

DRAFT

DIVISION III
GENERAL PROVISIONS
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DIVISION III

GENERAL PROVISIONS

SECTION 10

DEFINITION OF TERMS

Whenever the following terms are used in these specifications, in the Contract, in any documents or other instruments pertaining to construction where these specifications govern, the intent and meaning shall be interpreted as follows:

10-01 AASHTO. The American Association of State Highway and Transportation Officials, the successor association to AASHTO

10-02 ACCESS ROAD. The right-of-way, the roadway and all improvements constructed thereon connecting the airport to a public highway.

10-03 ADVERTISEMENT. A public announcement, as required by local law, inviting bids or qualifications for work to be performed and materials to be furnished

10-04 AIRPORT IMPROVEMENT PROGRAM (AIP). A grant-in-aid program, administered by the Federal Aviation Administration.

10-05 AIR OPERATIONS AREA (AOA). For the purpose of these specifications, the term air operations area shall mean any area of the airport used or intended to be used for the landing, takeoff, or surface maneuvering 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, taxiway, or apron.

10-06 AIRPORT. Airport means an area of land or water which is used or intended to be used for the landing and takeoff of aircraft; an appurtenant area used or intended to be used for airport buildings or other airport facilities or rights of way; and airport buildings and facilities located in any of these areas, and includes a heliport.

10-07 ASTM INTERNATIONAL (ASTM). Formerly known as the American Society for Testing and Materials (ASTM).

10-08 AWARD. The notice and acceptance, by the Owner, of the successful offeror's proposal

10-09 OFFEROR. Any individual, partnership, firm, or corporation, acting directly or through a duly authorized representative, who submits a proposal for the work contemplated.

10-10 BUILDING AREA. An area on the airport to be used, considered, or intended to be used for airport buildings or other airport facilities or rights-of-way together with all airport buildings and facilities located thereon.

10-11 CALENDAR DAY. Every day shown on the calendar

10-12 CHANGE ORDER. A written order to the CMAR covering changes in the plans, specifications, or proposal quantities and establishing the basis of payment and Contract time adjustment, if any, for the work affected by such changes. The work, covered by a change order, shall be within the scope of the Contract.

10-13 CONTRACT. The written Contract Agreement covering the work to be performed. The awarded Contract shall include those documents listed in Section 7 of the Contract Agreement.

10-14 CONTRACT ITEM (PAY ITEM). A specific unit of work for which a price is provided in the Contract.

10-15 CONTRACT TIME. The number of calendar days or working days, stated in the proposal, allowed for completion of the Contract, including authorized time extensions. If a calendar date of completion is stated in the proposal, in lieu of a number of calendar or working days, the Contract shall be completed by that date.

10-16 CMAR'S LABORATORY. The CMAR's quality control organization in accordance with the CMAR Quality Control Program.

10-17 CONSTRUCTION MANAGER AT RISK (CMAR). The individual, partnership, firm, or corporation primarily liable for the acceptable performance of the work Contracted and for the payment of all legal debts pertaining to the work who acts directly or through lawful agents or employees to complete the Contract work.

10-18 CONSTRUCTION SAFETY AND PHASING PLAN (CSPP). The overall plan for safety and phasing of a construction project developed by the airport operator, or developed by the airport operator's consultant and approved by the airport operator. It is included in the invitation for bids and becomes part of the project specifications.

10-19 DRAINAGE SYSTEM. The system of pipes, ditches, and structures by which surface or subsurface waters are collected and conducted from the airport area.

10-20 ARCHITECT. The individual, partnership, firm, or corporation duly authorized by the Owner to be responsible for engineering observation or inspection of the Contract work and acting directly or through an authorized representative.

10-21 EQUIPMENT. All machinery, together with the necessary supplies for upkeep and maintenance, and also all tools and apparatus necessary for the proper construction and acceptable completion of the work.

10-22 EXTRA WORK. An item of work not provided for in the awarded Contract as previously modified by change order or supplemental agreement, but which is found by the Architect to be necessary to complete the work within the intended scope of the Contract as previously modified.

10-23 FAA. The Federal Aviation Administration of the U.S. Department of Transportation. When used to designate a person, FAA shall mean the Administrator or his/her duly authorized representative.

10-24 FEDERAL SPECIFICATIONS. The Federal Specifications and Standards, and supplements, amendments and indices thereto are prepared and issued by the General Services Administration of the Federal Government.

10-25 FORCE ACCOUNT. Force account construction work is construction that is accomplished through the use of material, equipment, labor, and supervision provided by the Owner or by another public agency pursuant to an agreement with the Owner.

10-26 INSPECTOR. An authorized representative of the Architect or Owner assigned to make all necessary inspections, observations and/or tests and observation of tests of the work performed or being performed, or of the materials furnished or being furnished by the CMAR.

10-27 INTENTION OF TERMS. Whenever, in these specifications or on the plans, the words "directed", "required", "permitted", "ordered", "designated", "prescribed", or words of the like import are used, it shall be understood that the direction, requirement, permission, order, designation, or prescription of the Architect is intended; and similarly, the words "approved", "acceptable", "satisfactory", or words of like import, shall mean approved by, or acceptable to, or satisfactory to the Architect, subject in each case to the final determination of the Owner.

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.

10-28 LABORATORY. The official testing laboratories of the Owner or other laboratories as may be designated by the Architect. Also referred to as "Architect's Laboratory" or "Quality Assurance laboratory".

10-29 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.

10-30 MAJOR AND MINOR CONTRACT ITEMS. A major Contract item shall be any item that is listed in the proposal, the total cost of which is equal to or greater than 20.0% (twenty percent) of the total amount of the original awarded Contract. All other items shall be considered minor Contract items.

10-31 MATERIALS. Any substance specified for use in the construction of the Contract work.

10-32 NOTICE TO PROCEED. A written notice to the CMAR to begin the actual Contract work on a previously agreed to date. If applicable, the Notice to Proceed shall state the date on which the Contract time begins.

10-33 OWNER. The term Owner shall mean the party of the first part or the Contracting agency signatory to the Contract. The Owner is the Phoenix-Mesa Gateway Airport Authority, C/O Mr. Bob Draper, PE, Engineering and Facilities Director, or authorized Representative, Phoenix-Mesa Gateway Airport, 5835 South Sossaman Road, Mesa, AZ, 85212, telephone 480.988.7705, Facsimile 480.988.2315.

10-34 PASSENGER FACILITY CHARGE (PFC). Per 14 CFR Part 158 and 49 USC § 40117, a PFC is a charge imposed by a public agency on passengers enplaned at a commercial service airport it controls.”

10-35 PAVEMENT. The combined surface course, base course, and subbase course, if any, considered as a single unit.

10-36 PAYMENT BOND. The approved form of security furnished by the CMAR and his/her surety as a guaranty that he will pay in full all bills and accounts for materials and labor used in the construction of the work.

10-37 PERFORMANCE BOND. The approved form of security furnished by the CMAR and his/her surety as a guaranty that the CMAR will complete the work in accordance with the terms of the Contract.

10-38 PLANS. The official drawings or exact reproductions which show the location, character, dimensions and details of the airport and the work to be done and which are to be considered as a part of the Contract, supplementary to the specifications.

10-39 PROJECT. The agreed scope of work for accomplishing specific airport development with respect to a particular airport.

10-40 PROPOSAL. The written offer of the offeror (when submitted on the approved proposal form) to perform the contemplated work and furnish the necessary materials in accordance with the provisions of the plans and specifications.

10-41 RUNWAY. The area on the airport prepared for the landing and takeoff of aircraft.

10-42 SPECIFICATIONS. A part of the Contract containing the written directions and requirements for completing the Contract work. Standards for specifying materials or testing which are cited in the Contract specifications by reference shall have the same force and effect as if included in the Contract physically.

10-43 Sponsor. A Sponsor is defined in 49 USC § 47102(24) as a public agency that submits to the FAA for an AIP grant; or a private Owner of a public-use airport that submits to the FAA an application for an AIP grant for the airport.

10-44 STRUCTURES. Airport facilities such as bridges; culverts; catch basins, inlets, retaining walls, cribbing; storm and sanitary sewer lines; water lines; underdrains; electrical ducts, manholes, handholes, lighting fixtures and bases; transformers; flexible and rigid pavements; navigational aids;

buildings; vaults; and, other manmade features of the airport that may be encountered in the work and not otherwise classified herein.

10-45 SUBGRADE. The soil which forms the pavement foundation.

10-46 SUPERINTENDENT. The CMAR's executive representative who is present on the work during progress, authorized to receive and fulfill instructions from the Architect, and who shall supervise and direct the construction.

10-47 SUPPLEMENTAL AGREEMENT. A written agreement between the CMAR and the Owner covering: (1) work that would increase or decrease the total amount of the awarded Contract, or any major Contract item, by more than 25 percent, such increased or decreased work being within the scope of the originally awarded Contract; or (2) work that is not within the scope of the originally awarded Contract.

10-48 SURETY. The corporation, partnership, or individual, other than the CMAR, executing payment or performance bonds that are furnished to the Owner by the CMAR.

10-49 TAXIWAY. For the purpose of this document, the term taxiway means the portion of the air operations area of an airport that has been designated by competent airport authority for movement of aircraft to and from the airport's runways or aircraft parking areas.

10-50 TECHNICAL SPECIFICATIONS. The Technical Specifications contain written directions and requirements for completing the Contract work. Standards for specifying materials or testing which are cited in the Technical Specifications or in other areas of the Contract, by reference, shall have the same force and effect as if included in the Contract physically.

10-51 WORK. The furnishing of all labor, materials, tools, equipment, and incidentals necessary or convenient to the CMAR's performance of all duties and obligations imposed by the Contract, plans, and specifications.

10-52 WORKING DAY. A working day shall be any day other than a legal holiday, Saturday, or Sunday on which the normal working forces of the CMAR may proceed with regular work for at least 6 hours toward completion of the contract. When work is suspended for causes beyond the CMAR's control, Saturdays, Sundays and holidays on which the CMAR's forces engage in regular work, requiring the presence of an inspector, will be considered as working days.

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GENERAL PROVISIONS

SECTION 20

PROPOSAL REQUIREMENTS AND CONDITIONS

20-01 ADVERTISEMENT (Notice of Request for Qualifications).

The Owner has published the advertisement at such places and at such times as are required by local law or ordinances. The published advertisement states the time and place for submitting sealed Statements of Qualifications (SOQ); a description of the proposed work; instructions to offerors as to obtaining plans, and specifications;; and the Owner's right to reject any and all Statements of Qualification.

20-02 INTERPRETATION OF ESTIMATED PROPOSAL QUANTITIES.

An estimate of quantities of work to be done and materials to be furnished under these specifications is given in the proposal. It is the result of careful calculations and has typically been rounded up from the theoretical value calculated. It is given only as a basis for comparison of proposals and the award of the Contract. The Owner does not expressly or by implication agree that the actual quantities involved will correspond exactly therewith; nor shall the offeror plead misunderstanding or deception because of such estimates of quantities, or of the character, location, or other conditions pertaining to the work. Payment to the CMAR will be made only for the actual quantities of work performed or materials furnished in accordance with the plans and specifications. It is understood that the quantities may be increased or decreased as hereinafter provided in the subsection 40-02 titled ALTERATION OF WORK AND QUANTITIES of Section 40 without in any way invalidating the unit bid prices.

20-03 EXAMINATION OF PLANS, SPECIFICATIONS, AND SITE.

The offeror is expected to carefully examine the site of the proposed work, the proposal, plans specifications, and Contract forms, refer to Article 3.1.2 *Examination of the Site* of the *General Conditions*. He shall satisfy himself as to the character, quality, dimension, and quantities of work to be performed, materials to be furnished, and as to the requirements of the proposed Contract. The submission of a proposal shall be prima facie evidence that the offeror has made such examination and is satisfied as to the conditions to be encountered in performing the work and as to the requirements of the proposed Contract, plans, and specifications.

Boring logs and other records of subsurface investigations and tests are available for inspection of offerors. It is understood and agreed that such subsurface information, whether included in the plans, specifications, or otherwise made available to the offeror, was obtained and is intended for the Owner's design and estimating purposes only. Such information has been made available for the convenience of all offerors. It is further understood and agreed that each offeror is solely responsible for all assumptions, deductions, or conclusions which he may make or obtain from his/her examination of the boring logs and other records of subsurface investigations and tests that are furnished by the Owner.

END OF SECTION 20

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GENERAL PROVISIONS

SECTION 30

SCOPE OF WORK

30-01 INTENT OF CONTRACT.

The intent of the Contract is to provide for construction and completion, in every detail, of the work described. It is further intended that the CMAR shall furnish all labor, materials, equipment, tools, transportation, and supplies required to complete the work in accordance with the plans, specifications, and terms of the Contract.

