers, truck agitators, or nonagitating hauling equipment are equipped with means for discharge of concrete without segregation of the materials, the concrete shall be placed and spread using an approved mechanical spreading device that prevents segregation of the materials. Placing shall be continuous between transverse joints without the use of intermediate bulkheads. Necessary hand spreading shall be done with shovels--not rakes. Workers shall not be allowed to walk in the freshly mixed concrete with boots or shoes coated with earth or foreign substances.

   Concrete shall be deposited as near to expansion and contraction joints as possible without disturbing them but shall not be dumped from the discharge bucket or hopper onto a joint assembly unless the hopper is centered above the joint assembly.

   Concrete shall be thoroughly consolidated against and along the faces of all forms and previously placed concrete and along the full length and on both sides of all joint assemblies by means of vibrators inserted in the concrete. Vibrators shall not be permitted to come in contact with a joint assembly, the grade, or a

side form. In no case shall the vibrator be operated longer than 20 seconds in any one location, nor shall the vibrators be used to move the concrete.

b. Slip-form Method. ~~For the slip-form method, the concrete shall be placed with an approved crawler-mounted, slip-form paver designed to spread, consolidate and shape the freshly placed concrete in one complete pass of the machine so that a minimum of hand finishing will be necessary to provide a dense and homogeneous pavement in conformance with requirements of the Plans and specifications. The concrete shall be placed directly on top of the joint assemblies to prevent them from moving when the paver moves over them. Side forms and finishing screeds shall be adjustable to the extent required to produce the specified pavement edge and surface tolerance. The side forms shall be of dimensions, shape, and strength to support the concrete laterally for a sufficient length of time so that no edge slumping exceeds the requirements of Subsection 501-5.2e(5). Final finishing shall be accomplished while the concrete is still in the plastic state.~~

~~In the event that slumping or sloughing occurs behind the paver or if there are any other structural or surface defects which, in the opinion of the Engineer, cannot be corrected within permissible tolerances, paving operations shall be immediately stopped until proper adjustment of the equipment or procedures have been made. In the event that satisfactory procedures and pavement are not achieved after not more than 2,000 linear feet of single lane paving, the Contractor shall complete the balance of the work with the use of standard metal forms and the formed method of placing and curing. Any concrete not corrected to permissible tolerances shall be removed and replaced at the Contractor's expense.~~

The concrete shall be distributed uniformly into final position by a self-propelled slip-form paver without delay. The alignment and elevation of the paver shall be regulated from outside reference lines established for this purpose. The paver shall vibrate the concrete for the full width and depth of the strip of pavement being placed and the vibration shall be adequate to provide a consistency of concrete that will stand normal to the surface with sharp well defined edges. The sliding forms shall be rigidly held together laterally to prevent spreading of the forms.

The plastic concrete shall be effectively consolidated by internal vibration with transverse vibrating units for the full width of the pavement and/or a series of equally placed longitudinal vibrating units. The space from the outer edge of the pavement to longitudinal unit shall not exceed 9 inches. The spacing of internal units shall be uniform and shall not exceed 18 inches.

The term internal vibration means vibrating unit located within the specified thickness of pavement section.

The rate of vibration of each vibrating unit shall be within 8,000 to 12,000 cycles per minute and the amplitude of vibration shall be sufficient to be perceptible on the surface of the concrete along the entire length of the vibrating unit an for a distance of at least 1 foot. The frequency of vibration or amplitude shall vary proportionately with the rate of travel to result in a uniform density and air content. The paving machine shall be equipped with a tachometer or other suitable device for measuring and indicating the actual frequency of vibrations.

The concrete shall be held at a uniform consistency. The slip-form paver shall be operated with as nearly a continuous forward movement as possible. All operations of missing, delivering, and spreading concrete shall be coordinated to provide uniform progress with stopping and starting of the paver held to a minimum. If for any reason, it is necessary to stop the forward movement of the paver, the vibratory and tamping elements shall also be stopped immediately. No tractive force shall be applied to the machine, except that which is controlled from the machine.

Temporary headers at the start and at the completion of the slip form paving operation shall be placed a

minimum of 10 feet beyond the designated pavement joint. The concrete shall be sawcut full depth and the concrete removed and disposed of at no cost to the department.

When concrete is being placed adjacent to an existing pavement, that part of the equipment which is supported on the existing pavement shall be equipped with protective pads on crawler tracks or rubber-tired wheels on which the bearing surface is offset to run a sufficient distance from the edge of the pavement to avoid breaking the pavement edge.

501-4.9 STRIKE-OFF OF CONCRETE AND PLACEMENT OF REINFORCEMENT. Following the placing of the concrete, it shall be struck off to conform to the cross section shown on the Plans and to an elevation such that when the concrete is properly consolidated and finished, the surface of the pavement shall be at the elevation shown on the Plans. When reinforced concrete pavement is placed in two layers, the bottom layer shall be struck off to such length and depth that the sheet of reinforcing steel fabric or bar mat may be laid full length on the concrete in its final position without further manipulation. The reinforcement shall then be placed directly upon the concrete, after which the top layer of the concrete shall be placed, struck off, and screeded. If any portion of the bottom layer of concrete has been placed more than 30 minutes without being covered with the top layer or if initial set has taken place, it shall be removed and replaced with freshly mixed concrete at the Contractor's expense. When reinforced concrete is placed in one layer, the reinforcement may be positioned in advance of concrete placement or it may be placed in plastic concrete by mechanical or vibratory means after spreading.

Reinforcing steel, at the time concrete is placed, shall be free of mud, oil, or other organic matter that may adversely affect or reduce bond. Reinforcing steel with rust, mill scale or a combination of both will be considered satisfactory, provided the minimum dimensions, weight, and tensile properties of a hand wire-brushed test specimen are not less than the applicable AASHTO/ASTM specification requirements.

501-4.10 JOINTS. Joints shall be constructed as shown on the Plans and according to these requirements. All joints shall be constructed with their faces perpendicular to the surface of the pavement and finished or edged as shown on the Plans. Joints shall not vary more than 1/2 inch from their designated position and shall be true to line with not more than 1/4 inch variation in 10 feet. The surface across the joints shall be tested with a Contractor furnished 10-foot straightedge as the joints are finished and any irregularities in excess of 1/4 inch shall be corrected before the concrete has hardened. All joints shall be so prepared, finished, or cut to provide a groove of uniform width and depth as shown on the Plans.

a. **Construction.** Longitudinal construction joints shall be slip-formed or formed against side forms with or without keyways, as shown in the Plans.

   Transverse construction joints shall be installed at the end of each day's placing operations and at any other points within a paving lane when concrete placement is interrupted for more than 30 minutes or it appears that the concrete will obtain its initial set before fresh concrete arrives. The installation of the joint shall be located at a planned contraction or expansion joint. If placing of the concrete is stopped, the Contractor shall remove the excess concrete back to the previous planned joint.

b. **Contraction.** Contraction joints shall be installed at the locations and spacing as shown on the Plans. Contraction joints shall be installed to the dimensions required by forming a groove or cleft in the top of the slab while the concrete is still plastic or by sawing a groove into the concrete surface after the concrete has hardened. When the groove is formed in plastic concrete the sides of the grooves shall be finished even and smooth with an edging tool. If an insert material is used, the installation and edge finish shall be according to the manufacturer's instructions. The groove shall be finished or cut clean so that spalling will be avoided at intersections with other joints. Grooving or sawing shall produce a slot at least 1/8 inch wide and to the depth shown on the Plans.

c. **~~Expansion~~ Isolation.** ~~Expansion~~ Isolation joints shall be installed as shown on the Plans. The premolded filler of the thickness as shown on the Plans, shall extend for the full depth and width of the slab at the joint, except for space for sealant at the top of the slab. The filler shall be securely staked or fastened into position perpendicular to the proposed finished surface. A cap shall be provided to protect the top edge of the filler and to permit the concrete to be placed and finished. After the concrete has been placed and struck off, the cap shall be carefully withdrawn leaving the space over the premolded filler. The edges of the joint shall be finished and tooled while the concrete is still plastic. Any concrete bridging the joint space shall be removed for the full width and depth of the joint.

d. **Keyways.** Keyways shall be formed in the plastic concrete by means of side forms or the use of keyway liners which are inserted during the slip-form operations. The keyway shall be formed to a tolerance of 1/4 inch in any dimension and shall be of sufficient stiffness to support the upper keyway flange without distortion or slumping of the top of the flange. The dimensions of the keyway forms shall not vary more than plus or minus 1/4 inch from the mid-depth of the pavement. Liners that remain in place permanently and become part of the keyed joint shall be made of galvanized, copper clad, or of similar rust-resistant material compatible with plastic and hardened concrete and shall not interfere with joint reservoir sawing and sealing.

e. **Tie Bars.** Tie bars shall consist of deformed bars installed in joints as shown on the Plans. Tie bars shall be placed at right angles to the centerline of the concrete slab and shall be spaced at intervals shown on the Plans. They shall be held in position parallel to the pavement surface and in the middle of the slab depth. When tie bars extend into an unpaved lane, they may be bent against the form at longitudinal construction joints, unless threaded bolt or other assembled tie bars are specified. These bars shall not be painted, greased, or enclosed in sleeves. When slip-form operations call for tie bars, two-piece hook bolts can be installed in the female side of the keyed joint provided the installation is made without distorting the keyed dimensions or causing edge slump. If a bent tie bar installation is used, the tie bars shall be inserted through the keyway liner only on the female side of the joint. In no case shall a bent tie bar installation for male keyways be permitted.

f. **Dowel Bars.** Dowel bars or other load-transfer units of an approved type shall be placed across joints in the manner as shown on the Plans. They shall be of the dimensions and spacings as shown and held rigidly in the middle of the slab depth in the proper horizontal and vertical alignment by an approved assembly device to be left permanently in place. The dowel or load-transfer and joint devices shall be rigid enough to permit complete assembly as a unit ready to be lifted and placed into position. A metal, or other type, dowel expansion cap or sleeve shall be furnished for each dowel bar used with expansion joints. These caps shall be substantial enough to prevent collapse and shall be placed on the ends of the dowels as shown on the Plans. The caps or sleeves shall fit the dowel bar tightly and the closed end shall be watertight. The portion of each dowel painted with rust preventative paint, as required under Subsection 501-2.7 and shown on the Plans to receive a debonding lubricant, shall be thoroughly coated with asphalt MC-70, or an approved lubricant, to prevent the concrete from bonding to that portion of the dowel. If free-sliding plastic-coated or epoxy-coated steel dowels are used, a lubrication bond breaker shall be used except when approved pullout tests indicate it is not necessary. Where butt-type joints with dowels are designated, the exposed end of the dowel shall be oiled.

   Dowel bars at contraction joints may be placed in the full thickness of pavement by a mechanical device approved by the Engineer. The device shall be capable of installing dowel bars within the maximum permissible alignment tolerances. Dowels bars at longitudinal construction joints shall be bonded in drilled holes.

g. **Installation of Joint Devices.** All joint devices shall be approved by the Engineer.

   The top of an assembled joint device shall be set at the proper distance below the pavement surface and the elevation shall be checked. Such devices shall be set to the required position and line and

shall be securely held in place by stakes or other means to the maximum permissible tolerances during the placing and finishing of the concrete. Where premolded joint material is used, it shall be placed and held in a vertical position; if constructed in sections, there shall be no offsets between adjacent units.

Dowel bars and assemblies shall be checked for position and alignment. The maximum permissible tolerances on dowel bar alignment shall be according to Subsection 501-5.2. During the concrete placement operation, it is advisable to place plastic concrete directly on dowel assemblies immediately prior to passage of the paver to help maintain dowel position and alignment within maximum permissible tolerances.

When concrete is placed using slip-form pavers, dowels and tie bars shall be placed in longitudinal construction joints by bonding the dowels or tie bars into holes drilled into the hardened concrete. Holes approximately 1/8 to 1/4 inch greater in diameter than the dowel or tie bar shall be drilled with rotary-type core drills that must be held securely in place to drill perpendicularly into the vertical face of the pavement slab. Rotary-type percussion drills may be used provided that spalling of concrete does not occur. Any damage of the concrete shall be repaired by the Contractor in a method approved by the Engineer. Dowels or tie bars shall be bonded in the drilled holes using an epoxy resin material. Installation procedures shall be adequate to insure that the area around dowels is completely filled with epoxy grout. Epoxy shall be injected into the back of the hole and displaced by the insertion of the dowel bar. Bars shall be completely inserted into the hole and shall not be withdrawn and reinserted creating air pockets in the epoxy around the bar. The Contractor shall furnish a template for checking the position and alignment of the dowels. Dowel bars shall not be less than 10 inches from a transverse joint and shall not interfere with dowels in the transverse direction.

h. **Sawing of Joints.** Joints shall be cut as shown on the Plans. Equipment shall be as described in Subsection 501-4.1. The circular cutter shall be capable of cutting a groove in a straight line and shall produce a slot at least 1/8 inch wide and to the depth shown on the Plans. The top portion of the slot shall be widened by sawing to provide adequate space for joint sealers as shown on the Plans. Sawing shall commence as soon as the concrete has hardened sufficiently to permit cutting without chipping, spalling, or tearing and before uncontrolled shrinkage cracking of the pavement occurs. Sawing shall be carried on both during the day and night as required. The joints shall be sawed at the required spacing, consecutively in sequence of the concrete placement. Curing compound, if being used as the cure type, shall be reapplied in the initial sawcut and maintained for the remaining cure period. Curing compound shall not be applied and used as the cure type to any concrete face that is to receive sealant. All slurry and debris shall be immediately removed from the pavement by washing and vacuuming before it dries. Temporary backer rod shall be inserted into the joint. The backer rod shall be one size larger than the initial sawcut and no more than ¼ inch below the top surface of the slab. Temporary backer rods shall be maintained and remain in place until the second sawcut in preparation for joint sealing. Temporary backer rods shall not be reused as part of the joint sealing operation.

501-4.11 FINAL STRIKE-OFF, CONSOLIDATION, AND FINISHING.

a. **Sequence.** The sequence of operations shall be the strike-off, floating and removal of laitance, straightedging, and final surface finish. The addition of superficial water to the surface of the concrete to assist in finishing operations will not be permitted.

b. **Finishing at Joints.** The concrete adjacent to joints shall be compacted or firmly placed without voids or segregation against the joint material; it shall be firmly placed without voids or segregation under and around all load-transfer devices, joint assembly units, and other features designed to extend into the pavement. Concrete adjacent to joints shall be mechanically vibrated as required in Subsection 501-4.8a. After the concrete has been placed and vibrated adjacent to the joints, the finishing machine shall be operated in a manner to avoid damage or misalignment of joints. If

uninterrupted operations of the finishing machine, to, over, and beyond the joints, cause segregation of concrete, damage to, or misalignment of the joints, the finishing machine shall be stopped when the screed is approximately 8 inches from the joint. Segregated concrete shall be removed from the front of and off the joint; and the forward motion of the finishing machine shall be resumed. Thereafter, the finishing machine may be run over the joint without lifting the screed, provided there is no segregated concrete immediately between the joint and the screed or on top of the joint.

c. **Machine Finishing.** The concrete shall be spread as soon as it is placed, and it shall be struck off and screeded by a finishing machine. The machine shall go over each area as many times and at such intervals as necessary to give to proper consolidation and to leave a surface of uniform texture. Excessive operation over a given area shall be avoided. When side forms are used, the tops of the forms shall be kept clean by an effective device attached to the machine, and the travel of the machine on the forms shall be maintained true without lift, wobbling, or other variation tending to affect the precision finish. During the first pass of the finishing machine, a uniform ridge of concrete shall be maintained ahead of the front screed for its entire length. When in operation, the screed shall be moved forward with a combined longitudinal and transverse shearing motion, always moving in the direction in which the work is progressing, and so manipulated that neither end is raised from the side forms during the striking-off process. If necessary, this shall be repeated until the surface is of uniform texture, true to grade and cross section, and free from porous areas.

d. **Hand Finishing.** Hand finishing methods will not be permitted, except under the following conditions: in the event of breakdown of the mechanical equipment, hand methods may be used to finish the concrete already deposited on the grade; in areas of narrow widths or of irregular dimensions where operation of the mechanical equipment is impractical. Concrete, as soon as placed, shall be struck off and screeded. An approved portable screed shall be used. A second screed shall be provided for striking off the bottom layer of concrete when reinforcement is used.

   The screed for the surface shall be a least 24 inches longer than the maximum width of the slab to be struck off. It shall be of approved design, sufficiently rigid to retain its shape, and shall be constructed either of metal or of other suitable material covered with metal. Consolidation shall be attained by the use of suitable vibrators.

e. **Floating.** After the concrete has been struck off and consolidated, it shall be further smoothed and trued by means of a longitudinal float using one of the following methods:

   (1) **Hand Method.** Long-handled floats shall not be less than 12 feet in length and 6 inches in width, stiffened to prevent flexibility and warping. The float shall be operated from foot bridges spanning but not touching the concrete or from the edge of the pavement. Floating shall pass gradually from one side of the pavement to the other. Forward movement along the centerline of the pavement shall be in successive advances of not more than one-half the length of the float. Any excess water or laitance in excess of 1/8 inch thick shall be removed and wasted.

   (2) **Mechanical Method.** The Contractor may use a machine composed of a cutting and smoothing float(s), suspended from and guided by a rigid frame and constantly in contact with, the side forms or underlying surface. If necessary, long-handled floats having blades not less than 5 feet in length and 6 inches in width may be used to smooth and fill in open-textured areas in the pavement. When the crown of the pavement will not permit the use of the mechanical float, the surface shall be floated transversely by means of a long-handled float. Care shall be taken not to work the crown out of the pavement during the operation. After floating, any excess water and laitance in excess of 1/8 inch thick shall be removed and wasted. Successive drags shall be lapped one-half the length of the blade.

f. **Straight-edge Testing and Surface Correction.** After the pavement has been struck off and while the concrete is still plastic, it shall be tested for trueness with a Contractor furnished 16-foot straightedge swung from handles 3 feet longer than one-half the width of the slab. The straightedge

shall be held in contact with the surface in successive positions parallel to the centerline and the whole area gone over from one side of the slab to the other, as necessary. Advancing shall be in successive stages of not more than one-half the length of the straightedge. Any excess water and laitance in excess of 1/8 inch thick shall be removed from the surface of the pavement and wasted. Any depressions shall be immediately filled with freshly mixed concrete, struck off, consolidated, and refinished. High areas shall be cut down and refinished. Special attention shall be given to assure that the surface across joints meets the smoothness requirements of Subsection 501-5.2. Straightedge testing and surface corrections shall continue until the entire surface is found to be free from observable departures from the straightedge and until the slab conforms to the required grade and cross section. The use of long-handled wood floats shall be confined to a minimum; they may be used only in emergencies and in areas not accessible to finishing equipment.

501-4.12 SURFACE TEXTURE. The surface of the pavement shall be finished with either a broom, burlap drag, or artificial turf finish for all newly constructed concrete pavements. It is important that the texturing equipment not tear or unduly roughen the pavement surface during the operation. Any imperfections resulting from the texturing operation shall be corrected. The corrugations shall be uniform in appearance and approximately 1/16 inch in depth.

a. **Brush or Broom Finish.** If the pavement surface texture is to be a type of brush or broom finish, it shall be applied when the water sheen has practically disappeared. The equipment shall operate transversely across the pavement surface.

b. **Burlap Drag Finish.** If a burlap drag is used to texture the pavement surface, it shall be at least 15 oz/yd^2. To obtain a textured surface, the transverse threads of the burlap shall be removed approximately 1 foot from the trailing edge. A heavy buildup of grout on the burlap threads produces the desired wide sweeping longitudinal striations on the pavement surface.

c. **Artificial Turf Finish.** If artificial turf is used to texture the surface, it shall be applied by dragging the surface of the pavement in the direction of concrete placement with an approved full-width drag made with artificial turf. The leading transverse edge of the artificial turf drag will be securely fastened to a lightweight pole on a traveling bridge. At least 24 inches of the artificial turf shall be in contact with the concrete surface during dragging operations. A variety of different types of artificial turf are available and approval of any one type will be done only after it has been demonstrated by the Contractor to provide a satisfactory texture. One type that has provided satisfactory texture consists of 7,200 approximately 0.85-inches-long polyethylene turf blades per square foot.

501-4.13 CURING. Immediately after finishing the concrete pavement surface, the newly laid pavement shall be kept damp by applying a water-fog or mist with approved spraying equipment until the pavement is covered by the curing medium. When conditions are such that problems with plastic cracking can be expected, and particularly if any plastic cracking begins to occur, the Contractor shall immediately take such additional measures as necessary to protect the concrete surface. Such measures shall consist of wind screens, more effective fog sprays, and similar measures commencing immediately behind the paver. If these measures are not effective in preventing plastic cracking, paving operations shall be immediately stopped. Immediately after finishing operations are completed and marring of the concrete will not occur, the entire surface of the newly placed concrete shall be cured for a 7-day cure period according to one of the methods below. Failure to provide sufficient cover material of whatever kind the Contractor may elect to use, or lack of water to adequately take care of both curing and other requirements, shall be cause for immediate suspension of concreting operations. The concrete shall not be left exposed for more than 1/2 hour during the curing period. The concrete shall be maintained at a temperature of at least 50 °F for a period of 72 hours after placing and at a temperature above freezing for the remainder of the curing time. The Contractor shall be responsible for the quality and strength of the concrete placed during cold weather, and any concrete injured by frost action shall be removed and replaced at the Contractor's expense.

a. **Impervious Membrane Method.** The entire surface of the pavement shall be sprayed uniformly with white pigmented curing compound immediately after the finishing of the surface and before the set of

the concrete has taken place. The curing compound shall not be applied during rainfall. Curing compound shall be applied by mechanical sprayers under pressure at the rate of 1 gallon to not more than 150 square feet. The spraying equipment shall be of the fully atomizing type equipped with a tank agitator. At the time of use, the compound shall be in a thoroughly mixed condition with the pigment uniformly dispersed throughout the vehicle. During application the compound shall be stirred continuously by mechanical means. Hand spraying of odd widths or shapes and concrete surfaces exposed by the removal of forms will be permitted. The curing compound shall be of such character that the film will harden within 30 minutes after application. Should the film become damaged from any cause, including sawing operations, within the required curing period, the damaged portions shall be repaired immediately with additional compound or other approved means. Upon removal of side forms, the sides of the exposed slabs shall be protected immediately to provide a curing treatment equal to that provided for the surface.

~~**b.Polyethylene Films.** The top surface and sides of the pavement shall be entirely covered with polyethylene sheeting. The units shall be lapped at least 18 inches. The sheeting shall be placed and weighted to cause it to remain in contact with the surface and sides. The sheeting shall have dimensions that will extend at least twice the thickness of the pavement beyond the edges of the pavement. Unless otherwise specified, the sheeting shall be maintained in place for 7 days after the concrete has been placed.~~

~~**c.Waterproof Paper.** The top surface and sides of the pavement shall be entirely covered with waterproofed paper. The units shall be lapped at least 18 inches. The paper shall be placed and weighted to cause it to remain in contact with the surface covered. The paper shall have dimensions that will extend at least twice the thickness of the pavement beyond the edges of the slab. The surface of the pavement shall be thoroughly saturated prior to placing of the paper. Unless otherwise specified, the paper shall be maintained in place for 7 days after the concrete has been placed.~~

~~**d.White Burlap-Polyethylene Sheets.** The surface of the pavement shall be entirely covered with the sheeting. The sheeting used shall be such length (or width) that it will extend at least twice the thickness of the pavement beyond the edges of the slab. The sheeting shall be placed so that the entire surface and both edges of the slab are completely covered. The sheeting shall be placed and weighted to remain in contact with the surface covered, and the covering shall be maintained fully saturated and in position for 7 days after the concrete has been placed.~~

e. **Water Method.** The entire area shall be covered with burlap or other water absorbing material. The material shall be of sufficient thickness to retain water for adequate curing without excessive runoff. The material shall be kept wet at all times and maintained for 7 days. When the forms are stripped, the vertical walls shall also be kept moist. It shall be the responsibility of the Contractor to prevent ponding of the curing water on the subbase.

501-4.14 REMOVING FORMS. Unless otherwise specified, forms shall not be removed from freshly placed concrete until it has hardened sufficiently to permit removal without chipping, spalling, or tearing but in no case, less than 24 hours. After the forms have been removed, the sides of the slab shall be cured as outlined in one of the methods indicated in Subsection 501-4.14. Major honeycombed areas shall be considered as defective work and shall be removed and replaced according to Subsection 501-5.2.

501-4.15 SEALING JOINTS. The joints in the pavement shall be sealed according to Section P-605.

501-4.16 PROTECTION OF PAVEMENT. The Contractor shall protect the pavement and its appurtenances against both public traffic and traffic caused by the Contractor's employees and agents. This shall include workers to direct traffic and the erection and maintenance of warning signs, lights, pavement bridges, crossovers, and protection of unsealed joints from intrusion of foreign material, etc. Any damage to the pavement occurring prior to final acceptance shall be repaired or the pavement replaced at the Contractor's expense. The Contractor shall have available at all times, materials for the protection of the edges and surface of the unhardened concrete. Such protective materials shall consist of rolled polyethylene sheeting at

least 4 mils thick of sufficient length and width to cover the plastic concrete slab and any edges. The sheeting may be mounted on either the paver or a separate movable bridge from which it can be unrolled without dragging over the plastic concrete surface. When rain appears imminent, all paving operations shall stop and all available personnel shall begin covering the surface of the unhardened concrete with the protective covering.

501-4.17 SURFACE SEALER. Apply over the entire surface of the concrete after completing the sealer manufacturer's recommended curing period. Comply with the sealer manufacturer's recommendations for concrete surface preparation, sealer application temperature, rate, and method.

501-~~4.17~~ 4.18 OPENING TO TRAFFIC. The pavement shall not be opened to traffic until test specimens molded and cured according to WAQTC FOP for AASHTO T 23 have attained a flexural strength of 550 psi when tested according to AASHTO T 97. If such tests are not conducted, the pavement shall not be opened to traffic until 14 days after the concrete was placed. Prior to opening to traffic, the pavement shall be cleaned.

501-4.19 REPAIR, REMOVAL, REPLACEMENT OF SLABS.

a. **General.** New pavement slabs that are broken or contain cracks, for whatever reason, shall be removed and replaced. Spalls along joints shall be repaired as specified. Removal of partial slabs is not permitted. Removal and replacement shall be full depth, shall be full width of the slab, and the limit of removal shall be normal to the paving lane and to each original joint.

d. **Removal and Replacement of Full Slabs.** Where it is necessary to remove full slabs, unless there are keys or dowels present, all edges of the slab shall be cut full depth with a concrete saw. All saw cuts shall be perpendicular to the slab surface. If keys, dowels, or tie bars are present along any edges, these edges shall be sawed full depth 24 inches from the edge if only keys are present, or just beyond the end of the dowels or tie bars if they are present. These joints shall then be carefully sawed on the joint line to within 1 inch of the depth of the dowel or key. The main slab shall be further divided by sawing full depth, at appropriate locations, and each piece lifted out and removed. Suitable equipment shall be used to provide a truly vertical lift, and approved safe lifting devices used for attachment to the slabs. The narrow strips along keyed or doweled edges shall be carefully broken up and removed using light, hand-held jackhammers, 30 LB (14 kg) or less, or other approved similar equipment. Care shall be taken to prevent damage to the dowels, tie bars, or keys or to concrete to remain in place. The joint face below keys or dowels shall be suitably trimmed so that there is not abrupt offset in any direction greater than 1/2 inch and no gradual offset greater than 1 inch when tested in a horizontal direction with a 12 foot straightedge. No mechanical impact breakers, other than the above hand-held equipment shall be used for any removal of slabs. If underbreak between 1-1/2 and 4 inches deep occurs at any point along any edge, the area shall be repaired as directed before replacing the removed slab. Procedures directed will be similar to those specified for surface spalls, modified as necessary. If underbreak over 4 inches deep occurs, the entire slab containing the underbreak shall be removed and replaced. Where there are no dowels, tie bars, or keys on an edge, or where they have been damaged, dowels of the size and spacing as specified for other joints in similar pavement shall be installed by epoxy grouting them into holes drilled into the existing concrete using procedures as specified. Original damaged dowels or tie bars shall be cut off flush with the joint face. Protruding portions of dowels shall be painted and lightly oiled. All four edges of the new slab shall contain dowels. Placement of concrete shall be as specified for original construction. Prior to placement of new concrete, the underlying material (unless it is stabilized) shall be recompacted and shaped as specified in the appropriate SECTION of these specifications. The surfaces of all four joint faces shall be cleaned of all loose material and contaminants and coated with a double application of membrane forming curing compound as bond breaker.

e. **Repairing Spalls Along Joints.** Where directed, spalls along joints of new slabs, and along parallel cracks used as replacement joints, shall be repaired by first making a vertical saw cut at least 1 inch

outside the spalled area and to a depth of at least 2 inches. Saw cuts shall be straight lines forming rectangular areas. The concrete between the saw cut and the joint, or crack, shall be chipped out to remove all unsound concrete and at least 1/2 inch of visually sound concrete. The cavity thus formed shall be thoroughly cleaned with high pressure water jets supplemented with compressed air to remove all loose material. Immediately before filling the cavity, a prime coat of epoxy resin, Type III, Grade I, shall be applied to the dry cleaned surface of all sides and bottom of the cavity, except any joint face. The prime coat shall be applied in a thin coating and scrubbed into the surface with a stiff-bristle brush. Pooling of epoxy resin shall be avoided. The cavity shall be filled with low slump Portland cement concrete or mortar or with epoxy resin concrete or mortar. Concrete shall be used for larger spalls, generally those more than 1/2 cu. ft. (0.014 m3) in size, and mortar SHALL BE USED FOR THE SMALLER ONES. ANY SPALL LESS THAN 0.1 CU. FT. (0.003 m3) shall be repaired only with epoxy resin mortar or a Grade III epoxy resin. Portland cement concrete and mortar mixtures shall be proportioned as directed and shall be mixed, placed, consolidated, and cured as directed. Epoxy resin mortars shall be made with Type III, Grade 1, epoxy resin, using proportions and mixing and placing procedures as recommended by the manufacturer and approved by the Engineer. The epoxy resin materials shall be placed in the cavity in layers not over 2 inches thick. The time interval between placement of additional layers shall be such that the temperature of the epoxy resin material does not exceed 140oF (60oC) at any time during hardening. Mechanical vibrators and hand tampers shall be used to consolidate the concrete or mortar. Any repair material on the surrounding surfaces of the existing concrete shall be removed before it hardens. Where the spalled area abuts a joint, an insert or other bond-breaking medium shall be used to prevent bond at the joint face. A reservoir for the joint sealant shall be sawed to the dimensions required for other joints, or as required to be routed for cracks. The reservoir shall be thoroughly cleaned and sealed with the sealer specified for the joints. If any spall penetrates half the depth of the slab or more, the entire slab shall be removed and replaced as previously specified.

MATERIAL ACCEPTANCE

501-5.1 ACCEPTANCE SAMPLING AND TESTING. All acceptance sampling and testing, with the exception of coring for thickness determination, necessary to determine conformance with the requirements specified in this subsection will be performed by the Engineer. Concrete will be accepted for strength and thickness on a lot basis. After initial curing, the Contractor shall deliver the beams to the Central Region Materials Laboratory (5750 Tudor Road, Anchorage, Alaska) or the Northern Region Materials Laboratory (2301 Peger Road, Fairbanks, Alaska); or the Southeast Region Materials Laboratory (6860 Glacier Highway, Juneau, Alaska); as directed by the Engineer, for final curing and/or acceptance testing. Deliver cores for measuring thickness to the Project Engineer.

Lot Size. A lot will consist of 1000 cubic yards.

a. Flexural Strength.

(1) Sampling. Each lot will be divided into five equal sublots. One sample shall be taken for each sublot from the plastic concrete delivered to the job site. Sampling locations will be determined by the Engineer according to random sampling procedures contained in ASTM D 3665. The concrete shall be sampled according to WAQTC TM 2. The Contractor shall make and initially cure the number of flexural beam specimens specified according to WAQTC FOP for AASHTO T 23. Each beam shall be between 20 and 30 inches in length. Beams shall be constructed using rigid steel forms.

(2) Testing. Two specimens shall be made from each sample. The flexural strength of each specimen shall be determined according to AASHTO T 97 at a loading rate that constantly increases the extreme fiber stress at the mid-point of the allowable range. Test results will be checked for outliers as described in Subsection 501-5.1.d. and outliers will be discarded. The flexural strength for each sublot will be computed by averaging the results of the remaining test specimens representing that sublot.

(3) **Curing.** The Contractor shall provide adequate facilities for the initial curing of beams according to WAQTC FOP for AASHTO T 23.

(4) **Acceptance.** Acceptance of pavement for flexural strength will be determined by the Engineer according to Subsection 501-5.2.

b. **Pavement Thickness.** Pavement placed using fixed forms shall not be cored. Sampling and testing will be accomplished by inspection and measurement of the forms prior to and after placing of concrete. Sampling and testing for pavement placed with slipform paving methods will be as follows:

(1) **Sampling.** Each lot will be divided into four equal sublots and one core shall be taken by the Contractor for each sublot. Sampling locations will be determined by the Engineer according to random sampling procedures contained in ASTM D 3665. Areas, such as thickened edges, with planned variable thickness, will be excluded from sample locations.

Cores shall be neatly cut with a core drill. The Contractor shall furnish all tools, labor, and materials for cutting samples and filling the cored hole. Core holes shall be filled by the Contractor with a non-shrink grout approved by the Engineer within one day after sampling.

(2) **Testing.** The thickness of the cores will be determined by the Engineer by the average caliper measurement according to AASHTO T 148.

(3) **Acceptance.** Acceptance of pavement for thickness will be determined by the Engineer according to Subsection 501-5.2.

c. **Partial Lots.** When sampling for flexural strength, if 150 cubic yards or less remain to complete the project quantity, it will be considered as part of the previous sublot. If more than 150 cubic yards remain, it will be considered as a complete sublot and sampled and tested as such.

If a project has more than 1 lot and less than 4 additional sublots have been sampled at the time a lot is terminated, the additional sublots will be included in the previous lot. If 4 or more additional sublots have been sampled, they will be considered as a separate lot and the acceptance criteria calculation will be based on the actual number of samples in the shortened lot.

d. **Outliers.** All individual flexural strength tests within a lot will be checked for an outlier (test criterion) according to ATM, SP-7. Outliers will be discarded, and the PWL will be determined using the remaining test values.

e. **Yield, Cement Content, and Air Content.** Acceptance of pavement for yield, cement content, and air content will be determined by the Engineer according to Subsection 501-5.2 at the testing rate of 1 test series per 200 cubic yards.

501-5.2 ACCEPTANCE CRITERIA.

a. General. Acceptance will be based on the following characteristics of the completed pavement:

(1) Flexural strength
(2) Thickness
(3) Smoothness
(4) Grade
(5) Edge slump
(6) Dowel bar alignment
(7) Yield, cement content, and air content

Flexural strength and thickness will be evaluated for acceptance on a lot basis using the method of estimating percentage of material within specification limits (PWL). Acceptance using PWL considers the variability (standard deviation) of the material and the testing procedures, as well as the average (mean) value of the test results to calculate the percentage of material that is above the lower specification tolerance limit (L).

Acceptance for flexural strength will be based on the criteria contained according to Subsection 501-5.2e(1). Acceptance for thickness will be based on the criteria contained in Subsection 501-5.2e(2). Acceptance for smoothness will be based on the criteria contained in Subsection 501-5.2e(3). Acceptance for grade will be based on the criteria contained in Subsection 501-5.2e(4).

The Engineer may at any time reject and require the Contractor to dispose of any batch of concrete mixture which is rendered unfit for use due to contamination, segregation, or improper slump. Such rejection may be based on only visual inspection. In the event of such rejection, the Contractor may take a representative sample of the rejected material in the presence of the Engineer, and if it can be demonstrated in the laboratory, in the presence of the Engineer, that such material was erroneously rejected, payment will be made for the material at the contract unit price.

b. **Flexural Strength.** Acceptance of each lot of in-place pavement for flexural strength will be based on PWL. The Contractor shall target production quality to achieve 90 PWL or higher.

c. **Pavement Thickness.** Acceptance of each lot of in-place pavement will be based on PWL. The Contractor shall target production quality to achieve 90 PWL or higher.

d. **Percentage of Material Within Limits (PWL).** The PWL will be determined according to procedures specified in Section 110 of the General Provisions.

The lower specification tolerance limit (L) for flexural strength and thickness will be:

Lower Specification Tolerance Limit (L)	
Flexural Strength	0.93 x strength specified in Subsection 501-3.1
Thickness	Plan Thickness - 0.5 inch

e. **Acceptance Criteria.**

(1) **Flexural Strength.** If the PWL of the lot equals or exceeds 90%, the lot will be acceptable. Acceptance and payment for the lot will be determined according to Subsection 501-8.1.

(2) **Thickness.** If the PWL of the lot equals or exceeds 90%, the lot will be acceptable. Acceptance and payment for the lot will be determined according to Subsection 501-8.1.

(3) **Smoothness.** As soon as the concrete has hardened sufficiently, the pavement surface will be tested with a ~~12~~16-foot straightedge ~~or other specified device~~. Surface smoothness deviations shall not exceed 1/4 inch from the 16 foot straightedge. ~~placed in any direction, including placement along and spanning any pavement joint edge.~~

The work area shall be divided into sample lot areas not less than 1000 square yards unless approved by the Engineer. The lot size for each sample area shall be all the measurements taken within that area.

Sample lines shall be located at the edges and middle of all slabs, at all joints, at grade breaks, and at offsets as determined by the Engineer.

Sample measurements shall be made at maximum 4' intervals along the sampling grid lines, at the intersection of all sampling lines, and at any other points as directed by the Engineer. The

sample measurement shall be made at the center of the 16' straight edge with the straight edge centered over the sample point.

All measurements shall be recorded in a bound note book. Records for each area's inspections shall include the location, date, air temperature, wind direction and approx speed, cloud condition, precipitation, and operators' names. Records for each measurement shall include Station, Offset, and measured distance between the 16' straightedge and the pavement surface to the nearest 1/8 inch.

Smoothness measurements shall not be made across designated grade breaks. At warped transition areas, straightedge position shall be adjusted to measure surface smoothness and not designed grade transitions.

When more than 15 percent of all the measurements within a lot are outside the specified tolerance, or if any one shot within the lot deviates 1/2 inch or more from the straightedge, the slabs shall be removed and replaced to full width, length and depth. Skin patching shall not be permitted. Isolated high points may be ground off by a method approved by the Engineer, providing the remaining slab thickness is within 1/4 inch of the thickness specified on the plans.

Repairs, removal and replacement of pavement shall be at no cost to the Department in accordance with the limitations noted above.

~~Areas in a slab showing high spots of more than 1/4 inch but not exceeding 1/2 inch in 12 feet shall be marked and immediately ground down with an approved grinding machine to an elevation that will fall within the tolerance of 1/4 inch or less. Where the departure from correct cross-section exceeds 1/2 inch, the pavement shall be removed and replaced at the expense of the Contractor when so directed by the Engineer.~~

(4) **Grade.** An evaluation of the surface grade will be made by the Engineer for compliance to the tolerances contained below.

(a) Lateral Deviation. Lateral deviation from established alignment of the pavement edge shall not exceed plus or minus 0.10 foot in any lane.

(b) Vertical Deviation. Vertical deviation from established grade shall not exceed plus or minus 0.~~05~~ 0.04 foot at any point.

The work area shall be divided into sample lot areas not less than 1000 square yards unless approved by the Engineer. The lot size for each sample area shall be all the measurements taken within that area.

Sample lines shall be located at the edges and middle of all slabs, at all joints, and at grade breaks. In areas covered by design grading plans the locations of grid sampling points shall match the points shown on the plans. Additional sample lines shall be located at offsets as determined by the Engineer. The grid angles may be adjusted and grid intervals decreased at the Engineers discretion.

Measurements shall be made at the intersection of all sample lines and as directed by the Engineer.

The Contractor shall pay the cost of surveying of the level runs that shall be performed by a licensed surveyor. The documentation, stamped and signed by a licensed surveyor, shall be provided by the Contractor to the Engineer. All measurements shall be recorded in a bound

note book. Records for each area's measurements shall include the location, date, air temperature, wind direction and approx speed, cloud condition, precipitation, and operators' names. Records for each measurement shall include Station, Offset, and elevations to the nearest 0.01 foot.

When more than 15 percent of all the measurements within a lot are outside the specified tolerance, or if any one shot within the lot deviates 0.06 foot or more from planned grade, the Contractor shall remove and replace slabs identified by the Engineer to full width, length and depth. Patching shall not be permitted. Isolated high points may be ground off by a method approved by the Engineer, providing the remaining course thickness is within 0.02 foot of the thickness specified on the plans.

Repairs, removal and replacement of pavement shall be at no cost to the Department in accordance with the limitations noted above.

(5) Edge Slump. When slip-form paving is used, not more than 15% of the total free edge of each 500-foot segment of pavement, or fraction thereof, shall have an edge slump exceeding 1/4 inch, and none of the free edge of the pavement shall have an edge slump exceeding 3/8 inch. (The total free edge of 500 feet of pavement will be considered the cumulative total linear measurement of pavement edge originally constructed as nonadjacent to any existing pavement; i.e., 500 feet of paving lane originally constructed as a separate lane will have 1,000 feet of free edge, 500 feet of fill-in lane will have no free edge, etc.). The area affected by the downward movement of the concrete along the pavement edge shall be limited to not more than 18 inches from the edge. When excessive edge slump cannot be corrected before the concrete has hardened, the area with excessive edge slump shall be removed and replaced at the expense of the Contractor when so directed by the Engineer.

(6) Dowel Bar Alignment. Dowel bars and assemblies will be checked for position and alignment. The maximum permissible tolerance on dowel bar alignment in each plane, horizontal and vertical, shall not exceed 2% (or 1/4 inch per foot) of a dowel bar.

(7) Yield, Cement Content, and Air Content. Yield, cement content, and air content will be determined according to WAQTC FOP for AASHTO T 121 and T 152.

f. Removal and Replacement of Concrete. Any area or section of concrete that is removed and replaced shall be removed and replaced back to planned joints. The Contractor shall replace damaged dowels and the requirements for doweled longitudinal construction joints in Subsection 501-4.10 shall apply to all contraction joints exposed by concrete removal.

CONTRACTOR QUALITY CONTROL

501-6.1 QUALITY CONTROL PROGRAM. The Contractor shall develop a Quality Control Program according to Section 100 of the General Provisions. The program shall address all elements which affect the quality of the pavement including but not limited to:

a. Mix Design	**e.** Proportioning	**i.** Dowel Placement and Alignment
b. Aggregate Gradation	**f.** Mixing and Transportation	**j.** Flexural Strength
c. Quality of Materials	**g.** Placing and Consolidation	**k.** Finishing and Curing
d. Stockpile Management	**h.** Joints	**l.** Surface Smoothness

501-6.2 QUALITY CONTROL TESTING. The Contractor shall perform all quality control tests necessary to control the production and construction processes applicable to this specification and as set forth in the Quality Control Program. The testing program shall include, but not necessarily be limited to, tests for aggregate gradation, aggregate moisture content, slump, and air content.

A Quality Control Testing Plan shall be developed as part of the Quality Control Program.

a. **Fine Aggregate.**

   (1) **Gradation.** A sieve analysis shall be made at a minimum of every 100 cubic yards according to WAQTC FOP for AASHTO T 27/T 11 from randomly sampled material taken from the discharge gate of storage bins or from the conveyor belt.

   (2) **Moisture Content.** If an electric moisture meter is used, at least two direct measurements of moisture content shall be made per week to check the calibration. If direct measurements are made in lieu of using an electric meter, two tests shall be made per day. Tests shall be made according to WAQTC FOP for AASHTO T 255/T 265.

b. **Coarse Aggregate.**

   (1) **Gradation.** A sieve analysis shall be made at a minimum of every 100 cubic yards for each size of aggregate. Tests shall be made according to WAQTC FOP for AASHTO T 27/T 11 from randomly sampled material taken from the discharge gate of storage bins or from the conveyor belt.

   (2) **Moisture Content.** If an electric moisture meter is used, at least two direct measurements of moisture content shall be made per week to check the calibration. If direct measurements are made in lieu of using an electric meter, two tests shall be made per day. Tests shall be made according to WAQTC FOP for AASHTO T 255/T 265.

c. **Slump.** Slump tests shall be performed for every 100 cubic yards of material produced. Slump tests shall be performed according to WAQTC FOP for AASHTO T 119 from material randomly sampled from material discharged from trucks at the paving site. Material samples shall be taken according to WAQTC TM 2.

d. **Air Content.** Air content tests, shall be performed for every 100 cubic yards of material produced. Air content tests shall be performed according to WAQTC FOP for AASHTO T 152, from material randomly sampled from trucks at the plant site. Material samples shall be taken according to WAQTC TM 2.

501-6.3 CONTROL CHARTS. The Contractor shall maintain linear control charts for fine and coarse aggregate, gradation, slump, and air content.

Control charts shall be posted in a location satisfactory to the Engineer and shall be kept up to date at all times. As a minimum, the control charts shall identify the project number, the contract item number, the test number, each test parameter, the Action and Suspension Limits, or Specification limits, applicable to each test parameter, and the Contractor's test results. The Contractor shall use the control charts as part of a process control system for identifying potential problems and assignable causes before they occur. If the Contractor's projected data during production indicates a potential problem and the Contractor is not taking satisfactory corrective action, the Engineer may halt production or acceptance of the material.

a. **Fine and Coarse Aggregate Gradation.** The Contractor shall record the running average of the last five gradation tests for each control sieve on linear control charts. Specification limits contained in Tables 1 and 2 shall be superimposed on the Control Chart for job control.

b. **Slump and Air Content.** The Contractor shall maintain linear control charts both for individual measurements and range (i.e., difference between highest and lowest measurements) for slump and air content according to the following Action and Suspension Limits.

CONTROL CHART LIMITS
Based on Sample Size n=4

Control Parameter	Individual Measurements		Range Suspension Limit
	Action Limit	Suspension Limit	
Slump	+/- 1 in.	+/- 1.5 inch	+/- 2.4 inch
Air Content	+/- 1.2%	+/- 1.8%	+/- 2.8%

The individual measurement control charts shall use the mix design Target Values as indicators of central tendency.

501-6.4 CORRECTIVE ACTION. The Quality Control Plan shall indicate that appropriate action shall be taken when the process is believed to be out of control. The Quality Control Plan shall detail what action will be taken to bring the process into control and shall contain sets of rules to gauge when a process is out of control. As a minimum, a process shall be deemed out of control and corrective action taken if any one of the following conditions exists.

a. **Fine and Coarse Aggregate Gradation.** When two consecutive averages of five tests are outside of the Tables 1 or 2 specification limits, immediate steps, including a halt to production, shall be taken to correct the grading.

b. **Fine and Coarse Aggregate Moisture Content.** Whenever the moisture content of the fine or coarse aggregate changes by more than 0.5%, the scale settings for the aggregate batcher(s) and water batcher shall be adjusted.

c. **Slump.** The Contractor shall halt production and make appropriate adjustments whenever:

(1) one point falls outside the Suspension Limit line for individual measurements or range; or

(2) two points in a row fall outside the Action Limit line for individual measurements.

d. **Air Content.** The Contractor shall halt production and adjust the amount of air-entraining admixture whenever:

(1) one point falls outside the Suspension Limit line for individual measurements or range; or

(2) two points in a row fall outside the Action Limit line for individual measurements.

Whenever a point falls outside the Action Limits line, the air-entraining admixture dispenser shall be calibrated to ensure that it is operating correctly and with good reproducibility.

METHOD OF MEASUREMENT

501-7.1 Portland cement concrete pavement will be measured by the number of cubic yards of pavement as specified in place, completed and accepted.

BASIS OF PAYMENT

501-8.1 PAYMENT. Payment for accepted concrete pavement will be made at the contract unit price per cubic yard, adjusted according to Subsection 501-8.1a. All costs associated with Steel Reinforcement, Dowels, and Concrete Surface Sealer are subsidiary to the Portland Cement Concrete Pavement Item.

Payment shall be full compensation for all labor, materials, tools, equipment, and incidentals required to complete the work as specified herein and on the drawings.

a. Basis of Adjusted Payment. The pay factor for each individual lot will be calculated according to Table 1. A pay factor will be calculated for both flexural strength and thickness. The lot pay factor will be the lower of the two pay factors.

TABLE 1. PRICE ADJUSTMENT SCHEDULE

Percentage of Material Within Specification Limits (PWL)	Pay Factor
96 – 100	1.05
90 – 95	0.01 PWL + 0.10
75 - 89	0.005 PWL + 0.55
55 – 74	0.014 PWL – 0.12
Below 55	0*

*If the PWL falls below 55, the lot shall be removed and replaced. However, the Engineer may decide to allow the rejected lot to remain. In that case, if the Engineer and Contractor agree in writing that the lot shall not be removed, the pay factor for the lot shall be 0.50.

For each lot accepted, the adjusted contract unit price shall be the product of the lot pay factor for the lot and the contract unit price.

b. Payment. Payment will be made under:

Item P-501a Portland Cement Concrete Pavement - per cubic yard

TESTING REQUIREMENTS

AASHTO T 26	Quality of Water to be Used in Concrete
AASHTO T 96	Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
AASHTO T 97	Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading)
AASHTO T 259	Resistance of Concrete to Chloride Ion Penetration
ASTM C 642	Density, Absorption, and Voids in Hardened Concrete
ASTM C 672	Scaling Resistance of Concrete Surfaces Exposed to Deicing Chemicals
ASTM C 1077	Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation
ASTM D 1260	Potential Alkali Reactivity for Aggregates (Mortar-bar Method)
ASTM D 1567	Determining the Potential Alkali-Silica Reaction of Combinations of Cementitious Material and Aggregate (accelerated mortar-bar method)

ASTM D 3665	Random Sampling of Construction Materials
ATM 306	Percentage of Flat and Elongated Particles in Coarse Aggregate
ATM SP-7	Determination of Outlier Test Results
WAQTC FOP for AASHTO T 23	Making & Curing Concrete Test Specimens in the Field
WAQTC FOP for AASHTO T 27/T 11	Sieve Analysis of Aggregates & Soils
WAQTC FOP for AASHTO T 119	Slump of Freshly Mixed Concrete
WAQTC FOP for AASHTO T 121	Unit Weight, Cement Factor & Water/Cement Ratio of Freshly Mixed Concrete
WAQTC FOP for AASHTO T 152	Air Content of Freshly Mixed Concrete by the Pressure Method
WAQTC FOP for AASHTO T 255/T 265	Moisture Content of Aggregate and Soils
WAQTC TM 2	Sampling Freshly Mixed Concrete

MATERIAL REQUIREMENTS

AASHTO M 6	Fine Aggregate for Portland Cement Concrete
AASHTO M 31	Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
AASHTO M 43	Sizes of Aggregate for Road and Bridge Construction
AASHTO M 55	Steel Welded Wire Reinforcement, Plain, for Concrete
AASHTO M 80	Coarse Aggregate for Portland Cement Concrete
AASHTO M 85	Portland Cement
AASHTO M 148	Liquid Membrane-Forming Compounds for Curing Concrete
AASHTO M 154	Air-Entraining Admixtures for Concrete
AASHTO M 157	Ready-Mixed Concrete
AASHTO M 171	Sheet Materials for Curing Concrete
AASHTO M 194	Chemical Admixtures for Concrete
AASHTO M 213	Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
AASHTO M 235	Epoxy Resin Adhesives
AASHTO M 254	Corrosion-Resistant Coated Dowel Bars

AASHTO M 295	Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete
AASHTO M 322	Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement
ACI 306R	Cold Weather Concreting
Federal Specification TT-P-664	

ITEM P-603 TACK COAT

DESCRIPTION

603-1.1 This item shall consist of preparing and treating an asphalt or concrete surface with liquid asphalt material according to these Specifications and in reasonably close conformity to the lines shown on the Plans.

MATERIALS

603-2.1 MATERIALS. Tack coat material shall be either cutback asphalt, emulsified asphalt, or tar and shall conform to the requirements of Table 1. The type, grade, controlling specification, and application temperature of tack coat to be used shall be specified by the Engineer.

TABLE 1. MATERIAL

Type and Grade	Specification	Application Temperature °F	Application Rate gal/yd^2
Emulsified Asphalt			
SS-1, SS-1h	AASHTO M 140	75-130	0.05 to 0.16
CSS-1, CSS-1h	AASHTO M 208	75-130	0.05 to 0.16
STE-1	\1\	68-140	0.08 to 0.10
Cutback Asphalt			
RC-70	ASTM D 2028	120-160	0.05 to 0.16
Tar			
RTCB 5, RTCB 6	AASHTO M 52	60-120	0.05 to 0.16

\1\ STE-1 shall meet the following specifications: Viscosity, Sabolt Furol at 77 °F of 30 max., when tested under AASHTO T 59. Particle charge test of Positive when tested under AASHTO T 59 (If particle charge test is inconclusive, material having a max. pH value of 6.7 will be acceptable). Storage Stability, 1 day 1% max when tested under AASHTO T 59. Demulsibility, 35 mil 0.8% Dioctyl Sodium Sulfosuccinate Solution 25 minimum when tested under AASHTO T 59. Sieve test maximum of 0.10% when tested under AASHTO T 59. Oil distillate, by volume of emulsion, of 5% maximum when tested under AASHTO T 59. Residue of 45% minimum when tested under AASHTO T 59. Penetration at 77 °F, 100 gm, 5 sec. of 100 minimum, 200 maximum when tested under ASTM D 5. Ductility at 77 °F of 40 cm minimum when tested under ASTM D 113. Solubility in trichloroethylene of 97.5% minimum

CONSTRUCTION METHODS

603-3.1 WEATHER LIMITATIONS. The tack coat shall be applied only when the existing surface is dry and the surface temperature is above 40 °F. The temperature requirements may be waived, but only when so directed by the Engineer.

603-3.2 EQUIPMENT. The Contractor shall provide equipment for heating and applying the tack coat.

The distributor shall be designed, equipped, maintained, and operated so that tack coat at even heat may be applied uniformly on variable widths of surface at the specified rate. The allowable variation from the specified rate shall not exceed 10%. Distributor equipment shall include a tachometer, pressure gages, volume-measuring devices or a calibrated tank, and a thermometer for measuring temperatures of tank

contents. The distributor shall be self-powered and shall be equipped with a power unit for the pump and full circulation spray bars adjustable laterally and vertically.

A power broom and/or blower shall be provided for any required cleaning of the surface to be treated.

603-3.3 APPLICATION OF TACK COAT. Immediately before applying the tack coat, the full width of surface to be treated shall be swept with a power broom and/or airblast to remove all loose dirt and other objectionable material.

Emulsified asphalt shall be applied a sufficient time in advance of the paver to ensure that all water has evaporated before any of the overlying mixture is placed on the tacked surface.

The tack coat material including vehicle or solvent shall be uniformly applied with an asphalt distributor at the rate specified in Table 1, depending on the condition of the existing surface. The type of material and application rate shall be approved by the Engineer prior to application.

Following the application, the surface shall be allowed to cure without being disturbed for such period of time as may be necessary to permit drying out and setting of the tack coat. This period shall be determined by the Engineer. The surface shall then be maintained by the Contractor until the next course has been placed. Suitable precautions shall be taken by the Contractor to protect the surface against damage during this interval.

603-3.4 CONTRACTOR'S RESPONSIBILITY. Samples of the tack coat material that the Contractor proposes to use, together with a statement as to its source and character, must be submitted and approved before use of such material begins. The Contractor shall require the manufacturer or producer of the tack coat to furnish material subject to this and all other pertinent requirements of the contract. Only satisfactory materials so demonstrated by certified tests, shall be acceptable.

The Contractor shall furnish the vendor's certified test reports for each carload, or equivalent, of tack coat shipped to the project. The report shall be delivered to the Engineer before permission is granted for use of the material. The furnishing of the vendor's certified test report for the material shall not be interpreted as a basis for final acceptance. All such test reports shall be subject to verification by testing samples of material received for use on the project.

603-3.5 FREIGHT AND WEIGH BILLS. Before the final estimate is allowed, the Contractor shall file with the Engineer receipted bills when railroad shipments are made, and certified weigh bills when materials are received in any other manner, of the tack coat actually used in the construction covered by the contract. The Contractor shall not remove tack coat from the tank car or storage tank until the initial outage and temperature measurements have been taken by the Engineer, nor shall the car or tank be released until the final outage has been taken by the Engineer. Copies of freight bills and weigh bills shall be furnished to the Engineer during the progress of the work.

METHOD OF MEASUREMENT

603-4.1 Tack coat will be measured by the ton according to Subsection GCP-90-02.

BASIS OF PAYMENT

603.5-1 Payment will be made at the contract unit price per ton of accepted material. An Asphalt Material Price Adjustment will be made if applicable under subsection P-401-9.1 Item P-401e.

Payment will be made under:

Item P-603a Tack Coat, STE-1 - per ton

TESTING REQUIREMENTS

AASHTO T 59	Testing Emulsified Asphalts
ASTM D 5	Penetration of Bituminous Materials
ASTM D 113	Ductility of Bituminous Materials

MATERIAL REQUIREMENTS

AASHTO M 52	Tar for Use in Road Construction
AASHTO M 140	Emulsified Asphalt
AASHTO M 208	Cationic Emulsified Asphalt
ASTM D 633	Volume Correction Table for Road Tar
ASTM D 2028	Liquid Asphalt (Rapid-Curing Type)

ITEM P-604 COMPRESSION JOINT SEALS FOR CONCRETE PAVEMENTS

604-1.1 DESCRIPTION. This item shall consist of preformed polychloroprene compression seals used for sealing joints of rigid pavements.

604-2.1 PREFORMED SEALS. Preformed joint seal materials shall be a vulcanized elastomeric compound using polychloroprene as the only base polymer. The material and the manufactured seal itself shall conform to ASTM D 2628 and CRD C 548. The joint seal shall be a labyrinth type seal with the uncompressed depth of the seal greater than the uncompressed width of the seal, ~~[except that for seals 1 inch or greater in width, the depth need be only 1 inch or greater].~~ The actual width of the uncompressed seal shall be 13/16 inch ~~or 1 inch [or _____]~~ within a tolerance of plus 1/8 inch and minus 1/16 inch.

604-2.2 LUBRICANT/ADHESIVE. Lubricant/adhesive used for the preformed elastomeric joint seal shall be a one-component compound conforming to ASTM D 2835.

604-2.3 DELIVERY AND STORAGE. Materials delivered to the job site shall be inspected for defects, unloaded, and stored with a minimum of handling to avoid damage. Storage facilities shall be provided at the job site to protect materials from weather and to maintain them at temperatures as recommended by the manufacturer.

604-2.4 SUBMITTALS. Certified copies of test results shall be provided ~~[_____]~~ 30 days prior to use of material on the project.

a. **Construction Equipment List.** List of proposed equipment to be used in the performance of construction work, including descriptive data shall be provided to the engineer ~~[_____]~~ 30 days prior to use on the project.

b. **Manufacturer's Instructions.** Where installation procedures, or any part thereof, are required to be in accordance with the manufacturer's recommendations, printed copies of theses recommendations shall be furnished to the engineer ~~[_____]~~ 30 days prior to use on the project. Installation of the material will not be allowed until the recommendations are received. Failure to furnish these recommendations can be a cause for rejection of the material.

c. **Samples.** Regardless of testing responsibility, samples of the materials shall be submitted by the contractor to the engineer for written approval ~~[_____]~~ 30 days prior to use on the project. Written or printed directions from the manufacturer giving recommended criteria for installation shall be furnished to the engineer at the same time, plus certification from the manufacturer that the seal selected is recommend for the installation involved on this project. No material will be allowed to be used until it has been approved.

604-2.5 TEST REQUIREMENTS. Each lot of preformed joint seal and lubricant/adhesive produced for this project shall be sampled, adequately identified, and tested for conformance with the referenced applicable material specification. A lot of preformed seal shall consist of one day's production or 20,000 linear feet for each cross section, whichever is less. A lot of lubricant/adhesive shall consist of one day's production. ~~[Samples of the preformed joint seal and lubricant/adhesive material shall be submitted and will be tested by the Engineer. No material shall be used at the project prior to receipt of written notice that the materials meet the laboratory requirements. The cost of testing the samples from each original lot supplied will be borne by the Engineer. If the sample fails to meet specification requirements, the materials represented by the sample shall be replaced and the new materials tested. A cost of [_____] for Engineer testing of each lot of replacement material will be charged to the Contractor.]~~ [Testing of the preformed joint and lubricant/adhesive material shall be the responsibility of the Contractor and shall be performed in an approved independent laboratory and certified copies of the test reports shall be submitted for approval ~~[_____]~~ 30 days prior to the use of the materials at the job site. Samples of each

lot of material shall also be submitted and will be retained by the Engineer for possible future testing should the materials appear defective during or after application.] The Contractor shall furnish additional samples of materials, in sufficient quantity to be tested, upon request. Conformance with the requirements of the laboratory tests specified will not constitute final acceptance of the materials. Final acceptance will also be based on the performance of the in-place materials.

604-3.1 EQUIPMENT. Machines, tools, and equipment used in the performance of the work required by this section shall be approved by the engineer before the work is started and shall be maintained by the contractor in satisfactory condition at all times.

a. Joint Cleaning Equipment.

(1) **Concrete Saw.** A self-propelled power saw with water-cooled diamond or abrasive saw blades shall be provided for cutting joints to the depths and widths shown on the plans. ~~specified and for removing filler~~ **~~[existing old joint seal]~~** ~~or other material embedded in the joints or adhered to the joint faces.~~

(2) **Sandblasting Equipment.** Sandblasting equipment shall include an air compressor, hose, and a long-wearing venturi-type nozzle of proper size, shape, and opening. The maximum nozzle opening should not exceed 1/4 inch. The air compressor shall be portable and shall be capable of furnishing not less than 150 cubic feet per minute and maintaining a line pressure of not less than 90 psi at the nozzle while in use. The compressor shall be equipped with traps that will maintain the compressed air free of oil and water. The nozzle shall have an adjustable guide that will hold the nozzle aligned with the joint about 1 inch above the pavement surface and will direct the blast to clean the joint walls. The height, angle of inclination, and the size of the nozzle shall be adjusted as necessary to ensure satisfactory results.

(3) **Waterblasting Equipment.** Waterblasting equipment shall include a trailer-mounted water tank, pumps, high-pressure hose, a wand with safety release cutoff controls, nozzle, and auxiliary water resupply equipment. The water tank and auxiliary water resupply equipment shall be sufficient capacity to permit continuous operations. The pumps, hoses, wand, and nozzle shall be of sufficient capacity to permit the cleaning of both walls of the joint and the pavement surface for a width of at least 1/2 inch on either side of the joint. The pump shall be capable of supplying a pressure of at least 3,000 psi. A pressure gauge mounted at the pump shall show at all times the pressure in pounds per square inch at which the equipment is operating.

b. Sealing Equipment. Equipment used to install the preformed seal shall place the preformed seal to the prescribed depths within the specified tolerances without cutting, nicking, twisting, or otherwise damaging the seal. The equipment shall not stretch or compress the seal more than 3.0 percent longitudinally during installation. The machine shall be an automatic self-propelled joint seal application equipment and shall be engine powered. The machine shall include a reservoir for the lubricant/adhesive, a device for conveying the lubricant/adhesive in the proper quantities to the sides the preformed seal or the sidewalls of the joint, a reel capable of holding one full spool of preformed seal, and a power-driven apparatus for feeding the joint seal through a compression device and inserting the seal into the joint. The equipment shall also include a guide to maintain the proper course along the joint being sealed. The machine shall at all times be operated by an experienced operator.