30-02 ALTERATION OF WORK AND QUANTITIES.

The Owner reserves and shall have the right to make such alterations including additions and deletions in the work as may be necessary or desirable to complete the work originally intended in an acceptable manner. Unless otherwise specified herein, the Architect shall be and is hereby authorized to make such alterations in the work as may increase or decrease the originally awarded Contract quantities, provided that the aggregate of such alterations does not change the total Contract cost or the total cost of any major Contract item by more than 25% (percent) (total cost being based on the unit prices and estimated quantities in the awarded Contract). Alterations that do not exceed the 25% (percent) limitation shall not invalidate the Contract nor release the surety, and the CMAR agrees to accept payment for such alterations as if the altered work had been a part of the original Contract. "Change Orders" issued by the Architect shall cover these alterations that are for work within the general scope of the Contract. Change orders for altered work shall include extensions of Contract time where, in the Architect's opinion, such extensions are commensurate with the amount and difficulty of added work.

Should the aggregate amount of altered work exceed the 25% (percent) limitation herein before specified, such excess altered work shall be covered by supplemental agreement. If the Owner and the CMAR are unable to agree on a unit adjustment for any Contract item that requires a supplemental agreement, the Owner reserves the right to terminate the Contract with respect to the item and make other arrangements for its completion.

Supplemental agreements shall be approved by the FAA and shall include all applicable Federal contract provisions for procurement and contracting required under AIP. Supplemental agreements shall also require consent of the CMAR's surety and separate performance and payment bonds.

30-03 OMITTED ITEMS.

The Architect may, in the Owner's best interest, omit from the work any Contract item, except major Contract items. Major Contract items may be omitted by a supplemental agreement. Such omission of Contract items shall not invalidate any other Contract provision or requirement.

Should a Contract item be omitted or otherwise ordered to be non-performed, the CMAR shall be paid for all work performed toward completion of such item prior to the date of the order to omit such item. Payment for work performed shall be in accordance with the subsection 90-04 titled PAYMENT FOR OMITTED ITEMS of Section 90.

30-04 MAINTENANCE OF TRAFFIC.

It is the explicit intention of the Contract that the safety of aircraft, as well as the CMAR's equipment and personnel, is the most important consideration.

- a. It is understood and agreed that the CMAR shall provide for the free and unobstructed movement of aircraft in the air operations areas (AOAs) of the airport with respect to his/her own operations and the operations of all his/her subcontractors as specified in the subsection 80-04 titled LIMITATION OF OPERATIONS of Section 80. It is further understood and agreed that the CMAR shall provide for the uninterrupted operation of visual and electronic signals (including power supplies thereto) used in the guidance of aircraft while operating to, from, and upon the airport as specified in the subsection 70-15 titled CMAR'S RESPONSIBILITY FOR UTILITY SERVICE AND FACILITIES OF OTHERS in Section 70.
- b. With respect to his/her own operations and the operations of all his/her subcontractors, the CMAR 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, or maintenance vehicles at the airport.
- c. When the Contract requires the maintenance of vehicular traffic on an existing road, street, or highway during the CMAR's performance of work that is otherwise provided for in the Contract, plans, and specifications, the CMAR shall keep such road, street, or highway open to all traffic and shall provide such maintenance as may be required to accommodate traffic. The CMAR shall furnish, erect, and maintain barricades, warning signs, flagmen, and other traffic control devices in reasonable conformity with the Manual on Uniform Traffic Control Devices (MUTCD) (<http://mutcd.fhwa.dot.gov/>), unless otherwise specified. The CMAR shall also construct and maintain in a safe condition any temporary connections necessary for ingress to and egress from abutting property or intersecting roads, streets or highways.

30-05 REMOVAL OF EXISTING STRUCTURES.

All existing structures encountered within the established lines, grades, or grading sections shall be removed by the CMAR, unless such existing structures are otherwise specified to be relocated, adjusted up or down, salvaged, abandoned in place, reused in the work or to remain in place. The cost of removing such existing structures shall not be measured or paid for directly, but shall be included in the various Contract items.

Should the CMAR encounter an existing structure (above or below ground) in the work for which the disposition is not indicated on the plans, the Architect shall be notified prior to disturbing such structure. The Architect in accordance with the provisions of the Contract shall immediately determine the disposition of existing structures so encountered.

Except as provided in the subsection 40-07 titled RIGHTS IN AND USE OF MATERIALS FOUND IN THE WORK of this Section, it is intended that all existing materials or structures that may be encountered (within the lines, grades, or grading sections established for completion of the work) shall be utilized in the work as otherwise provided for in the Contract and shall remain the property of the Owner when so used in the work.

30-06 RIGHTS IN AND USE OF MATERIALS FOUND IN THE WORK.

Should the CMAR encounter any material such as (but not restricted to) sand, stone, gravel, slag, or concrete slabs within the established lines, grades, or grading sections, the use of which is intended by the terms of the Contract to be either embankment or waste, the CMAR may at his/her option either:

- a. Use such material in another Contract item, provided such use is approved by the Architect and is in conformance with the Contract specifications applicable to such use; or,
- b. Remove such material from the site, upon written approval of the Architect; or
- c. Use such material for his/her own temporary construction on site, or
- d. Use such material as intended by the terms of the Contract.

Should the CMAR wish to exercise option a., b., or c., he shall request the Architect's approval in advance of such use.

Should the Architect approve the CMAR's request to exercise option a., b., or c., the CMAR shall be paid for the excavation or removal of such material at the applicable Contract price. The CMAR shall replace, at his/her own expense, such removed or excavated material with an agreed equal volume of material that is acceptable for use in constructing embankment, backfills, or otherwise to the extent that such replacement material is needed to complete the Contract work. The CMAR shall not be charged for his/her use of such material so used in the work or removed from the site.

Should the Architect approve the CMAR's exercise of option a., the CMAR shall be paid, at the applicable Contract price, for furnishing and installing such material in accordance with requirements of the Contract item in which the material is used.

It is understood and agreed that the CMAR shall make no claim for delays by reason of his/her exercise of option a., b., or c.

The CMAR shall not excavate, remove, or otherwise disturb any material, structure, or part of a structure which is located outside the lines, grades, or grading sections established for the work, except where such excavation or removal is provided for in the Contract, plans, or specifications.

30-07 FINAL CLEANING UP.

Upon completion of the work and before acceptance and final payment will be made, the CMAR shall remove from the site all machinery, equipment, surplus and discarded materials, rubbish,

temporary structures, and stumps or portions of trees. The CMAR shall cut all brush and woods within the limits indicated and shall leave the site in a neat and presentable condition. Material cleared from the site and deposited on adjacent property will not be considered as having been disposed of satisfactorily, unless the CMAR has obtained the written permission of such property Owner.

END OF SECTION 30

GENERAL PROVISIONS

SECTION 40

CONTROL OF WORK

40-01 AUTHORITY OF THE ARCHITECT.

The Architect shall decide any and all questions that may arise as to the quality and acceptability of materials furnished, work performed, and as to the manner of performance and rate of progress of the work. The Architect shall decide all questions that may arise as to the interpretation of the specifications or plans relating to the work. The Architect shall determine the amount and quality of the several kinds of work performed and materials furnished that are to be paid for under the Contract.

40-02 CONFORMITY WITH PLANS AND SPECIFICATIONS.

All work and all materials furnished shall be in reasonably close conformity with the lines, grades, grading sections, cross sections, dimensions, material requirements, and testing requirements that are specified (including specified tolerances) in the Contract, plans or specifications.

If the Architect finds the materials furnished, work performed, or the finished product not within reasonably close conformity with the plans and specifications but that the portion of the work affected will, in his/her opinion, result in a finished product having a level of safety, economy, durability, and workmanship acceptable to the Owner, the Architect will advise the Owner of his/her determination that the affected work be accepted and remain in place. In this event, the Architect will document his/her determination and recommend to the Owner a basis of acceptance that will provide for an adjustment in the Contract price for the affected portion of the work. The Architect's determination and recommended Contract price adjustments will be based on sound engineering judgment and such tests or retests of the affected work as are, in the Architect's opinion, needed. Changes in the Contract price shall be covered by Contract change order or supplemental agreement as applicable.

If the Architect finds the materials furnished, work performed, or the finished product are not in reasonably close conformity with the plans and specifications and have resulted in an unacceptable finished product, the affected work or materials shall be removed and replaced or otherwise corrected by, and at the expense of, the CMAR in accordance with the Architect's written orders.

For the purpose of this subsection, the term "reasonably close conformity" shall not be construed as waiving the CMAR's responsibility to complete the work in accordance with the Contract Documents, plans, and specifications. The term shall not be construed as waiving the Architect's right to insist on strict compliance with the requirements of the Contract, plans, and specifications during the CMAR's execution of the work, when, in the Architect's opinion, such compliance is essential to provide an acceptable finished portion of the work.

For the purpose of this subsection, the term "reasonably close conformity" is also intended to provide the Architect with the authority to use good engineering judgment in his/her

determinations as to acceptance of work that is not in strict conformity but will provide a finished product equal to or better than that intended by the requirements of the Contract, plans and specifications.

The Architect will not be responsible for the CMAR's means, methods, techniques, sequences, or procedures of construction or the safety precautions incidental thereto.

40-03 COORDINATION OF CONTRACT, PLANS AND SPECIFICATIONS.

The Contract, Plans, Specifications, and all referenced standards cited are essential parts of the Contract requirements. A requirement occurring in one is as binding as though occurring in all. They are intended to be complementary and to describe and provide for a complete work. In case of discrepancy, calculated dimensions will govern over scaled dimensions; Contract technical specifications shall govern over Contract general provisions, plans, cited standards for materials or testing, and cited advisory circulars (ACs); Contract general provisions shall govern over plans, cited standards for materials or testing, and cited ACs; plans shall govern over cited standards for materials or testing and cited ACs. If any paragraphs contained in the Special Provisions conflict with General Provisions or Technical Specifications, the Special Provisions shall govern.

From time to time, discrepancies within cited testing standards occur due to the timing of the change, edits, and/or replacement of the standards. If the CMAR discovers any apparent discrepancy within standard test methods, the CMAR shall immediately ask the Architect for an interpretation and decision, and such decision shall be final.

In case of a discrepancy between the Plans and the Specifications, the following is the precedence:

1. General Conditions to the Construction Contract.
2. Special Provisions.
3. Technical Specifications.
4. General Provisions.
5. Plans/Drawings.
6. City of Mesa Supplements to the MAG Specifications and Details.
7. MAG Uniform Standard Specifications and Details.

40-04 COOPERATION OF CMAR.

The CMAR will be supplied with three (3) copies each of the plans and specifications. He shall have available on the work at all times one (1) copy each of the plans and specifications. Additional copies of plans and specifications may be obtained by the CMAR for the cost of reproduction.

The CMAR shall give constant attention to the work to facilitate the progress thereof, and he shall cooperate with the Architect and his/her inspectors and with other contractors in every way possible. The Architect shall allocate the work and designate the sequence of construction in case of controversy between contractors. The CMAR shall have a competent superintendent on the work at all times who is fully authorized as his/her agent on the work. The superintendent shall be capable of reading and thoroughly understanding the plans and specifications and shall receive and fulfill instructions from the Architect or his/her authorized representative.

40-05 COOPERATION BETWEEN CONTRACTORS.

The Owner reserves the right to contract for and perform other or additional work on or near the work covered by this Contract.

When separate contracts are let within the limits of any one (1) project, each CMAR shall conduct his/her work so as not to interfere with or hinder the progress of completion of the work being performed by other contractors. Contractors working on the same project shall cooperate with each other as directed by the Architect.

Each Contractor involved shall assume all liability, financial or otherwise, in connection with his/her contract and shall protect and save harmless the Owner and Architect from any and all damages or claims that may arise because of inconvenience, delays, or loss experienced by him because of the presence and operations of other contractors working within the limits of the same project.

The CMAR shall arrange his/her work and shall place and dispose of the materials being used so as not to interfere with the operations of the other contractors within the limits of the same project. He shall join his/her work with that of the others in an acceptable manner and shall perform it in proper sequence to that of the others.

40-06 CONSTRUCTION LAYOUT AND STAKES.

The Architect shall establish horizontal and vertical control only. The CMAR must establish all layout required for the construction of the work. Such stakes and markings as the Architect may set for either their own or the CMAR's guidance shall be preserved by the CMAR. In case of negligence on the part of the CMAR, or their employees, resulting in the destruction of such stakes or markings, an amount equal to the cost of replacing the same may be deducted from subsequent estimates due the CMAR at the discretion of the Architect.

The CMAR will be required to furnish all lines, grades and measurements from the control points necessary for the proper execution and control of the work contracted for under these specifications.

The CMAR must give copies of survey notes to the Architect for each area of construction and for each placement of material as specified to allow the Architect to make periodic checks for conformance with plan grades, alignments and grade tolerances required by the applicable material specifications. All surveys must be provided to the Architect prior to commencing work items that will cover or disturb the survey staking as set by the CMAR's surveyor. Survey(s) and notes shall be provided in the following format(s): Comma Separated values (CSV) and hard copies. In the case of error, on the part of the CMAR, their surveyor, employees or subcontractors, resulting in established grades, alignment or grade tolerances that do not concur with those specified or shown on the plans, the CMAR is solely responsible for correction, removal, replacement and all associated costs at no additional cost to the Owner.

Construction Staking and Layout includes but is not limited to:

- a. Clearing and Grubbing perimeter staking

- b. Rough Grade slope stakes at 100-foot stations**
- c. Drainage Swales slope stakes and flow line blue tops at 50-foot stations**

Subgrade blue tops at 25-foot stations and 25-foot offset distance (maximum) for the following section locations:

- a. Runway – minimum five (5) per station**
- b. Taxiways – minimum three (3) per station**
- c. Holding apron areas – minimum three (3) per station**
- d. Roadways – minimum three (3) per station**

Base Course blue tops at 25-foot stations and 25-foot offset distance (maximum) for the following section locations:

- a. Runway – minimum five (5) per station**
- b. Taxiways – minimum three (3) per station**
- c. Holding apron areas – minimum three (3) per station**

Pavement areas:

- a. Edge of Pavement hubs and tacks (for stringline by CMAR) at 100-foot stations.**
- b. Between Lifts at 25-foot stations for the following section locations:**
 - (1) Runways – each paving lane width**
 - (2) Taxiways – each paving lane width**
 - (3) Holding areas – each paving lane width**
- c. After finish paving operations at 50-foot stations:**
 - (1) All paved areas – Edge of each paving lane prior to next paving lot**
- d. Shoulder and safety area blue tops at 50-foot stations and at all break points with maximum of 50-foot offsets.**
- e. Fence lines at 100-foot stations minimum.**
- f. Electrical and Communications System locations, lines and grades including but not limited to duct runs, connections, fixtures, signs, lights, Visual Approach Slope Indicators (VASIs), Precision Approach Path Indicators (PAPIs), Runway End Identifier Lighting (REIL), Wind Cones, Distance Markers (signs), pull boxes and manholes.**
- g. Drain lines, cut stakes and alignment on 25-foot stations, inlet and manholes.**

h. Painting and Striping layout (pinned with 1.5-inch PK nails) marked for paint CMAR. (All nails shall be removed after painting).

i. Laser, or other automatic control devices, shall be checked with temporary control point or grade hub at a minimum of once per 400 feet per pass (that is, paving lane).

The establishment of Survey Control and/or reestablishment of survey control shall be by a State Licensed Land Surveyor.

Controls and stakes disturbed or suspect of having been disturbed shall be checked and/or reset as directed by the Architect without additional cost to the Owner.

40-07 AUTOMATICALLY CONTROLLED EQUIPMENT.

Whenever batching or mixing plant equipment is required to be operated automatically under the Contract and a breakdown or malfunction of the automatic controls occurs, the equipment may be operated manually or by other methods for a period 48 hours following the breakdown or malfunction, provided this method of operations will produce results which conform to all other requirements of the Contract.

40-08 AUTHORITY AND DUTIES OF INSPECTORS.

Inspectors employed by the Architect or Owner shall be authorized to inspect all work done and all material furnished. Such inspection may extend to all or any part of the work and to the preparation, fabrication, or manufacture of the materials to be used. Inspectors are not authorized to revoke, alter, or waive any provision of the Contract, or enter into Change Orders or modifications of payment clauses. Inspectors are not authorized to issue instructions contrary to the plans and specifications or to act as foreman for the CMAR.

Inspectors employed by the Architect or Owner are authorized to notify the CMAR or his/her representatives of any failure of the work or materials to conform to the requirements of the Contract, plans, or specifications and to reject such nonconforming materials in question until such issues can be referred to the Architect for his/her decision.

40-09 INSPECTION OF THE WORK.

All materials and each part or detail of the work shall be subject to inspection by the Architect. The Architect shall be allowed access to all parts of the work and shall be furnished with such information and assistance by the CMAR as is required to make a complete and detailed inspection.

If the Architect requests it, the CMAR, at any time before acceptance of the work, shall remove or uncover such portions of the finished work as may be directed. After examination, the CMAR shall restore said portions of the work to the standard required by the specifications. Should the work thus exposed or examined prove acceptable, the uncovering, or removing, and the replacing of the covering or making good of the parts removed will be paid for as extra work; but should the work so exposed or examined prove unacceptable, the uncovering, or removing, and the replacing of the covering or making good of the parts removed will be at the CMAR's expense.

Any work done or materials used without supervision or inspection by an authorized representative of the Owner may be ordered removed and replaced at the CMAR's expense unless the Owner's representative failed to inspect after having been given reasonable notice in writing that the work was to be performed.

Should the Contract work include relocation, adjustment, or any other modification to existing facilities, not the property of the (Contract) Owner, authorized representatives of the Owners of such facilities shall have the right to inspect such work. Such inspection shall in no sense make any facility Owner a party to the Contract, and shall in no way interfere with the rights of the parties to this Contract.

40-10 REMOVAL OF UNACCEPTABLE AND UNAUTHORIZED WORK.

All work, which does not conform to the requirements of the Contract, plans, and specifications, will be considered unacceptable, unless otherwise determined acceptable by the Architect as provided in the subsection 50-02 titled CONFORMITY WITH PLANS AND SPECIFICATIONS of this Section.

Unacceptable work, whether the result of poor workmanship, use of defective materials, damage through carelessness, or any other cause found to exist prior to the final acceptance of the work, shall be removed immediately and replaced in an acceptable manner in accordance with the provisions of the subsection 70-14 titled CMAR'S RESPONSIBILITY FOR WORK of Section 70.

No removal work made under provision of this subsection shall be done without lines and grades having been established by the Architect.

Work done contrary to the instructions of the Architect, work done beyond the lines shown on the plans or as given, except as herein specified, or any extra work done without authority, will be considered as unauthorized and will not be paid for under the provisions of the Contract. Work so done may be ordered removed or replaced at the CMAR's expense.

Upon failure on the part of the CMAR to comply forthwith with any order of the Architect made under the provisions of this subsection, the Architect will have authority to cause unacceptable work to be remedied or removed and replaced and unauthorized work to be removed and to deduct the costs incurred by the Owner from any monies due or to become due the CMAR.

40-11 LOAD RESTRICTIONS.

The CMAR shall comply with all legal load restrictions in the hauling of materials on public roads beyond the limits of the work. A special permit will not relieve the CMAR of liability for damage that may result from the moving of material or equipment.

The operation of equipment of such weight or so loaded as to cause damage to structures or to any other type of construction will not be permitted. Hauling of materials over the base course or surface course under construction shall be limited as directed. No loads will be permitted on a concrete pavement, base, or structure before the expiration of the curing period. The CMAR shall be responsible for all damage done by his/her hauling equipment and shall correct such damage at his/her own expense.

40-12 MAINTENANCE DURING CONSTRUCTION.

The CMAR shall maintain the work during construction and until the work is accepted. This maintenance shall constitute continuous and effective work prosecuted day by day, with adequate equipment and forces so that the work is maintained in satisfactory condition at all times.

In the case of a Contract for the placing of a course upon a course or subgrade previously constructed, the CMAR shall maintain the previous course or subgrade during all construction operations.

All costs of maintenance work during construction and before the project is accepted shall be included in the unit prices given on the various Contract items in the GMP, and the CMAR will not be paid an additional amount for such work.

40-13 FAILURE TO MAINTAIN THE WORK.

Should the CMAR at any time fail to maintain the work as provided in the subsection 50-12 titled MAINTENANCE DURING CONSTRUCTION of this section, the Architect shall immediately notify the CMAR of such noncompliance. Such notification shall specify a reasonable time within which the CMAR shall be required to remedy such unsatisfactory maintenance condition. The time specified will give due consideration to the exigency that exists.

Should the CMAR fail to respond to the Architect's notification, the Owner may suspend any work necessary for the Owner to correct such unsatisfactory maintenance condition, depending on the exigency that exists. Any maintenance cost incurred by the Owner, shall be deducted from monies due or to become due the CMAR. The CMAR shall not be entitled to any time extension or additional compensation for any delay due to the Owner suspending the work necessary for the Owner to correct the unsatisfactory maintenance conditions.

40-14 PARTIAL ACCEPTANCE.

If at any time during the execution of the project the CMAR substantially completes a usable unit or portion of the work, the occupancy of which will benefit the Owner, he may request the Architect to make final inspection of that unit. If the Architect finds upon inspection that the unit has been satisfactorily completed in compliance with the contract, he may accept it as being completed, and the CMAR may be relieved of further responsibility for that unit. Such partial acceptance and beneficial occupancy by the Owner shall not void or alter any provision of the contract.

40-15 FINAL ACCEPTANCE.

Upon due notice from the CMAR of presumptive completion of the entire project, the Architect and Owner will make an inspection. If all construction provided for and contemplated by the contract is found to be complete in accordance with the contract, plans, and specifications, such inspection shall constitute the final inspection. The Architect shall notify the CMAR in writing of final acceptance as of the date of the final inspection.

If, however, the inspection discloses any work, in whole or in part, as being unsatisfactory, the Architect will give the CMAR the necessary instructions for correction of same and the CMAR shall immediately comply with and execute such instructions. Upon correction of the work, another inspection will be made which shall constitute the final inspection, provided the work has been satisfactorily completed. In such event, the Architect will make the final acceptance and notify the CMAR in writing of this acceptance as of the date of final inspection.

See General Conditions Section 9.9 - *Final Completion and Final Payment*.

40-16 CLAIMS FOR ADJUSTMENT AND DISPUTES.

If for any reason the CMAR deems that additional compensation is due for work or materials not clearly provided for in the contract, plans, or specifications or previously authorized as extra work, the CMAR shall notify the Architect in writing of his or her intention to claim such additional compensation before the CMAR begins the work on which the CMAR bases the claim. If such notification is not given or the Architect is not afforded proper opportunity by the CMAR for keeping strict account of actual cost as required, then the CMAR hereby agrees to waive any claim for such additional compensation. Such notice by the CMAR and the fact that the Architect has kept account of the cost of the work shall not in any way be construed as proving or substantiating the validity of the claim. When the work on which the claim for additional compensation is based has been completed, the CMAR shall, within 10 calendar days, submit a written claim to the Architect who will present it to the Owner for consideration in accordance with local laws or ordinances.

Nothing in this subsection shall be construed as a waiver of the CMAR's right to dispute final payment based on differences in measurements or computations.

END OF SECTION 40

GENERAL PROVISIONS

SECTION 50

CONTROL OF MATERIALS

50-01 SOURCE OF SUPPLY AND QUALITY REQUIREMENTS.

The materials used on the work shall conform to the requirements of the Contract, plans, and specifications. Unless otherwise specified, such materials that are manufactured or processed shall be new (as compared to used or reprocessed).

In order to expedite the inspection and testing of materials, the CMAR shall furnish complete statements to the Architect as to the origin, composition, and manufacture of all materials to be used in the work. Such statements shall be furnished promptly after execution of the Contract but, in all cases, prior to delivery of such materials.

At the Architect's option, materials may be approved at the source of supply before delivery is stated. If it is found after trial that sources of supply for previously approved materials do not produce specified products, the CMAR shall furnish materials from other sources.

50-02 SAMPLES, TESTS, AND CITED SPECIFICATIONS.

Unless otherwise designated, all materials used in the work shall be inspected, tested, and approved by the Architect before incorporation in the work. Any work in which untested materials are used without approval or written permission of the Architect shall be performed at the CMAR's risk. Materials found to be unacceptable and unauthorized will not be paid for and, if directed by the Architect, shall be removed at the CMAR's expense.

Unless otherwise designated, quality assurance tests in accordance with the cited standard methods of ASTM, American Association of State Highway and Transportation Officials (AASHTO), Federal Specifications, Commercial Item Descriptions, and all other cited methods, which are current on the date of advertisement for bids, will be made by and at the expense of the Owner.

The testing organizations performing on-site quality assurance field tests shall have copies of all referenced standards on the construction site for use by all technicians and other personnel, including the CMAR's representative at his or her request. Unless otherwise designated, samples for quality assurance will be taken by a qualified representative of the Architect. All materials being used are subject to inspection, test, or rejection at any time prior to or during incorporation into the work. Copies of all tests will be furnished to the CMAR's representative at their request after review and approval of the Architect.