Single-axle type application equipment shall not be utilized.

CONSTRUCTION METHODS

604-4.1 ENVIRONMENTAL CONDITIONS. The ambient temperature and the pavement temperature within the joint wall shall be at least 35°F and rising at the time of installation of the materials. Sealant application will not be permitted if moisture or any foreign material is observed in the joint.

604-4.2 TRIAL JOINT SEAL AND LUBRICANT/ADHESIVE INSTALLATION. Prior to the cleaning and sealing of the joints for the entire project, a test section at least 200 feet long shall be prepared at a location directed in the project pavement using the specified materials and the approved equipment, so as to demonstrate the proposed joint preparation and sealing of all types of joints in the project. Following the completion of the trial length and before any other joint is sealed, the trial joints will be inspected by the Engineer and an onsite manufacturers representative to determine that the materials and installation meet the requirements specified. If materials or installation do not meet requirements the materials shall be removed, and the joints shall be recleaned and resealed at no cost to the owner. No other joints shall be sealed until the test installation has been approved. If the trial section is approved, it may be incorporated into the permanent work and paid for at the contract unit prices per linear foot for sealing items scheduled. All other joints shall be sealed in the manner approved for sealing the trial joints.

604-4.3 PREPARATION OF JOINTS Immediately before installation of the preformed joint seal, the joints shall be thoroughly cleaned to remove all laitance, filler, [old existing sealant,] foreign material and protrusions of hardened concrete from the sides and upper edges of the joint space to be sealed. Any irregularity in the joint face that would prevent uniform contact between the joint seal and the joint face shall be corrected ~~by~~ _____ prior to the installation of the joint seal.

a. Sawing. Joints shall be sawed to clean and to open them to the full specified width and depth. Immediately following the sawing operation, the joint faces and opening shall be thoroughly cleaned using a water jet to remove all saw cuttings or debris remaining on the faces or in the joint opening. Compression seal shall be installed within 3 calendar days of the time the individual joint cavity is sawed. Depth of sawing the cavity shall be between 3/4 and 1 inch deeper than the uncompressed depth of the seal (or otherwise recommended by the manufacturer). The saw cut for the joint seal cavity shall at all locations be centered over the joint line. The nominal width of the sawed joint seal cavity shall be as follows; the actual width shall be within a tolerance of plus or minus 1/16 inch:

(1) If a nominal 13/16 inch wide compression seal is furnished, the nominal width of the saw cut shall be 7/16 inch. However, this shall apply only when the pavement temperature at the time of sawing is between +50 and +105 degrees F. ~~If the pavement temperature at the time of sawing is above this range, the nominal width of the saw cut shall be decreased 1/16 inch.~~ If the pavement temperature at the time of sawing is below this range, the nominal width of the saw cut shall be increased 1/16 inch.

~~(2) If a nominal 1 inch wide compression seal is furnished, the nominal width of the saw cut shall be inch. However, this shall apply only when the pavement temperature at the time of sawing is between degrees F. If the pavement temperature at the time of sawing is above this range, the nominal width of the saw cut shall be decreased 1/16 inch. If the pavement temperature at the time of sawing is below this range, the nominal width of the saw cut shall be increased 1/16 inch.~~

The pavement temperature shall be measured and recorded in the presence of the Engineer. Measurement shall be made each day before commencing sawing and at any other time during the day when the temperature appears to be moving out of the allowable sawing range.

b. Sandblast Cleaning. The concrete joint faces and pavement surfaces extending at least 1/2 inch from the joint edges shall be sandblasted clean. A multiple pass technique shall be used until the surfaces are free of dust, direct curing compound, or any residue that might prevent ready insertion or uniform contact of the seal and bonding of the lubricant/adhesive to the concrete. After final cleaning and immediately prior to sealing, the joints shall be blown out with compressed air and left completely free of debris and water.

c. Waterblast Cleaning. The concrete joint faces and pavement surfaces extending at least 1/2 inch from the joint edges shall be waterblasted clean. A multiple pass technique shall be used until the surfaces are free of dust, direct, curing compound, or any residue that might prevent ready insertion or uniform contact of the seal and bonding of the lubricant/adhesive to the concrete. After final cleaning and

immediately prior to sealing, the joints shall be blown out with compressed air and left completely free of debris and water.

d. Rate of Progress. The stages of joint preparation which includes sandblasting or waterblasting of the joint faces and air pressure cleaning of the joints shall be limited to only the linear footage of joint that can be sealed during the same workday.

604-4.4 INSTALLATION OF THE PREFORMED SEAL.

a. Time of Installation. Joints shall be sealed within 3 calendar days of sawing the joint seal cavity and immediately following concrete cure and the final cleaning of the joint walls. Open joints ready for sealing that cannot be sealed under the conditions specified herein shall be provided with an approved temporary seal to prevent infiltration of foreign material. When rain interrupts the sealing operations, the joints shall be washed, air pressure cleaned and allowed to dry prior to installing the lubricant/adhesive and preformed seal.

b. Sequence of Installation. Longitudinal joints shall be sealed first, followed by transverse joints and then all other joints. Seals in longitudinal joints shall be cut so that all transverse joint seals will be intact from edge to edge of the pavement. Intersections shall be made monolithic by use of joint seal adhesive and care in fitting the intersection parts together. Extender pieces of seal shall not be used at intersections. Any seal falling short of the intersection shall be removed and replaced with new seal at no additional cost to the owner.

604-4.5 SEALING OF JOINTS. The joint seal shall be installed using the equipment specified in paragraph 604-3.1b EQUIPMENT. The sides of the joint seal or the sides of the joint shall be covered with a coating of lubricant/adhesive and the seal installed in such a manner as to conform to all requirements specified. Butt joints and seal intersections shall be coated with liberal applications of lubricant/adhesive. Lubricant/adhesive spilled on the pavement shall be removed immediately to prevent setting on the pavement. An in-place joint seal shall be in an upright position and free form twisting, distortion, cuts, and stretching or compression in excess of 3.0 percent. The joint seal shall be placed at a uniform depth within the tolerances specified. In-place joint seal that fails to meet the specified requirements shall be removed and replaced with new joint seal in a satisfactory manner at no additional cost to the owner. The preformed joint seal shall be placed to a depth of 3/16 inch, plus or minus 1/8 inch, below the pavement surface except when the joint is beveled or has a radius at the surface, or unless otherwise directed. For beveled joints or joints with a radius at the surface, the preformed joint seal shall be installed at a depth of 1/8 inch, plus or minus 1/8 inch, below the bottom of the edge of the bevel or radius. No part of the seal shall be allowed to project above the surface of the pavement or above the edge of the bevel or radius. The seal shall be installed in the longest practicable lengths in longitudinal joints and shall be cut at the joint intersections so as to provide continuous installation of the seal in the transverse joints. The lubricant/adhesive in the longitudinal shall be allowed to set for 1 hour prior to cutting at the joint intersections to reduce the possibility of shrinkage. For all transverse joints, the minimum length of the preformed joint seal shall be the pavement width from edge to edge.

604-4.6 CLEAN-UP. Upon completion of the project, all unused materials shall be removed from the site, all lubricant/adhesive on the pavement surface shall be removed, and the pavement shall be left in clean condition.

604-5.1 QUALITY CONTROL PROVISIONS.

a. Equipment. The application equipment shall be inspected to assure uniform application of lubricant/adhesive to the sides of the preformed joint seal or the walls of the joint. If any equipment causes cutting, twisting, nicking, excessive stretching or compressing of the preformed seal, or improper application of the lubricant/adhesive, the operation shall be suspended until causes of the deficiencies are determined and corrected by the contractor.

b. Procedures.

(1) Quality control provisions shall be provided during the joint cleaning process to prevent or correct improper equipment and cleaning techniques that damage the concrete in any manner. Cleaned joints shall be approved by the Engineer per recommendations by an onsite manufacturer's representative prior to installation of the lubricant/adhesive and preformed joint seal.

(2) ~~Conformance to stretching and compression limitations shall be determined by the engineer. After installation, the distance between the marks shall be measured on the pavement.~~ Measurements shall be made to assure compliance with the stretching and compression requirements. If the stretching or compression exceeds the specified limit, the seal shall be removed and replaced with new joint seal at no additional cost to the owner. The seal shall be removed up to the last correct measurement. The seal shall be inspected a minimum of once per 100 feet of seal for compliance to the shrinkage or compression requirements. Measurements shall also be made as directed to determine conformance with depth and width installation requirements. All preformed seal that is not in conformance with specification requirements shall be removed and replaced with new joint seal at no additional cost to the owner.

c. Product. The joint sealing system (preformed seal and lubricant/adhesive) shall be inspected by the engineer and an onsite manufacturer's representative for proper rate of cure and bonding to the concrete, cuts, twists, nicks, and other deficiencies. Seals exhibiting any defects, at any time prior to final acceptance of the project, shall be removed from the joint, wasted, and replaced in a satisfactory manner, as determined by the engineer per recommendations by an onsite manufacturer's representative.

METHOD OF MEASUREMENT

604-6.1 MEASUREMENT. The quantity of each sealing item to be paid for will be determined by actual measurement of the number of linear feet of in-place material that has been approved. A separate measurement will not be made for the onsite manufacturer's representative and shall be subsidiary.

BASIS OF PAYMENT

604-7.1 PAYMENT. Payment will be made at the contract unit bid prices per linear foot for the sealing items scheduled. The unit bid prices shall include the cost of all labor, materials, the use of all equipment, and tools required to complete the work.

Payment will be made under:

Item P-604a Compression Joint Seal – per Linear Foot

TESTING REQUIREMENTS

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in this text by basic designation only.

U.S. ARMY CORPS OF ENGINEERS

CRD C 548 Standard Specification for Jet-Fuel and Heat Resistant Preformed Polychloroprene Elastomeric Joint Seals for Rigid Pavements

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 2628 Preformed Polychloroprene Elastomeric Joint Seals for Concrete Pavements
ASTM D 2835 Lubricant for Installation of Preformed Compression Seals in Concrete Pavements

ITEM P-605 JOINT SEALING FILLER

DESCRIPTION

605-1.1 This item shall consist of providing and installing a resilient and adhesive joint sealing filler capable of effectively sealing joints and cracks in pavements.

MATERIALS

605-2.1 JOINT SEALERS. Joint sealing material shall meet the requirements of ASTM D 7116.

Each lot or batch of sealing compound shall be delivered to the jobsite in the manufacturer's original sealed container. Each container shall be marked with the manufacturer's name, batch or lot number, and the safe heating temperature and shall be accompanied by the manufacturer's certification stating that the compound meets the requirements of this specification.

CONSTRUCTION METHODS

605-3.1 TIME OF APPLICATION. Joints shall be sealed as soon after completion of the curing period as feasible and before the pavement is opened to traffic, including construction equipment. The pavement temperature shall be above 50 °F at the time of installation of the poured joint sealing material.

605-3.2 PREPARATION OF JOINTS. Immediately before sealing, the joints shall be thoroughly cleaned of all laitance, curing compound, and other foreign material. Cleaning shall be accomplished by wire brushing. Upon completion of cleaning, the joints shall be blown out with compressed air. The joint faces shall be surface dry when the seal is applied.

Prior to resealing joints, the existing joint material shall be removed to the depth as shown on the Plans. If joint sealer other than that originally used is specified, all existing joint sealer shall be removed.

605-3.3 INSTALLATION OF SEALANT. Joints shall be inspected for proper width, depth, alignment, and preparation, and shall be approved by the Engineer before sealing is allowed.

The joint sealant shall be applied uniformly solid from bottom to top and shall be filled without formation of entrapped air or voids. A backing material shall be placed as shown on the Plans and shall be nonadhesive to the concrete or the sealant material. The heating kettle shall be an indirect heating type, constructed as a double boiler. A positive temperature control and mechanical agitation shall be provided. The sealant shall not be heated to within 20 degrees (F) below the safe heating temperature. The safe heating temperature can be obtained from the manufacturer's shipping container. A direct connecting pressure type extruding device with nozzles shaped for insertion into the joint shall be provided. Any sealant spilled on the surface of the pavement shall be removed immediately.

METHOD OF MEASUREMENT

605-4.1 Joint sealing material will not be measured for payment and shall be subsidiary to P-610c~~by the linear foot of sealant in place, complete, and accepted.~~

BASIS OF PAYMENT

605-5.1 Payment for joint sealing material will be made at the contract unit price per linear foot.

Payment will be made under:

Item P-605a Joint Sealing Filler - per linear foot

TESTING REQUIREMENTS

ASTM D 412	Rubber Properties in Tension
ASTM D 1644	Nonvolatile Content of Varnishes

MATERIAL REQUIREMENTS

ASTM D ~~3581~~ 7116	Joint Sealants, Hot Applied, Jet Fuel Resistant Types, for Portland Cement Concrete Pavements

ITEM P-606 ADHESIVE COMPOUND

DESCRIPTION

606-1.1 This specification covers two types of material: a liquid suitable for sealing electrical wire in saw cuts in pavement and sealing light fixtures or bases in pavement; a paste suitable for embedding light fixtures and aircraft tie-downs in the pavement. Both types of material are two-component filled formulas with the characteristics specified in Subsection 606-2.4. Materials supplied for use with hot mix asphalt pavements must be formulated so they are compatible with the hot mix asphalt.

EQUIPMENT AND MATERIALS

606-2.1 CURING. When prewarmed to 77 °F, mixed, and placed according to manufacturer's directions, the materials shall cure at temperatures of 45 °F or above without the application of external heat.

606-2.2 STORAGE. The adhesive components shall not be stored at temperatures over 86 °F.

606-2.3 CAUTION. Installation and use shall be according to the manufacturer's recommended procedures. Avoid prolonged or repeated contact with skin. In case of contact, wash with soap and flush with water. If taken internally, call doctor. Keep away from heat or flame. Avoid vapor. Use in well-ventilated areas. Keep in cool place. Keep away from children.

606-2.4 CHARACTERISTICS. When mixed and cured according to the manufacturer's directions, the materials shall have the following properties shown in Table 1.

SAMPLING, INSPECTION, AND TEST PROCEDURES

606-3.1 TENSILE PROPERTIES. Tests for tensile strength and elongation shall be conducted according to ASTM D 638.

606-3.2 EXPANSION. Tests for coefficients of linear and cubical expansion shall be conducted according to ASTM D 1168, Method B, except that mercury shall be used instead of glycerin. The test specimen(s) shall be mixed in the proportions specified by the manufacturer, and cured in a glass tub approximately 2 inches long by 3/8 inch in diameter. The interior of the tube shall be precoated with a silicone mold release agent. The hardened sample shall be removed from the tube and aged at room temperature for 1 week before conducting the test. The test temperature range shall be from 35 to 140 °F.

606-3.3 TEST FOR DIELECTRIC STRENGTH. Test for dielectric strength shall be conducted according to ASTM D 149 for sealing compounds to be furnished for sealing electrical wires in pavement.

606-3.4 TEST FOR ARC RESISTANCE. Test for arc resistance shall be conducted according to ASTM D 495 for sealing compounds to be furnished for sealing electrical wires in pavement.

606-3.5 TEST FOR ADHESION TO STEEL. The ends of two smooth, clean, steel specimens (approximately 1 inch X 1 inch X 6 inches) are bonded together with adhesive mixture and allowed to cure at room temperature for a period of time to meet formulation requirements and then tested to failure on a Riehle (or similar) tensile tester. The thickness of adhesive to be tested shall be 1/4 inch.

TABLE 1. PROPERTY REQUIREMENTS

Physical or Electrical Property	Minimum	Maximum	ASTM Method
Tensile			
Portland Cement Concrete	1,000 psi		D 638
Hot Mix Asphalt	395 psi		
Elongation			
Portland Cement Concrete	8% \1\		D 638
Hot Mix Asphalt	50%		D 638
Coef. of cub. exp., cm3/cm3/°C	0.00090	0.00120	D 1168
Coef. of lin. exp., cm/cm/°C	0.00030	0.00040	D 1168
Dielectric strength, short time test	350 volts/mil.		D 149
Arc resistance	125 secs.		D 495
Adhesion to steel	1,000 psi		
Adhesion to portland cement concrete	200 psi		
Adhesion to asphalt concrete	(no test available)		

\1\ 20% or more (without filler) for formulations to be supplied for areas subject to freezing.

606-3.6 ADHESION TO PORTLAND CEMENT CONCRETE.

a. **Concrete Test Block Preparation.** The aggregate grading shall be as shown in Table 2.

The coarse aggregate shall consist of crushed rock having a minimum of 75% of the particles with at least one fractured face and having a water absorption of not more than 1.5%. The fine aggregate shall consist of crushed sand manufactured from the same parent rock as the coarse aggregate. The concrete shall have a water-cement ratio of 5.5 gallons of water per bag of cement, a cement factor of 6, plus or minus 0.5, bags of cement per cubic yard of concrete, and a slump of 2-1/2 inches plus or minus 1/2 inch. The ratio of fine aggregate to total aggregate shall be approximately 40% by solid volume. The air content shall be 5.0%, plus or minus 0.5%, and it shall be obtained by the addition to the batch of an air-entraining admixture such as vinsol resin. The mold shall be metal with a metal base plate. Means shall be provided for securing the base plate to the mold. The assembled mold and base plate shall be watertight and shall be oiled with mineral oil before use. The inside measurement of the mold shall be such that several 1-inch by 2-inch by 3-inch test blocks can be cut from the specimen with a concrete saw having a diamond blade. The concrete shall be prepared and cured according to AASHTO T 126.

TABLE 2. AGGREGATE FOR BOND TEST BLOCKS

Type	Sieve Size	Percent Passing
Coarse Aggregate	3/4 in.	97 to 100
	1/2 in.	63 to 69
	3/8 in.	30 to 36
	No. 4	0 to 3
Fine Aggregate	No. 4	100
	No. 8	82 to 88
	No. 16	60 to 70
	No. 30	40 to 50
	No. 50	16 to 26

b. **Bond Test.** Prior to use, oven-dry the test blocks to constant weight at a temperature of 220 to 230 °F, cool to room temperature, 73.4 ±3 °F, in a desiccator, and clean the surface of the blocks of film or powder by vigorous brushing with a stiff-bristled fiber brush. Two test blocks shall be bonded together on the 1-inch X 3-inch sawed face with the adhesive mixture and allowed to cure at room temperature for a period of time to meet formulation requirements and then tested to failure in a Riehle (or similar) tensile tester. The thickness of the adhesive to be tested shall be 1/4 inch.

606-3.7 COMPATIBILITY WITH HOT MIX ASPHALT. Test for compatibility with asphalt according to ASTM D 3407.

606-3.8 CERTIFICATION. The Contractor shall furnish the vendor's certified test reports for each batch of material delivered to the project. The report shall certify that the material meets specification requirements and is suitable for use with portland cement concrete or hot mix asphalt pavements. The report shall be delivered to the Engineer before permission is granted for use of the material. In addition the Contractor shall obtain a statement from the supplier or manufacturer which guarantees the material for one year. The supplier or manufacturer shall furnish evidence that the material has performed satisfactorily on other projects.

606-3.9 APPLICATION. Adhesive shall be applied on a dry, clean surface, free of grease, dust, and other loose particles. The method of mixing and application shall be in strict accordance with the manufacturer's recommendations.

METHOD OF MEASUREMENT

606-4.1 The adhesive compound will be measured by the pound of adhesive as specified, in place, complete and accepted with the following exceptions. When required in the installation of an in-runway lighting system, taxiway lighting system or portion thereof, or for aircraft tie-down, no measurement will be made for direct payment of adhesive, as the cost of furnishing and installing will be considered as a subsidiary obligation in the completion of the installation.

BASIS OF PAYMENT

606-5.1 Payment will be made, where applicable, at the contract unit price per pound for the adhesive. If the following pay item is absent from the bid schedule, no payment will be made. All work, materials, and equipment required to complete the work will be subsidiary to those items requiring its application.

Payment will be made under:

Item P-606a	Adhesive Compound - per pound

TESTING REQUIREMENTS

AASHTO T 126	Making and Curing Concrete Test Specimens in the Laboratory
ASTM C 192	Making and Curing Concrete Compression and Flexure Test Specimens in the Laboratory
ASTM D 149	Tests for Dielectric Breakdown Voltage and Dielectric Strength of Electrical Insulating Materials at Commercial Power Frequencies
ASTM D 495	Test for High-Voltage, Low-Current, Arc Resistance of Solid Electrical Insulating Materials

ASTM D 638	Test for Tensile Properties of Plastics
ASTM D 1168	Test for Hydrocarbon Waxes Used for Electrical Insulation
ASTM D 3407	Joint Sealants, Hot-Poured, For Concrete and Asphalt Pavements

ITEM P-610 STRUCTURAL PORTLAND CEMENT CONCRETE

DESCRIPTION

610-1.1 This item shall consist of plain or reinforced structural portland cement concrete, prepared and constructed according to these Specifications, at the locations and of the form and dimensions shown on the Plans.

MATERIALS

610-2.1 GENERAL. Only approved materials, conforming to the requirements of these Specifications, shall be used in the work. They may be subjected to inspection and tests at any time during the progress of their preparation or use. The source of supply of each of the materials shall be approved by the Engineer before delivery or use is started. Representative preliminary samples of the materials shall be submitted by the Contractor, when required, for examination and test. Materials shall be scored and handled to insure the preservation of their quality and fitness for use and shall be located to facilitate prompt inspection. All equipment for handling and transporting materials and concrete must be clean before any material or concrete is placed therein.

In no case shall the use of pit-run or naturally mixed aggregates be permitted. Naturally mixed aggregate shall be screened and washed, and all fine and coarse aggregates shall be stored separately and kept clean. The mixing of different kinds of aggregates from different sources in one storage pile or alternating batches of different aggregates will not be permitted.

610-2.2 COARSE AGGREGATE. The coarse aggregate shall meet the requirements of AASHTO M 80, Class B.

Coarse aggregate shall be well graded from coarse to fine, and shall meet AASHTO M 43, Number 57 or 67, when tested according to WAQTC FOP for AASHTO T 27/T 11.

610-2.3 FINE AGGREGATE. The fine aggregate shall meet the requirements of AASHTO M 6, Class A.

The fine aggregate shall be well graded from fine to coarse, and shall meet the requirements of AASHTO M 6, Table 1, when tested according to WAQTC FOP for AASHTO T 27/T 11.

Blending will be permitted, if necessary, in order to meet the gradation requirements for fine aggregate. Fine aggregate deficient in the percentage of material passing the No. 50 sieve may be accepted, provided that such deficiency does not exceed 5% and is remedied by the addition of pozzolanic or cementitious materials other than portland cement, as specified in 610-2.6 on admixtures, in sufficient quantity to produce the required workability as approved by the Engineer.

610-2.4 CEMENT. Cement shall conform to the requirements of AASHTO M 85.

The Contractor shall furnish manufacturer's certified test reports for each carload, or equivalent, of cement shipped to the project. The report shall be delivered to the Engineer before permission to use the cement is granted. All such test reports shall be subject to verification by testing sample materials received for use on the project.

610-2.5 WATER. The water used in concrete shall be potable and free from sewage, oil, acid, strong alkalies, vegetable matter, and clay and loam. If the water is of questionable quality, it shall be tested according to AASHTO T 26.

610-2.6 ADMIXTURES. The use of any material added to the concrete mix shall be indicated on the mix design approved by the Engineer. Before approval of any material, the Contractor shall be required to submit

the results of complete physical and chemical analyses made by an acceptable testing laboratory. Subsequent tests shall be made of samples taken by the Engineer from the supply of the material being furnished or proposed for use on the work to determine whether the admixture is uniform in quality with that approved.

Pozzolanic admixtures shall be fly ash or raw or calcined natural pozzolans meeting the requirements of AASHTO M 295.

Air-entraining admixtures shall meet the requirements of AASHTO M 154. Air-entraining admixtures shall be added at the mixer in the amount necessary to produce the specified air content.

Water-reducing, set-controlling admixtures shall meet the requirements of AASHTO M 194, Type A water-reducing, or Type D water-reducing and retarding. Water-reducing admixtures shall be added at the mixer separately from air-entraining admixtures according to the manufacturer's printed instructions.

610-2.7 PREMOLDED JOINT MATERIAL. Premolded joint material for expansion joints shall meet the requirements of AASHTO M 213.

610-2.8 JOINT FILLER. The filler for joints shall meet the requirements of Item P-605.

610-2.9 STEEL REINFORCEMENT. Reinforcing shall consist of Deformed and Plain Billet-Steel Bars conforming to the requirements of AASHTO M 31, Welded Steel Wire Fabric conforming to the requirements of AASHTO M 55, Welded Deformed Steel Fabric conforming to the requirements of AASHTO M 221, or Bar Mats conforming to the requirements of AASHTO M 54, as shown on the Plans.

610-2.10 COVER MATERIALS FOR CURING. Curing materials shall conform to one of the following specifications:

~~AASHTO M 171~~	~~Waterproof Paper for Curing concrete~~
~~AASHTO M 171~~	~~Polyethylene Sheeting for Curing Concrete~~
AASHTO M 171	Sheet Materials for Curing Concrete
AASHTO M 148, Type 1 or 2	Liquid Membrane-Forming Compounds for Curing Concrete

610-2.11 SURFACE SEALER. Provide a liquid applied, water soluble hydrophobic pore lining impregnate that is specifically formulated to protect concrete from the detrimental effects of moisture intrusion, freeze-thaw cycles, chloride ion penetration, and deicing chemicals. Provide Pavix CCC100 manufactured by Chem-Crete, Hydrozo Enviroseal 40 by Chemrex, or an Engineer approved product containing 40 percent silane meeting AASHTO T 259 ASTM C 642, and ASTM C 672.

CONSTRUCTION METHODS

610-3.1 GENERAL. The Contractor shall furnish all labor, materials, and services necessary for, and incidental to, the completion of all work as shown on the drawings and specified herein. All machinery and equipment owned or controlled by the Contractor, which they propose to use on the work, shall be of sufficient size to meet the requirements of the work, and shall be such as to produce satisfactory work; all work shall be subject to the inspection and approval of the Engineer.

610-3.2 CONCRETE COMPOSITION. The concrete shall develop a minimum compressive strength of 3,600 psi in 28 days as determined by test cylinders made according to WAQTC FOP for AASHTO **T** 23 and tested according to AASHTO T 22. Concrete for encasement of electrical conduit shall be exempt from the compressive strength test requirement. The concrete shall contain not less than 564 pounds of cement per cubic yard. The concrete shall contain 5% of entrained air, plus or minus 1%, as determined by WAQTC FOP for AASHTO T 152 and shall have a slump of not more than 4 inches as determined by WAQTC FOP for AASHTO T 119.

610-3.3 ACCEPTANCE SAMPLING AND TESTING. Concrete for each structure will be accepted on the basis of the compressive strength specified in Subsection 610-3.2. The concrete will be sampled according to WAQTC TM 2. Compressive strength specimens will be made according to WAQTC FOP for AASHTO T 23 and tested according to AASHTO T 22.

The Engineer will make the actual tests on the specimens at no expense to the Contractor.

610-3.4 PROPORTIONING AND MEASURING DEVICES. When package cement is used, the quantity for each batch shall be equal to one or more whole sacks of cement. The aggregates shall be measured separately by weight. If aggregates are delivered to the mixer in batch trucks, the exact amount for each mixer charge shall be contained in each batch compartment. Weighing boxes or hoppers shall be approved by the Engineer and shall provide means of regulating the flow of aggregates into the batch box so that the required and exact weight of aggregates can be readily obtained.

610-3.5 CONSISTENCY. The consistency of the concrete shall be checked by the slump test specified in WAQTC FOP for AASHTO T 119.

610-3.6 MIXING. Concrete may be mixed at the construction site, at a central point, or in truck mixers. The concrete shall be mixed and delivered according to the requirements of AASHTO M 157.

610-3.7 MIXING CONDITIONS. The concrete shall be mixed only in quantities required for immediate use. Concrete shall not be mixed while the air temperature is below 40 °F without permission of the Engineer. If permission is granted for mixing under such conditions, aggregates or water, or both, shall be heated and the concrete shall be placed at a temperature not less than 50 °F nor more than 100 °F. The Contractor shall be held responsible for any defective work, resulting from freezing or injury in any manner during placing and curing, and shall replace such work at their expense.

Retempering of concrete by adding water or any other material shall not be permitted.

The delivery of concrete to the job shall be in such a manner that batches of concrete will be deposited at uninterrupted intervals.

610-3.8 FORMS. Concrete shall not be placed until all the forms and reinforcements have been inspected and approved by the Engineer. Forms shall be of suitable material and shall be of the type, size, shape, quality, and strength to build the structure as designed on the Plans. The forms shall be true to line and grade and shall be mortar-tight and sufficiently rigid to prevent displacement and sagging between supports. The Contractor shall bear responsibility for their adequacy. The surfaces of forms shall be smooth and free from irregularities, dents, sags, and holes.

The internal ties shall be arranged so that, when the forms are removed, no metal will show in the concrete surface or discolor the surface when exposed to weathering. All forms shall be wetted with water or with a nonstaining mineral oil which shall be applied shortly before the concrete is placed. Forms shall be constructed so that they can be removed without injuring the concrete or concrete surface. The forms shall not be removed before the expiration of at least 30 hours from vertical faces, walls, slender columns, and similar structures; forms supported by falsework under slabs, beams, girders, arches, and similar construction shall not be removed until tests indicate that at least 80% of the design strength of the concrete has developed.

610-3.9 PLACING REINFORCEMENT. All reinforcement shall be accurately placed, as shown on the Plans, and shall be firmly held in position during concreting. Bars shall be fastened together at intersections. The reinforcement shall be supported by approved metal chairs. Shop drawings, lists, and bending details shall be supplied by the Contractor when required.

Reinforcing bars shall be bent cold and shall conform accurately to the shape and dimensions shown on the diagram. In no case shall the radius of any bend be less than 4 times the diameter of the bar.

Place reinforcement as indicated on the Plans or as hereinafter specified. Rigidly block and wire in place, using metal or plastic supports or concrete blocks and securely tie at each intersection with annealed iron wire of at least 1/8 inch.

Do not splice bars at points not indicated on the Plans except with the consent of the Engineer. Such splices shall be at the points of minimum tensile stress and the lap shall be not less than 36 bar diameters.

Verify the quantity, size, and shape of the reinforcement against the structure drawings and make necessary corrections to the bar lists and bending schedules before ordering. Errors in the bar lists and/or bending schedules shall not be cause for adjustment of the contract prices.

If reinforcing bars are to be welded, follow AWS D12.1.

610-3.10 EMBEDDED ITEMS. Before placing concrete, any items that are to be embedded shall be firmly and securely fastened in place as indicated. All such items shall be clean and free from coating, rust, scale, oil, or any foreign matter. The embedding of wood shall be avoided. The concrete shall be spaded and consolidated around and against embedded items.

610-3.11 PLACING CONCRETE. All concrete shall be placed during daylight, unless otherwise approved. The concrete shall not be placed until the depth and character of foundation, the adequacy of forms and falsework, and the placing of the steel reinforcing have been approved. Concrete shall be placed as soon as practical after mixing and in no case later than 1 hour after water has been added to the mix. The method and manner of placing shall be such to avoid segregation and displacement of the reinforcement. Troughs, pipes, and chutes shall be used as an aid in placing concrete when necessary. Dropping the concrete a distance of more than 5 feet, or depositing a large quantity at one point, will not be permitted. Concrete shall be placed upon clean, damp surfaces, free from running water, or upon properly consolidated soil.

The concrete shall be compacted with suitable mechanical vibrators operating within the concrete. When necessary, vibrating shall be supplemented by hand spading with suitable tools to assure proper and adequate compaction. Vibrators shall be manipulated so as to work the concrete thoroughly around the reinforcement and embedded fixtures and into corners and angles of the forms. The vibration at any joint shall be of sufficient duration to accomplish compaction but shall not be prolonged to the point where segregation occurs. Concrete deposited under water shall be carefully placed in a compact mass in its final position by means of a tremie, a closed bottom dump bucket, or other approved method and shall not be disturbed after being deposited.