The CMAR shall employ a testing organization to perform all CMAR required Quality Control tests. The CMAR shall submit to the Architect resumes on all testing organizations and individual persons who will be performing the tests. The Architect will determine if such persons are qualified. All the test data shall be reported to the Architect after the results are known. A legible, handwritten copy of all test data shall be given to the Architect daily, along with printed reports, in an approved format, on a weekly basis. After completion of the project, and prior to final payment, the CMAR

shall submit a final report to the Architect showing all test data reports, plus an analysis of all results showing ranges, averages, and corrective action taken on all failing tests.

50-03 CERTIFICATION OF COMPLIANCE.

The Architect may permit the use, prior to sampling and testing, of certain materials or assemblies when accompanied by manufacturer's certificates of compliance stating that such materials or assemblies fully comply with the requirements of the Contract. The certificate shall be an original, and signed by the manufacturer. Each lot of such materials or assemblies delivered to the work must be accompanied by a certificate of compliance in which the lot is clearly identified.

Materials or assemblies used on the basis of certificates of compliance may be sampled and tested at any time and if found not to be in conformity with Contract requirements will be subject to rejection whether in place or not.

The form and distribution of certificates of compliance shall be as approved by the Architect.

When a material or assembly is specified by "brand name or equal" and the CMAR elects to furnish the specified "brand name", the CMAR shall be required to furnish an original, signed, manufacturer's certificate of compliance for each lot of such material or assembly delivered to the work. Such certificate of compliance shall clearly identify each lot delivered and shall certify as to:

- a. Conformance to the specified performance, testing, quality or dimensional requirements; and,
- b. Suitability of the material or assembly for the use intended in the Contract work.

Should the CMAR propose to furnish an "or equal" material or assembly, he shall furnish the original manufacturer's certificates of compliance as herein before described for the specified brand name material or assembly. However, the Architect shall be the sole judge as to whether the proposed "or equal" is suitable for use in the work.

The Architect reserves the right to refuse permission for use of materials or assemblies on the basis of certificates of compliance.

50-04 PLANT INSPECTION.

The Architect or his/her authorized representative may inspect, at its source, any specified material or assembly to be used in the work. Manufacturing plants may be inspected from time to time for the purpose of determining compliance with specified manufacturing methods or materials to be used in the work and to obtain samples required for his/her acceptance of the material or assembly.

Should the Architect conduct plant inspections, the following conditions shall exist:

- a. **Cooperation and Assistance.** The Architect shall have the cooperation and assistance of the CMAR and the producer with whom he has contracted for materials.

b. **Full Entry.** The Architect shall have full entry at all reasonable times to such parts of the plant that concern the manufacture or production of the materials being furnished.

It is understood and agreed that the Owner shall have the right to retest any material that has been tested and approved at the source of supply after it has been delivered to the site. The Architect shall have the right to reject only material which, when re-tested, does not meet the requirements of the Contract, plans, or specifications.

50-05 STORAGE OF MATERIALS.

Materials shall be so stored as to assure the preservation of their quality and fitness for the work. Stored materials, even though approved before storage, may again be inspected prior to their use in the work. Stored materials shall be located so as to facilitate their prompt inspection. The CMAR shall coordinate the storage of all materials with the Architect. Materials to be stored on airport property shall not create an obstruction to air navigation nor shall they interfere with the free and unobstructed movement of aircraft. Unless otherwise shown on the plans, the storage of materials and the location of the CMAR's plant and parked equipment or vehicles shall be as directed by the Architect. Private property shall not be used for storage purposes without written permission of the Owner or lessee of such property. The CMAR shall make all arrangements and bear all expenses for the storage of materials on private property. Upon request, the CMAR shall furnish the Architect a copy of the property owner's permission.

All storage sites on private or airport property shall be restored to their original condition by the CMAR at his/her own expense, except as otherwise agreed to (in writing) by the owner or lessee of the property.

50-06 UNACCEPTABLE MATERIALS.

Any material or assembly that does not conform to the requirements of the Contract, plans, or specifications shall be considered unacceptable and shall be rejected. The CMAR shall remove any rejected material or assembly from the site of the work, unless otherwise instructed by the Architect.

Rejected material or assembly, the defects of which have been corrected by the CMAR, shall not be returned to the site of the work until such time as the Architect has approved its use in the work.

50-07 OWNER-FURNISHED MATERIALS.

The CMAR shall furnish all materials required to complete the work, except those specified herein (if any) to be furnished by the Owner. Owner-furnished materials shall be made available to the CMAR at the location specified.

All costs of handling, transportation from the specified location to the site of work, storage, and installing Owner-furnished materials shall be included in the GMP for the Contract item in which such Owner-furnished material is used.

After any Owner-furnished material has been delivered to the location specified, the CMAR shall be responsible for any demurrage, damage, loss, or other deficiencies that may occur during the

CMAR's handling, storage, or use of such Owner-furnished material. The Owner will deduct from any monies due or to become due the CMAR any cost incurred by the Owner in making good such loss due to the CMAR's handling, storage, or use of Owner-furnished materials.

END OF SECTION 50

GENERAL PROVISIONS

SECTION 60

LEGAL REGULATIONS AND RESPONSIBILITY TO THE PUBLIC

60-01 LAWS TO BE OBSERVED.

The CMAR shall keep fully informed of all Federal and state laws, all local laws, ordinances, and regulations and all orders and decrees of bodies or tribunals having any jurisdiction or authority, which in any manner affect those engaged or employed on the work, or which in any way affect the conduct of the work. CMAR shall at all times observe and comply with all such laws, ordinances, regulations, orders, and decrees; and shall protect and indemnify the Owner and all his/her officers, agents, or servants against any claim or liability arising from or based on the violation of any such law, ordinance, regulation, order, or decree, whether by the CMAR or the CMAR's employees.

60-02 PERMITS, LICENSES AND TAXES.

The CMAR shall procure all permits and licenses, pay all charges, fees, and taxes, and give all notices necessary and incidental to the due and lawful execution of the work.

60-03 PATENTED DEVICES, MATERIALS AND PROCESSES.

If the CMAR is required or desires to use any design, device, material, or process covered by letters of patent or copyright, he shall provide for such use by suitable legal agreement with the patentee or Owner. The CMAR and the surety shall indemnify and save harmless the Owner, any third party, or political subdivision from any and all claims for infringement by reason of the use of any such patented design, device, material or process, or any trademark or copyright, and shall indemnify the Owner for any costs, expenses, and damages which it may be obliged to pay by reason of an infringement, at any time during the execution or after the completion of the work.

60-04 RESTORATION OF SURFACES DISTURBED BY OTHERS.

The Owner reserves the right to authorize the construction, reconstruction, or maintenance of any public or private utility service, FAA or National Oceanic and Atmospheric Administration (NOAA) facility, or a utility service of another government agency at any time during the progress of the work.

CMAR shall not permit any individual, firm, or corporation to excavate or otherwise disturb such utility services or facilities located within the limits of the work without the written permission of the Owner.

Should the Owner of public or private utility service, FAA, or NOAA facility, or a utility service of another government agency be authorized to construct, reconstruct, or maintain such utility service or facility during the progress of the work, the CMAR shall cooperate with such Owners by arranging and performing the work in this Contract so as to facilitate such construction, reconstruction or

maintenance by others whether or not such work by others is listed above. When ordered as extra work by the Architect, the CMAR shall make all necessary repairs to the work which are due to such authorized work by others, unless otherwise provided for in the Contract, plans, or specifications. It is understood and agreed that the CMAR shall not be entitled to make any claim for damages due to such authorized work by others or for any delay to the work resulting from such authorized work.

60-05 SANITARY, HEALTH AND SAFETY PROVISIONS.

The CMAR shall provide and maintain in a neat, sanitary condition such accommodations for the use of his/her employees as may be necessary to comply with the requirements of the state and local Board of Health, OSHA or of other bodies or tribunals having jurisdiction.

Attention is directed to Federal, state, and local laws, rules and regulations concerning construction safety and health standards. The CMAR shall not require any worker to work in surroundings or under conditions that are unsanitary, hazardous, or dangerous to his/her health or safety.

60-06 PUBLIC CONVENIENCE AND SAFETY.

The CMAR shall control his/her operations and those of his/her subcontractors and all suppliers, to assure the least inconvenience to the traveling public. Under all circumstances, safety shall be the most important consideration.

The CMAR shall maintain the free and unobstructed movement of aircraft and vehicular traffic with respect to his/her own operations and those of his/her subcontractors and all suppliers in accordance with the subsection 40-05 titled MAINTENANCE OF TRAFFIC of Section 40 herein before specified and shall limit such operations for the convenience and safety of the traveling public as specified in the subsection 80-04 titled LIMITATION OF OPERATIONS of Section 80 hereinafter.

60-07 BARRICADES, WARNING SIGNS AND HAZARD MARKINGS.

The CMAR shall furnish, erect, and maintain all barricades, warning signs, and markings for hazards necessary to protect the public and the work. When used during periods of darkness, such barricades, warning signs, and hazard markings shall be suitably illuminated. Unless otherwise specified, barricades, warning signs, and markings for hazards that are in the air operations area (AOA) shall be a maximum of 18 inches high. Unless otherwise specified, barricades shall be spaced not more than 4 feet apart. Barricades, warning signs, and markings shall be paid for under subsection 40-05 title MAINTENANCE OF TRAFFIC of Section 40.

For vehicular and pedestrian traffic, the CMAR shall furnish, erect, and maintain barricades, warning signs, lights and other traffic control devices in reasonable conformity with the Manual of Uniform Traffic Control Devices.

When the work requires closing an air operations area of the airport or portion of such area, the CMAR shall furnish, erect, and maintain temporary markings and associated lighting conforming to the requirements of Advisory Circular 150/5340-1, *Standards for Airport Marking*, current version.

The CMAR shall furnish, erect, and maintain markings and associated lighting of open trenches, excavations, temporary stock piles, and his/her parked construction equipment that may be hazardous to the operation of emergency fire-rescue or maintenance vehicles on the airport in reasonable conformance to Advisory Circular 150/5370-2, *Operational Safety on Airports During Construction*. current version.

The CMAR shall identify each motorized vehicle or piece of construction equipment in reasonable conformance to AC 150/5370-2.

The CMAR shall furnish and erect all barricades, warning signs, and markings for hazards prior to commencing work that requires such erection and shall maintain the barricades, warning signs, and markings for hazards until their removal is directed by the Architect.

Open-flame type lights shall not be permitted.

60-08 USE OF EXPLOSIVES.

The use of explosives on or within 1,000 feet of the Airport property is not allowed on this project.

60-09 PROTECTION AND RESTORATION OF PROPERTY AND LANDSCAPE.

The CMAR shall be responsible for the preservation of all public and private property, and shall protect carefully from disturbance or damage all land monuments and property markers until the Architect has witnessed or otherwise referenced their location and shall not move them until directed.

The CMAR shall be responsible for all damage or injury to property of any character, during the execution of the work, resulting from any act, omission, neglect, or misconduct in his/her manner or method of executing the work, or at any time due to defective work or materials, and said responsibility shall not be released until the project has been completed and accepted.

When or where any direct or indirect damage or injury is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the work, or in consequence of the non-execution thereof by the CMAR, he shall restore, at his/her own expense, such property to a condition similar or equal to that existing before such damage or injury was done, by repairing, or otherwise restoring as may be directed, or he shall make good such damage or injury in an acceptable manner.

60-10 RESPONSIBILITY FOR DAMAGE CLAIMS.

The CMAR shall indemnify and save harmless the Architect and the Owner and their officers, and employees from all suits actions, or claims of any character brought because of any injuries or damage received or sustained by any person, persons, or property on account of the operations of the CMAR; or on account of or in consequence of any neglect in safeguarding the work; or through use of unacceptable materials in constructing the work; or because of any act or omission, neglect, or misconduct of said CMAR; or because of any claims or amounts recovered from any infringements of patent, trademark, or copyright; or from any claims or amounts arising or

recovered under the “Workmen's Compensation Act”, or any other law, ordinance, order, or decree. Money due the CMAR under and by virtue of his/her Contract as may be considered necessary by the Owner for such purpose may be retained for the use of the Owner or, in case no money is due, his/her surety may be held until such suit or suits, action or actions, claim or claims for injuries or damages as aforesaid shall have been settled and suitable evidence to that effect furnished to the Owner, except that money due the CMAR will not be withheld when the CMAR produces satisfactory evidence that he is adequately protected by public liability and property damage insurance.

60-11 THIRD PARTY BENEFICIARY CLAUSE.

It is specifically agreed between the parties executing the Contract that it is not intended by any of the provisions of any part of the Contract to create the public or any member thereof a third-party beneficiary or to authorize anyone not a party to the Contract to maintain a suit for personal injuries or property damage pursuant to the terms or provisions of the Contract.