610-3.12 CONSTRUCTION JOINTS. When the placing of concrete is suspended, necessary provisions shall be made for joining future work before the placed concrete takes its initial set. For the proper bonding of old and new concrete, such provisions shall be made for grooves, steps, keys, dovetails, reinforcing bars or other devices as may be prescribed. The work shall be arranged so that a section begun on any day shall be finished during daylight of the same day. Before depositing new concrete on or against concrete which has hardened, the surface of the hardened concrete shall be cleaned by a heavy steel broom, roughened slightly, wetted, and covered with a neat coating of cement paste or grout.

610-3.13 EXPANSION JOINTS. Expansion joints shall be constructed at such points and of such dimensions as may be indicated on the drawings. The premolded filler shall be cut to the same shape as that of the surfaces being joined. The filler shall be fixed firmly against the surface of the concrete already in place in such manner that it will not be displaced when concrete is deposited against it.

610-3.14 DEFECTIVE WORK. Any defective work disclosed after the forms have been removed shall be immediately removed and replaced. If any dimensions are deficient, or if the surface of the concrete is

bulged, uneven, or shows honeycomb, which in the opinion of the Engineer cannot be repaired satisfactorily, the entire section shall be removed and replaced at the expense of the Contractor.

610-3.15 SURFACE FINISH. All exposed concrete surfaces shall be true, smooth, free from open or rough spaces, depressions, or projections. The concrete in horizontal plane surfaces shall be brought flush with the finished top surface at the proper elevation and shall be struck-off with a straightedge and floated. Mortar finishing shall not be permitted, nor shall dry cement or sand-cement mortar be spread over the concrete during the finishing of horizontal plane surfaces.

When directed, the surface finish of exposed concrete shall be a rubbed finish. If forms can be removed while the concrete is still green, the surface shall be pointed and wetted and then rubbed with a wooden float until all irregularities are removed. If the concrete has hardened before being rubbed, a carborundum stone shall be used to finish the surface. When approved, the finishing can be done with a rubbing machine.

610-3.16 CURING AND PROTECTION. All concrete shall be properly cured and protected by the Contractor. The work shall be protected from the elements, flowing water, and from defacement of any nature during the building operations. The concrete shall be cured as soon as it has sufficiently hardened by covering with an approved material. Water-absorptive coverings shall be thoroughly saturated when placed and kept saturated for a period of at least 3 days for Type III Portland Cement and at least 7 days for Type I or Type II Portland Cement Concrete. All curing mats or blankets shall be sufficiently weighted or tied down to keep the concrete surface covered and to prevent the surface from being exposed to currents of air. Where wooden forms are used, they shall be kept wet at all times until removed to prevent the opening of joints and drying out of the concrete. Traffic shall not be allowed on concrete surfaces for 7 days after the concrete has been placed.

610-3.17 DRAINS OR DUCTS. Drainage pipes, conduits, and ducts that are to be encased in concrete shall be installed by the Contractor before the concrete is placed. The pipe shall be held rigidly so that it will not be displaced or moved during the placing of the concrete.

610-3.18 COLD WEATHER PROTECTION. When concrete is placed at temperatures below 40 °F, the Contractor shall provide satisfactory methods and means to protect the mix from injury by freezing. The aggregates, or water, or both, shall be heated in order to place the concrete at temperatures between 50 and 100 °F.

610-3.19 FILLING JOINTS. All joints which require filling shall be thoroughly cleaned, and any excess mortar or concrete shall be cut out with proper tools. Joint filling shall not be started until after final curing and shall be done only when the concrete is completely dry. The cleaning and filling shall be carefully done with proper equipment and in a manner to obtain a neat looking joint free from excess filler.

610-3.20 SURFACE SEALER. Apply over the entire surface of the concrete after completing the sealer manufacturer's recommended curing period. Comply with the sealer manufacturer's recommendations for concrete surface preparation, sealer application temperature, rate, and method.

METHOD OF MEASUREMENT

610-4.1 Portland cement concrete will be measured by the number of cubic yards of concrete complete in place and accepted. In computing the volume of concrete for payment, the dimensions used will be those shown on the Plans or ordered by the Engineer. No measurements or other allowances will be made for forms, falsework, cofferdams, pumping, bracing, expansion joints, or finishing of the concrete. No deductions will be made for the volumes of reinforcing steel or embedded items. When the pay items shown below are absent from the bid schedule, no measurement for payment will be made.

610-4.2 Reinforcing steel will not be measured but will be subsidiary to Portland Cement Concrete. ~~by the calculated theoretical number of pounds placed, as shown on the Plans~~, complete in place and accepted. The unit weight used for deformed bars will be the weight of plain square or round bars of equal nominal

size. If so indicated on the Plans, the weight to be paid for will include the weight of metal pipes and drains, metal conduits and ducts, or similar materials indicated and included.

BASIS OF PAYMENT

610-5.1 Payment will be made at the contract unit price per cubic yard for structural portland cement concrete ~~and per pound for reinforcing steel~~. If the following pay items are absent from the bid schedule, no payment will be made. All work, materials, and equipment required to complete the work will be subsidiary to those items referencing item P-610.

Payment will be made under:

Item P-610a	Structural Portland Cement Concrete - per cubic yard
Item P-610b	Steel Reinforcement - per pound

TESTING REQUIREMENTS

AASHTO T 22	Compressive Strength of Cylindrical Concrete Specimens
AASHTO T 26	Quality of Water to be used in Concrete
AASHTO T 259	Resistance of Concrete to Chloride Ion Penetration
ASTM C 642	Density, Absorption, and Voids in Hardened Concrete
ASTM C 672	Scaling Resistance of Concrete Surfaces Exposed to Deicing Chemicals
WAQTC FOP for AASHTO T 23	Making & Curing Concrete Test Specimens in the Field
WAQTC FOP for AASHTO T 27/T 11	Sieve Analysis of Aggregates & Soils
WAQTC FOP for AASHTO T 119	Slump of Freshly Mixed Concrete
WAQTC FOP for AASHTO T 152	Air Content of Freshly Mixed Concrete by the Pressure Method
WAQTC TM 2	Sampling Freshly Mixed Concrete

MATERIAL REQUIREMENTS

AASHTO M 6	Fine Aggregate for Portland Cement Concrete
AASHTO M 31	Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
AASHTO M 43	Sizes of Aggregate for Road and Bridge Construction
AASHTO M 54	Fabricated Deformed Steel Bar Mats for Concrete Reinforcement
AASHTO M 55	Steel Welded Wire Reinforcement, Plain, for Concrete
AASHTO M 80	Coarse Aggregate for Portland Cement Concrete
AASHTO M 85	Portland Cement

AASHTO M 148	Liquid Membrane-Forming Compounds for Curing Concrete
AASHTO M 154	Air-Entraining Admixtures for Concrete
AASHTO M 157	Ready-Mixed Concrete
AASHTO M 171	Sheet Materials for Curing Concrete
AASHTO M 194	Chemical Admixture for Concrete
AASHTO M 213	Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
AASHTO M 221	Steel Welded Wire Reinforcement, Deformed, for Concrete
AASHTO M 295	Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete
AWS D12.1	Recommended Practices for Welding Reinforcing Steel, Metal Inserts and Connections in Reinforced Concrete Construction

ITEM P-620 RUNWAY AND TAXIWAY PAINTING

DESCRIPTION

620-1.1 This item shall consist of the painting of numbers, markings, and stripes on the surface of runways, taxiways, paved roadways, and aprons, according to these Specifications and at the locations shown on the Plans, or as directed by the Engineer. This item includes removal of existing painted markings from pavement surfaces as shown on the plans or as designated by the Engineer. Complete this work within the limitations of the project safety and phasing plans.

MATERIALS

620-2.1 MATERIALS ACCEPTANCE. The Contractor shall furnish manufacturer's certified test reports for materials shipped to the project. The certified test reports shall include a statement that the materials meet the specification requirements. The reports can be used for material acceptance or the Engineer may perform verification testing. The reports shall not be interpreted as a basis for payment. The Contractor shall notify the Engineer upon arrival of a shipment of materials to the site. Provide manufacturer certification that each product does not contain mercury, lead, hexavalent chromium, halogenated solvents, nor any carcinogen as defined in 29 CFR 1910.1200 in amounts exceeding permissible limits as specified in relevant Federal Regulations.

620-2.2 PAINT. Paint shall be waterborne or solvent base according to the requirements of Subsection 620-2.2, a. or b. Paint shall be furnished in white (37925) and yellow (33538 or 33655) according to Federal Standard No 595. Paint shall be furnished in Type II (fast drying time for no-pick-up) when tested according to ASTM D 711.

a. **Waterborne.** Paint shall meet the requirements of Federal Specification TT-P-~~1952D~~1952E, Type II.

b. **Solvent Base.** Paint shall meet the requirements of Federal Specification ~~A-A-2886A~~ A-A-2886B, Type II, or the State of Alaska DOT&PF maintenance specification for "Traffic Paint - No-Heat Instant Dry Pavement Marking Material".

620-2.3 REFLECTIVE MEDIA. Glass beads shall meet the requirements of Fed. Spec. TT-B-1325, Type I, gradation A. Glass beads shall be treated with adhesion promoting and/or flotation coatings as specified by the manufacturer of the paint.

CONSTRUCTION METHODS

620-3.1 WEATHER LIMITATIONS. The painting shall be performed only when the surface is dry and when the surface temperature is at least 40 °F and rising and the pavement surface temperature is at least 5 °F above the dew point.

620-3.2 EQUIPMENT. Equipment shall include the apparatus necessary to properly clean the existing surface, a mechanical marking machine, a bead dispensing machine, and such auxiliary hand-painting equipment as may be necessary to satisfactorily complete the job.

The mechanical marker shall be an atomizing spray-type marking machine suitable for application of traffic paint. It shall produce an even and uniform film thickness at the required coverage and shall apply markings of uniform cross sections and clear-cut edges without running or spattering and without over spray.

620-3.3 PREPARATION OF SURFACE. Immediately before application of the paint, the surface shall be dry and free from dirt, grease, oil, laitance, or other foreign material which would reduce the bond between the paint and the pavement. The area to be painted shall be cleaned by sweeping and blowing or by other

methods as required to remove all dirt, laitance, and loose materials. Areas which cannot be satisfactorily cleaned by brooming and blowing shall be scrubbed as directed with a 10% solution of tri-sodium phosphate or an equally suitable solution. After scrubbing, the solution shall be rinsed off and the surface dried prior to painting.

620-3.4 LAYOUT OF MARKINGS. The proposed markings shall be laid out in advance of the paint application. The locations of markings to receive glass beads shall be shown on the Plans. Space control points at such intervals to ensure accurate location of all markings. Provide an experienced technician to supervise the location, alignment, layout dimensions, and application of the paint.

620-3.5 APPLICATION. Paint shall be applied at the locations and to the dimensions and spacing shown on the Plans. Paint shall not be applied until the layout and condition of the surface have been approved by the Engineer.

The edges of the markings shall not vary from a straight line more than 1/2 inch in 50 feet, and the marking dimensions and spacings shall be within the following tolerances:

Dimension and Spacing	Tolerance
Less than 36 inches	1/2 inch
36 inches to 6 feet	1 inch
6 feet to 60 feet	2 inches
Over 60 feet	3 inches

The paint shall be mixed and applied according to the manufacturer's instructions. The addition of thinner will not be permitted. The paint shall be applied to the pavement with a marking machine at the rate shown in Table 1

TABLE 1. APPLICATION RATES FOR PAINT AND GLASS BEADS

Paint Type	Paint, ft^2/gal maximum	Glass Beads lb/gal of paint (±2 oz.)
Waterborne	80	7
Solvent Base	80	~~7~~ 6

Pavement shall cure for 7 days or as directed by the Engineer before painting. If pavement is opened to traffic before the pavement curing period is complete, apply paint in two coats. Apply the first coat at least 12 hours after paving is completed at 25 percent of the total application rate. Apply the remaining 75 percent following pavement curing time and after pavement grooving operations in affected areas. The direction of the second application shall be 180 degrees from the first to ensure complete coverage. Apply glass beads, if required, in the second coat only. Painting may occur prior to completion of pavement grooving with approval of the engineer.

Pressure apply the glass beads on the marked areas at the locations shown on the Plans using a mechanical dispenser mounted not more than 12 inches behind the paint dispenser. Beads shall be applied at the rate shown in Table 1 and shall adhere to the cured paint or all marking operations shall cease until corrections are made.

All emptied containers shall be returned to the paint storage area for checking by the Engineer. The containers shall not be removed from the airport or destroyed until authorized by the Engineer.

620-3.6 PROTECTION. After application of the paint, all markings shall be protected from damage until the paint is dry. All surfaces shall be protected from excess moisture and/or rain and from disfiguration by spatter, splashes, spillage, or drippings of paint.

620-3.7 PAINTED MARKING REMOVAL. Where indicated, use high pressure water or sand blasting to remove all visible indications of existing painted markings from pavement surfaces. Do not paint over existing markings. Remove pavement markings to the fullest extent possible without materially damaging the pavement surface, color, or texture. Collect and dispose of all loose or waste material as needed to prevent interference with drainage or to prevent dusty conditions under traffic, wind, or propellers.

METHOD OF MEASUREMENT

620-4.1 RUNWAY AND TAXIWAY PAINTING BY UNIT AREA. ~~The quantity of runway and taxiway markings to be paid for will be the number of square feet of painting and the number of pounds of reflective media, performed according to the Specifications and accepted by the Engineer.~~ If runway and taxiway painting by unit area appears in the bid schedule, then new painted markings will be so measured.

620-4.2 REFLECTIVE MEDIA. If reflective media by unit weight appears in the bid schedule, then this material will be so measured.

620-4.3 RUNWAY AND TAXIWAY PAINTING BY LUMP SUM. If a lump-sum item appears in the bid schedule, new painted markings will not be measured for payment. In this case, reflective media (glass beads) as indicated on the plans are subsidiary to the item.

620-4.4 PAINTED MARKING REMOVAL. Painted marking removal will be measured by area acceptably completed with the following exception. If painted marking removal is absent from the bid schedule, no measurement will be made and this item will be subsidiary to painting.

BASIS OF PAYMENT

620-5.1 Payment will be made at the respective contract unit or lump sum price for the pay items listed below that appear in the bid schedule.~~per square foot for runway and taxiway painting and per pound for reflective media.~~ When Item P-620e is not in the bid schedule, painted marking removal is subsidiary to the painting.

Payment will be made under:

Item P-620a	Runway and Taxiway Painting - per square foot
Item P-620b	Reflective Media - per pound
Item P-620c	Runway and Taxiway Painting - per lump sum
Item P-620d	Reflective Media – per lump sum
Item P-620e	Painted Marking Removal - per square foot

TESTING REQUIREMENTS

ASTM C 371	Wire-Cloth Sieve Analysis of Nonplastic Ceramic Powders
ASTM D 92	Flash and Fire Points by Cleveland Open Cup
ASTM D 711	No-Pick-Up Time of Traffic Paint
ASTM D 968	Abrasion Resistance of Organic Coatings by Falling Abrasive
ASTM D 1652	Epoxy Content of Epoxy Resins
ASTM D 2074	Total Primary, Secondary, and Tertiary Amine Values of Fatty Amines by Alternative Indicator Method

ASTM D 2240	Rubber Products-Durometer Hardness
ASTM G 53	Operating Light and Water-Exposure Apparatus (Florescent UV-Condensation Type) for Exposure of Nonmetallic Materials.
Federal Test Method Standard No. 141	Paint, Varnish, Lacquer and Related Materials; Methods of Inspection, Sampling and Testing

MATERIAL REQUIREMENTS

Alaska DOT/PF Yellow	Traffic Paint - No-Heat Instant Dry Pavement Marking Material; White and
ASTM D 476	Titanium Dioxide Pigments
Code of Federal Regulations	40 CFR Part 60, Appendix A, 29 CFR Part 1910.1200
Commercial Item Description (CID) ~~A-A-2886A~~ A-A-2886B	Paint, Traffic, Solvent Based
Fed. Spec. TT-B-1325	Beads (Glass Spheres) Retroreflective
Fed. Spec. TT-P-~~1952D~~1952E	Paint, traffic and Airfield Marking, Waterborne
Federal Standard 595	Colors used in Government Procurement

ITEM P-621 SAW-CUT GROOVES

DESCRIPTION

621-1.1 This item consists of providing a skid resistant surface that prevents hydroplaning during wet weather in accordance with these specifications and at the locations shown on the plans, or as directed by the Engineer.

CONSTRUCTION METHODS

621-2.1 Transverse grooves saw-cut in the pavement must form a 1/4 inch wide by 1/4 inch deep by 1 1/2 inches center-to-center configuration. The grooves must be continuous for the entire runway length. They must be saw-cut transversely in the runway pavement to not less than 10 feet from the runway pavement edge to allow adequate space for equipment operation. The Contractor must provide a grooving machine of a type equipped with diamond-saw cutting blade groove cutting head capable of making at least 18 inches in width of multiple parallel grooves in one pass of the machine. Thickness of the cutting blades shall be capable of making the required width and depth of grooves in one pass of the machine. The cutting head shall not contain a mixture of new and worn blades or blades of unequal wear or diameter. The wheels on the grooving machine shall be of a design that will not scar or spall the pavement. The machine must be equipped with devices to control depth of groove and alignment within the specified tolerances.

The saw-cut grooves must meet the following tolerances. The tolerances apply to each day's production and to each piece of grooving equipment used for production. The Contractor is responsible for all controls and process adjustments necessary to meet these tolerances.

a. **Alignment tolerance.** Plus or minus 1-1/2 inches in alignment for 75 feet.

b. **Groove tolerance.**

   (1) **Depth.** The standard depth is 1/4 inch. At least 90 percent of the grooves must be at least 3/16 inch, at least 60 percent of the grooves must be at least 1/4 inch, and not more than 10 percent of the grooves may exceed 5/16 inch.

   (2) **Width.** The standard width is 1/4 inch. At least 90 percent of the grooves must be at least 3/16 inch, at least 60 percent of the grooves must be at least 1/4 inch, and not more than 10 percent of the grooves may exceed 5/16 inch.

c. **Center-to-center spacing.** The standard spacing is 1-1/2 inches.

   (1) **Minimum spacing** 1-3/8 inches.

   (2) **Maximum spacing** 1-1/2 inches.

Saw-cut grooves must not be closer than 3 inches or more than 9 inches from transverse paving joints. Grooves must not be closer than 6 inches and no more than 18 inches from in-pavement light fixtures. Grooves may be continued through longitudinal joints. Where neoprene compression seals have been installed and the compression seals are recessed sufficiently to prevent damage from the grooving operation. Grooves may be continued through the longitudinal joints. Where neoprene compression seals have been installed and the compression seals are not recessed sufficiently to prevent damage from the

grooving operation, grooves must not be closer than 3 inches or more than 5 inches from the longitudinal joints.

621-2.3 ENVIRONMENTAL REQUIREMENTS. Grooving operations will not be permitted when freezing conditions prevent the immediate removal of debris and/or drainage of water from the grooved area.

621-2.4 EXISTING PAVEMENTS. Bumps, depressed areas, bad or faulted joints, and badly cracked and/or spalled areas in the pavement shall not be grooved until such areas are adequately repaired or replaced.

621-2.5 NEW PAVEMENTS. New asphalt concrete pavements shall be allowed to cure for a minimum of 30 days before grooving, to allow the material to become stable enough to prevent closing of the grooves under normal use. Permit new Portland cement concrete pavements to cure for a minimum of 28 days before grooving. Spalling along or tearing or raveling of the groove edges shall not be allowed.

The Engineer may allow concrete and asphalt grooving before 28 or 30 days, respectively, if it can be demonstrated that grooves are stable with no spalling along or tearing or raveling of the groove edges.

621-2.6 CLEAN-UP. During and after installation of saw-cut grooves, the Contractor must remove from the pavement all debris, waste, and by-products generated by the operations to the satisfaction of the Engineer. Cleanup of waste material must be continuous during the grooving operation. Flush debris produced by the machine to the edge of the grooved area or pick it up as it forms. The dust coating remaining shall be picked up or flushed to the edge of the area if the resultant accumulation is not detrimental to the vegetation or storm drainage system. Accomplish all flushing operations in a manner to prevent erosion on the shoulders Waste material must be disposed of in an approved manner. Waste material must not be allowed to enter the airport storm or sanitary sewer system. The Contractor must dispose of these wastes in strict compliance with all applicable state, local, and Federal environmental statutes and regulations

621-2.7 REPAIR OF DAMAGED PAVEMENT. Grooving must be stopped and damaged pavement repaired at the Contractor's expense when in the opinion of the Engineer the result of the grooving operation will be detrimental to aircraft tires.

ACCEPTANCE

621-3.1 ACCEPTANCE TESTING. Grooves will be accepted based on results of zone testing. All acceptance testing necessary to determine conformance with the groove tolerances specified will be performed by the Engineer.

Instruments for measuring groove width and depth must have a range of at least 0.5 inches and a resolution of at least 0.005 inches. Gage blocks or gages machined to standard grooves width, depth, and spacing may be used.

Instruments for measuring center-to-center spacing must have a range of at least 3 inches and a resolution of at least 0.02 inches.

The Engineer will measure grooves in five zones across the pavement width. Measurements will be made at least three times during each day's production. Measurements in all zones will be made for each cutting head on each piece of grooving equipment used for each day's production.

The five zones are as follows:

Zone 1	Centerline to 5 feet left or right of the centerline.
Zone 2	5 feet 25 feet left of the centerline.
Zone 3	5 feet to 25 feet right of the centerline.
Zone 4	25 feet to edge of grooving left of the centerline.
Zone 5	25 feet to edge of grooving right of the centerline.

At a random location within each zone, five consecutive grooves sawed by each cutting head on each piece of grooving equipment will be measured for width, depth, and spacing. The five consecutive measurements must be located about the middle blade of each cutting head plus or minus 4 inches. Measurements will be made along a line perpendicular to the grooves.

Width or depth measurements less than 0.170 inches shall be considered less than 3/16 inches.

Width or depth measurements more than 0.330 inches shall be considered more than 5/16 inches.

Width or depth measurements more than 0.235 inches shall be considered more than 1/4 inches.

Production must be adjusted when more than one groove on a cutting head fails to meet the standard depth, width, or spacing in more than one zone.

The Engineer may require a written report indicating the percentage of grooves that meet tolerances and may require a report indicating how many times production was adjusted. Blade wear and surface variability may require more testing than the minimum of three per day per equipment. It is expected that the Contractor will routinely spot check for compliance each time the equipment aligns for a grooving pass.

~~MEASUREMENT AND PAYMENT~~

~~621-4.1 PAYMENT FOR SAW-CUT GROOVING. Payment for saw-cut grooving will be made at the contract unit price per square yard for saw-cut grooving.~~

METHOD OF MEASUREMENT

920-4.1 Pavement saw-cut grooves will be measured either by neat line dimensions as shown in the Plans or as a single item of work. No deductions will be made for areas skipped to avoid joints or in-pavement fixtures.

BASIS OF PAYMENT

920-5.1 Payment will be made at the contract unit price or the lump sum price for pavement saw-cut grooves accepted by the Engineer.

Payment will be made under:

Item P-621a Saw-Cut Grooves - per square yard

Item P-621b Saw-Cut Grooves - per lump sum

ITEM P-660 RETROREFLECTIVE MARKERS AND CONES

DESCRIPTION

660-1.1 Furnish and install airport retroreflective markers and traffic cones in accordance with the plans, the safety plan, and the specifications at the locations indicated on the plans or as directed by the Engineer. Assemble and install markers using all materials and incidentals necessary to place completed markers into operation to the satisfaction of the Engineer. Remove existing reflective marker cones and threshold markers for salvage and offer to the owner for possession.

MATERIALS

660-2.1 MARKERS.

a. **Type I Marker.** Semi-flush centerline marker conforming to FAA AC 150/5345-39x, "Specification for L-853. Runway and Taxiway Lighting Retroreflective Markers" and certified under AC 150/5345-53 *Airport Lighting Equipment Certification Program.*

b. **Type II Marker.** Elevated marker for edge marking conforming to FAA AC 150/5345-39x, "Specification for L-853. Runway and Taxiway Lighting Retroreflective Markers" and certified under AC 150/5345-53 *Airport Lighting Equipment Certification Program.* Provide flexible or frangible markers in accordance with the height, marker colors, and retro-reflective colors shown on the plans. If not called on the plans, provide a finished marker height that is 30 inches above finish grade, marker color orange, and retroreflective colors as required by AC 150/5345-39x. If frangible markers are supplied, ensure that the mounting system and tether are certified. When retro-reflective sheeting is used, provide manufacturer applied sheeting.

c. **Cone, 18 Inch.** Reflective rubber traffic cone, 18 inches in height, orange color. Traffic cone model number 18-AOR, as manufactured by Radiator Specialty Company, P.O. Box 34689, Charlotte, N.C. 28234-6080 or approved equal. Fit each cone with a 7-inch wide band of retro-reflective sheeting centered on the cone. Use pressure sensitive, flexible, high intensity retroreflective sheeting, conforming to AASHTO M 268, Type III-A. Use retroreflective sheeting 3M #3800 or approved equal. Provide the appropriate sheeting color(s) as indicated on the plans or if none is indicated supply with white colored band. Provide each cone with an anchoring tether of weather and corrosion resistant material capable of securing the assembly to prevent foreign object debris (FOD) hazard to aircraft similar to the tether required for Type II Markers that are frangible.

CONSTRUCTION REQUIREMENTS

660-3.1 Install markers and/or cones at the locations shown on the plans, called for in the specifications or as directed by the Engineer. Stabilize Type II Markers by using the manufacturer's recommended methods of driving the supporting posts into the ground or providing a certified mounting system. If frangible Type II Markers or cones are provided, secure the tether to a hard point in accordance with AC 150/5345-39x per the manufacturer's recommendations.

Remove existing reflective markers and threshold marking panels as shown on the plans or as directed for salvage and offer to the owner for possession. Markers not claimed by the owner become the property of the Contractor to be disposed of in a manner approved by the Engineer.

METHOD OF MEASUREMENT

660-4.1 The method of measurement will be by the number of markers or cones furnished and installed of the specified type, at locations approved by the Engineer, except as noted below under basis of payment.

Removal and salvaging of existing markers and panels will be subsidiary to the installation of reflective markers and/or cones and will not be measured for payment.

BASIS OF PAYMENT

660-5.1 Payment will be made at the contract unit price for each furnished and accepted item. This price will be full compensation for furnishing all materials, for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete this item.

If the following pay items are absent from the bid schedule, no payment will be made. All work, materials, and equipment required to complete the work will be subsidiary to those items requiring its installation.

Payment will be made under:

Item P-660a	Reflective Marker, Type I - per each
Item P-660b	Reflective Marker, Type II - per each
Item P-660c	Cone, 18 Inch - per each

ITEM P-660 RETROREFLECTIVE MARKERS AND CONES

DESCRIPTION

660-1.1 Furnish and install airport retroreflective markers and traffic cones in accordance with the plans, the safety plan, and the specifications at the locations indicated on the plans or as directed by the Engineer. Assemble and install markers using all materials and incidentals necessary to place completed markers into operation to the satisfaction of the Engineer. Remove existing reflective marker cones and threshold markers for salvage and offer to the owner for possession.

MATERIALS

660-2.1 MARKERS.

a. **Type I Marker.** Semi-flush centerline marker conforming to FAA AC 150/5345-39x, "Specification for L-853. Runway and Taxiway Lighting Retroreflective Markers" and certified under AC 150/5345-53 *Airport Lighting Equipment Certification Program.*

b. **Type II Marker.** Elevated marker for edge marking conforming to FAA AC 150/5345-39x, "Specification for L-853. Runway and Taxiway Lighting Retroreflective Markers" and certified under AC 150/5345-53 *Airport Lighting Equipment Certification Program.* Provide flexible or frangible markers in accordance with the height, marker colors, and retro-reflective colors shown on the plans. If not called on the plans, provide a finished marker height that is 30 inches above finish grade, marker color orange, and retroreflective colors as required by AC 150/5345-39x. If frangible markers are supplied, ensure that the mounting system and tether are certified. When retro-reflective sheeting is used, provide manufacturer applied sheeting.

c. **Cone, 18 Inch.** Reflective rubber traffic cone, 18 inches in height, orange color. Traffic cone model number 18-AOR, as manufactured by Radiator Specialty Company, P.O. Box 34689, Charlotte, N.C. 28234-6080 or approved equal. Fit each cone with a 7-inch wide band of retro-reflective sheeting centered on the cone. Use pressure sensitive, flexible, high intensity retroreflective sheeting, conforming to AASHTO M 268, Type III-A. Use retroreflective sheeting 3M #3800 or approved equal. Provide the appropriate sheeting color(s) as indicated on the plans or if none is indicated supply with white colored band. Provide each cone with an anchoring tether of weather and corrosion resistant material capable of securing the assembly to prevent foreign object debris (FOD) hazard to aircraft similar to the tether required for Type II Markers that are frangible.

CONSTRUCTION REQUIREMENTS

660-3.1 Install markers and/or cones at the locations shown on the plans, called for in the specifications or as directed by the Engineer. Stabilize Type II Markers by using the manufacturer's recommended methods of driving the supporting posts into the ground or providing a certified mounting system. If frangible Type II Markers or cones are provided, secure the tether to a hard point in accordance with AC 150/5345-39x per the manufacturer's recommendations.

Remove existing reflective markers and threshold marking panels as shown on the plans or as directed for salvage and offer to the owner for possession. Markers not claimed by the owner become the property of the Contractor to be disposed of in a manner approved by the Engineer.

METHOD OF MEASUREMENT

660-4.1 The method of measurement will be by the number of markers or cones furnished and installed of the specified type, at locations approved by the Engineer, except as noted below under basis of payment.

Removal and salvaging of existing markers and panels will be subsidiary to the installation of reflective markers and/or cones and will not be measured for payment.

BASIS OF PAYMENT

660-5.1 Payment will be made at the contract unit price for each furnished and accepted item. This price will be full compensation for furnishing all materials, for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete this item.

If the following pay items are absent from the bid schedule, no payment will be made. All work, materials, and equipment required to complete the work will be subsidiary to those items requiring its installation.

Payment will be made under:

Item P-660a	Reflective Marker, Type I - per each
Item P-660b	Reflective Marker, Type II - per each
Item P-660c	Cone, 18 Inch - per each

ITEM P-670 HAZARDOUS AREA BARRIERS

DESCRIPTION

670-1.1 Provide barriers for use on the project under subsection 70-09, Barricades, Flasher units, flags, Warning Signs and Hazard Markings. Provide each barrier or barricade complete with flasher unit and flag in accordance with the dimensions, design, and details shown on the Plans. Provide, install and maintain flasher units and flags for State provided barriers. Haul and place barriers as shown on the Plans or as directed by the Engineer. Relocate barriers as conditions warrant.

Provide additional flasher units and flags, when specified, for use on Department-supplied barriers.