60-12 OPENING SECTIONS OF THE WORK TO TRAFFIC.

Should it be necessary for the CMAR to complete portions of the Contract work for the beneficial occupancy of the Owner prior to completion of the entire Contract, such “phasing” of the work shall be specified herein and indicated on the plans. When so specified, the CMAR shall complete such portions of the work on or before the date specified or as otherwise specified. The CMAR shall make his/her own estimate of the difficulties involved in arranging the work to permit such beneficial occupancy by the Owner.

Upon completion of any portion of the work listed above, such portion shall be partially accepted by the Owner in accordance with the subsection titled PARTIAL ACCEPTANCE of Section 50-14.

No portion of the work may be opened by the CMAR for public use until ordered by the Architect in writing. Should it become necessary to open a portion of the work to public traffic on a temporary or intermittent basis, such openings shall be made when, in the opinion of the Architect, such portion of the work is in an acceptable condition to support the intended traffic. Temporary or intermittent openings are considered to be inherent in the work and shall not constitute either acceptance of the portion of the work so opened or a waiver of any provision of the Contract. Any damage to the portion of the work so opened that is not attributable to traffic which is permitted by the Owner shall be repaired by the CMAR at his/her expense.

The CMAR shall make his/her own estimate of the inherent difficulties involved in completing the work under the conditions herein described and shall not claim any added compensation by reason of delay or increased cost due to opening a portion of the Contract work.

CMAR shall be required to conform to safety standards contained AC 150/5370-2, *Operational Safety on Airports During Construction*, current version (See Special Provisions Section 60).

60-13 CMAR'S RESPONSIBILITY FOR WORK.

Until the Architect's final written acceptance of the entire completed work, excepting only those portions of the work accepted in accordance with the subsection 50-14 titled PARTIAL ACCEPTANCE of Section 50, the CMAR shall have the charge and care thereof and shall take every precaution against injury or damage to any part due to the action of the elements or from any other cause, whether arising from the execution or from the non-execution of the work. The CMAR shall rebuild, repair, restore, and make good all injuries or damages to any portion of the work occasioned by any of the above causes before final acceptance and shall bear the expense thereof except damage to the work due to unforeseeable causes beyond the control of and without the fault or negligence of the CMAR, including but not restricted to acts of God such as earthquake, tidal wave, tornado, hurricane or other cataclysmic phenomenon of nature, or acts of the public enemy or of government authorities.

If the work is suspended for any cause whatever, the CMAR shall be responsible for the work and shall take such precautions necessary to prevent damage to the work. The CMAR shall provide for normal drainage and shall erect necessary temporary structures, signs, or other facilities at his/her expense. During such period of suspension of work, the CMAR shall properly and continuously maintain in an acceptable growing condition all living material in newly established planting, seeding, and sodding furnished under the contract, and shall take adequate precautions to protect new tree growth and other important vegetative growth against injury.

60-14 CMAR'S RESPONSIBILITY FOR UTILITY SERVICE AND FACILITIES OF OTHERS.

As provided in Section 70-04, *RESTORATION OF SURFACES DISTURBED BY OTHERS*, the CMAR shall cooperate with the Owner of any public or private utility service, FAA or NOAA, or a utility service of another government agency that may be authorized by the Owner to construct, reconstruct or maintain such utility services or facilities during the progress of the work. In addition, the CMAR shall control his/her operations to prevent the unscheduled interruption of such utility services and facilities.

To the extent that such public or private utility services, FAA, or NOAA facilities, or utility services of another governmental agency are known to exist within the limits of the contract work, the appropriate locations have been indicated on the plans. Owner contact information has also been indicated on the plans.

It is understood and agreed that the Owner does not guarantee the accuracy or the completeness of the location information relating to existing utility services, facilities, or structures that may be shown on the plans or encountered in the work. Any inaccuracy or omission in such information shall not relieve the CMAR of his/her responsibility to locate and protect such existing features from damage or unscheduled interruption of service.

It is further understood and agreed that the CMAR shall, upon execution of the Contract, notify the Owners of all utility services or other facilities of his/her plan of operations. Such notification shall be in writing addressed to utility owner contact, as provided on the plans. A copy of each notification shall be given to the Owner.

In addition to the general written notification herein before provided, it shall be the responsibility of the CMAR to keep such individual Owners advised of changes in his/her plan of operations that would affect such Owners.

Prior to beginning the work in the general vicinity of an existing utility service or facility, the CMAR shall again notify each such Owner of his/her plan of operation. If, in the CMAR's opinion, the Owner's assistance is needed to locate the utility service or facility or the presence of a representative of the Owner is desirable to observe the work, such advice should be included in the notification. Such notification shall be given by the most expeditious means to reach the utility owner's contact no later than two normal business days prior to the CMAR's commencement of operations in such general vicinity. The CMAR shall furnish a written summary of the notification to the Architect.

The CMAR's failure to give the two days' notice shall be cause for the Owner to suspend the CMAR's operations in the general vicinity of a utility service or facility.

Where the outside limits of an underground utility service have been located and staked on the ground, the CMAR shall be required to use hand excavation methods within 3 feet of such outside limits at such points as may be required to ensure protection from damage due to the CMAR's operations.

Should the CMAR damage or interrupt the operation of a utility service or facility by accident or otherwise, he shall immediately notify the proper authority and the Architect and shall take all reasonable measures to prevent further damage or interruption of service. The CMAR, in such events, shall cooperate with the utility service or facility Owner and the Architect continuously until such damage has been repaired and service restored to the satisfaction of the utility or facility Owner.

The CMAR shall bear all costs of damage and restoration of service to any utility service or facility due to his/her operations whether or not due to negligence or accident. The Owner reserves the right to deduct such costs from any monies due or which may become due the CMAR, or his/her surety.

60-15 FURNISHING RIGHTS-OF-WAY.

The Owner will be responsible for furnishing all rights-of-way upon which the work is to be constructed in advance of the CMAR's operations.

60-16 PERSONAL LIABILITY OF PUBLIC OFFICIALS.

In carrying out any of the Contract provisions or in exercising any power or authority granted to him by this Contract, there shall be no liability upon the Architect, his/her authorized representatives, or any officials of the Owner either personally or as an official of the Owner. It is understood that in such matters they act solely as agents and representatives of the Owner.

60-17 NO WAIVER OF LEGAL RIGHTS.

Upon final completion of the work, the Owner will expeditiously make final inspection and notify the CMAR of final acceptance. Such final acceptance, however, shall not preclude or stop the Owner from correcting any measurement, estimate, or certificate made before or after completion of the work, nor shall the Owner be precluded or stopped from recovering from the CMAR or his/her surety, or both, such overpayment as may be sustained, or by failure on the part of the CMAR to fulfill his/her obligations under the Contract. A waiver on the part of the Owner of any breach of any part of the Contract shall not be held to be a waiver of any other or subsequent breach.

The CMAR, without prejudice to the terms of the Contract, shall be liable to the Owner for latent defects, fraud, or such gross mistakes as may amount to fraud, or as regards the Owner's rights under any warranty or guaranty.

60-18 ENVIRONMENTAL PROTECTION.

The CMAR shall comply with all Federal, state, and local laws and regulations controlling pollution of the environment. The CMAR shall take necessary precautions to prevent pollution of streams, lakes, ponds, and reservoirs with fuels, oils, bitumen, chemicals, or other harmful materials and to prevent pollution of the atmosphere from particulate and gaseous matter.

60-19 ARCHAEOLOGICAL AND HISTORICAL FINDINGS.

Unless otherwise specified in this subsection, the CMAR is advised that the site of the work is not within any property, district, or site, and does not contain any building, structure, or object listed in the current National Register of Historic Places published by the United States Department of Interior. The CMAR is advised that a defined archaeological site may be present within the south portion of the project area.

Should the CMAR encounter, during his or her operations, any building, part of a building, structure, or object that is incongruous with its surroundings, the CMAR shall immediately cease operations in that location and notify the City of Mesa. The City of Mesa will immediately investigate the CMAR's finding and the Owner will direct the CMAR to either resume operations or to suspend operations as directed.

Should the Owner order suspension of the CMAR's operations in order to protect an archaeological or historical finding, or order the CMAR to perform extra work, such shall be covered by an appropriate contract change order or supplemental agreement as provided in the subsection 40-04 titled EXTRA WORK of Section 40 and the subsection 90-05 titled PAYMENT FOR EXTRA WORK of Section 90. If appropriate, the contract change order or supplemental agreement shall include an extension of contract time in accordance with the subsection 80-07 titled DETERMINATION AND EXTENSION OF CONTRACT TIME of Section 80.

END OF SECTION 60

GENERAL PROVISIONS

SECTION 70

EXECUTION AND PROGRESS

70-01 SUBLETTING OF CONTRACT.

The Owner will not recognize any subcontractor on the work. The CMAR shall at all times when work is in progress be represented either in person, by a qualified superintendent, or by other designated, qualified representative who is duly authorized to receive and execute orders of the Architect.

The CMAR shall provide copies of all subcontracts to the Architect.

Should the CMAR elect to assign his/her Contract, said assignment shall be concurred in by the surety, shall be presented for the consideration and approval of the Owner, and shall be consummated only on the written approval of the Owner.

70-02 NOTICE TO PROCEED.

The notice to proceed shall state the date on which it is expected the CMAR will begin the construction and from which date Contract Time will be charged. The CMAR shall begin the work to be performed under the Contract within ten (10) calendar days of the date set by the Architect in the written notice to proceed, but in any event, the CMAR shall notify the Architect at least forty-eight (48) hours in advance of the time actual construction operations will begin. The CMAR shall not commence any actual construction prior to the date on which the notice to proceed is issued by the Owner.

70-03 EXECUTION AND PROGRESS.

Unless otherwise specified, the CMAR shall submit his/her progress schedule for the Architect's approval within ten (10) calendar days after the notice of award. The CMAR's progress schedule, when reviewed by the Architect, may be used to establish major construction operations and to check on the progress of the work. The CMAR shall provide sufficient materials, equipment, and labor to guarantee the completion of the project in accordance with the plans and specifications within the time set forth in the Contract.

If the CMAR falls significantly behind the submitted schedule, the CMAR shall, upon the Architect's request, submit a revised schedule for completion of the work within the Contract time and modify his/her operations to provide such additional materials, equipment, and labor necessary to meet the revised schedule. The Architect may order the CMAR, in writing, at no additional cost to the Owner to accelerate his work. Accelerated work may constitute longer shift hours, and working Saturdays, Sundays and holidays. Should the execution of the work be discontinued for any reason, the CMAR shall notify the Architect at least forty-eight (48) hours in advance of resuming operations.

The CMAR shall not commence any actual construction prior to the date on which the notice to proceed is issued by the Owner.

70-04 CHARACTER OF WORKERS, METHODS AND EQUIPMENT.

The CMAR shall, at all times, employ sufficient labor and equipment for prosecuting the work to full completion in the manner and time required by the Contract, Plans, and Specifications.

All workers shall have sufficient skill and experience to perform properly the work assigned to them. Workers engaged in special work or skilled work shall have sufficient experience in such work and in the operation of the equipment required to perform the work satisfactorily.

Any person employed by the CMAR or by any subcontractor who violates any operational regulations or operational safety requirements and, in the opinion of the Architect, does not perform his work in a proper and skillful manner or is intemperate or disorderly shall, at the written request of the Architect, be removed forthwith by the CMAR or subcontractor employing such person, and shall not be employed again in any portion of the work without approval of the Architect.

Should the CMAR fail to remove such persons or person, or fail to furnish suitable and sufficient personnel for the proper execution of the work, the Owner may suspend the work by written notice until compliance with such orders.

All equipment that is proposed to be used on the work shall be of sufficient size and in such mechanical condition as to meet requirements of the work and to produce a satisfactory quality of work. Equipment used on any portion of the work shall be such that no injury to previously completed work, adjacent property, or existing airport facilities will result from its use.

When the methods and equipment to be used by the CMAR in accomplishing the work are not prescribed in the Contract, the CMAR is free to use any methods or equipment that will accomplish the work in conformity with the requirements of the Contract, plans, and specifications.

When the Contract specifies the use of certain methods and equipment, such methods and equipment shall be used unless others are authorized by the Architect. If the CMAR desires to use a method or type of equipment other than specified in the Contract, he may request authority from the Architect to do so. The request shall be in writing and 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 CMAR will be fully responsible for producing work in conformity with Contract requirements. If, after trial use of the substituted methods or equipment, the Architect determines that the work produced does not meet Contract requirements, the CMAR shall discontinue the use of the substitute method or equipment and shall complete the remaining work with the specified methods and equipment. The CMAR shall remove any deficient work and replace it with work of specified quality, or take such other corrective action as the Architect 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.