MATERIALS

670-2.1 Use materials that conform to the following:

a. **Hazard Marker Barrier, Timber.** Provide construction-grade Douglas Fir-Larch with nominal dimensions of 12 inches x 12 inches and a length of 8 feet. Use pressure treated wood with a preservative salt retention of not less than 0.6 lbs/ft^3, kiln dried after impregnation, and conforming to the American Wood Preservers Bureau (AWPB) FDN Standard. Provide timbers that bear the AWPB Quality Mark of an approved inspection agency as described in the AWPB Standard. Use either oil base or latex exterior paint in colors international orange and white.

b. **Hazard Marker Barrier, Plastic.** Provide 10 inch x 10 inch by 8 foot nominal dimension portable water-ballast barriers made from high impact, safety orange and white, UV-resistant, high density polyethylene (HDPE) plastic. Provide barriers with pre-molded flag staff and flasher bracket attachment holes. Provide barriers that are designed as a modular system to allow assembly/disassembly and nesting for compact storage, and to permit the option of physically bolting multiple barriers together to provide a continuous barrier wall. Provide 6-inch x 72-inch reflective striping panel for attachment to one side of each barrier. The state will provide plastic barriers for use in this contract. The contractor shall provide flasher units and flags for these barriers. The contractor shall transport, utilize and maintain these barriers and relocate as required by the work.

c. Traffic control Barricade, type III. provide 5' by 8' nominal dimension portable freestanding stansions as shown on the plans or as approved by the Engineer. Construct as required by the Manual for Uniform Traffic Control Devices for Type III Barricades, Section 6F.63. Apply retroreflective strips to both sides of barricade. Provide a flag per paragraph 670-2.2 and flasher unit per paragraph 670-2.3 below. Provide each barricade with sufficient blast to prevent overturning by wind or aircraft blast.

670-2.2 Flag. Provide heavy vinyl coated nylon, 18 inch x 18 inch flag with an integral diagonal metal or plastic stay to make the flag self supporting. Provide flag in color fluorescent orange and mounted on a ¾ inch x 30-inch staff.

670-2.3 Flasher Unit. Provide battery-operated omnidirectional flashing red light. Provide flasher unit with mounting bracket designed for the appropriate barrier or barricade type.

a. **Flasher Unit for Timber Barrier.** Meet Manual on Uniform Traffic Control Devices (MUTCD) requirements for Type A Warning Lights, section 6f.78. Supply one set of non-standard tools, such as the on/off switch or battery access tool, for each 5 flasher units furnished.

b. **Flasher Unit for Plastic Barrier.**

Composition	High impact, polycarbonate plastic lens and base
Flashing Rate	60 flashes per minute
Brightness	6000 mcd
LED	Total of 3 red
Photo Cell	Allows for solar light to automatically shut off in higher level light conditions and turn on in lower light conditions

c. **Flasher Unit for Type III Barricade.** Meet Manual on Uniform Traffic Control Devices (MUTCD) requirements for Type A Warning Lights, section 6F.78. Supply one set of non-standard tools, such as the on/off switch or battery access tool, for each 5 flasher units furnished

CONSTRUCTION REQUIREMENTS

670-3.1 GENERAL. On the top side and at opposite ends of each barrier, mount one flag and one flasher unit per manufacturer's instructions. Tether flag to the barrier.

a. **Hazard Marker Barrier, Timber.**

(1) **Preparation.** Prior to painting, notch the underside of each timber to allow for the use of a forklift. Cut two 4 inch high by 12 inch wide notches spaced 36 inches center to center, centered on the long axis of the timber.

(2) **Painting.** Apply one coat of primer and one coat of finish white color paint on all sides and the ends followed by two coats of orange finish paint to form the stripes on the sides. Paint orange stripes 24 inches wide and offset by 6 inches from one side to the next giving a "barber pole" effect.

(3) **Flag and Flasher Unit.** Mount the flag 24 inches from one end of the timber by drilling a hole 1/8 inch larger than the diameter of the staff by 8 inches deep. Mount the flasher unit 24 inches from the opposite end of the timber.

b. **Hazard Marker Barrier, Plastic.** Fill barriers with water for ballast in accordance with manufacturer's recommendations. When shown on the plans or directed by the Engineer, interlock barrier units using manufacturer recommended connectors to form a continuous wall separating the hazardous work area from aircraft movement areas. Adhere reflective striping panels to one side of each barrier.

670-3.2 DELIVERY. Deliver hazard marker barriers, flasher units, and flags to the project site prior to commencing work within the Air Operations Area.

670-3.3 STORAGE. Following completion of the project, remove flasher units and flags from the barriers. Barriers, flasher units, and flags are the property of the State. Drain plastic barriers. Deliver to a location on the Airport designated by the Engineer.

METHOD OF MEASUREMENT

670-4.1 Hazard marker barriers and Traffic Barricades Type III, ~~complete with flag and flasher~~ unit will be measured by the number of units furnished and accepted.

Flasher units and flags to be used on Department-supplied barriers and traffic barricades will be measured by the number of units furnished and accepted.

BASIS OF PAYMENT

670-5.1 Payment covers all costs associated with furnishing and storing hazard marker barriers, flasher units, and flags, including tools, batteries, and incidentals.

Work required for placing, erecting, moving, and maintaining barriers ,barricades, flasher units and flags is subsidiary.

Payment will be made under:

Item P-670a Hazard Marker Barrier, Plastic - per each
Item P-670a(1) Traffic Barricade, Type III – per each
Item P-670b Flasher Unit for Plastic Barrier - per each
Item P-760b(1) Flasher Unit for Traffic Barricade, Type III – per each
Item P-670c Flag - per each

ITEM P-671 RUNWAY AND TAXIWAY CLOSURE MARKERS

DESCRIPTION

671-1.1 Furnish, install, and maintain lighted runway and/or taxiway closure markers at the locations shown on the Plans or as directed by the Engineer. Where a new runway is built to replace an existing runway, install runway closure markers on the old runway immediately after the new runway has been opened for operations. Place markers as shown on the Plans or as directed by the Engineer. Relocate markers as required. Maintain markers as required during the construction. Materials supplied under this item may be used as temporary closure markers as required in section 80-04.

MATERIALS

671-2.1 Use materials that conform to the following.

a. Vinyl Mesh Panel.

(1) Panel Material. High tenacity vinyl coated polyester mesh fabric, 9 oz/yd^2, 70% closed mesh allowing water to flow through. Use 3.0 oz/yd^2 woven polyester fabric, coated after weaving with 6.0 oz/yd^2 coating of poly vinyl chloride, color traffic yellow. Minimum tensile strength 230x200 lbs grab method and 200x140 lbs strip method. Meet ASTM D 471 for water absorption, 7 days @160 degrees F, 5.0% maximum weight gain and ASTM D 750 for weathering, 2500 hours, no appreciable change in color, no cracking, minimum crazing.

(2) Seams, Perimeter Hem, and Thread. Double flat felled seams, double stitched, and 3-ply perimeter hem sewn with UV resistant #92 bonded polyester thread.

(3) Grommets. No. 2 brass rolled-rim spur grommets installed through hem at 30-inch intervals along marker perimeter.

(4) Anchors. 3/8-inch diameter deformed reinforcing steel at least 18 inches long, including a hook formed as a 4-inch segment bent perpendicular to the anchor stem.

b. Snow Fence Panel.

(1) Panel Material. Wire-supported wood lathe snow fence, pre-treated with a suitable wood stain.

(2) Paint Type: (select one)

(a) AASHTO M248, Type F (Alkyd resin)

(a) FSS TT-P-19D(1) Paint Latex (Acrylic emulsion, Exterior).

(3) Paint Color: Traffic Yellow, #33538

(4) Anchors: 3/8-inch diameter deformed reinforcing steel at least 18 inches long, including a hook formed as a 4-inch segment bent perpendicular to the anchor stem.

b. Lighted Runway Closure Marker. Pre-manufactured assembly delivered completely assembled and ready to use.

CONSTRUCTION REQUIREMENTS

671-3.1 Meet the following requirements.

a. Vinyl Mesh Panel. Secure by driving anchors into the embankment through all grommets.

b. Snow Fence Panel. Apply to the upper side of the panels, two coats of paint that result in a dense and consistent color. Construct panels double layered, with upper layer wood lathe oriented to lower lathe at right angles to provide a solid yellow appearance.

Combine standard manufactured widths to provide plan dimensions, if necessary.

Secure panels by driving anchors into the embankment at 30-inch intervals around the perimeter of each panel. If more than one standard manufactured width is combined to obtain plan dimensions, provide anchors on each strip.

c. Lighted Runway Closure Marker.

(1) Features.

a. 14' "X" type marker
b. Aluminum, steel or fiberglass arms retractable for towing
c. DOT compliant trailer mounted highway towable
d. Generator powered with self contained fuel tank providing at least 72 hour operation without refueling
e. Four corner leveling/stabilization jacks
f. Adjustable marker angle for sloped runways
g. Photocell controlled light levels for day/night operation.
h. Certified compliant with FAA Advisory Circular 150/5345-55A, *Specifications for L-893, Lighted Visual Aid to Indicate Temporary Runway Closure* and qualified under FAA Advisory Circular 150/5345-53, *Airport Lighting Equipment Certification Program.*

METHOD OF MEASUREMENT

671-4.1 By the number of markers of the specified type, installed and accepted as completed units in place. No additional measurement will be made for maintaining, removing and relocating markers for various stages of work.

BASIS OF PAYMENT

671-5.1 Payment will be made at the contract unit price for each furnished and accepted item of the marker type specified. Markers shall become the property of the State of Alaska at the end of the contract.

Payment will be made under:

Item P-671a	Runway Closure Marker, Lighted - per each
Item P-671b	Taxiway Closure Marker, [Type] - per each

TESTING REQUIREMENTS

ASTM D 471 Rubber Property – Effect of Liquids

ASTM D 750 Rubber Deterioration in Carbon-Arc Weathering Apparatus

SECTION P-680 GEOTEXTILE FOR SILT FENCE

DESCRIPTION

680-1.1 Furnish, place, maintain, and remove temporary silt fence as shown on the Plans or as directed.

MATERIALS

680-2.1 GEOTEXTILE. Use geotextile that meets AASHTO M 288 for Temporary Silt Fence.

680-2.2 POSTS. Use posts made of wood, steel, or approved synthetic material that will adequately support the fence under forces induced by water and sediment loading.

CONSTRUCTION REQUIREMENTS

680-3.1 Erect geotextile fence before excavation or embankment construction begins.

680-3.2 POST INSTALLATION. Place posts a maximum of 8 feet apart and drive a minimum of 18 inches into the ground.

680-3.3 GEOTEXTILE PLACEMENT. Install geotextile on posts in a vertical position and support by a wire mesh fence or self-support system. Set at the height specified in the Contract. Secure the bottom 18 inches of the geotextile on the upslope side of the fence as shown on the Plans. Backfill trench with tamped soil. Join adjacent sections of geotextile only at posts with a minimum of 6 inches overlap.

680-3.4 MAINTENANCE AND REMOVAL. Maintain the integrity of the fence as long as it is necessary to contain sediment runoff. Inspect the fence daily and correct deficiencies immediately. Remove and dispose of the fence when adequate vegetative growth insures no further erosion of the slopes. Cut off the fabric at ground level and remove the fabric, wire and posts. When thickness of trapped sediment is in excess of 4 inches above the ground, either remove sediment from the site or spread sediment uphill of the fence and seed all exposed soil immediately, following the requirements of Item T-901.

METHOD OF MEASUREMENT

680-4.1 Fence will be measured in place, on the ground along the post line.

BASIS OF PAYMENT

680-5.1 Payment will be subsidiary to Item P-157b.~~made as follows: 60% for installation. 25% for maintenance and repairs, prorated at the Engineer's discretion, 15% for removing it from the site.~~

~~Payment will be made under:~~

~~Item P-680a – Silt Fence – per linear foot~~

ITEM P-681

GEOTEXTILE FOR SEPARATION AND STABILIZATION

DESCRIPTION

681-1.1 Prepare surfaces and furnish and place geotextiles for embankment separation and/or stabilization as shown on the Plans.

MATERIALS

681-2.1 Use geotextiles and sewing thread that conform to the following:

a. Separation. Meet AASHTO M 288 for Separation, except provide a minimum permittivity of 0.05 sec^{-1}.

b. Stabilization. Meet AASHTO M288 for Stabilization, except provide a minimum permittivity of 0.08 sec^{-1}.

CONSTRUCTION REQUIREMENTS

681-3.1 Surface Preparation. Prepare surface by removal of stumps, brush, boulders, and sharp objects. Fill holes and large ruts with material shown on the Plans or as approved.

681-3.2 Geotextile Placement. Unroll geotextile directly onto the prepared surface. Stretch geotextile to remove any creases or wrinkles. Do not expose geotextiles to the elements for longer than 5 days after removal of protective covering.

a. Separation. Lay geotextile for embankment separation parallel to the embankment centerline. On horizontal curves, place in segment lengths not exceeding those listed in Table 1, with butt ends cut to match and sewn or overlapped. On tangents, straighten the geotextile and sew or overlap butt ends.

b. Stabilization. Lay geotextile for embankment stabilization perpendicular to the embankment centerline. Join segments by sewing or an approved bonding or attachment process.

681-3.3 Joining. Join geotextile for embankment separation by sewing or overlapping. Join geotextile for stabilization by sewing. Use other attachment methods, if approved.

a. Sew seams with a butterfly or j-seam. Use a double-thread chain stitch (lock stitch). Bring adjacent sections of geotextile together and fold so that the stitching penetrates four layers of geotextile for the full seam length. Make the stitching line 1-¼ inches (± ¼-inch) from the folded edge of the seam and at least ½-inch from the free edge of the geotextile.

b. Overlapped sections must overlap a minimum of 3 feet.

TABLE 1

GEOTEXTILE PLACEMENT ON CURVES

Degree of Curve	Maximum Segment Length (ft.)
1	125
2	90
3	75
4	65
5	55
6	50

681-3.4 Material Placing and Spreading. During placing and spreading, maintain a minimum depth of 12 inches of cover material at all times between the fabric and the wheels or tracks of the construction equipment.

Spread the material in the direction of the fabric overlap. Maintain proper overlap and fabric continuity. If sewn or bonded seams are used, place the cover material and spread in only one direction for the entire length of the geotextile. On weak subgrades spread the cover material simultaneously with dumping to minimize the potential of a localized subgrade failure.

Compact using a smooth drum roller. Do not allow construction equipment to make sudden stops, starts, or turns on the cover material.

681-3.5 Geotextile Repair.

a. **Separation.** Overlay torn area with geotextile with a minimum 3-foot overlap around the edges of the torn area. Ensure that the patch remains in place when material is placed over the affected area.

b. **Stabilization.** Sew according to Subsection 681-3.3.

METHOD OF MEASUREMENT

681-4.1 By multiplying plan neat line width by the measured length in final position parallel to installation centerline along the ground surface. No allowance will be made for overlap, whether at joints or patches.

BASIS OF PAYMENT

681-5.1 Payment will be made at the contract unit price per square yard.

Material used to fill ruts and holes will be paid for at the unit price for the type of material used.

Payment will be made under:

Item P-681a Geotextile, Separation - per square yard
Item P-681b Geotextile, Stabilization - per square yard

ITEM S-142 EQUIPMENT STORAGE BUILDING

DESCRIPTION

142-1.1 Furnish all labor, materials and equipment required to engineer, fabricate and erect complete a building with foundation, floor, lighting and electrical systems, ready for occupancy, at the location shown on the plans.

REQUIREMENTS

142-2.1 CODES AND STANDARDS. Design the buildings and all components in conformance with International Building Code (IBC), International Mechanical Code (IMC), National Electric Code (NEC), and the International Fire Code (IFC) as adopted by the State of Alaska and current Building Code requirements of the Municipality of Anchorage.

142-2.2 DESIGN LOADS. Design to meet or exceed the load requirements as defined in the IBC. Use the most stringent snow, seismic, and wind load requirements of IBC that apply for the specific geographic building location.

142-2.4 FRAMING. Design a single span, rigid framed structure with gable roof and metal siding. Verify that the frame provides adequate clearances within the building for operation of the doors, penetrations, etc. Design all framing connections to be bolted, screwed or nailed.

142-2.5 DESIGN DISCIPLINE COORDINATION. Design the building to incorporate all necessary blocking and structural bracing as required to support the electrical and mechanical devices, and systems as shown on the Plans and as specified herein. While in some cases specific devices and systems have been specified, design the building using the actual devices and systems provided under this contract.

142-2.6 WARRANTIES. Submit five (5) bound copies of required warranties to the Engineer. In addition to the warranties described in other subsections, the following warranties apply:

a. Provide building manufacturer's 3-year standard warranty on materials and workmanship.

b. Provide panel manufacturer's 20-year warranty on panel finish.

c. Provide manufacturer's 10-year warranty on panel finish for bifold and personnel doors.

d. Provide manufacturer's standard warranties on electrical and mechanical components.

142-2.7 TESTING. Furnish devices and systems under this contract that are listed or labeled by an independent testing agency acceptable to the Engineer. Acceptable agencies include but are not limited to, Under Writers Laboratories (UL), Edison Test Labs (ETL), and Factory Mutual (FM).

142-2.8 CERTIFICATIONS AND APPROVALS. Provide verification of design adequacy and code compliance by means of engineering calculations/design analysis stamped by a Professional Engineer registered in the State of Alaska. Furnish five (5) complete sets of materials submittals, working drawings, engineering calculations, color chips and manufacturer's certifications as one complete set of documents to the Engineer for approval before ordering the building and building components. Submit one complete set of working drawings to the State of Alaska, Department of Public Safety, Division of Fire Safety at 5700 E. Tudor Road, Anchorage, Alaska 99504 for plan review and approval. Contractor is responsible for payment of all submittal and plan review fees. Obtain Fire Marshall's approval prior to ordering the building or building components. Provide the Engineer with a copy of the Fire Marshall's approval.

Submit plans and working drawings in accordance with section 50-02.

CONSTRUCTION METHODS AND MATERIALS

142-3.1 REQUIRED FEATURES.

a. NDB building: 12'x 12' located as shown on the plans. This facility will house the NDB control equipment.

PCC concrete foundation and floor adequate to support the building. Seal floor with gray non-staining polyurethane concrete floor sealer meeting FS TT-S-00230c or ASTM C920.

Building constructed of wood or metal framing 16" o.c. All framing field connections shall be bolted . Do not field drill or weld frame. Edges of all siding and roofing shall be supported by framing.

Construction per ICB Business Group B occupancy classification.

Metal siding 26 ga. sheet steel minimum with factory embossed stucco texture. One piece panels, continuous from floor to roof. Factory finished with one of the manufacturer's standard finishes in light green or tan as approved by the Engineer, with manufacturer approved fasteners.

Metal standing seam sheet steel gable roof 4:12 pitch with 1' enclosed overhangs at eaves and gables. Framing 16" o.c. Panels one piece continuous from eaves to ridge to roof. Factory finished with one of the manufacturer's standard finishes in light green or tan as approved by the Engineer, Attach with manufacturer approved fasteners. Enclose eaves. Trim at all exposed edges. Roof snow tabs to protect the man door.

One 36" insulated metal clad man door with metal frame, automatic door closer and rekeyable commercial door lock. Factory primed, painted to match exterior.

Interior walls and ceiling finished with moister resistant sheet rock. Mud, and tape walls and ceiling. Prime and paint with two (2) coats of 100 % acrylic paint, color near white as approved by the Engineer.

Interior finished ceiling height 8'.

Interior/exterior electrical lighting, heating, ventilating and power systems meeting the requirements of the electrical performance specifications.

Comply with section 60-08 for submittals.

142-3.2 ACCESSORIES.

a. **Fire Extinguishers.** Provide portable fire extinguishers and applicable mounting hardware. Provide two (2) fire extinguishers, one inside the building at the entry door and one in the opposite corner of the building. Mount extinguisher with the top at 48 inches above the floor. Provide 10 pound fire extinguishers, type 2-A:10-B:C minimum, multi-purpose dry chemical pressurized, with pressure gauge, metal valves and siphon tubing and UL listed. Affix a State Fire Marshal approved sign adjacent to each fire extinguisher.

142-3.3 HEATING SYSTEM.

a. **Heating System Materials:** Provide equipment, controls, and accessories listed/labeled by an approved independent materials testing laboratory such as Underwriters Testing Laboratories (UL), Electrical Testing Laboratories (ETL), Canadian Standards Association (CSA), Factory Mutual (FM), or other agencies recognized by the State of Alaska Department of Labor.

Submittals: Provide for review and approval Manufacturers cut sheet data for each component specified. Where a specified part number or model number is used in the Contract Documents, substitutions will be considered on an "or equal" basis for review unless component or system is identified as "no substitution".

(1) **Electric Resistance Unit Heater.** Provide a factory packaged and wired units complete with heating element, fan and motor assembly, casing and controls. The electric resistance-heating coil shall be nickel-chromium heating wire, embedded in magnesium oxide refractory and sealed in corrosion-resistant metallic sheath. Terminate elements in stainless steel, machine-staked terminals secured with stainless steel hardware and limit controls for high temperature protection. Factory wire motor and controls for a single field connection with disconnect switch. Motor shall be permanently lubricated. Unit heaters larger than 7.5kW shall have two-stage or fully modulating controls.

(2) **Heating System Controls.** For each unit heater, provide a 24-VAC heating thermostat. Set initial default temperature at 50°F. Supply control voltage with a 24-VAC control transformer connected to the circuit providing power to the unit heater.

(3) **Heating System Installation.** Install equipment, controls, and accessories as recommended by manufacturer, and in accordance with the International Mechanical Code (IMC). Size the heating system to maintain an interior temperature of 50°F at an outdoor temperature of -20°F.

142-3.4 VENTILATION SYSTEM.

a. **Ventilation System Materials:** Provide equipment labeled by an approved independent testing laboratory such as Underwriters Testing Laboratories (UL), Electrical Testing Laboratories (ETL), Canadian Standards Association (CSA), Factory Mutual (FM), or other agencies recognized by the State of Alaska Department of Labor.

Submittals: Provide for review and approval Manufacturers cut sheet data for each component specified. Where a specified part number or model number is used in the Contract Documents, substitutions will be considered on an "or equal" basis for review unless component or system is identified as "no substitution".

(1) **Exhaust Fan.** Propeller type exhaust fan with stamped aluminum propeller with steel hub, steel venturi panel frame, inlet guard, and direct drive motor. Provide 120 VAC, direct drive motor, with integral overload protection, horsepower rating as required. Provide Loren Cook fan, type SWD or approved equal. Provide the exhaust fan with a backdraft damper and exhaust louver.

(2) **Exhaust Fan Timer.** Furnish an electrically driven timer with an adjustable 0 to 15 minute range and hand activation knob, SPDT contact rated 20 amps, 240VAC. Industrial Timer Company Division of Essex Products Group, 30 Industrial Park Road, Centerbrook CT 06409, No AB-53-R03 or approved equal.

(3) **Motorized Louvers and Dampers.** Provide multi-blade low leakage type. Provide blades that are linked for parallel operation with vinyl edge and stainless steel jamb seals. Provide motor operator that is direct shaft mounted, spring return two position type or modulating as

required, 120 VAC operating voltage. Provide rain-proof louvers with motorized dampers in exterior walls.

(4) **Carbon Monoxide Detector.** Provide carbon monoxide detector, Kidde Model KN-COP-IC or smaller similar. This model is AC wired with battery backup.

b. **Ventilation System Installation.** Install equipment, controls, and accessories as recommended by equipment manufacturer, and in accordance with the International Mechanical Code, and equipment listing by an approved testing laboratory.

c. **Ventilation System Controls.** Provide a magnetic motor starter, exhaust fan timer, and other ventilation system components specified above. Design the ventilation system to provide the required ventilation in accordance with the International Building Code and International Mechanical Code while minimizing heat loss. The ventilation system shall be controlled automatically based on temperature and/or occupancy with an exhaust fan timer for manual override.

142-3.5 ELECTRICAL SYSTEM.

a. **Electrical Materials.** Provide equipment labeled by an approved independent testing laboratory such as Underwriters Testing Laboratories (UL), Electrical Testing Laboratories (ETL), Canadian Standards Association (CSA), Factory Mutual (FM), or other agencies recognized by the State of Alaska Department of Labor.

(1) **Quality Control.** Furnish devices and systems under this contract that are listed or labeled by an independent testing agency acceptable to the authority having jurisdiction (State Inspector). Acceptable agencies include (but are not limited to) Under Writers Laboratories (UL), Edison Test Labs (ETL), and Factory Mutual (FM). Contact the Alaska Department of Labor Mechanical Inspections Division for additional agencies currently approved.

Submittals: Provide for review and approval Manufacturers cut sheet data for each component specified. Where a specified part number or model number is used in the Contract Documents, substitutions will be considered on an "or equal" basis for review unless component or system is identified as "no substitution".

(2) **Conduit.**

Galvanized Rigid Steel Conduit (GRSC) conforming to UL-6.

Intermediate Metal Conduit (IMC) conforming to UL-1242.

Electrical Metallic Conduit (EMT) conforming to UL-797.

Flexible Metal Conduit (FMC) conforming to UL-1.

Liquid Tight Metal Conduit (LTF) conforming to UL-360.

(3) **Conduit Fittings.**

GRSC and IMC - Use threaded conduit and secure with gland-type lock rings at all non-hub attachment points. Provide insulated bushings. Compression type fittings are not permitted.

EMT - Install using compression type couplings and connectors. Use connectors with insulated throat.

FMC - Install using connectors suitable for the intended purpose. Provide insulating bushings at all non-hub connections.

LTF – Provide connectors with insulated throat.

(4) **Conductors.** Provide copper conductors. Use stranded conductors for #10 AWG and larger.

Furnish conductors for general purpose power and lighting circuits that are rated 90 degrees C in wet and dry applications, and rated 600-volt, with XHHW-2 insulation conforming UL-44, No. 12 AWG minimum.

(5) **Outlet Boxes.** Unless otherwise noted, provide wall and ceiling boxes for exposed or concealed raceway systems that are a minimum 4 inches square by 2-1/8 inches deep galvanized steel suitable for the device to be installed. Wall boxes below 8 feet AFF shall be cast metal.

Provide exterior boxes that are weatherproof, cast metal with mounting lugs.

(6) **Receptacles.** Provide industrial specification grade units designed for heavy-duty service, housed in device boxes with metal cover plates.

Provide convenience outlets that are duplex unit receptacles, grounding-type, AC rated 20 A, 125 V, 2-pole, 3-wire NEMA 5-20R. Locate receptacles at a maximum spacing of 20'-0" on center along each wall. Locate one exterior receptacle at each end of the building.

Provide receptacles incorporating Class-A (5-ma) Ground Fault Circuit Interruption GFCI protection with a light emitting diode that is lighted when the receptacle is active and circuitry that will not allow the receptacle to be reset when the GFCI protection is inoperative.

Provide receptacles 20 amps and lower that are ivory color.

(7) **Switches.** Provide switches, other than motor starting disconnect switches with and without thermal over load elements, rated up to 30 amps @ 277 volts that are Industrial Specification Grade, AC quiet type rated for tungsten and inductive lighting, and motor starting loads.

Provide switches at each entry into the building and one for the exterior lights. Where more than 1 switch is shown at a location, mount in a common box (up to 6 gangs wide) under a one-piece faceplate, unless otherwise noted. Provide non-lighted handles that are ivory in color.

(8) **Cover Plates.** Provide metal cover plates of the type designed for the box or fitting, and the type of device mounted in the box.

Provide exterior cover plates with gaskets. Provide exterior cover plates that are lockable and rated weatherproof while in use.

(9) **Motor Starters.** Provide manual starters for fractional horsepower induction motors that are full-voltage single or double pole as required with thermal overload elements, with a toggle operator in a NEMA 1 enclosure.

Provide magnetic starters for induction motors rated in horsepower that are AC general-purpose class-A magnetic controller full-voltage starting with thermal overload elements. For manual start motors provide start/stop and reset push buttons. For automatic start motors provide with a hand-off-auto switch. Provide indicator lights when the motor is out of sight of the controller.

(10) **Panelboards and Breakers.** Provide panelboards and bolt-on molded-case circuit breakers that conform to the requirements of Fed. Spec. W-P-115c, Class 1, Type 1 UL Standard 67 – Panelboards, and UL 489 – Circuit Breakers and Circuit Breaker Enclosures - Molded Case. Provide panelboard power bus, neutral and ground bars that are copper. Provide terminals that are rated for operation with 75-degree C conductors.

(11) **Lighting Fixtures.** Provide enclosed fluorescent lighting fixtures to provide a maintained illumination level of 20fc. Light fixtures shall be provided complete with lamps and all mounting hardware.

Provide metal-halide exterior wall pack fixtures over each entry door. Fixtures shall have full-cutoff distribution and an integral photocell. Control fixtures from a manual switch inside the building.

Provide a combination exit/emergency light with battery backup above each entry door.

(12) **Disconnect Switches.** Where required by code, provide a non-fused disconnect switch, or molded-case circuit breakers in a NEMA-1 or NEMA-3R enclosure with separate neutral and ground buses or through-feed landing lugs. Provide disconnects that are heavy duty rated for operation with 75-degree C conductors. Where used as a building main disconnect, provide switch that is UL listed for use as service entrance equipment.

(13) **Grounding and Bonding.** Comply with NEC article 250 for types, sizes and quantities of equipment, and grounding conductors, unless specific types, larger sizes or quantities greater than required by the NEC are indicated.

(14) **Service Equipment.** Provide NEMA 3R service equipment consisting of a meter/main assembly or a CT cabinet and fused disconnect switch. Coordinate equipment and installation requirements with the serving utility company. Size the electrical service to support the building loads plus 25% spare capacity, but not less than 200-amps at 208/120-volt, 3-phase.

b. **Electrical System Installation.** Install equipment and systems to include electrical service, power distribution, general purpose and special receptacles, and lighting (to include emergency lighting), and wiring and controls for HVAC. Install equipment and systems according to the current editions of the National Electrical Code (NEC) and the National Association of Electrical Contractors (NECA) Standards of Installation as adopted by the State of Alaska.

(1) **Grounding.** Provide or install ground conductors in all raceways and multi-color cables for power and signal.

Employ grounding electrode system conductor splices and connections that are irreversible, made with either compression connectors or exothermic weldments and molds specifically designed for ground systems and using listed materials and tools. Bond ground conductor to buried rods and metal floor using exothermic weldments.

Where available, bond all of the following:

(a) Building structural steel

(b) Exterior ground rods and ground ring

Ground Ring: Provide a #1/0 bare copper ground ring around the building in accordance with NEC articles 250.52(A)(4) and 250.53(F) with ¾-inch by 10-foot copper-clad ground rods

driven at each corner of the building driven vertically to a depth of 6 inches below finish grade. Install ground ring 30 inches from building perimeter. Where rocky soil or permafrost is encountered, ground rods may be installed as allowed in NEC 250-52(G). When driving at an angle, install rod angle away from building. Locate buried ground rods and ring on as-built drawings using building corners as datum.

Where ground conductors and bonding jumpers are run exposed and potentially subject to mechanical damage, install in metallic conduit and connect to bonding bushings at either end.

(2) **Wiring Methods.** Install all conductors in metallic raceway.

Install raceways level, parallel to building lines, and secured using pipe clamps and unistrut on vertical or horizontal brackets or two-hole straps. Unless otherwise required, install conduit to comply with the following schedule:

(a) GRSC - Use for all exterior wiring and exposed interior wiring below 8 feet AFF. May use GRSC where IMC and EMT is allowed as well.

(b) IMC and EMT may be used for exposed interior wiring above 8 feet AFF or where concealed.

(c) Install FMC for connections to lighting fixtures and mechanical equipment located 8 feet AFF or higher.

(d) Use LTF for all exterior connections requiring flexibility or to mitigate the effects of differential shifting of the structure, or below 8 feet AFF in the building.

(3) **Lighting.** Install fixtures in accordance with the manufacturers' requirements and the field conditions.

Align fixtures with building lines at heights sufficient to provide clearance for stored equipment.

Clean fixtures and ensure proper operation of all lamps and ballasts at substantial completion.

(4) **Devices.** Mount switches and receptacles at 48 inches AFF.

(5) **Utility/Service Coordination.** Coordinate the installation of the building electrical supply. Apply for service and pay for all one time charges as deemed necessary by the serving utility to provide power to the building. Coordinate with the Engineer for required State involvement. In addition, pay for all electric service charges until substantial completion has been established. Obtain utility approval for anticipated service equipment.

(6) **Installation Standards.** Perform all wiring in accordance with the latest legally adopted version of NFPA 72 National Electrical Code (NEC) and any State or local amendments.

(7) **Testing and Commissioning.** Provide all necessary equipment and personnel required to accomplish testing and demonstrate the operation of all electrical components installed under this contract. If any device or system does not function as intended or required, as determined by manufacturer's data and Contract Documents, replace the device or system at no additional cost to the State.

METHOD OF MEASUREMENT

142-5.1 This item will not be measured for payment. The Engineer's acceptance constitutes measurement.

BASIS OF PAYMENT

142-6.1 Payment will be made at the contract lump sum price for construction of the building and related systems. This item provides full compensation for this work to include the building and internal systems.

Bollards external to building walls, all required mobilization/demobilization, surveying required for this work, and standard signs are specified and paid for under items F-170, G-100, G-135, and P-661.

Earthwork associated with construction of the building pad, including the area within the building boundary line, will be specified, measured, and paid for under the appropriate earthwork (P series) bid items. Excavation and backfill of building foundation and footings will be subsidiary to item S-142p.

Payment will be made under:

Item S-142p NDB building – per lump sum

ITEM T-901 SEEDING

DESCRIPTION

901-1.1 This work consists of preparing the ground and applying seed and fertilizer in conformance with the Plans and Specifications.

The intent of this work is to provide a living vegetative cover in the areas indicated on the Plans and to maintain the cover for the term of the Contract.

MATERIALS

901-2.1 SEED. Furnish the seed mixture listed ~~in the Special Provisions~~ below:

Seed Type	Proportion By Weight
Annual Rye Grass (Lolium multiflorum)	5%
Arctared Red Fescue (Festuca rubra 'Arctared')	30%
Kentucky Bluegrass:	
Alpine (Poa alpine)	25%
Alene (Poa pratensis)	20%
Durar Hard Fescue (Festuca ovina 'Durar')	20%

Application Rate: 5 lbs/1000 s.f.

Apply mulch (refer to Item T-908 for requirements) at a rate of 2000 lbs per acre based on dry weight.

Meet the applicable requirements of the State of Alaska Seed Regulations, 11 AAC 34, Articles 1 and 4.

Meet or exceed ~~95~~90% pure seed and ~~74~~85% germination.

Furnish 4 signed copies of a report for each lot of seed, certifying it has been tested by an approved laboratory within 9 months of date of seed application. Submit these certifications no later than 10 days prior to seeding. Include the following in each certification:

a. name and address of laboratory
b. date of test
c. lot number
d. seed name
e. percent pure seed
f. percent germination
g. percent weed content
h. percent inert matter

901-2.2 FERTILIZER. Furnish a 20-20-10 fertilizer containing no cyanamid compounds or hydrated lime. Tolerances of the chemical ingredients shall be plus or minus 2%.

Use standard commercial fertilizer supplied separately or in mixtures, and in moisture proof containers. Mark each container with the total net weight and with the manufacturer's guaranteed analysis of the contents showing the percentage for each ingredient.

CONSTRUCTION METHODS

901-3.1 SOIL PREPARATION. Clear all areas to be seeded of stones 4 inches in diameter and larger and of all sticks, stumps, noxious weeds, and other debris or irregularities that might interfere with the seeding operation, growth of grass, or subsequent maintenance of the grass covered areas.

Just prior to seeding, roughen the surface of all areas to be seeded by track-walking transversely up and down the slopes or using a scarifying slope board. Round the top and bottom of the slopes, when necessary, to facilitate tracking and to create a pleasing appearance, but do not disrupt drainage flow lines. Where fill is adjacent to wetlands, keep the equipment entirely on the fill slope.

901-3.2 SEEDING SEASONS. Seed and fertilize between May 15 and August 15.

Do not seed during windy conditions or when climatic conditions or ground conditions would hinder placement or proper growth.

901-3.3 APPLICATION. Apply seed and fertilizer at the rates specified: 44 lbs per acre for seed and 450 lbs per acre for fertilizer ~~in the Special Provisions~~. Use ~~either of~~ the following methods~~:~~

a. Hydraulic Method.

(1) Mix a slurry of seed, fertilizer, water, and other components as required by the ~~Special Provisions~~ application rates specified. Add seed to the slurry mixture no more than 30 minutes before application.

(2) Use hydraulic seeding equipment that will maintain a continuous agitation and apply a homogeneous mixture through a spray nozzle. The pump must produce enough pressure to maintain a continuous nonfluctuating spray that will reach the extremities of the seeding area, without causing damage to the seed bed. Use a hose attachment to reach areas where a fixed nozzle cannot reach.

(3) ~~If mulch material is required, add it~~ Add mulch to the water slurry in the hydraulic seeder after adding the proportionate amounts of seed and fertilizer.

(4) Apply slurry at a rate that distributes all materials evenly.

~~**b. Dry Method.**~~

~~**(1)** Use mechanical spreaders, seed drills, landscape seeders, cultipacker seeders, fertilizer spreaders, or other approved mechanical spreading equipment.~~

~~**(2)** Moisten the soil prior to the application of seed and fertilizer and immediately afterwards.~~

~~**(3)** Mix or rake the seed and fertilizer into the seed bed to a depth of 1/2 inch, unless mulch material is to be applied immediately.~~

901-3.4 MAINTENANCE OF SEEDED AREAS. Protect seeded areas against traffic using approved warning signs or barricades. Promptly repair surfaces that are gullied or otherwise damaged following seeding by regrading and reseeding, as directed. Maintain seeded areas in a satisfactory condition until final inspection and acceptance of the work.

Keep temporary erosion control measures in place until the vegetation is accepted.

Water the seeded areas, as required, for proper germination and growth. Use equipment that can acceptably water all seeded areas without vehicular traffic on seeded areas.

Reseed any seeded areas not showing evidence of satisfactory growth, as directed.

Final acceptance will be based on the following criteria and must provide 70% vegetative coverage of the seeded area. If seeding is completed by July 15th, coverage must be attained by September 30th. If seeding is completed by August 15th, coverage must be attained by June 15th of the following season. Final acceptance will be based on the Engineers approval.

METHOD OF MEASUREMENT

901-4.1 The work will be measured according to Subsection 90-02, and as follows:

a. **Seeding by the acre.** By the area of ground surface acceptably seeded, fertilized, and maintained. Required reseeding is subsidiary.

b. **Seeding by the pound.** By the weight of seed acceptably placed. Fertilizer is subsidiary. Mulching is subsidiary. Any other work required will be measured separately.

c. **Water for maintenance.** By the M-gal (1,000 gallons) acceptably placed. Use a conversion factor of 8.34 pounds per gallon, if measured by weight. Use a conversion factor of 7.48 gallons per cubic foot, if measured by volume.

BASIS OF PAYMENT

901-5.1 At the contract unit price per unit of measure for the pay items listed below that appear on the bid schedule.

Water for hydraulic application of seed mixtures is subsidiary. Water for maintenance is subsidiary except when it is listed in the bid schedule.

Mulching ~~will be measured and paid for~~ as further described under Item T-908 is subsidiary to seeding.

Payment will be made under:

Item T-901a	Seeding - per acre
Item T-901b	Seeding - per pound
Item T-901c	Water for Maintenance - per M-gal

ITEM T-905 TOPSOILING

DESCRIPTION

905-1.1 This work consists of furnishing and spreading topsoil where shown on the Plans.

MATERIALS

905-2.1 TOPSOIL. Furnish a natural friable surface soil without admixtures of undesirable subsoil, refuse, or foreign materials and reasonably free from roots, clods, hard clay, noxious weeds, tall grass, brush sticks, stubble or other litter, and which is free draining and non-toxic.

Meet the grading requirements in Table 1 for the class of topsoil shown on the Plans:

TABLE 1. TOPSOIL GRADING

Sieve Designation	Percent Passing By Weight	
	CLASS A	CLASS B
3 in	-	100
1/2 in.	100	-
No. 4	95-100	75-100
No. 16	64-90	50-95
No. 200	30-60	20-80
Organic Matter	10-40	5 min.

Percent of organic matter will be determined by loss-on-ignition of oven dried samples using ATM 203.

When necessary, amend natural topsoil to meet the above specifications, using approved materials and methods.

CONSTRUCTION METHODS

905-3.1 PREPARING THE GROUND SURFACE. Where grades in the areas to be topsoiled have not been established, smooth-grade the areas to the grades shown on the Plans. Maintain the prescribed grades in an even and properly compacted condition to prevent the formation of low places or pockets where water will stand.

Clear the surface of the area to be topsoiled of all stones larger than 2 inches in any diameter and all litter or other material which may be detrimental to proper bonding, the rise of capillary moisture, or the proper growth of the desired planting.

Immediately prior to dumping and spreading the topsoil, loosen the surface, by approved means, to a minimum depth of 2 inches to facilitate bonding of the topsoil to the covered subgrade soil.

905-3.2 OBTAINING TOPSOIL. Prior to the stripping of topsoil from designated areas, remove any vegetation, stumps and large roots, rubbish or stones found on such areas, which may interfere with subsequent operations, using approved methods.

When suitable topsoil is available on the site, remove this material from the designated areas to the depth directed. Spread the topsoil on areas already tilled and smooth-graded, or stockpile in approved areas. Grade the stockpile sites and adjacent areas which have been disturbed if required and put into a condition acceptable for seeding.

When suitable topsoil is secured off the airport site, locate and obtain the supply, subject to approval. Notify the Engineer sufficiently in advance of operations in order that necessary measurements and tests can be made. Remove the topsoil from approved areas and to the depth as directed. Haul the topsoil to the site of the work and stockpile or spread as required.

905-3.3 PLACING TOPSOIL. Spread the topsoil evenly on the prepared areas to a uniform depth of 4 inches after compaction. Do not spread when the ground or topsoil is frozen or excessively wet.

After spreading, break up any large stiff clods and hard lumps with a pulverizer or other effective means. Rake up and dispose of all stones or rocks (2 inches or more in diameter), roots, litter, or any foreign matter. After spreading, compact the topsoil with a cultipacker or by other approved means. The compacted topsoil surface shall conform to the required lines, grades, and cross sections. Promptly remove any topsoil or other dirt falling upon pavements or other surface courses.

Track topsoil with a dozer to make track marks running perpendicular to the direction of drainage.

METHOD OF MEASUREMENT

905-4.1 By the square yard, according to Subsection GCP-90-02, acceptably placed.

BASIS OF PAYMENT

905-5.1 Payment will be made at the contract unit price per square yard.

Stockpiling and rehandling of topsoil are subsidiary.

Payment will be made under:

Item T-905a Topsoiling - per square yard

ITEM T-908 SOIL STABILIZATION

DESCRIPTION

908-1.1 This work consists of furnishing, placing, and maintaining soil stabilization material where shown on the Plans.

MATERIALS

908-2.1 MULCH. Virgin/recycled wood fiber, recycled paper (wood cellulose), or an acceptable blend containing up to 50% recycled paper, with the following characteristics:

a. Contains no growth or germination inhibiting factors.

b. Will remain in uniform suspension in water under agitation and will blend with grass seed, fertilizer and other additives to form a homogeneous slurry, when required.

c. Will form a uniform, blotter-like ground cover on application, having moisture absorption and percolation properties and the ability to cover and hold grass seed in contact with soil.

d. Will not form a hard crust upon drying.

e. Dyed a suitable color to facilitate inspection of its placement.

Ship the mulch in packages of uniform weight (plus or minus 5%) bearing the name of the manufacturer and the air-dry weight content.

Use a commercial tackifier on all slopes 4:1 or steeper Use the amount recommended by the manufacturer.

908-2.2 ROLLED MATTING. Use materials that conform to one of the following standards:

a. Unbleached single jute yarn. Use yarn that is loosely twisted and not varying in thickness more than one-half its normal diameter. Furnish jute mesh in rolled strips conforming to the following requirements.

(1) Width: 45 to 48 inches, ± 1 inch.
(2) 78 warp-ends per width of cloth (minimum).
(3) 41 weft-ends per yard (minimum).
(4) Weight: 1.22 pounds per linear yard, ± 5%

b. Knitted Straw Matting. Commercially manufactured erosion control blanket. Use netting which is biodegradable. Straw shall be from oats, wheat, rye, rice, or other approved grain crops that are free from noxious weeds, mold, or other objectionable material. May contain coconut or other natural fiber to reinforce the straw. Follow the manufacturer's published recommendations.

908-2.3 STAPLES. U-shaped staples for anchoring matting, approximately 6 inches long and 1 inch wide. Machine-made: No. 11 gage or heavier steel wire. Hand-made: 12-inch lengths of No. 9 gage or heavier steel.

CONSTRUCTION REQUIREMENTS

908-3.1 SURFACE PREPARATION. Smooth the surface and backfill all gullies and potholes before application. Remove all sticks and other foreign matter that prevents contact of the mulch or matting and the

soil. Ensure that the surface is moist at the time of placement. If area is to be seeded, soil preparation shall conform to Section 901-3.1.

908-3.2 APPLICATION. Apply soil stabilization material at the rate specified in the Special Provisions – for mulch, apply at a rate of 2000 lbs per acre based on dry weight. If seeding is specified, complete the application of mulch ~~or matting~~ during hydroseeding or within 24 hours after seed is placed. Staple matting every 5 feet at overlapped joints and edges or as recommended by the manufacturer. Do not use vehicles or equipment which cause rutting or displacement of the subgrade or topsoil.

908-3.3 MAINTENANCE. Reshape and reseed any damaged areas and repair the mulch or matting as required.

Maintain the mulch or matting until all work on the project is complete and accepted.

METHOD OF MEASUREMENT

908-4.1 By the square yard, according to Subsection GCP-90-02, acceptably placed. Water, maintenance, and repair are subsidiary. When no item for mulching appears on the bid schedule, mulching will be subsidiary to Item T-901.

BASIS OF PAYMENT

908-5.1 At the contract unit price per unit of measure for the pay items listed below that appear on the bid schedule.

Payment will be made under:

Item T-908a	Mulching - per square yard
Item T-908b	Rolled Matting - per square yard

Appendix A

Ted Stevens Anchorage International Airport
Runway 7R/25L Rehabilitation Phase II/Extension

Project No. 52405
AIP No. 3-02-0016-XXX-2011
Project No. 53201
AIP No. 3-02-0016-XXX-2011

Erosion and Sediment Control Plan, Storm Water Pollution Prevention Plan Checklist, & Stormwater Construction Site Inspection Report Form

Included in this Appendix are the Storm Water Pollution Prevention Plan Checklist and a Stormwater Construction Site Inspection Report form. These documents have been included for the Contractor's information. The Storm Water Pollution Prevention Plan Checklist will be used by the Department to review a Storm Water Pollution Prevention Plan (SWPPP) that has been submitted by the Contractor. References to the EPA General Permit which are included in the checklist apply only to projects requiring the General Permit. The Stormwater Construction Site Inspection Report form will be used for storm water site inspections during construction.

Erosion and Sediment Control Plan

For:

Ted Stevens Anchorage International Airport

Runway 7R/25L Rehabilitation Phase II/Extension
AKSAS#52405/53201
AIP # 3-02-0016-XXX-2011

January 2011

Prepared by:

STATE OF ALASKA

DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
CENTRAL REGION, DESIGN AND CONSTRUCTION
AVIATION DESIGN

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SECTION 1: SITE EVALUATION, ASSESSMENT, AND PLANNING

1.1 Project/Site Information

Project Name: Ted Stevens Anchorage International Airport
Runway 7R/25L Rehabilitation Phase II/Extension

Location: Anchorage **State:** Alaska

USGS Quadrangle Maps: Anchorage (A-8), Alaska & Tyonek (A-1)

Latitude/Longitude (degrees, minutes, seconds):

Latitude: 61° 10' 36" N

Longitude: 150° 00' 05" W

Method for determining latitude/longitude: Airport Reference Point shown on ALP

Is the project located in Indian country? ☐ Yes ☒ No

1.2 General

The Erosion and Sediment Control Plan (ESCP) for the Runway 7R/25L Rehabilitation /Extension project consists of this narrative, the ESCP plan sheets, and the specifications for this project. In accordance with the Department's policy, erosion and sediment control measures have been incorporated into the plans and specifications based on our knowledge of site conditions.

The goal of this ESCP is to provide a guide by which construction activities will have zero impact on receiving waters. Protecting these resources during construction can be achieved by implementing best management practices to reduce, intercept and treat sediment-laden water prior to discharge into receiving waters and to permanently stabilize constructed embankments.

The anticipated amount of disturbed ground for this project is 119.3 acres; therefore, a Storm Water Pollution Prevention Plan (SWPPP) meeting the requirements of the National Pollutant Discharge and Elimination System (NPDES) Construction General Permit is required. The information in this ESCP will be used by the Contractor in developing the SWPPP as required under the contract specifications Section P-157 Erosion, Sediment and Pollution Control. Actual construction methods, materials, and equipment used by the selected Contractor may vary from assumptions used in preparation of this ESCP. Preparation and execution of the SWPPP will be the responsibility of the Contractor.

1.3 Nature of Construction Activity

1.3.1 General Scope of Project

The Runway 7R/25L Rehabilitation Phase II/Extension project is the second of two projects that will reconstruct, extend and provide drainage at the 7R/25L runway to accommodate Group VI aircraft or less. A location and vicinity map of the project area is shown on ESCP Plan sheet 1.

Runway 7R/25L Rehabilitation, Phase II, and Runway 7R/25L Extension:

- Rehabilitate and widen the existing western portion of Runway 7R/25L from 150 feet to 200 feet from STA 1062+00 to STA 1102+00.
- Construct a 100-foot-wide Portland Cement Concrete (PCC) keel STA 1047+00 to STA 1077+31 reducing to 80 feet wide at STA 1077+31 to STA 1096+95.
- Runway 7R/25L will be extended 1500 feet in the westerly direction with a runway safety area extending west beyond the new threshold 600 feet.
- Upgrade Taxiway J for Group VI aircraft.
- Relocate the ILS Critical Area to support the runway extension.
- Complete civil work for relocating FAA facilities and install support towers for the approach lighting system. Systems the FAA are relocating: approach lighting system and support buildings, glide slope antenna and buildings for the instrument landing system, non-directional beacon electronics and enclosure, runway visual range sensors, precision approach path indicator, inner marker antenna, far-field monitor antenna, moving target indicator reflector.
- Realign the service road around the west end of the runway extension.
- Realign and extend existing roads on the west end of the runway for approach lighting system (ALSF-2) access.
- Relocate and extend the runway and taxiway lighting for the widening and extension.
- Clear obstructions between the Airport Surveillance Radar (ASR) and the relocated runway threshold, as necessary.
- Replace existing drainage system under the runway embankment effected by work.
- Expand the sub drain system to collect drainage from the widened runway and taxiway shoulders.
- Repair frost jacking at the inlet of the 72-inch elliptical culverts located under Runway 7R/25L.
- Part 77 surface obstructions for the extension portion of the runway will be removed.
- Relocate existing electrical and communication utilities due to the extension.

1.3.2 Sequence of Construction Activities

Construction activities such as clearing, grubbing and excavation will disturb soils over a large portion of the site. The Contractor's construction sequencing and timely installation of appropriate erosion and sediment control measures should be planned to minimize the area of unstabilized soils exposed at any one time. Erosion and sediment control measures should remain in place for the duration of construction, including appropriate non-storm water pollution

controls. The approved SWPPP will address the activities planned for each area of the project as it is opened up for construction and plan the control measures or Best Management Practices to be implemented before, during and after construction activities in that area. The following is the generalized concept to be followed for each area.

- Employ temporary erosion control and sediment control measures. Appropriate controls shall be in place before clearing, excavation or the stockpiling of erodible materials.
- Ensure appropriate non-storm water pollution controls are in place and implemented.
- Erosion and sediment control measures will be inspected as required in the approved SWPPP, applicable regulations and the contract specifications, and maintained in good serviceable condition throughout the duration of the project.
- Remove any temporary erosion and sediment controls after each disturbed area is permanently stabilized or erodible stockpile is removed.

Best Management Practices will be implemented according to the approved SWPPP.

1.4 Existing Conditions

1.4.1 Soil types

Native soil types in the area generally consist of glacial aeolian and glacial fluvial deposits. These deposits generally consist of silt, sand and occasional gravel and clay layers. The constructed runway, shoulders and taxiways are combinations of silts, sands or gravel.

1.4.2 Vegetation

Vegetation within the project limits consists of grasses. Vegetation bordering the project consists of birch, spruce, willows, alders, and grasses. The area disturbed by the rehabilitation and extension of the runway is largely grass covered embankment.

1.4.3 Slopes

The slopes in the area to be disturbed during the project are generally shallow. The slopes after project completion will be similar. When completed, project slopes will range from flat to 2:1 (horizontal:vertical).

1.4.4 Drainage Patterns

The airport watershed consists of three drainage basins as identified in the "Storm Drainage Master Plan" for ANC, November, 2000: the Turnagain Arm drainage basin; the Knik Arm drainage basin; and the Lake Hood/Lake Spenard drainage basin. The three drainage basins are further subdivided into nine drainage systems. The Kink Arm Drainage Basin includes the Postmark Drive and Turnagain Bog drainage systems. The Turnagain Arm Drainage Basin includes the North-South Runway drainage system. The Lake Hood/Lake Spenard Drainage

Basin includes the Main Terminal, International Terminal, International Terminal Parking, Aircraft Tie-Down, East-West Runway, and Lake Hood/Lake Spenard drainage systems. Large scale drainage patterns will not be changed as a result of this project.

Since the project area is an already developed airport area, it has been graded to drain to existing ditches and swales. Surface drainage after the project will remain similar.

1.4.5 Hydrology and Climate

The Ted Stevens Anchorage International Airport is located within the Anchorage Bowl in a transitional climate zone influenced by both maritime and continental weather patterns that result in constantly changing weather (CRW, 2000). Average annual precipitation is 15.9 inches. Average summer temperatures range from 51°F to 65°F, while winter temperatures range from 8°F to 21°F.

1.5 Construction Site Estimates

The following are estimates of the construction site. This estimate does not include Contractor supplied material sites. On-site and off-site material/equipment storage, stockpile, and waste areas shall be included in the Contractor's SWPPP.

Total Project Area	140 acres
Construction Site Area to be disturbed	119.3 acres
Percentage impervious area before construction	26.9%
Runoff coefficient before construction	0.48
Percentage impervious area after construction	33.0%
Runoff coefficient after construction	0.54

1.6 Receiving Waters

1.6.1 Receiving Waters and Wetlands

The receiving waters are Lake Hood/Spenard Lake drainage and Cook Inlet (Turnagain Arm and Knik Arm). The potential exists for runoff to enter the Waters of the U.S. and adjacent wetlands during project construction.

The Contractor will use Best Management Practices (BMP) to minimize discharge and comply with the National Pollutant Discharge Elimination System (NPDES) General Permit for Construction Activities in Alaska. There will be no work conducted below ordinary high water of any Waters of the U.S. or navigable water body.

1.6.2 Storm drain systems

Existing storm drainage structures within the airport property include both closed conduit and open channel drainage systems (CRW, 2000). These range from series of ditches and culverts to a closed conduit drainage system that conveys runoff from the airport to either Cook Inlet or Lake Hood/Lake Spenard. Drainage into these lakes eventually passes into either Jones Lake or Fish Creek.

Sub-drain systems located beneath the runways and taxiways are in place to remove groundwater from the pavement structure. The runway sub-drains are being replaced and expanded in the area of this project. The sub-drains discharge into open channels or closed conduit drainage systems.

1.6.3 Impaired waters or waters subject to TMDLs

The only impaired water body or water body subject to Total Maximum Daily Load (TMDL) requirements within the project area or potentially subject to runoff from the project area is Lake Hood/Lake Spenard. It has a TMDL dated September 30, 1997, for fecal coliform. Runoff from the construction project is not expected to impact the fecal coliform levels in this lake.

1.7 Potential Sources of Pollution

Potential pollutants of concern mainly consist of sediments originating from areas disturbed by construction activities. Potential sources of sediment to stormwater runoff include but are not limited to:

- Construction of the runway extension.
- Removing and replacing runway and taxiway structural sections.
- Realigning and extending existing roads on the west end of the runway.
- Replacing and expanding the existing sub drain system.
- Construction of the towers for the ALSF-2 lighting system.
- Ditch grading

These could introduce more sediment by the removal of asphalt and vegetation and the disturbance and exposure of the underlying soils. This issue will be dealt with using BMPs in the existing storm water channels prior to the runoff leaving the project site.

Construction materials and activities that will be performed that have the potential to contribute pollutants other than sediment to stormwater runoff include but are not limited to:

- Vehicle and equipment fluids, including oil, grease, fuel, and coolants
- Materials associated with paving operations
- Placement of pavement markings
- Best Management Practices (BMP) materials
- General site litter

1.8 Allowable Non-Stormwater Discharge

Non-stormwater discharges are allowed under the Construction General Permit (CGP) part 1.3B but should be eliminated or reduced to the extent feasible. Non-storm water discharges may include:

- Water used to wash vehicles where detergents are not used
- Water used to control dust
- Pavement wash waters where spills or leaks of toxic or hazardous materials have not occurred and where detergents are not used
- Uncontaminated ground water or spring water
- Landscape irrigation

Any additional non-stormwater discharges identified by the Contractor shall be included in the SWPPP. The SWPPP shall ensure the implementation of appropriate pollution prevention measures for the non-storm water components of the discharge.

1.9 Endangered Species Certification

There are no listed threatened or endangered species known to exist within or near the project area.

1.10 Historic Preservation

No historical, architectural, archaeological, or cultural resources have been identified in the project's Area of Potential Effect. The SHPO concurred with the finding of No Historic Properties Affected for the proposed project. If previously undiscovered cultural material is found during construction, all work will be stopped in the area and the SHPO will be notified immediately. Correspondence with the SHPO is located in the Environmental Assessment/ FONSI dated June 2002.

SECTION 2: CONTROL MEASURES

2.1 Construction Site Planning and Management

2.1.1 Scheduling/Sequencing of Construction Activities

The Contractor is responsible for developing a construction schedule that incorporates the SWPPP requirements. Each BMP shall be included in the master construction schedule for the appropriate construction activity with subtasks to install and maintain. The plan shall address both temporary and permanent control measures and should include any revisions made to the schedule during the project.

Temporary stabilization measures must be instituted within 14 days on all portions of the site where construction activities have temporarily or permanently ceased as required by the Construction General Permit (CGP). All temporary erosion control measures will remain in place until the soil is stabilized, or work resumes at the site.

2.1.2 Preservation of Existing/Natural Vegetation

Ground disturbance should be kept to a minimum to perform the work and to help prevent erosion. Measures will be employed to provide erosion protection in sensitive areas. Whereever possible vegetation should be retained on slopes and downslope of cleared areas. Only as much soil should be exposed as the Contractor has manpower, equipment, and supplies necessary to effectively control erosion and sedimentation.

2.2 Temporary Erosion Control BMPs

Generally, erosion control measures which prevent or discourage the erosion of sediments from exposed surfaces are more effective and economical than sediment control measures. The following are some erosion control measures to be employed in this project. This is not a complete list of measures. Others may be desirable and may be used in conjunction with an approved SWPPP. The Contractor shall use the DOT&PF SWPPP Grading & Stabilization Activities Log, Form 25D-110 (4/08) (attached) to document temporary stabilization.

2.2.1 Vegetative Cover

Construction will be phased so as to clear as little area of pavements and surface vegetation as practicable at one time. Avoid clearing any surface vegetation not actually required to be removed for proper construction of the work. Avoid clearing vegetation before it is necessary. Leave grass in ditches and swales except where regrading is necessary.

2.2.2 Covering

Surfaces exposed during construction, including uncovered fill and temporary stockpiles of imported material, shall be covered or stabilized if left undisturbed for more than 14 days. Soil materials with less than 6% passing the #200 sieve in stockpiles or on slopes of less than 3% may be exempt from this requirement as long as perimeter sediment controls are in place (straw waddles, etc.) with the concurrence of the Engineer. Cover materials may be rolled plastic or other rolled materials designed for such purposes as approved by the engineer. Such materials must be firmly affixed to the ground to prevent being removed by or becoming airborne in the wind. Cover may also consist of seeding and mulching.

2.2.3 Temporary Seeding and Mulching

Surfaces exposed during construction, including uncovered fill and temporary stockpiles of imported material, shall be covered or stabilized if left undisturbed for more than 14 days. Any areas not intended to be paved will be cleared of surface vegetation only immediately before work on the specific area commences that requires clearing, and will be brought to final grade and seeded and mulched as soon as possible to reduce the length of time the soil surface is exposed to precipitation and runoff.

2.2.4 Wind Erosion Control

Watering will be used for dust control as required by conditions. If necessary, covering or other methods as approved by the Engineer will be used to prevent wind dispersal of sediment.

2.3 Temporary Sediment Control BMPs

Sediment controls are structural measures that are intended to complement and enhance the selected erosion control measures and reduce sediment discharges from construction areas. Sediment controls are designed to intercept and settle out soil particles that have been detached and transported by the force of water. Best Management Practices will be implemented in accordance with an approved SWPPP. Temporary sediment controls shall be removed upon final stabilization and termination of construction activities. This plan uses the following controls for effective temporary sediment control during construction:

2.3.1 Vegetative Barriers

Grass and other surface vegetation slows down stormwater sheet flow and captures sediment migrating with the stormwater. Leave undisturbed areas of grass and other vegetation between sediment sources and drainage channels and structures to help reduce the sediment load entering the drainage system. Bring cleared areas to grade and pave or seed and mulch as quickly as practicable.

2.3.2 Sediment Basins

In accordance with the CGP, sediment basins must be constructed where attainable to treat the storm water discharge from any drainage basin, including material sites, which contain 10 acres or more of disturbed ground. In this project, three settlement ponds are to be constructed to intercept stormwater leaving the project area in ditches flowing in each of four directions. See the ESCP plan sheets for approximate locations of these settlement ponds. The ponds may be constructed by placing small dam structures across existing ditches. Care must be taken when siting them to ensure water does not back up into culverts causing sediment deposition in the culverts. More refined settlement pond design, as needed, will be included in the SWPPP. Smaller capacities than indicated may be sufficient. The ponds will have the capacities listed on

the plan sheets unless supported by SWPPP design calculations. Sediment must be removed from settlement ponds if sediment reaches 50% of capacity.

2.3.3 Linear Sediment Barriers

Linear sediment barriers such as straw waddles, fiber rolls or compost socks should be used to keep sediment from migrating from soil stockpile areas or any other area where the vegetative barrier is not sufficient to prevent sediment migration. Silt fences should generally be avoided unless directed otherwise by the engineer. Silt fence can create a FOD hazard. Linear sediment barriers must be regularly inspected and maintained to ensure they are properly installed and positioned, in good repair, and sediment is not bypassing the barrier.

2.3.4 Inlet Protection

In areas to be cleared or graded or where the pavement surface will be excavated, inlet protection will be installed around manholes before work in the area commences. Inlets and manholes constructed during the work will also be protected. Filter bags or "witches' hats" will be installed in the manholes and regularly inspected and cleaned out when they reach 50% of design capacity. Manholes will be surrounded with gravel bags (sand bags made of geotextile fabric – not burlap) filled with pea gravel (#4) to ¾ inch rock. These bags are intended to slow the water before reaching the manholes and create small settlement areas. They will not be allowed to divert water around the manholes. Other inlet protection methods are allowable if part of an approved SWPPP.

2.3.5 Rattle Grates

Rattle grates will be installed at gates W-1 and W-2 as well as access locations along taxiway Zulu/Raspberry Road to help remove sediment from trucks leaving the site before leaving the fenced construction area and before entering Raspberry Road. Rattle grates will also be installed where trucks hauling soils and other granular materials enter active taxiways.

2.3.6 Street Cleaning

Off-site paved roads used by construction equipment must be cleaned of any excess mud, dirt, or rock left from project activities. Sediment tracked onto paved surfaces within the project area as a result of construction activities performed must be swept up as well. The project roadway and affected off-site roads will be inspected a minimum of once a day and will be cleaned to the satisfaction of the Engineer.

2.4 Good Housekeeping BMPs

2.4.1 Material Delivery and Storage

Proper handling and storage of construction materials will minimize the discharge of these materials into nearby waterbodies.