70-05 TEMPORARY SUSPENSION OF THE WORK.

The Owner shall have the authority to suspend the work wholly, or in part, for such period or periods as the Owner may deem necessary, due to unsuitable weather, or such other conditions as are considered unfavorable for the execution of the work, or for such time as is necessary due to the failure on the part of the CMAR to carry out orders given or perform any or all provisions of the contract.

In the event that the CMAR is ordered by the Owner, in writing, to suspend work for some unforeseen cause not otherwise provided for in the Contract and over which the CMAR has no control, the CMAR may be reimbursed for actual money expended on the work during the period of shutdown. No allowance will be made for anticipated profits. The period of shutdown shall be computed from the effective date of the Owner's order to suspend work to the effective date of the Owner's order to resume the work. Claims for such compensation shall be filed with the Architect within the time period stated in the Owner's order to resume work. The CMAR shall submit with his/her claim information substantiating the amount shown on the claim. The Architect will forward the CMAR's claim to the Owner for consideration in accordance with local laws or ordinances. No provision of this section shall be construed as entitling the CMAR to compensation for delays due to inclement weather, for suspensions made at the request of the CMAR, or for any other delay provided for in the Contract, Plans, or Specifications.

If it should become necessary to suspend work for an indefinite period, the CMAR shall store all materials in such manner that they will not become an obstruction nor become damaged in any way. The CMAR shall take every precaution to prevent damage or deterioration of the work performed and provide for normal drainage of the work. The CMAR shall erect temporary drainage ditches, channels, and structures where necessary to provide for traffic on, to, or from the Airport.

70-06 DETERMINATION AND EXTENSION OF CONTRACT TIME.

The number of calendar days allowed for completion of the work has been stated in the Construction Contract and shall be known as the Contract time.

Should the Contract time require extension for reasons beyond the CMAR's control, it shall be adjusted as follows:

- a. Contract time based on calendar days shall consist of the number of calendar days stated in the Contract counting from the effective date of the notice to proceed and including all Saturdays, Sundays, holidays, and non-work days. All calendar days elapsing between the effective dates of the Architect's orders to suspend and resume all work, due to causes not the fault of the CMAR, shall be excluded.

At the time of final payment, the Contract time shall be increased in the same proportion as the cost of the actually completed quantities bears to the cost of the originally estimated quantities in the proposal. Such increase in the Contract time shall not consider either cost of work or the extension of Contract time that has been covered by a change order or supplemental agreement. Charges against the Contract time will cease as of the date of final acceptance.

If the CMAR finds it impossible for reasons beyond his or her control to complete the work within the contract time as specified, or as extended in accordance with the provisions of this subsection, the CMAR may, at any time prior to the expiration of the contract time as extended, make a written request to the Owner for an extension of time setting forth the reasons which the CMAR believes will justify the granting of his or her request. Requests for extension of time on calendar day projects, caused by inclement weather, shall be supported with National Weather Bureau data showing the actual amount of inclement weather exceeded what could normally be expected during the contract period. The CMAR's plea that insufficient time was specified is not a valid reason for extension of time. If the supporting documentation justify the work was delayed because of conditions beyond the control and without the fault of the CMAR, the Owner may extend the time for completion by a change order that adjusts the contract time or completion date. The extended time for completion shall then be in full force and effect, the same as though it were the original time for completion.

70-07 FAILURE TO COMPLETE ON TIME.

For each calendar day, as specified in the Contract, that any work remains uncompleted after the Contract time (including all extensions and adjustments as provided in the subsection 80-07 titled *DETERMINATION AND EXTENSION OF CONTRACT TIME* of this Section) the sum specified in the Contract as liquidated damages will be deducted from any money due or to become due the CMAR or his/her surety. Such deducted sums shall not be deducted as a penalty but shall be considered as liquidation of a reasonable portion of damages including but not limited to additional engineering that will be incurred by the Owner should the CMAR fail to complete the work in the time provided in his/her Contract.

The goal of this project is to increase queue and checkpoint throughput and capacity to meet a sharp increase in flights starting in October 2017. PMGA peak travel season is March and April coinciding with the start of MLB Spring Training. This project shall be Finally Complete not later than February 24, 2018. The liquidated damages for any work that remains uncompleted after February 24, 2018 will be \$2,000 per calendar day as specified in the Contract.

Permitting the CMAR to continue and finish the work or any part of it after the time fixed for its completion, or after the date to which the time for completion may have been extended, will in no way operate as a waiver on the part of the Owner of any of its rights under the Contract.

70-08 DEFAULT AND TERMINATION OF CONTRACT.

The CMAR shall be considered in default of his/her Contract and such default will be considered as cause for the Owner to terminate the Contract for any of the following reasons if the CMAR:

- a. Fails to begin the work under the Contract within ten (10) calendar days of the Notice to Proceed, or;
- b. Fails to perform the work or fails to provide sufficient workers, equipment and/or materials to assure completion of work in accordance with the terms of the Contract, or;
- c. Performs the work unsuitably or neglects or refuses to remove materials or to perform anew such work as may be rejected as unacceptable and unsuitable, or;

- d. Discontinues the execution of the work, or;
- e. Fails to resume work which has been discontinued within five (5) calendar days after notice to do so, or;
- f. Becomes insolvent or is declared bankrupt, or commits any act of bankruptcy or insolvency, or;
- g. Allows any final judgment to stand against the CMAR unsatisfied for a period of ten (10) days, or;
- h. Makes an assignment for the benefit of creditors, or;
- i. For any other cause whatsoever, fails to carry on the work in an acceptable manner.

Should the Architect consider the CMAR in default of the Contract for any reason herein before, he shall immediately give written notice to the CMAR and the CMAR's surety as to the reasons for considering the CMAR in default and the Owner's intentions to terminate the Contract.

If the CMAR or surety, within a period of ten (10) calendar days after such notice, does not proceed in accordance therewith, then the Owner will, upon written notification from the Architect of the facts of such delay, neglect, or default and the CMAR's failure to comply with such notice, have full power and authority without violating the Contract, to take the execution of the work out of the hands of the CMAR. The Owner may appropriate or use any or all materials and equipment that have been mobilized for use in the work and are acceptable and may enter into an agreement for the completion of said Contract according to the terms and provisions thereof, or use such other methods as in the opinion of the Architect will be required for the completion of said Contract in an acceptable manner.

All costs and charges incurred by the Owner, together with the cost of completing the work under Contract, will be deducted from any monies due or which may become due the CMAR. If such expense exceeds the sum which would have been payable under the Contract, then the CMAR and the surety shall be liable and shall pay to the Owner the amount of such excess.

70-09 TERMINATION FOR NATIONAL EMERGENCIES.

The Owner shall terminate the Contract or portion thereof by written notice when the CMAR is prevented from proceeding with the construction Contract as a direct result of an Executive Order of the President with respect to the execution of war or in the interest of national defense.

When the Contract, or any portion thereof, is terminated before completion of all items of work in the Contract, payment will be made for the actual number of units or items of work completed at the Contract price or as mutually agreed for items of work partially completed or not started. No claims or loss of anticipated profits shall be considered.

Reimbursement for organization of the work, and other overhead expenses, (when not otherwise included in the Contract) and moving equipment and materials to and from the job will be considered, the intent being that an equitable settlement will be made with the CMAR.

Acceptable materials, obtained or ordered by the CMAR for the work and that are not incorporated in the work shall, at the option of the CMAR, be purchased from the CMAR at actual cost as shown by receipted bills and actual cost records at such points of delivery as may be designated by the Architect.

Termination of the Contract or a portion thereof shall neither relieve the CMAR of his/her responsibilities for the completed work nor shall it relieve his/her surety of its obligation for and concerning any just claim arising out of the work performed.

END OF SECTION 70

GENERAL PROVISIONS

SECTION 80

MEASUREMENT AND PAYMENT

80-01 MEASUREMENT OF QUANTITIES.

All work completed under the Contract will be measured by the Architect, or his/her authorized representatives, using United States Customary Units of Measurement or the International System of Units.

The method of measurement and computations to be used in determination of quantities of material furnished and of work performed under the Contract will be those methods generally recognized as conforming to good engineering practice.

Unless otherwise specified, longitudinal measurements for area computations will be made horizontally, and no deductions will be made for individual fixtures (or leave-outs) having an area of nine (9) square feet or less. Unless otherwise specified, transverse measurements for area computations will be the neat dimensions shown on the plans or ordered in writing by the Architect.

Structures will be measured according to neat lines shown on the plans or as altered to fit field conditions.

Unless otherwise specified, all Contract items that are measured by the linear foot such as electrical ducts, conduits, pipe culverts, slotted drains, and similar items shall be measured parallel to the base or foundation upon which such items are placed.

In computing volumes of excavation the average end area method shall be used.

The thickness of plates and galvanized sheet used in the manufacture of corrugated metal pipe, metal plate pipe culverts and arches, and metal cribbing will be specified and measured in decimal fraction of inch.

The term "ton" will mean the short ton consisting of 2,000 pounds avoirdupois. Competent, qualified personnel at locations designed by the Architect shall weigh all materials that are measured or proportioned by weights on accurate, approved scales. If material is shipped by rail, the car weight may be accepted provided that only the actual weight of material be paid for. However, car weights will not be acceptable for material to be passed through mixing plants. Trucks used to haul material being paid for by weight shall be weighed empty daily at such times as the Architect directs, and each truck shall bear a plainly legible identification mark.

Materials to be measured by volume in the hauling vehicle shall be hauled in approved vehicles and measured therein at the point of delivery. Vehicles for this purpose may be of any size or type acceptable to the Architect, provided that the body is of such shape that the actual contents may be

readily and accurately determined. All vehicles shall be loaded to at least their water level capacity, and all loads shall be leveled when the vehicles arrive at the point of delivery.

When requested by the CMAR and approved by the Architect in writing, material specified to be measured by the cubic yard may be weighed, and such weights will be converted to cubic yards for payment purposes. Factors for conversion from weight measurement to volume measurement will be determined by the Architect and shall be agreed to by the CMAR before such method of measurement of pay quantities is used.

Bituminous materials will be measured by the gallon or ton. When measured by volume, such volumes will be measured at 60° Fahrenheit or will be corrected to the volume at 60° Fahrenheit using ASTM D 1250 for asphalt or ASTM D 633 for tars.

Net certified scale weights or weights based on certified volumes in the case of rail shipments will be used as a basis of measurement, subject to correction when bituminous material has been lost from the car or the distributor, wasted, or otherwise not incorporated in the work.

When bituminous materials are shipped by truck or transport, net certified weights by volume, subject to correction for loss or foaming, may be used for computing quantities.

Cement will be measured by the ton or hundredweight.

The term “lump sum” when used as an item of payment will mean complete payment for the work described in the Contract.

When a complete structure or structural unit (in effect, “lump sum” work) is specified as the unit of measurement, the unit will be construed to include all necessary fittings and accessories.

Rental of equipment will be measured by time in hours of actual working time and necessary traveling time of the equipment within the limits of the work. Special equipment ordered by the Architect in connection with force account work will be measured as agreed in the change order or supplemental agreement authorizing such force account work as provided in the subsection 90-05 titled PAYMENT FOR EXTRA WORK of this Section.

When standard manufactured items are specified such as fence, wire, plates, rolled shapes, pipe conduit, etc., and these items are identified by gage, 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.

Scales for weighing materials which are required to be proportioned or measured and paid for by weight shall be furnished, erected, and maintained by the CMAR, or be certified as permanently installed commercial scales.

Scales shall be accurate within one-half (0.5) percent of the correct weight throughout the range of use. The CMAR shall have the scales checked under the observation of the inspector before beginning work and at such other times as requested. The intervals shall be uniform in spacing throughout the graduated or marked length of the beam or dial and shall not exceed one-tenth of 1

percent (0.10%) of the nominal rated capacity of the scale, but not less than one (1) pound. The use of spring balances will not be permitted.

Beams, dials, platforms, and other scale equipment shall be so arranged that the operator and the inspector can safely and conveniently view them.

Scale installations shall have available ten standard 50-pound weights for testing the weighing equipment or suitable weights and devices for other approved equipment.

Scales must be tested for accuracy and serviced before use at a new site. Platform scales shall be installed and maintained with the platform set level and rigid bulkheads at each end.

Scales “overweighing” (indicating more than correct weight) will not be permitted to operate, and all materials received subsequent to the last previous correct weighting-accuracy test will be reduced by the percentage of error in excess of one-half of 1 percent.

In the event inspection reveals the scales have been “underweighing” (indicating less than correct weight), they shall be adjusted, and no additional payment to the CMAR will be allowed for materials previously weighed and recorded.

All costs in connection with furnishing, installing, certifying, testing, and maintaining scales; for furnishing check weights and scale house; and for all other items specified in this subsection, for the weighing of materials for proportioning or payment, shall be included in the unit Contract prices for the various items of the project.