2.4.2 Staging and Materials Site Management

The Contractor is responsible for developing construction staging and selecting appropriate controls to prevent erosion and sediment discharge at staging sites, material sites, and material disposal sites used for the project.

2.4.3 General Construction Site Waste Management

Building materials and other construction site wastes must be properly managed and disposed of to reduce the risk of pollution. Practices such as trash disposal, recycling, proper material handling, and spill prevention and cleanup measures can reduce the potential for stormwater runoff to mobilize construction site wastes and contaminate surface or ground water.

2.4.4 Hazardous Waste Management

The Contractor will develop a Hazardous Material Control Plan (HMCP) in accordance with Section P-157-2.2, Hazardous Material Control Plan requirements, of the contract specifications.

2.4.5 Vehicle & Equipment Fueling and Maintenance

Proper vehicle maintenance procedures and practices can help prevent construction site spills of fuel, coolant or other contaminants. Construction vehicles should be inspected daily, and any leaks be repaired immediately. Dispose of all used oil, antifreeze, solvents and other automotive-related chemicals in accordance with State and Federal regulations.

No vehicles or equipment shall be fueled or serviced within 100 feet of wetlands or other waters of the United States. Fueling and service vehicles shall be equipped with adequate materials (such as absorbent pads, booms, etc.) to immediately contain and commence clean up of spilled fuels and other petroleum products. Cover and store all fuels, oils, solvents, and other automotive-related chemicals within a secondary containment system to prevent mixing with storm water.

2.4.6 Concrete Washout

Provide a wash out area for concrete trucks that will prevent wash water from contaminating the ground. Site the washout at least 50 feet from manholes or ditches in an area that allows convenient access for the trucks. The contractor should be aware that construction of the runway will include 30,000 cubic yards of concrete in the keel section in addition to other concrete work related to utilities, fence posts, and headwalls.

2.4.7 Spill Prevention and Control Plan

A Spill Prevention Control and Countermeasure (SPCC) Plan will provide measures to stop the source of a spill; contain and clean up a spill; dispose of contaminated materials; and train personnel to prevent and control future spills. The Contractor will submit a copy of the SPCC Plan to the Engineer if required under Subsection P-157-2.3, Spill Prevention, Control and Countermeasure (SPCC) Plan requirements. Reference the contract specifications.

2.5 Permanent Erosion and Sediment Control BMPs

Permanent stormwater management measures should be installed as needed during the construction process to control pollutants in stormwater discharges after construction operations have been completed. The Contractor should develop and implement strategies that include a combination of structural and/or non-structural BMPs depending on the site conditions and as approved by the Engineer.

2.6 Final Stabilization

All disturbed ground areas of the project not to be paved will be seeded and mulched. Seeding is to occur as soon as practicable after disturbance. Use mulch in conjunction with hydro seed with a mix Kentucky Bluegrass, Hard Fescue, Arctared Red Fescue and Annual Ryegrass applied at a rate of 44 lbs per acre. See Item T-901 in the contract specifications. Watering and maintenance must be done as needed, including daily watering, for all seeded areas from time of initial seeding until final acceptance of stabilization by the Department. Non-permanent erosion and sediment controls shall be removed upon termination of construction activities.

SECTION 3: INSPECTIONS and MAINTENANCE

3.1 Inspections

The Contractor shall select qualified individuals who will be responsible for inspections, maintenance, repair activities, and filling out the inspection and maintenance report. These people will be trained in all inspection and maintenance practices necessary for keeping the erosion and sediment controls used on site in good working order.

The Contractor will conduct inspections of BMPs and stormwater pollution prevention procedures in accordance with current EPA and ADEC regulations and guidance. Revise the SWPPP whenever during inspections the BMPs are determined not to be effective in minimizing pollutants. All amendments to the SWPPP shall be noted in the SWPPP Amendment Log, Form 25D-114 (4/08) (attached).

3.2 Maintenance of Controls

The Contractor shall maintain, in good and effective operating condition, vegetation, erosion and sediment control measures, and other protective measures identified in the approved SWPPP. Exposed areas shall be inspected for evidence of, or potential for, pollutants entering the drainage system.

a. Erosion and sediment control measures shall be monitored by the Contractor with an inspection every 7 calendar days or within 24 hours of a rain event that exceeds 0.5

inches. Weather forecasts shall be monitored and a daily record of rainfall maintained using the SWPPP Daily Record of Rainfall, Form 25D-115 (4/08) (attached). All measures will be maintained in good working order. If a repair is necessary, it will be initiated within 24 hours.

b. Temporary stabilized areas shall be inspected for bare spots, washouts and healthy growth (if seeded or planted). Repairs or corrective measures shall be implemented as necessary to ensure erosion and sediment control.

c. The Contractor shall also maintain and repair, including watering as necessary, permanently seeded slopes and re-vegetated areas until final acceptance is obtained from the DOT&PF.

d. Built up sediment shall be removed from sediment and erosion control measures according to DOT&PF Best Management Practice criteria. Once construction activities have permanently ceased, any accumulated sediment shall be moved and stabilized as directed by the Engineer.

e. A maintenance inspection report will be made after each inspection and submitted to the Engineer. The DOT&PF Stormwater Construction Site Inspection Report, Form 25D-100 (4/08) (attached) shall be used for all inspections.

3.3 Corrective Action Log

The Contractor shall attach to the SWPPP, a corrective action log describing repairs, replacements, and maintenance of BMP's undertaken based on the inspections and maintenance procedures described above. This log should describe actions taken, the date completed, and the person that completed the work. All corrective actions as a result of inspections shall be recorded in SWPPP Corrective Action Log, Form 25D-112 (4/08) (attached).

SECTION 4: RECORDKEEPING & TRAINING

4.1 Recordkeeping

The Contractor shall keep an updated SWPPP on-site with all inspection reports included. Retain the SWPPP for three years after the project is complete.

The Contractor shall maintain records to be kept available at the project site for inspectors to review. The records shall be in accordance with the CGP and shall include, but not be limited to, the following:

a. Dates of major grading activity, construction activity, and stabilization. Use the DOT&PF SWPPP Grading & Stabilization Activities Log (April 2008)

b. Dates when construction activities temporarily or permanently cease on a portion of the site. Use the DOT&PF SWPPP Grading & Stabilization Activities Log (April 2008)
c. The following documents as attachments to the SWPPP:
    - A copy of the Construction General Permit.
    - The signed and certified NOI form or permit application form.
    - A copy of the letter from the EPA/State notifying their receipt of the complete NOI/application.
    - Inspection Reports.
    - Records relating to endangered species and historic preservation.
    - Weather observation logs.
    - Corrective action logs.
    - Log of changes and updates to SWPPP.
    - BMP specifications and details.

4.2 Training

The Contractor shall be responsible for ensuring that all employees are aware of the BMP's that are being used during the construction of this project. Training for on-site employees should be provided and should address topics including good housekeeping and preventative maintenance in addition to other structural and non-structural BMPs.

4.3 Log of Changes to the SWPPP

The Contractor shall maintain a log of changes and updates to the SWPPP as an attachment to the SWPPP. All amendments to the SWPPP shall be noted in the SWPPP Amendment Log, Form 25D-114 (4/08) (attached).

a. The SWPPP must be amended whenever there is a change in design, construction, operation, or maintenance at the construction site that has or could have a significant effect on the discharge of pollutants to the waters of the United States that has not been previously addressed in the SWPPP.

b. The SWPPP must be amended if during inspections, it is determined that any part of the SWPPP is ineffective in eliminating or significantly minimizing pollutants in storm water discharges from the construction site. Based on the results of inspections, the SWPPP must be modified as necessary to include additional or modified BMPs designed to correct problems identified.

c. The SWPPP must be amended when the Contractor selects an area to be used for a waste or borrow site, which was not previously identified. The Contractor must comply with the NPDES regulations, update the SWPPP, and have all environmental clearances prior to using the area.

SECTION 5: PLANS

5.1 Plans

Site specific Erosion and Sediment Control practices are illustrated on the Erosion and Sediment Control plan sheets. These measures are designed to limit the discharge of pollutants from exposed areas of the site. Best Management Practices to be employed are not limited to those shown on the Plans but include all needed to prevent sediment and other pollutants from leaving the site in accordance with an approved SWPPP.

REFERENCES

Alaska Department of Environmental Conservation, Approved TMDLs, Website: http://www.dec.state.ak.us/water/tmdl/approvedtmdls.htm

Alaska Stormwater Guide, Alaska Department of Environmental Conservation, June 2009

Developing Your Stormwater Pollution Prevention Plan: A Guide for Construction Sites, US Environmental Protection Agency, May 2007

DOT&PF stormwater website with electronic copies of forms and useful links: http://www.dot.state.ak.us/stwddes/desenviron/resources/stormwater.shtml

EPA Best Management Practices. Website: http://cfpub.epa.gov/npdes/stormwater/menuofbmps/

NPDES General Permit for Stormwater Discharges from Construction Activities, January 2009, Website: http://www.epa.gov/npdes/pubs/cgp2008_finalpermit.pdf

Ted Stevens Anchorage International Airport Storm Drainage Master Plan, CRW Engineering Group, November 2000

Appendix B

Ted Stevens Anchorage International Airport
Runway 7R/25L Rehabilitation Phase II/Extension

Project No. 52405
AIP No. 3-02-0016-XXX-2011
Project No. 53201
AIP No. 3-02-0016-XXX-2011

Construction Survey Requirements

Appendix C

Ted Stevens Anchorage International Airport
Runway 7R/25L Rehabilitation Phase II/Extension

Project No. 52405
AIP No. 3-02-0016-XXX-2011
Project No. 53201
AIP No. 3-02-0016-XXX-2011

Materials Sampling and Testing Frequency

MATERIALS, SAMPLING & TESTING FREQUENCY

AIRPORT CONSTRUCTION CONTRACTS

MATERIAL	TYPE OF SAMPLE	SAMPLE SIZE	TYPE OF TESTS	FREQUENCY	REMARKS
Excavation	Acceptance	(5)	Gradation, P.I., Moisture (or visual organic content)	1 per 5,000 yd^3 waste	Number consecutively EX-W-1. No need to test, if waste is designated on the plans.
Embankment	Acceptance	(5)	Standard Density	As required by changes in material	Number consecutively BX-SD-1 or EX-SD-1
			Field Density (1)	1 per 3,000 tons (1,500 yd^3) See Note (6)	Number consecutively BX-D-1 or EX-D-1
			Gradation, P.I., Deleterious (visual)	1 per 10,000 tons (5,000 yd^3)	Number consecutively BX-G-1 or EX-G-1
	Independent Assurance	(5)	Standard Density (2)	1 per source	Numbers correspond to acceptance samples.
			Field Density	1 per 30,000 tons (15,000 yd^3)	
			Gradation, P.I., Deleterious (visual)	1 per 100,000 tons (50,000 yd^3)	
Bedding & Backfill for Structures: Foundation Fill and Filter Material	Acceptance	(5)	Standard Density	As required by changes in material	
			Field Density (1)	See Note (3)	
			Gradation, P.I., (4), Deleterious (visual)	1 per source or 1 per 500 feet of pipe	

General: Independent Assurance Testing may be waived when Acceptance Testing is performed in DOT&PF Regional Laboratories accredited in the acceptance test method. When DOT&PF Regional Laboratories perform Acceptance Testing, they may also perform the Independent Assurance Testing provided different personnel and equipment is used from that used for the Acceptance Testing.

(1) If material is impractical to test for field density, document quantity and/or area by reporting percent oversize and compactive effort used on a proper density acceptance form.
(2) Required when Standard Density test is run in the field. Submit copy of the field worksheet with the sample.
(3) One density per concrete structure (manhole, catch basin, inlet, utility vault, abutments, etc.) or pipe and minimum of one density per 100 lineal feet of pipe (i.e. water, sewer, culvert, conduit, etc.) installed. Pipe densities will be taken within 18 inches of the outside diameter of the pipe.
(4) Run P.I. tests on the first five samples at the start of production from any source. If these tests indicate the material to be nonplastic, additional tests need only be performed on the assurance samples.
(5) Size of samples for gradation testing is determined by nominal maximum size. See WAQTC FOP for AASHTO T 27/T 11 for minimum sample size. Size of samples for Standard Densities should be four times the size required for gradation testing.
(6) For large unclassified embankments, a field density testing frequency of 1/10,000 c.y. or 1/20,000 tons is acceptable subject to the approval of the Quality Assurance/Regional Materials Engineer.

MATERIALS, SAMPLING & TESTING FREQUENCY

AIRPORT CONSTRUCTION CONTRACTS

MATERIAL	TYPE OF SAMPLE	SAMPLE SIZE	TYPE OF TESTS	FREQUENCY	REMARKS
Subbase	Quality	150 lbs.	Wear, Degradation	1 per source prior to use	14 days min. for testing and transport
	Acceptance	(5)	Standard Density	1 per source and as required based on changes in material	Number consecutively SB-SD-1
			Field Density (1)	1 per 2,000 tons (1,000 yd^3)	Number consecutively SB-D-1
			Gradation, LL & P.I. (3)	1 per 5,000 tons (2,500 yd^3)	Number consecutively SB-G-1
	Independent Assurance	(5)	Standard Density (2)	1 per source	Numbers correspond to Acceptance samples
			Field Density	1 per 20,000 tons (10,000 yd^3)	
			Gradation, LL & P.I.	1 per 50,000 tons (25,000 yd^3)	
Crushed Aggregate Base and Surface Course	Quality	150 lbs.	Wear, degradation, soundness	1 per source prior to use	Allow minimum of 14 days for testing and transport
	Acceptance	(5)	Standard Density	As required by changes in material	Number consecutively BC-SD-1 or SC-SD-1
			Field Density	1 per 1,000 tons (500 yd^3)	Number consecutively BC-D-1 or SC-D-1
			Gradation, Fracture (4), LL & P.I. (3), Sand Equivalent (3)	1 per 2,000 tons (1,000 yd^3)	Number consecutively BC-G-1 or SC–G-1
	Independent Assurance	(5)	Standard Density (2)	1 per source	Numbers correspond to Acceptance samples.
			Field Density	1 per 10,000 tons (5,000 yd^3)	
			Gradation, Fracture, LL & P.I., Sand Equivalent	1 per 20,000 tons (10,000 yd^3)	

(1) If material is impractical to test for field density, document quantity and /or area by reporting percent oversize and compactive effort used on a proper density acceptance form.
(2) Required when Standard Density is run in the field. Submit copy of the field worksheet with the sample.
(3) Run tests on the first five samples at the start of production from any source. If these tests indicate the material meets specifications, additional tests need only be performed on the assurance samples. The sand equivalent test is not performed on the aggregate surface course.
(4) Run fracture tests on the first ten samples at the start of production and after each change in material. If these tests indicate the fracture to be 5% or more above specification, additional tests need only be performed on the assurance samples.
(5) Size of samples for gradation testing is determined by nominal maximum size. See WAQTC FOP for AASHTO T 27/T 11 for minimum sample size. Size of samples for Standard Densities should be four times the size required for gradation testing.

MATERIALS, SAMPLING & TESTING FREQUENCY

AIRPORT CONSTRUCTION CONTRACTS

MATERIAL	TYPE OF SAMPLE	SAMPLE SIZE	TYPE OF TESTS	FREQUENCY	REMARKS
Bituminous Pavement	Quality	150 lbs. Aggregate	Wear, degradation, soundness	1 per source prior to use	Allow 25 days for testing and transport.
	Mix Design	500 lbs. Aggregate (5)	Mix Design (1), Sand equivalent, Flat & Elongated, Fracture	As required by changes in material	Allow 15 days for design and testing after receipt of material.
		5 gal. of AC (6)	0.25 L of Anti Strip (6)		
	Acceptance	(4)	Mat Density, Joint Density, Gradation, Oil Content, P.I. (2), Fracture (3), Flat & Elongated (2), Sand Equivalent (2), Thickness	1 per 500 tons	Coating test (AASHTO T 195)
			MSG (Maximum Specific Gravity)	1 per 5,000 tons	1st lot uses Mix Design MSG
			Smoothness		
	Independent Assurance	(4)	Mat Density, Gradation, Oil Content, P.I., Fracture, Flat & Elongated, Sand Equivalent	1 per 5,000 tons	
			MSG	1 per 50,000 tons	See Note (8)
Asphalt Cement	Quality				Supplier certification required
	Acceptance	3-1 quart cans	(7)	1 per 50,000 gallons or 1 per 200 tons	Sampled on project. Test for anti-strip if required by QAE/ME
Liquid Asphalt for: a. Prime Coat b. Tack Coat c. Seal Coats and Surface Treatment	Quality				Supplier certification required
	Acceptance	1 gallon in plastic or glass jug	(7)	1 per 50,000 gallons or 1 per 200 tons	Sample must be tested by Lab, which did not test material for Quality. Material sampled prior to dilution.
Cover coat Material for Surface Treatment	Quality	75 lbs. Aggregate	Wear, soundness, degradation, (1)	1 per source prior to use	Allow 25 days for testing and transport.
	Acceptance	(4)	Gradation, Fracture (3)	1 per 500 tons	May be taken from stockpile or production.
	Independent Assurance	(4)	Gradation, Fracture	1 per 5,000 tons	

(1) Recommendations regarding stripping must be determined for each project.
(2) Run tests on the first five samples at the start of production from any source. If these tests indicate the material meets specifications, additional tests need only be performed on the assurance samples.
(3) Run tests on the first ten samples at the start of production and after each change in material. If these tests indicate the material to be 5% or more above specification, additional tests need only be performed on the assurance samples.
(4) Size of sample for gradation is determined by nominal maximum size. See the specified test method for minimum sample size.
(5) Proportion coarse and fine aggregate to the proposed Job Mix Design blend ratio.
(6) Contact the Regional Materials Laboratory for instructions on submitting the Asphalt Cement and Anti-strip if necessary.
(7) Refer to project specifications.
(8) Required when MSG is run in the field. Submit copy of the field worksheet with the sample.

MATERIALS, SAMPLING & TESTING FREQUENCY

AIRPORT CONSTRUCTION CONTRACTS

MATERIAL	TYPE OF SAMPLE	SAMPLE SIZE	TYPE OF TESTS	FREQUENCY	REMARKS
Concrete (a) Cement	Quality	(a) 10 lbs. in can	Physical properties	1 per shipment or Manufacturer Cert.	Allow 40 days for testing and transport. Manufacturer's certification required. (1)
(b) Water		(b)			Potable water accepted by the Project Engineer
(c) Coarse Aggregate		(c) 100 lbs.	Wear, Soundness	1 per source	Allow 25 days for testing and transport.
(d) Fine Aggregate		(d) 25 lbs.	Soundness	1 per source	Allow 25 days for testing and transport.
(e) Air Entraining Agent		(e)			Supplier certification required
(f) Joint Sealer		(f)			Supplier certification required
(g) Joint Filler		(g)			Supplier certification required
(h) Curing Materials		(h)			Supplier certification required
	Mix Design (2)	Aggregate: Coarse: 300 lbs Fine: 100 lbs Cement: 1 sack Additives: 1 qt.	Mix design	1 per source prior to use	Contractor furnished material. Allow 45 days for testing and transport

(1) Re-test any cement stored in silos or bins over six months, or in bags over two months.
(2) Complete the Concrete Plant Inspection prior to production.

MATERIALS, SAMPLING & TESTING FREQUENCY
AIRPORT CONSTRUCTION CONTRACTS

MATERIAL	TYPE OF SAMPLE	SAMPLE SIZE	TYPE OF TESTS	FREQUENCY	REMARKS
Concrete continued					
Coarse Aggregate	Acceptance (5)	(4)	Flat & Elongated (6), Gradation	1 per 200 yd^3	Number consecutively CA-G-1
Fine Aggregate		(4)	Gradation, Fineness Modulus	1 per 200 yd^3	Number consecutively FA-G-1
Mix		As required	Yield, Cement Factor, Slump, Water Cement Ratio, % Air, Smoothness, Grade	1 per ½ days pour (1) or 1 per 200 yd^3	(2)
		2 cylinders or beams	Compressive strength or Flexural Strength (3)	1 per ½ days pour (1) or 1 per 200 yd^3	Test at 28 days. (2) (7)
	Information	Cylinders or beams	Compressive strength or Flexural Strength (3)	As required (e.g. for 7 day break)	
Coarse Aggregate	Independent Assurance	(4)	Gradation, All Deleterious, Flat & Elongated	1 per 2,000 yd^3 (with minimum of 1 per project) if over 100 yd^3 is placed	Numbers correspond to acceptance samples.
Fine Aggregate		(4)	Gradation, All Deleterious, Fineness Modulus		
Mix		As required	Yield, Cement Factor, Slump, Water Cement Ratio, % Air	1 per project	
		2 cylinders or beams	Compressive strength or Flexural Strength (3)	1 per 2,000 yd^3	

(1) Half day's pour considered to be six hours or less.
(2) Commercial sources, which are periodically inspected, do not have to be tested if *total quantity* of concrete placement is less than 5 yd^3 as determined by the Project Engineer. Placement reports summarizing all minor pours will be completed.
(3) Only required when strength criteria is included for the item.
(4) Size of sample for gradation is determined by nominal maximum size. See WAQTC FOP for AASHTO T 27/T 11 for minimum sample size.
(5) Truck inspections are required for each pour.
(6) Run tests on the first five samples at the start of production from any source. If these tests indicate the material meets specifications, additional tests need only be performed on the assurance samples.
(7) Non-structural or minor concrete construction, 1 set minimum per project is recommended.

MATERIALS, SAMPLING & TESTING FREQUENCY

AIRPORT CONSTRUCTION CONTRACTS

MATERIAL	TYPE OF SAMPLE	SAMPLE SIZE	TYPE OF TESTS	FREQUENCY	REMARKS
Misc. Hardware	Quality	See contract special provisions, Project Engineer's inspection and acceptance.			Certs/Mill reports approved by QA/ME or SME
Reinforcing Steel	Quality	2 pieces 36 inches long per size and grade		1 per 20 tons minimum or 1 per project when a pay item	Mill reports approved by QA/ME or SME in lieu of testing, or QPL.
Porous Backfill	Quality	(1)	Standard Density	As required by changes in material	Number consecutively PB-SD-1
	Acceptance	(1)	Density	1 per installation	Number consecutively PB-D-1
			Gradation	1 per source	Number consecutively PB-G-1
Topsoil	Quality	15 lbs.	Organic content, pH, Gradation	1 per source prior to use	Allow 15 days for testing and transport.
	Acceptance	(1)	Organic content, Gradation	1 per 2,500 yd^3	Number consecutively TS-G-1
Lighting Equipment	Within 30 days following contract award, the contractor must submit to the Project Engineer for approval a complete list of material and equipment that is proposed to be used for this item. The data must include catalogue cuts, diagrams, test reports, manufacturers' certifications, etc. The above data must be submitted in eight sets. Any proposed deviation from the Plans must also be submitted.				

(1) Size of samples for gradation testing is determined by nominal maximum size. See WAQTC FOP for AASHTO T 27/T 11 for minimum sample size. Size of samples for Standard Densities should be four times the size required for gradation testing.

MATERIALS, SAMPLING & TESTING FREQUENCY
AIRPORT CONSTRUCTION CONTRACTS

Minor Quantities

A. **Portland Cement Concrete.** Concrete for the following items may be accepted on the basis of an approved mix design and placement reports documenting batch information and pour location, time, and quantity. Under this system, the producer must state on the delivery ticket accompanying each load of concrete, the class of concrete being furnished, the weights of cement, aggregates and water used in the batch, and the time of batching. Only State-tested aggregates and cement, or supplier certified cement, approved by the State Materials Engineer, may be used. Document each pour on a Concrete Placement Report.

1. Slope paving and headers 2. Paved ditch 3. Small culvert headwalls 4. Fence post footings 5. Catch basins, manhole bases, and inlets

6. Electrical vault, light or signal boxes

B. **Small Quantities of Miscellaneous Materials.** The primary documentation of delivery and placement may be the Project Materials Report.

1. Aggregates:--Not to exceed 500 tons per item per project.
2. Asphalt/Aggregate Mixtures:--Not to exceed 1,500 tons per approved mix design.
3. Bituminous Material:--Not to exceed 85 tons per project.
4. Paint:--Not to exceed 20 gallons per project. Acceptance to be based on weights and analysis on the container label.
5. Lumber:--Not to exceed 5,000 Board Feet per project. Recognized commercial grades only may be used.
6. Masonry Items:--Not to exceed 100 pieces. Subject to checking of nominal size and visual inspection.
7. Plain concrete or clay pipe:--Not to exceed 100 lineal feet.
8. Hardware:-- When a minor component to other small quantities of work.
9. Topsoil:--Not to exceed 6,000 ft^2.

Appendix D

Ted Stevens Anchorage International Airport
Runway 7R/25L Rehabilitation Phase II/Extension

Project No. 52405
AIP No. 3-02-0016-XXX-2011
Project No. 53201
AIP No. 3-02-0016-XXX-2011

SAFETY PLAN

Construction Safety Plan

Project # 52405/53201

Runway 7R/25L Rehabilitation Phase II/Extension

Ted Stevens Anchorage International Airport

Airport Emergency Notification Procedure:

Call 266-2555 Airport Emergency

(911 calls the Anchorage Police)

State Type of Emergency:_____

Give location: DISTANCE – DIRECTION from nearest RUNWAY ____, TAXIWAY ____ OR BUILDING_____

Emergency Follow up - As soon as possible notify:

632-2654 Robert Leroux - State of Alaska Project Engineer

266-2620 On Duty Manager - Airport Operations Center

Contractor: 24 hr Rep Name_____

24 hr Phone_____

Non-Emergency Notification:

264-2411 Airport Police, Rescue and Fire Dispatch
Immediately notify Dispatch of any personal injury requiring medical attention or damage to Airport/State/Federal property, even when an emergency response is not required.

632-2654/243-4169 Robert Leroux- State of Alaska Engineer

266-2620 On Duty Manager- Airport Operations Center

Contractor: Rep Name_____

Cell Phone_____Office Phone_____

Radio Frequencies and ATCT Light Gun Signals

Radio Frequencies:

When operating vehicles on or near open runways or taxiways, personnel must maintain radio contact with Airport Operations and the ATCT.

Air Traffic Control Tower (ATCT) -- 118.3 MHz
Ground Control (GC) ---------- 121.9 MHz

ATCT Light Gun Signals:

In the event of radio failure, the ATCT will utilize the following light gun signals:

Steady Green----------Cleared to cross, proceed or go
Flashing Green----------(Aircraft signal only)
Steady Red----------STOP
Flashing Red----------CLEAR the taxiway/runway
Flashing White----------Return to starting point on airport
Alternating Red/Green----Exercise extreme caution

Edge Lighting:

Runways---------- White
Taxiways---------- Blue

Points of Contact:

Project Engineer: **D.C. "Chuck" Swenor**, Project Engineer
ADOT&PF, Aviation Construction
P.O. Box 196900, Anchorage, Alaska 99519-6900
Telephone (907) 243-4169
Cellular (907) 830-8109
FAX (907) 243-4597

The ADOT&PF Project Engineer will be the central point of contact between the Contractor and ANC Operations Center and the FAA.

Airport Operations Center:

Tim Lufkin, Operations Construction Coordinator
Ted Stevens Anchorage International Airport
P.O. Box 196960, Anchorage, Alaska 99519-6960
Telephone (907)266-2615(24 hr)
Cellular (907) 306-5023
FAX (907) 266-2646

Dan Frisby, Field Maintenance Manager
Ted Stevens Anchorage International Airport
P.O. Box 196960, Anchorage, Alaska 99519-6960
Telephone (907) 266-2427
Cellular (907) 748-2302
FAX (907) 266-2677

Ron Silva, Field Electrician
Ted Stevens Anchorage International Airport
P.O. Box 196960, Anchorage, Alaska 99519-6960
Telephone (907) 266-2423
Cellular (907) 227-9475
FAX (907) 266-2122

Security Contact Phone Numbers:

Airport Operations:	266-2600
Airport Badge Office:	266-2409
Airport Dispatch:	266-2415

Due to the ever-changing nature of security requirements please contact the Airport Security Manager at 266-2522 for any clarification you may need.

Contractor:

24-hour Point of Contact: _____
Telephone: _____ Cellular: _____

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1. Introduction

a. Purpose

This is the Construction Safety Plan for Project #52405/53201 Runway 7R/25L Rehabilitation/Extension on Ted Stevens Anchorage International Airport (ANC), Anchorage, Alaska during 2011. This plan also incorporates the Traffic Control Plan and Security Plan. Its purpose is to guide contractor operations that impact safety and security including traffic control and access issues in the complex working environment at this airport. This plan is also intended to supply information useful to assist the contractor in the preparation of other plans as required by the contract. Many of the topics covered in this plan are also addressed, often in more detail, in the contract specifications.

Safety and security are of paramount importance. The entire airport is an industrial site with potentially significant danger to the traveling public, individual workers and property if safety and security are not carefully attended to.

b. Abbreviations and Definitions used in this plan:

AIRCRAFT MOVEMENT AREA. The runways, taxiways, and other areas of an airport that are used for taxiing or hover taxiing, air taxiing, takeoff, and landing of aircraft, exclusive of loading ramps and aircraft parking areas. (FAA AC 150/5370-2E)

AIR OPERATIONS AREA (AOA). Any area of the airport used or intended to be used for the landing, takeoff, or surface maneuvering of aircraft. An air operations area includes such paved or unpaved areas that are used or intended to be used for the unobstructed movement of aircraft in addition to its associated runways, taxiways, or aprons. (FAA AC 150/5370-2E)

FOREIGN OBJECT DEBRIS (FOD) – A substance, debris or article alien to the vehicle or system which would potentially cause damage. (FAA AC 150/5380-5B)

NAVIGATIONAL AID (NAVAID) – Any visual or electronic device airborne or on the surface which provides point-to-point guidance information or position data to aircraft in flight. (FAA Pilot/Controller Glossary, 8/27/09)

NOTICE TO AIRMEN (NOTAM) – A notice containing information (not known sufficiently in advance to publicize by other means) concerning the establishment, condition, or change in any component (facility, service, or procedure of, or hazard in the National Airspace System) the timely knowledge of which is essential to personnel concerned with flight operations. (FAA Pilot/Controller Glossary, 8/27/09)

OBJECT FREE AREA (OFA). An area on the ground centered on the runway, taxiway, or taxilane provided to enhance safety of aircraft operations by having the area free of objects except for those objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes. (FAA AC 150/5370-2E)

RUNWAY SAFETY AREA (RSA). A defined surface surrounding the runway prepared or suitable to reduce the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway, in accordance with FAA AC 150/5300-13. (FAA AC 150/5370-2E)

SECURITY IDENTIFICATION DISPLAY AREA (SIDA) – Designated area where security identification must be displayed. Includes each part of the AOA that is regularly used to load cargo on or unload cargo from aircraft. Also areas where cargo is present after an aircraft operator accepts it including cargo facilities; loading and unloading vehicle docks; and areas where cargo is sorted, stored, staged, consolidated, processed, screened, or transferred. (49 CFR Part 1542)

TAXIWAY SAFETY AREA (TSA). A defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an airplane unintentionally departing the taxiway, in accordance with FAA AC 150/5300-13. (FAA AC 150/5370-2E)

c. Contractor Safety and Security Responsibilities:

Throughout the construction project, observe the following practices:

- Provide a 24-hour point of contact to resolve emergency/safety discrepancies who can respond to the airport within 30 minutes.
- Restrict construction personnel or any unauthorized persons from entering airport areas that would be hazardous to themselves or others.
- Where the contractor has the responsibility of monitoring gates and entry points, restrict access to the AOA to only authorized persons and vehicles.
- Before beginning any construction activity, coordinate with ANC Operations through the Project Engineer to provide information for Notices to Airmen (NOTAMS). Upon completion of work and return of all areas to standard conditions, coordinate similarly to provide information regarding the cancellation of all notices issued as NOTAMS.
- Immediately suspend operations; move personnel, equipment, and materials to a safe location; and stand by when ordered to by the engineer, Airport Operations, or other designated airport representative until aircraft or emergency equipment use is completed.

- No vehicles or equipment will enter or operate within active runway or taxiway safety areas without clearance from ATCT Ground Control.

- Always yield right of way to moving aircraft and responding emergency vehicles and equipment.

- Notify and obtain permission from the Engineer and Airport Operations before taking any actions that will render inoperable or compromise the operations of any active Navaid, or lighting or communications circuit. Navaid function is compromised by changes in terrain and obstructions in Navaid critical areas.

- Throughout the work, notify Kulis ANG Base of taxiway closures within each phase of construction so that Kulis Aircraft Rescue Emergency Response can plan alternate response routes.

- Control work to minimize disturbance to aircraft operations.

- Keep operational safety a standing agenda item during progress meetings throughout the project. Frequently remind personnel of safely and security issues, requirements and boundaries that affect their areas of work.

- Ensure personnel assigned access authorization duties or perimeter guard duties are properly trained and alert to security concerns and procedures.

- Ensure vehicle operators are properly trained and are aware of airport unique hazards, signs, markings and procedures.

- Ensure personnel assigned radio duties or driving unescorted in aircraft movement areas are properly trained in radio communication language and procedures.

- Ensure personnel assigned duties in or adjacent to aircraft movement areas are made aware of the dangers posed by jet blast and prop wash, and establish practices and procedures to guard against injuries, property damage and FOD.

- Notify Airport Operations at least 30 minutes before the end of shifts each day for a safety inspection of the work site.

- Perform joint onsite inspections with the engineer and airport operations throughout the project, with immediate remedy of any deficiencies, whether caused by negligence, oversight, or project scope change.

- Comply with Occupational Safety and Health Administration (OSHA) and Alaska Occupational Safety and Health (AKOSH) safety regulations and guidelines.

- Throughout the duration of the construction project, remain aware of and take action to address the safety problems and hazards described in AC 150/3570-2E, Operational Safety on Airports During Construction.

2. The Airport

a. General Airport Information

Ted Stevens Anchorage International Airport (ANC) in Anchorage, Alaska, serves as the primary air transportation facility in the state. Air transportation is of particular importance to Alaska because of its geographical separation from the rest of the continental United States (CONUS) and because, while the state has an area roughly the size of a third of the CONUS, many rural communities are not connected to the statewide highway system and depend on the air transportation system for essential services and supplies. ANC is the primary destination point within the state for travelers from the CONUS, and is a refueling checkpoint for many international flights.

ANC is state owned and operated and conducts 793 aircraft operations a day serving aircraft ranging in size from small propeller driven aircraft to Boeing 747's. The airport operates two parallel east/west runways, RW 7L/25R (10,600 feet long) and RW 7R/25L (10,900 feet), and one north/south runway RW 14/32 (11,584 feet).

b. Airport Ground Safety Environment

Since the airport, especially the air operations area of the airport, is likely to be unfamiliar to many construction personnel, the potential for confusion resulting in safety or security incidents is greatly increased. The airport contains facilities for major passenger and cargo airlines, numerous businesses providing airport related services, and Kulis Air National Guard Base. Kulis has both fixed wing and helicopter operations.

Several entities have responsibilities for the safety and security of the airport including the Air Traffic Control Tower (FAA), Ground Control (FAA), FAA operations facilities, Airport Fire and Rescue, the Transportation Security Administration (TSA), and the airport police.

The airport Air Operations Area (AOA), sometimes referred to as the "airside" of the airport, has unusual features that may be unfamiliar to construction personnel:

- **Runways** (white edge markings) are for aircraft takeoff and landing.
- **Taxiways or taxilanes** (double yellow edge markings) are for the ground

movement of aircraft. Also used for vehicular traffic. The taxilanes are lanes drawn on larger pieces of pavement like aircraft parking aprons.

- **Runway and Taxiway Safety Areas (RSA/TSA)/Object Free Areas (OFA)** are centered on the centerline. No vehicles or equipment will enter or operate within runway or taxiway safety areas without clearance from ATCT Ground Control.

Runway Safety Area and OFA Dimensions

(dimensions centered on runway centerline)

	Rwy 7R-25L	Rwy 7L-25R	Rwy 14-32
RSA Width	500'	500'	500'
OFA Width	800'	800'	800'
RSA/OFA Length Beyond Runway End	1,000'	1,000'	1,000'

Taxiway Safety Area and OFA Dimensions

	Txys G, J & R	Txy Z		
Safety Area Width	262'	214'		
OFA Width	386'	320'		

- **Aprons.** Aprons are larger pavement areas used for aircraft parking places and servicing.

- **Navaid critical areas.** FAA air navigation devices have areas around them that must remain unaltered and clear of objects for the devices to work properly. Do not enter Navaid critical areas unless given clearance to do so. Navaid critical areas are marked on the Plans. Observe instructions in the associated notes. Do not conduct any construction activity within navigational aid critical areas without prior approval from the local Federal Aviation Administration (FAA) Airway Facilities sector representative, unless work on navigational aids is included in the plans, and you have received approval from the Engineer.

- **Part 77 airspace clearance areas.** The airport has air spaces above and surrounding the runways which must remain free of penetrating obstructions for flying safety. Vehicles and equipment operating in these areas could pose hazards for arriving and departing aircraft.

- **Kulis Air National Guard Base.** There is a red line on the National Guard Taxiway beyond the project limits. The red line is a legal boundary that is enforced by security forces personnel. If unauthorized personnel cross the red line, they are subject to being detained by security forces. In the event that contractors need to cross the red line in the performance of their duties, they

need to contact the military liaison who will escort them and contact security forces (249-1271) for authorization. The military liaison is SMSgt Iscah Miles at 249-1106.

Throughout the work, notify Kulis ANG Base of taxiway closures within each phase of construction so that Kulis Aircraft Rescue Emergency Response can plan alternate response routes.

3. The Project

a. Project Scope:

The purpose of this project is to complete the runway extension and the western portion of the runway rehabilitation and improvements for the 7R/25L runway that will ultimately reconstruct, extend and provide drainage to accommodate Group VI aircraft or less. This runway is the only Category III Instrument Landing System (ILS) capable runway at the Ted Stevens Airport. It's important that this runway is rehabilitated and routinely maintained because of its significance.

- Rehabilitate and widen the existing western portion of Runway 7R/25L from 150 feet to 200 feet from STA 1062+00 to STA 1103+00.
- Construct a 100-foot-wide Portland Cement Concrete (PCC) keel STA 1047+00 to STA 1077+29 reducing to 80 feet wide at STA 1077+29 to STA 1096+95.
- Extend Runway 7R/25L 1500 feet in the westerly direction with a runway safety area extending west beyond the new threshold 600 feet.
- Upgrade Taxiway J for Group VI aircraft.
- Relocate the ILS Critical Area to support the runway extension.
- Complete civil work for relocating FAA facilities and install support towers for the approach lighting system. Systems the FAA are relocating include: the approach lighting system and support buildings, the glide slope antenna and buildings for the instrument landing system, runway visual range sensors, precision approach path indicator, inner marker antenna, far-field monitor antenna, moving target indicator reflector.
- Realign the service road around the west end of the runway extension.
- Realign and extend existing roads on the west end of the runway for approach lighting system (ALSF-2) access.
- Relocate and extend the runway and taxiway lighting for the widening and extension.
- Clear obstructions between the Airport Surveillance Radar (ASR) and the relocated runway threshold, as necessary.
- Replace the existing drainage system under the runway embankment effected by work.
- Expand the sub drain system to collect drainage from the widened runway and taxiway shoulders.

- Repair the frost jacking at the inlets of the 72-inch elliptical culverts located under Runway 7R/25L.
- Remove Part 77 surface obstructions for the extension portion of the runway.
- Relocate existing electrical and communication utilities due to the extension.

b. Construction Scheduling

Construction shall be planned and sequenced by the contractor to have the runway open and useable by September 15, 2011. The Contractor will develop a CPM schedule according to the requirements in G-300. The goal of the schedule is to facilitate construction activities while maintaining airport operations to the fullest extent possible.

An acceptable schedule must be based on the following constraints:

- Runway 7R/25L will be closed during construction.
- The parallel (RW 7L/25R) and cross wind (RW14/32) runways will remain open.
- Aircraft operations will continue day and night.
- Aircraft access for the South Airpark and Kulis ANG Base to and from Runway 7L/25R will be constantly maintained.
- All efforts will be made to minimize impacts to airport operations.

4. Issuance of Notices to Airmen (NOTAMs)

Before beginning any construction activity, coordinate with ANC Operations through the Project Engineer to provide information for Notices to Airmen (NOTAMS).

Provide sufficient information for ANC Operations to fulfill the following procedures:

- Airport Operations will provide information on closed or hazardous conditions on airport movement areas to the Flight Service Station (FSS) so it can issue a NOTAM.
- Airport Operations will coordinate the issuance, maintenance, and cancellation of NOTAMS about airport conditions resulting from construction activities with tenants and the local air traffic facility.
- Only Airport Operations may issue or cancel NOTAMS on airport conditions. (The airport owner/operator is the only entity that can close or open a runway or taxiway.)

Upon completion of work and return of all areas to standard conditions, coordinate similarly to provide information regarding the cancellation of all notices issued as NOTAMS.

5. Construction within the AOA

Restrict project activities to the construction limits shown in the Plans. Coordinate with ANC Operations through the Engineer to locate the line that will form a boundary for use of construction equipment. Boundaries may be different for each phase and may vary within each phase. Airport Operations at their discretion may designate such boundaries and portions of such boundaries as temporarily outside the AOA for security purposes.

Aircraft operations areas will remain available for use by aircraft to the maximum extent possible. Construction will have to be planned to accommodate safe aircraft movement from taxiways south of the project to runways to the north. Control your work in aircraft operations areas to minimize disturbance to aircraft operation. Some aircraft operations cannot be curtailed, so consider the effects of jet blast in planning construction activity.

a. Safety Area Construction

Perform construction within the safety area of any active runway, taxiway, or apron only when the runway, taxiway, or apron is closed or use-restricted; and initiate such construction only with prior permission from Airport Operations and after the proper NOTAMs have been issued. Maintain contact with ANC Ground Control while working within these areas. Authorization for work within active Taxiway Safety Areas will depend on whether adequate wingtip clearance exists between the aircraft and equipment/material; whether excavations, trenches, or other conditions are conspicuously marked and lighted; and whether aircraft towing or other guided movement can be accommodated. (See AC 150/5300-13 for wingtip clearance requirements.)

b. Hazardous Area Marking and Lighting

Hazardous conditions on the movement area of the airport will be marked with hazard marker barriers, flags, and flashers as well as traffic control barricades. These markers restrict access and make hazards obvious to aircraft, personnel, and vehicles. Prominently mark open trenches, excavations, and stockpiled materials and light these obstacles during hours of restricted visibility and darkness. During periods of low visibility and at night, identify hazardous areas with red flashing lights. Because of wind and jet blast conditions on the airport, flags and lights need to be tethered to the hazard marker barriers at all times.

The hazard marker barriers will be provided by ANC. The hazard marker barrier flagging, lighting and batteries as well as the traffic control barricades will be supplied by the Contractor, as specified in the contract under subsection 70-09, Barricades, Warning Signs and Hazard Markings, and Item P-670. Hazard marker barrier and traffic control barricade details are included in the Safety Plan drawings and will be used as shown and as required by the direction of the Project Engineer

and ANC. Hazard marker barriers and barricades shall be anchored down to withstand jet blast and prop wash and shall be placed a minimum of 210 feet from the centerline of Runway 7L/25R.

c. Foreign Object Debris (FOD) Management

Waste and loose materials, commonly referred to as foreign object debris (FOD), are capable of causing damage to aircraft landing gear, propellers, and jet engines. FOD includes loose hardware, tools, parts, pavement fragments, catering supplies, building materials, rocks, sand, pieces of luggage, pens, coins, badges, hats, soda cans, paper clips, rags, trash, paperwork and even wildlife. Anything that can find its way into an aircraft engine or flight control mechanisms is a recipe for foreign object damage and can result in anything from minor repairs to catastrophic events. Jet engines are extremely capable of picking up and ingesting FOD. Jet blast from the rear of an engine can pick up debris and launch it towards personnel and equipment.

Constrain stockpiled material to prevent its movement as a result of the maximum anticipated aircraft blast and forecasted wind conditions. No uncovered stockpiled material will be permitted on the ramp work area.

Control and continuously remove waste or loose materials that might attract wildlife.

Great care must be taken to ensure FOD is not be left or placed on or near active aircraft movement areas. Materials tracked onto these areas must be continuously removed during the construction project.

The Contractor will keep all active haul routes, runways, and taxiway areas swept clean of materials spilled by construction operations. All material spills will be removed from active runways, taxiways, and aprons immediately upon occurring to avoid damage to aircraft engines. All spilled materials must be cleaned from runways and taxiways before opening them to aircraft.

Suitable equipment, such as broom/vacuum trucks, will be stationed at the job site for this purpose and will be used to clean loose material immediately after being spilled on any runway or taxiway.

The Contractor will remove all loose material and debris from the sides of haul vehicles before leaving or entering the site in order to minimize spills of material on airport or road surfaces. The Contractor will assign one laborer with a hand broom to sweep off excess material that accumulates on the outside of trucks during loading. Each truck will be hand swept before leaving the work areas.

6. Vehicle Operation, and Traffic and Pedestrian Control

a. Vehicle Operation

Vehicle operators will:

- Obey state laws.
- Heed posted signs and traffic markings. Be familiar with and heed airport peculiar signs, barriers, markings, and lighting, including edge lights and markings, hold short lines, and hazardous area barriers, markings and lighting.
- Obtain clearance from ATCT Ground Control before entering or operating within runway or taxiway safety areas.
- Obtain clearance to cross a runway or taxiway. Confirm by personal observation that no aircraft is approaching when given clearance to cross.
- Yield the right of way to moving aircraft. Be aware that pilots have poor visibility of objects and vehicles on the ground.
- Watch for slow moving vehicles, aircraft in tow, and vehicles parked in unusual places.
- Understand the dangers of jet blast and prop wash.
- Understand that roads on some areas are only paint markings.
- Persons that are found not complying with airport driving rules will no longer be allowed to operate vehicles on the airport.

b. Vehicle Marking

To operate in aircraft movement and non-movement areas during daylight hours, the vehicle must have an orange and white checkered flag or a flashing yellow dome type light attached to it. Any vehicle operating on the movement areas during hours of darkness or reduced visibility shall be equipped with a flashing yellow dome light.

All contractor vehicles requiring access to the AOA shall display a company logo and temporary ramp permit as issued and instructed by Airport Badge Office. Contractor vehicles are authorized onto the AOA only when within their area of authorization (to include access routes to and from the construction site) and required vehicle permits are properly displayed, and all occupants have the required airport identification properly displayed.

c. Traffic Control (Ground vehicles)

Vehicular traffic crossing active movement areas must be controlled either by two-way radio with the Air Traffic Control Tower (ATCT), escort, flagman, or signal light.

When any vehicle operator must travel over any portion of an aircraft movement or non-movement area, other than properly closed and marked areas, they shall be escorted by a vehicle operator who has received radio communication training, and drivers training on compliance with airport vehicle rules, a working aviation-band

two-way radio, and prior approval from Airport Operations. In addition, it is the responsibility of the escort vehicle driver to verify the movement/position of all escorted vehicles at any given time.

Personnel engaged in activities involving unescorted vehicle operation on aircraft movement areas will be trained by Airport Operations to observe the proper procedures for communications, including using appropriate radio frequencies. When operating vehicles on or near open runways or taxiways, personnel must understand the critical importance of maintaining radio contact with Airport Operations and the ATCT.

If authorized by the Airport, vehicle operators granted access to travel a designated haul route within the line-of sight of airport ID badged individuals with the capability to radio Airport Operations can travel the haul route unescorted. These persons will not deviate from the designated route and will not leave their vehicles in route except in an emergency.

d. Ground Vehicle Access

Access to the job site shall be as shown on the Plans.

Access must be maintained along the service road south of Runway 7R/25L.

Construction for other projects may be occurring concurrently. Ensure that access is also maintained for these projects according to the instructions of the Engineer.

e. Persons Controlling AOA Access and Flaggers

Flaggers will be positioned at the following locations. Airport flagger positions will be adjusted as conditions warrant.

- At each position shown on the Plans or Safety Plan, or at an alternate location as directed by the Engineer.
- Where work or hauling operations are being conducted within 25 feet of an active taxiway.
- Where construction activity is being conducted in close proximity to operating aircraft and the Engineer determines that a flagger is needed.
- Where gates not manned by Airport Security are used for haul or other construction access.
- To maintain vehicular traffic on an existing road, street, or highway during performance of your work.

Provide each airport flagger with a two-way radio to contact construction equipment and other airport flaggers on the project. Equip each airport flagger assigned to an aircraft operations area and persons responsible for controlling AOA access with a two-way radio that broadcasts and receives on the ANC Tower and Ground Control

Frequencies (118.3 MHz and 121.9 MHz). Persons equipped with radios for communication on ANC Tower and Ground Control Frequencies will be trained by Airport Operations to observe proper communication procedures.

Duties of flaggers or other persons positioned at gates not manned by Airport Security include vehicle access, pedestrian control and wildlife control. These persons shall be instructed by Airport Operations in the proper procedures and identification requirements for persons and vehicles. Typically pedestrians would be limited to construction employees whose vehicles must be parked outside the AOA. These procedures are specific to each contract and may change during different phases of the contract.

Watch for moose or other wildlife in the vicinity of open gates. If a breach of the AOA by wildlife appears imminent, close gates and notify Airport Operations via the Airport Operations frequency.

The contractor may not impede, modify or control traffic flow outside airport boundaries without a Traffic Control Plan approved by the Engineer. Such activities must follow all applicable federal, state and municipal statutes and regulations.

f. Haul Routes and Parking Areas

Haul routes for this project will be as shown on the plans. Use of a different haul route must be approved by the Engineer in coordination with ANC Operations. Every truck must possess a copy of the designated haul route.

Construction employees will park in designated areas. An employee parking area is shown in the Safety Plan sheets. Motorized vehicles will not be parked on grassy unimproved surfaces. Do not park vehicles within 15 feet of any roadway.

A contractor staging area is shown in the project plans. Do not stage motorized equipment on dirt surfaces in the staging area without a drip pan. Park and service all construction vehicles outside the runway safety areas and obstacle free zones (OFZs). Parked vehicles must not obstruct the clear line of sight by the ATCT to any taxiways or runways under air traffic control nor obstruct any runway visual aids, signs, or navigational aids.

7. Additional Safety Requirements

a. Underground Utility Lines

Take all precautions necessary to protect the safety of workers and the public when performing work involving utilities.

Arrange with utility owners to locate all utilities that may be within an area of work

before excavation in that area. Approximate locations of utilities known to the Department to be within the work zone are shown on the Plans. The actual locations and elevations and the true nature of utilities may vary from and additional utilities may exist than what is shown on the Plans.

The FAA has various navigational aids and other equipment in operation at ANC. The approximate location of the power cable, control cables and equipment is shown on the plans; however there may be cables and equipment that are not shown. Contact the FAA for locates prior to excavation.

Carefully work around existing underground utilities. When utility lines are found in areas of excavation, hand dig pot-holes every 100 feet along the cable to maintain visibility of the cable. Carefully uncover utilities where they intersect the work.

Ensure that all lighting systems, telecommunications, and control cables remain in operation continuously throughout the construction period except as noted in the plans and specifications. Facilities that are directly related to work items for this project may be placed out of service only as long as necessary to make the alterations as shown on the plans. Obtain permission from the Engineer before taking any of the above facilities out of service. Provide at least 72 hours final notice to the Airport Operations Center through the Engineer before placing any airport lighting or NAVAIDS out of service. All airfield lighting circuits locked out for construction shall be returned to ATCT control no later than 2 hours before sunset.

Notify ANC Airfield Maintenance (266-2425) when work is expected to begin for de-energizing any circuit. Upon completion of each stage, notify ANC Airfield Maintenance before energizing that portion of the system.

Coordinate requests to temporarily remove any other underground utilities from service with the Engineer.

A fiber optic cable critical to airport operations is located within the project area. The approximate location is shown on the plans. Exercise great care when excavating in the vicinity of this cable.

Immediately stop excavating in the vicinity of a utility and notify the Engineer and the utility owner if an underground utility is discovered that was not field marked or was inaccurately field marked. Promptly notify the utility owner and the Engineer in the event of accidental interruption of utility service, and cooperate with the utility owner and the Engineer until service is restored.

See Section 50-06 of the contract documents for more details.

b. Prohibited Construction Activities

1) Open-flame welding or torch cutting operations are prohibited unless

adequate fire safety precautions are provided and these operations have been authorized by Airport Operations.

2) Blasting is prohibited on airport property.

8. Security

More detailed security information and requirements are included in Section 70-21 of the contract documents.

The contractor is responsible for preventing unauthorized access to the AOA by way of the construction site and is responsible for maintaining, as a minimum, a six (6) foot clear zone on both sides of any perimeter fence line affected by the contractor or any authorized representative. This includes maintaining ANC perimeter gates and doors in either a locked condition or attended by appropriately badged persons who ensure that only authorized personnel or vehicles are admitted through them into the AOA. Those persons designated to control access points into the AOA shall be instructed by Airport Operations in the proper procedures of identification requirements for persons and vehicles. These procedures are specific to each contract and may change during different phases of the contract. The Contractor will provide these persons with the capability to communicate directly with Airport Operations and/or Airport Dispatch.

Any opening of the AOA security fence requires prior coordination with Airport Operations. Contact Airport Operations at 266-2600. Work on the perimeter fence required by this job, and the temporary removal of and then reinstatement of areas to the AOA, will require the Contractor to implement specific security measures that will be communicated to the Contractor by Airport Operations. The contractor will need to install temporary security fence which shall be inspected and approved by the Engineer prior to the removal for any perimeter fence. The contractor shall remove all wildlife and FOD from the area between the temporary security fence and the permanent perimeter fence to the satisfaction of the Engineer prior to removal of the temporary fence near the completion of the project.

The Transportation Security Administration (TSA) requires ANC to control access and prevent unauthorized persons from entering Air Operations Areas (AOA). In compliance with this requirement, the airport operator has established procedures to authorize or deny access to the AOA and to identify and control persons while in these areas.

The contractor shall be liable for any fines levied against the State, by the Transportation Security Administration (TSA), resulting from actions by the contractor, or those whom the contractor is responsible for, that cause a failure in the maintaining of security in the area of construction, to include any points of entry into the Air Operations Area (AOA) utilized for the construction project. Failure to maintain security will also include failure to abide by the airport badge identification program or other requirements pertaining to the security of the AOA.

The Airport Identification Badge, developed and adopted by ANC, is the only identification system recognized as authority to enter the Security Identification Display Area (SIDA) and Sterile Areas of the airport. Only persons identified by this system have permitted access. All Airport Identification Badges must be worn on the outermost garment above the waist.

An individually - assigned Airport Identification Badge will be used by each Contractor employee granted access to the airport SIDA, Sterile Area, or other airport restricted areas for construction projects. It does not grant access to aircraft and is valid only for the area in which their construction is actually taking place and the approved routes to and from that area.

In lieu of an Airport Identification Badge, for those employees working in the same area together, there needs to be only one employee with an Airport Identification Badge, with Escort Authorization, while the other employees in the area may be issued a visitor badge. Note: there must be an Airport I.D. Badged employee monitoring them at all times. This person must have Escort Authority indicated on their badge. A person using a visitor badge is expected to follow all regulations while on the restricted areas of the airport. Contractors utilizing escorts and visitor badges must receive prior approval from Airport Operations or the Airport Security Manager.

The contractor shall be responsible for the maintenance of records necessary to ensure the retrieval of badges from employees and subcontractor(s). The Contractor shall designate one or more persons to act as the authorized point of contact for coordination in matters of badge program administration and security.

Should an employee lose his or her I.D. Badge, they should immediately notify their employer, who shall then immediately notify the Airport Badge Office at 266-2409. If lost after normal business hours, then it should be reported to Airport Dispatch at 266-2415.

For specific job sites, the Airport may authorize the use of an access list. An airport badged individual would be responsible for checking each individual entering the work area against the list. Use of such a list is limited and solely at the discretion of the Airport.

Due to the ever-changing nature of ANC security requirements, please contact the Airport Security Manager at 266-2522 for any changes, updates or additional requirements.

Appendix E

Ted Stevens Anchorage International Airport
Runway 7R/25L Rehabilitation Phase II/Extension

Project No. 52405
AIP No. 3-02-0016-XXX-2011
Project No. 53201
AIP No. 3-02-0016-XXX-2011

Permits

Appendix F

Ted Stevens Anchorage International Airport
Runway 7R/25L Rehabilitation Phase II/Extension

Project No. 52405
AIP No. 3-02-0016-XXX-2011
Project No. 53201
AIP No. 3-02-0016-XXX-2011

Traffic Plan
(Included in Safety Plan, Appendix D)

Appendix G

Ted Stevens Anchorage International Airport
Runway 7R/25L Rehabilitation Phase II/Extension

Project No. 52405
AIP No. 3-02-0016-XXX-2011
Project No. 53201
AIP No. 3-02-0016-XXX-2011

Not Used

Appendix H

Ted Stevens Anchorage International Airport
Runway 7R/25L Rehabilitation Phase II/Extension

Project No. 52405
AIP No. 3-02-0016-XXX-2011
Project No. 53201
AIP No. 3-02-0016-XXX-2011

Not Used

Appendix I

Ted Stevens Anchorage International Airport
Runway 7R/25L Rehabilitation Phase II/Extension

Project No. 52405
AIP No. 3-02-0016-XXX-2011
Project No. 53201
AIP No. 3-02-0016-XXX-2011

Aviation Materials Certification List

AVIATION MATERIALS CERTIFICATION LIST

Project Name Ted Stevens Anchorage International Airport, Runway 7R/25L Rehabilitation Phase II/Extension

Project Number 52405/53201

Project Engineer Signature

Unshaded boxes indicate who approves the material submittals.

If two boxes are not shaded, either approving authority may be used.

* Unshaded boxes under the QPL do not indicate that the materials are on that list. They indicate materials with potential for being on the QPL once qualified.

Materials Item or Test Requirement	Specification	Construction			Design			Statewide		Manufacturer/ Remarks	Materials Certificate Location e.g. Binder #
		Airport Lighting Equipment Certification Program	Project Engineer	Regional Materials or QA Engineer	Civil Design Engineer of Record	Building Design Engineer of Record	Electrical Design Engineer of Record	Qualified Products List * (QPL)	State Materials or QA Engineer		
D-701 STORM DRAINS AND CULVERTS											
Pipe											
CMP Arch, 72'x 48"	D-701-2.2										
CMP Pipe , 18"Diam.	D-701-2.2										
D-705 PIPE UNDERDRAINS											
Pipe											
Type S, Semi-Rigid Underdrain, Perforated, 6" Diam. PE	D-705-2.2										
Type S, Solid PE 6" Diam.	D-705-2.2										
Type S, Solid PE 12" Diam.	D-705-2.2										
Filter Fabric	D-705-2.7										
6" Cleanout	D-705-2.8										
D-752 CONCRETE CULVERTS, HEADWALLS, AND MISC. DRAINAGE STRUCTURES											
Concrete Mix Design	P-610										
Reinforcing Steel	P-610-2.9/Plans										

Materials Item or Test Requirement	Specification	Construction			Design			Statewide		Manufacturer/ Remarks	Materials Certificate Location e.g. Binder #
		Airport Lighting Equipment Certification Program	Project Engineer	Regional Materials or QA Engineer	Civil Design Engineer of Record	Building Design Engineer of Record	Electrical Design Engineer of Record	Qualified Products List * (QPL)	State Materials or QA Engineer		
ITEM P-401 PLANT HOT MIX ASPHALT PAVEMENT											
Mix Design	P-401-3.2										
Joint Adhesive	P-401-4.12										
Longitudinal Joint Sealant	P-401-5.2 f.(3)										
ITEM P-501 PORTLAND CEMENT CONCRETE PAVEMENT											
Concrete Mix Design	P-501										
Premolded Joint Filler	P-501-2.4										
Joint Sealer	P-605/Plans										
Steel Reinforcement	P-501-2.6										
Dowel and Tie Bars	P-501-2.7										
Cover Material For Curing	P-501-2.9										
Liquid membrane-forming compound	P-501-2.9 a.										
White polyethylene film	P-501-2.9 b.										
White burlap-polyethylene film	P-501-2.9 c.										
Waterproof paper	P-501-2.9 d.										
Epoxy - Resin for Dowels	P-501-2.11										
ITEM P-603 TACK COAT											
Tack Coat Material	P-603-2.1										

Materials Item or Test Requirement	Specification	Construction			Design			Statewide		Manufacturer/ Remarks	Materials Certificate Location e.g. Binder #
		Airport Lighting Equipment Certification Program	Project Engineer	Regional Materials or QA Engineer	Civil Design Engineer of Record	Building Design Engineer of Record	Electrical Design Engineer of Record	Qualified Products List * (QPL)	State Materials or QA Engineer		
P-610 STRUCTURAL PORTLAND CEMENT CONCRETE											
Concrete Mix Design	P-610-3.2										
Premolded Joint Material	P-610-2.7										
Joint Filler	P-605										
Steel Reinforcement	P-610-2.9										
P-620 RUNWAY AND TAXIWAY PAINTING											
Paint, Waterborne											
White	P-620-2.2										
Yellow	P-620-2.2										
Solvent Base	P-620-2.2										
White	P-620-2.2										
Yellow	P-620-2.2										
Reflective Media, Combined Cert. with Paint	P-620-2.3										
P-660 RETROREFLECTIVE MARKERS AND CONES											
Type II Marker	P-660-2.1 b.										
P-670 HAZARDOUS AREA BARRIERS											
Flasher Unit for Plastic Barrier	P-670-2.3b										
Flag	P-670-2.2										
Traffic Barricade, Type III	P-670-2.1c										
Flasher Unit for Traffic Barricade	P-670-2.3c										
P-680 GEOTEXTILE FOR SILT FENCE											
Geotextile	P-680-2.1										

Materials Item or Test Requirement	Specification	Construction			Design			Statewide		Manufacturer/ Remarks	Materials Certificate Location e.g. Binder #
		Airport Lighting Equipment Certification Program	Project Engineer	Regional Materials or QA Engineer	Civil Design Engineer of Record	Building Design Engineer of Record	Electrical Design Engineer of Record	Qualified Products List * (QPL)	State Materials or QA Engineer		
P-681 GEOTEXTILE FOR SEPARATION AND STABILIZATION											
Separation	P-681-2.1 a.										
Stabilization	P-681-2.1 b.										
T-901 SEEDING											
Seed	T-901-2.1/Special Provisions										
Fertilizer	T-901-2.2										
T-908 SOIL STABILIZATION											
Mulch	T-908-2.1										

Appendix J

Ted Stevens Anchorage International Airport
Runway 7R/25L Rehabilitation Phase II/Extension

Project No. 52405
AIP No. 3-02-0016-XXX-2011
Project No. 53201
AIP No. 3-02-0016-XXX-2011

Not Used

Appendix K

Ted Stevens Anchorage International Airport
Runway 7R/25L Rehabilitation Phase II/Extension

Project No. 52405
AIP No. 3-02-0016-XXX-2011
Project No. 53201
AIP No. 3-02-0016-XXX-2011

Not Used

Appendix L

Ted Stevens Anchorage International Airport
Runway 7R/25L Rehabilitation Phase II/Extension

Project No. 52405
AIP No. 3-02-0016-XXX-2011
Project No. 53201
AIP No. 3-02-0016-XXX-2011

Not Used

Appendix M

Ted Stevens Anchorage International Airport
Runway 7R/25L Rehabilitation Phase II/Extension

Project No. 52405
AIP No. 3-02-0016-XXX-2011
Project No. 53201
AIP No. 3-02-0016-XXX-2011

Not Used