When the estimated quantities for a specific portion of the work are designated as the pay quantities in the Contract, they shall be the final quantities for which payment for such specific portion of the work will be made, unless the Architect revises the dimensions of said portions of the work shown on the plans. If revised dimensions result in an increase or decrease in the quantities of such work, the final quantities for payment will be revised in the amount represented by the authorized changes in the dimensions.

80-02 SCOPE OF PAYMENT.

The CMAR shall receive and accept compensation provided for in the Contract as full payment for furnishing all materials, for performing all work under the Contract in a complete and acceptable manner, and for all risk, loss, damage, or expense of whatever character arising out of the nature of the work or the execution thereof, subject to the provisions of the subsection 70-18 titled NO WAIVER OF LEGAL RIGHTS of Section 70.

When the “basis of payment” subsection of a technical specification requires that the Contract price include compensation for certain work or material essential to the item, this same work or material will not also be measured for payment under any other Contract item which may appear elsewhere in the Contract, plans, or specifications.

80-03 COMPENSATION FOR ALTERED QUANTITIES.

When the accepted quantities of work vary from the quantities in the proposal, the CMAR shall accept as payment in full, so far as Contract items are concerned, payment at the original Contract price for the accepted quantities of work actually completed and accepted. Altered quantities for minor items shall remain at the GMP prices. No allowance, except as provided for in the subsection 40-02 titled ALTERATION OF WORK AND QUANTITIES of Section 40 will be made for any increased expense, loss of expected reimbursement, or loss of anticipated profits suffered or claimed by the CMAR which results directly from such alterations or indirectly from his/her unbalanced allocation of overhead and profit among the Contract items, or from any other cause.

80-04 PAYMENT FOR OMITTED ITEMS.

As specified in the subsection 40-03 titled OMITTED ITEMS of Section 40, the Architect shall have the right to omit from the work (order nonperformance) any Contract item, except major Contract items, in the best interest of the Owner.

Should the Architect omit or order nonperformance of a Contract item or portion of such item from the work, the CMAR shall accept payment in full at the Contract prices for any work actually completed and acceptable prior to the Architect's order to omit or non-perform such Contract item.

Acceptable materials ordered by the CMAR or delivered on the site prior to the date of the Architect's order, will be paid for at the actual cost to the CMAR and shall thereupon become the property of the Owner.

In addition to the reimbursement herein before provided, the CMAR shall be reimbursed for all actual costs incurred for the purpose of performing the omitted Contract item prior to the date of the Architect's order. Such additional costs incurred by the CMAR must be directly related to the deleted Contract item and shall be supported by certified statements by the CMAR as to the nature and the amount of such costs.

80-05 PAYMENT FOR EXTRA WORK.

Extra work, performed in accordance with the subsection 40-04 titled EXTRA WORK of Section 40, will be paid for at the Contract prices or agreed prices specified in the change order or supplemental agreement authorizing the extra work.

When the change order or supplemental agreement authorizing the extra work requires that it be done by force account, such force account shall be measured and paid for based on expended labor, equipment, and materials, overhead, taxes, insurance and profit, as follows:

- a. General CMAR Self-Performed Work and Subcontractor Work Markups. For overhead and profit, the actual or approved costs for equipment, material, and labor shall be marked up by ten (10.0) percent for profit and overhead.**

b. General CMAR Markups of Subcontractor Work. The CMAR will be allowed to markup actual or approved subcontractor costs for equipment, material, and labor (excluding subcontractor overhead and profit) by five (5.0) percent.

c. Subcontractor Markups for Self-Performed Work. The subcontractor will be allowed to markup actual or approved costs for equipment, material, and labor performed by that subcontractor's own forces, shall be marked up by ten (10.0) percent.

d. Subcontractor Work Markups for lower tier subcontractors. The subcontractor will be allowed to markup actual or approved costs for equipment, materials and labor performed by the lower tier subcontractor by five (5.0) percent.

e. Bond. The CMAR shall not be allowed to markup the cost for additional payment and performance bonds resulting from extra work.

f. Insurance. The CMAR shall not be allowed to markup the cost for additional property damage/public liability insurance resulting from extra work.

g. Sales Tax. The CMAR shall not be allowed to markup the cost for additional sales tax at the rate required by the City of Mesa resulting from extra work.

h. Equipment. For all equipment, the use of which has been authorized by the Architect, except for small tools and manual equipment, the CMAR will be paid in accordance with the latest Schedule of Equipment Rates used by the Arizona Department of Transportation.

i. Material. For all material, accepted by the Architect and used in the work, the CMAR will be paid the actual cost of such material. See General Conditions Section 7.1.6 for additional information.

j. Labor. For all labor and for the foreman, when he is in direct charge of the operation, the CMAR will be paid the actual wages paid.

k. Miscellaneous. No additional allowance will be made for general superintendence, the use of small tools, or other costs for which no specific allowance is herein provided.

l. Comparison of Records. The CMAR and the Architect shall compare records of the cost of force account work at the end of each day. Agreement shall be indicated by signature of the CMAR and the Architect or their duly authorized representatives. The CMAR shall submit all required backup and supplemental information, calculations, invoices, etc., that are required to justify and support all CMAR, subcontractor and/or supplier costs.

m. Statement. No payment will be made for work performed on a force account basis until the CMAR has furnished the Architect with an itemized statement of the cost of such force account work detailed as follows:

- **Name, classification, date, daily hours, total hours, rate and extension for each laborer and operator.**
- **Designation, dates, daily hours, total hours, rental rate(s), and extension for each unit of machinery and equipment.**
- **Quantities of materials, prices, and extensions.**

Statements shall be accompanied and supported by a receipted invoice for all materials used and transportation charges.

80-06 PARTIAL PAYMENTS.

Partial payments will be made to the CMAR at least once each month as the work progresses. Said payments will be based upon estimates, prepared by the Architect, of the value of the work performed and materials completed in place, in accordance with the Contract, Plans, and Specifications. Such partial payments may also include the delivered actual cost of those materials stockpiled and stored in accordance with the subsection 90-07 titled PAYMENT FOR MATERIALS ON HAND of this Section. No partial payment will be made when the amount due the CMAR since the last estimate amounts to less than five hundred (500) dollars.

The CMAR is required to pay all subcontractors for satisfactory performance of their contracts no later than 30 days after the CMAR has received a partial payment. The Owner must ensure prompt and full payment of retainage from the prime CMAR to the subcontractor within 30 days after the subcontractor's work is satisfactorily completed. A subcontractor's work is satisfactorily completed when all the tasks called for in the subcontract have been accomplished and documented as required by the Owner. When the Owner has made an incremental acceptance of a portion of a prime contract, the work of a subcontractor covered by that acceptance is deemed to be satisfactorily completed.

From the total of the amount determined to be payable on a partial payment, ten (10) percent of such total amount will be deducted and retained by the Owner until the final payment is made, except as may be provided (at the CMAR's option) in the subsection 90-08 titled PAYMENT OF WITHHELD FUNDS of this Section. The balance (90 percent) of the amount payable, less all previous payments, shall be certified for payment. Should the CMAR exercise his/her option, as provided in the subsection 90-08 titled PAYMENT OF WITHHELD FUNDS of this Section, no such ten (10) percent retainage shall be deducted.

When at least 95 percent of the work has been completed, the Architect shall, at the Owner's discretion and with the consent of the surety, prepare estimates of both the Contract value and the cost of the remaining work to be done.

The Owner may retain an amount not less than twice the Contract value or estimated cost, whichever is greater, of the work remaining to be done. The remainder, less all previous payments and deductions, will then be certified for payment to the CMAR.

It is understood and agreed that the CMAR shall not be entitled to demand or receive partial payment based on quantities of work in excess of those provided in the proposal or covered by approved change orders or supplemental agreements, except when such excess quantities have been determined by the Architect to be a part of the final quantity for the item of work in question.

No partial payment shall bind the Owner to the acceptance of any materials or work in place as to quality or quantity. All partial payments are subject to correction at the time of final payment as provided in the subsection 90-09 titled ACCEPTANCE AND FINAL PAYMENT of this Section.

The CMAR shall deliver to the Owner a complete release of all claims for labor and material arising out of this contract before the final payment is made. If any subcontractor or supplier fails to furnish such a release in full, the CMAR may furnish a bond or other collateral satisfactory to the Owner to indemnify the Owner against any potential lien or other such claim. The bond or collateral shall include all costs, expenses, and attorney fees the Owner may be compelled to pay in discharging any such lien or claim.

80-07 PAYMENT FOR MATERIALS ON HAND.

Partial payments may be made to the extent of the delivered cost of materials to be incorporated in the work, provided that such materials meet the requirements of the Contract, plans, and specifications and are delivered to acceptable sites on the airport property or at other sites in the vicinity that are acceptable to the Owner. Such delivered costs of stored or stockpiled materials may be included in the next partial payment after the following conditions are met:

a. Storage of Materials. The material has been stored or stockpiled in a manner acceptable to the Architect at or on an approved site.

b. Quantity and Quality Justification. The CMAR has furnished the Architect with acceptable evidence of the quantity and quality of such stored or stockpiled materials.

c. Transportation Costs. The CMAR has furnished the Architect with satisfactory evidence that the material and transportation costs have been paid.

d. Legal Title. The CMAR has furnished the Owner legal title (free of liens or encumbrances of any kind) to the material so stored or stockpiled.

e. Insurance. The CMAR has furnished the Owner evidence that the material so stored or stockpiled is insured against loss by damage to or disappearance of such materials at any time prior to use in the work.

It is understood and agreed that the transfer of title and the Owner's payment for such stored or stockpiled materials shall in no way relieve the CMAR of his/her responsibility for furnishing and placing such materials in accordance with the requirements of the Contract, plans, and specifications.

In no case will the amount of partial payments for materials on hand exceed the Contract price for such materials or the Contract price for the Contract item in which the material is intended to be used.

No partial payment will be made for stored or stockpiled living or perishable plant materials. The CMAR shall bear all costs associated with the partial payment of stored or stockpiled materials in accordance with the provisions of this subsection.

80-08 PAYMENT OF WITHHELD FUNDS.

At the CMAR's option, he/she may request that the Owner deposit the retainage (as described in the subsection 90-07 title PARTIAL PAYMENTS of this Section) into an escrow account. The Owner's deposit of retainage into an escrow account is subject to the following conditions:

a. Expenses. The CMAR shall bear all expenses of establishing and maintaining an escrow account and escrow agreement acceptable to the Owner.

b. Escrow Deposits. The CMAR shall deposit to and maintain in such escrow only those securities or bank certificates of deposit as are acceptable to the Owner and having a value not less than the 10 percent retainage that would otherwise be withheld from partial payment.

c. Escrow Agreement. The CMAR shall enter into an escrow agreement satisfactory to the Owner.

d. Written Consent of Surety. The CMAR shall obtain the written consent of the surety to such agreement.

80-09 ACCEPTANCE AND FINAL PAYMENT.

When the Contract work has been accepted in accordance with the requirements of the subsection 50-15 titled FINAL ACCEPTANCE of Section 50, the Architect will prepare the final estimate of the items of work actually performed. The CMAR shall approve the Architect's final estimate or advise the Architect of his/her objections to the final estimate which are based on disputes in measurements or computations of the final quantities to be paid under the Contract as amended by change order or supplemental agreement. The CMAR and the Architect shall resolve all disputes (if any) in the measurement and computation of final quantities to be paid within 15 calendar days of the CMAR's receipt of the Architect's final estimate. If, after such 15-day period, a dispute still exists, the CMAR may approve the Architect's estimate under protest of the quantities in dispute, and the Owner such shall consider any disputed quantities as a claim in accordance with the subsection 50-16 titled CLAIMS FOR ADJUSTMENT AND DISPUTES of Section 50.

After the CMAR has approved, or approved under protest, the Architect's final estimate, final payment will be processed based on the entire sum, or the undisputed sum in case of approval under protest, determined to be due the CMAR less all previous payments and all amounts to be deducted under the provisions of the Contract. All prior partial estimates and payments shall be subject to correction in the final estimate and payment.

If the CMAR has filed a claim for additional compensation under the provisions of the subsection 50-16 titled CLAIMS FOR ADJUSTMENTS AND DISPUTES of Section 50 or under the provisions of this subsection, the Owner in accordance with local laws or ordinances will consider such claims. Upon final adjudication of such claims, any additional payment determined to be due the CMAR will be paid pursuant to a supplemental final estimate.

80-10 CONSTRUCTION WARRANTY.

- a. In addition to any other warranties in this contract, the CMAR warrants that work performed under this contract conforms to the contract requirements and is free of any defect in equipment, material, workmanship, or design furnished, or performed by the CMAR or any subcontractor or supplier at any tier.
- b. This warranty shall continue for a period of one year from the date of final acceptance of the work. If the Owner takes possession of any part of the work before final acceptance, this warranty shall continue for a period of one year from the date the Owner takes possession. However, this will not relieve the CMAR from corrective items required by the final acceptance of the project work.
- c. The CMAR shall remedy at the CMAR's expense any failure to conform, or any defect. In addition, the CMAR shall remedy at the CMAR's expense any damage to Owner real or personal property, when that damage is the result of:
 - (1) The CMAR's failure to conform to contract requirements; or
 - (2) Any defect of equipment, material, workmanship, or design furnished by the CMAR.
- d. The CMAR shall restore any work damaged in fulfilling the terms and conditions of this clause. The CMAR's warranty with respect to work repaired or replaced will be effective not less than one year from the date of repair or replacement.
- e. The Owner will notify the CMAR, in writing, within 7 days after the discovery of any failure, defect, or damage.
- f. If the CMAR fails to remedy any failure, defect, or damage within 14 days after receipt of notice, the Owner shall have the right to replace, repair, or otherwise remedy the failure, defect, or damage at the CMAR's expense.
- g. With respect to all warranties, express or implied, from subcontractors, manufacturers, or suppliers for work performed and materials furnished under this contract, the CMAR shall: (1) Obtain all warranties that would be given in normal commercial practice; (2) Require all warranties to be executed, in writing, for the benefit of the Owner, as directed by the Owner, and (3) Enforce all warranties for the benefit of the Owner.
- h. This warranty shall not limit the Owner's rights with respect to latent defects, gross mistakes, or fraud.

80-11 PROJECT CLOSEOUT.

Approval of final payment to the CMAR is contingent upon completion and submittal of the items listed below. The final payment will not be approved until the Architect approves the CMAR's final submittal. The CMAR shall:

- a. Provide two (2) copies of all manufacturers warranties specified for materials, equipment, and installations.
- b. Complete final cleanup in accordance with subsection 40-08, FINAL CLEANUP.
- c. Complete all punch list items identified during the Final Inspection.
- d. Provide complete release of all claims for labor and material arising out of the Contract.
- e. When applicable per state requirements, return copies of sales tax completion forms.
- f. Manufacturer's certifications for all items incorporated in the work.
- g. Submit required record drawings, as-built drawings or as-constructed drawings.
- h. Project Operation and Maintenance (O&M) Manual.
- i. Security for Construction Warranty, if required.
- j. Equipment commissioning documentation submitted, if required.

END OF SECTION 80

GENERAL PROVISIONS**SECTION 90****CMAR QUALITY CONTROL PROGRAM****90-01 GENERAL.**

The CMAR shall establish, provide, and maintain an effective Quality Control Program that details the methods and procedures that will be taken to assure that all materials and completed construction required by this contract conform to contract plans, technical specifications and other requirements, whether manufactured by the CMAR, or procured from subcontractors or vendors. Although guidelines are established and certain minimum requirements are specified herein and elsewhere in the contract technical specifications, the CMAR shall assume full responsibility for accomplishing the stated purpose.

The intent of this section is to enable the CMAR 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 CMAR and the Architect that the specification requirements can be met.
- c. Allow the CMAR as much latitude as possible to develop his or her own standard of control.

The CMAR shall be prepared to discuss and present, at the preconstruction conference, his/her understanding of the quality control requirements. The CMAR shall not begin any construction or production of materials to be incorporated into the completed work until the Quality Control Program has been approved by the Architect. 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 Architect.

90-02 -DESCRIPTION OF PROGRAM.

a. **General Description.** The CMAR shall establish a Quality Control Program to perform quality control inspection and testing of all items of work 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 CMAR to establish an effective level of quality control.

b. Quality Control Program. The CMAR shall describe the Quality Control Program in a written document that shall be reviewed by the Architect prior to the start of any production, construction, or off-site fabrication. The CMAR's Quality Control Plan and Quality Control testing laboratory must be submitted and approved in writing by the Architect prior to Notice to Proceed (NTP) issuance.

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 CMAR 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.

90-03 QUALITY CONTROL ORGANIZATION.

The CMAR 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 paragraph 100-03a and 100-03b. The organizational chart shall indicate which personnel are CMAR 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 CMAR, or a consultant engaged by the CMAR. The Program Administrator 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 1 of the following requirements:

(1) Professional architect with 1 year of airport paving experience acceptable to the Architect.

(2) Architect-in-training with 2 years of airport paving experience acceptable to the Architect.

(3) An individual with 3 years of highway and/or airport paving experience, 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.

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 100-06.

(2) Performance of all quality control tests as required by the technical specifications and Section 100-07.

(3) Performance of density tests for the Architect when required by the technical specifications.

Certification at an equivalent level, by a state or nationally recognized organization will be acceptable in lieu of NICET certification.

c. Staffing Levels. The CMAR 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.

90-04 PROJECT PROGRESS SCHEDULE.

The CMAR shall submit a coordinated construction schedule for all work activities. The schedule shall be prepared as a network diagram in Critical Path Method (CPM), Program Evaluation and Review Technique (PERT), or other format, or as otherwise specified in the contract. As a minimum, it shall provide information on the sequence of work activities, milestone dates, and activity duration.

The CMAR shall maintain the work schedule and provide an update and analysis of the progress schedule on a monthly basis, or as otherwise specified in the contract. Submission of the work schedule shall not relieve the CMAR of overall responsibility for scheduling, sequencing, and coordinating all work to comply with the requirements of the contract.

90-05 SUBMITTALS SCHEDULE.

The CMAR 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 paragraph requiring submittal; and
- e. Scheduled date of submittal.

90-06 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 CMAR as specified by subsection 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:

a. 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.

b. 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.

90-07 QUALITY CONTROL TESTING PLAN.

As a part of the overall Quality Control Program, the CMAR 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 each technical specification Item, as well as any additional quality control tests that the CMAR 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;
- 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 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 in accordance with ASTM D 3665. The Architect shall be provided the opportunity to witness quality control sampling and testing.

All quality control test results shall be documented by the CMAR as required by subsection 100-08.

90-08 DOCUMENTATION.

The CMAR 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 Architect daily. The

records shall cover all work placed subsequent to the previously furnished records and shall be verified and signed by the CMAR's Program Administrator.

Specific CMAR quality control records required for the contract shall include, but are not necessarily limited to, the following records:

a. Daily Inspection Reports. Each CMAR quality control technician shall maintain a daily log of all inspections performed for both CMAR and subcontractor operations. These technicians' 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 Architect 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 CMAR shall be responsible for establishing a system that 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 Architect prior to the start of the next day's work period. When required by the technical specifications, the CMAR shall maintain statistical quality control charts. The daily test reports shall be signed by the responsible quality control technician and the Program Administrator.

90-09 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 CMAR 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.

90-10 SURVEILLANCE BY THE ARCHITECT.

All items of material and equipment shall be subject to surveillance by the Architect at the point of production, manufacture or shipment to determine if the CMAR, 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 surveillance by the Architect at the site for the same purpose.

Surveillance by the Architect does not relieve the CMAR of performing quality control inspections of either on-site or off-site CMAR's or subcontractor's work.

90-11 NONCOMPLIANCE.

a. The Architect will notify the CMAR of any noncompliance with any of the foregoing requirements. The CMAR shall, after receipt of such notice, immediately take corrective action. Any notice, when delivered by the Architect or his/her authorized representative to the CMAR or his/her 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 CMAR Quality Control Program or the contract provisions, or where the CMAR fails to properly operate and maintain an effective Quality Control Program, as determined by the Architect, the Architect may:

(1) Order the CMAR to replace ineffective or unqualified quality control personnel or subcontractors.

(2) Order the CMAR to stop operations until appropriate corrective actions are taken.

END OF SECTION 90

GENERAL PROVISIONS

SECTION 100

MOBILIZATION

100-01 DESCRIPTION

This item shall consist of work and operations, but is not limited to, work and operations necessary for the movement of personnel, equipment, material and supplies to and from the project site for work on the project except as provided in the contract as separate pay items.

100-01.1 Posted Notices. Prior to commencement of construction activities the CMAR must post the following documents in a prominent and accessible place where they may be easily viewed by all employees of the prime CMAR and by all employees of subcontractors engaged by the CMAR: Equal Employment Opportunity (EEO) Poster “Equal Employment Opportunity is the Law” in accordance with the Office of Federal Contract Compliance Programs Executive Order 11246, as amended; Davis Bacon Wage Poster (WH 1321) - DOL “Notice to All Employees” Poster; and Applicable Davis-Bacon Wage Rate Determination. These notices must remain posted until final acceptance of the work by the Owner.

100-02 METHOD OF MEASUREMENT

Mobilization shall be measured for payment by the lump sum as a single complete unit of work as identified within this specification and on the plans.

100-03 BASIS OF PAYMENT

Payment for the performance of the Mobilization work as specified above will be made at the contract lump sum price for the item Mobilization. Mobilization shall not exceed four (4) percent of the total GMP. This item shall include the movement of all personnel, all equipment, the establishment of all haul roads, temporary fencing and gate, temporary utilities for the staging area, dust control and remediation, track-out pad, obtaining and maintaining water for construction activities, restoration and protection of the site(s) and route(s), providing and for maintaining temporary security fence, gates and public relations banners in the storage yard, and the obtaining and maintaining of water for the project.

Partial payments under this item will be made as follows: 50% of the mobilization line item in the GMP upon mobilization to the site and 50% of the mobilization line item upon restoration of the site at the end of the project.

END OF SECTION 100

GENERAL PROVISIONS

SECTION 110

METHOD OF ESTIMATING PERCENTAGE OF MATERIAL WITHIN SPECIFICATION LIMITS

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 in accordance with 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 (\bar{X}) and sample standard deviation (S_n) 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, Q_L for Lower Quality Index and/or Q_U for Upper Quality Index, is computed and the PWL for the lot for the specified n is determined from Table 1. All specification limits specified in the technical sections shall be absolute values. Test results used in the calculations shall be to the significant figure given in the test procedure.

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 CMAR's risk is the probability that material produced at the acceptable quality level is rejected or subjected to a pay adjustment. The Owner's risk is the probability that material produced at the rejected quality level is accepted.

It is the intent of this section to inform the CMAR that, in order to consistently offset the CMAR'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 CMAR 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 in accordance with the acceptance requirements of the specification.
- b. Locate the random sampling position within the subplot in accordance with the requirements of the specification.
- c. Make a measurement at each location, or take a test portion and make the measurement on the test portion in accordance with the testing requirements of the specification.
- d. Find the sample average (\bar{X}) for all subplot values within the lot by using the following formula:

$$\bar{X} = (x_1 + x_2 + x_3 + \dots + x_n) / n$$

Where: \bar{X} = Sample average of all subplot values within a lot

x_1, x_2 = Individual subplot values

n = Number of sublots

e. Find the sample standard deviation (S_n) by use of the following formula:

$$S_n = [(d_1^2 + d_2^2 + d_3^2 + \dots + d_n^2)/(n-1)]^{1/2}$$

Where: S_n = Sample standard deviation of the number of subplot values in the set
 d_1, d_2 = Deviations of the individual subplot values x_1, x_2, \dots from the average value X
 that is: $d_1 = (x_1 - X), d_2 = (x_2 - X) \dots d_n = (x_n - X)$
 n = Number of sublots

f. For single sided specification limits (that is, L only), compute the Lower Quality Index Q_L by use of the following formula:

$$Q_L = (X - L) / S_n$$

Where: L = specification lower tolerance limit

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. If the value of Q_L falls between values shown on the table, use the next higher value of PWL.

g. For double-sided specification limits (that is, L and U), compute the Quality Indexes Q_L and Q_U by use of the following formulas:

$$Q_L = (X - L) / S_n$$

AND

$$Q_U = (U - X) / S_n$$

Where: L and U = specification lower and upper tolerance limits

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. If the values of Q_L fall between values shown on the table, use the next higher value of P_L or P_U . 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

Project: Example Project

Test Item: Item P-401, Lot A.

A. PWL Determination for Mat Density.

1. Density of four random cores taken from Lot A.

- A-1 = 96.60
- A-2 = 97.55
- A-3 = 99.30
- A-4 = 98.35
- n = 4

2. Calculate average density for the lot.

$$X = (x_1 + x_2 + x_3 + \dots + x_n) / n$$

$$X = (96.60 + 97.55 + 99.30 + 98.35) / 4$$

$$X = 97.95 \text{ percent density}$$

3. Calculate the standard deviation for the lot.

$$S_n = [((96.60 - 97.95)^2 + (97.55 - 97.95)^2 + (99.30 - 97.95)^2 + (98.35 - 97.95)^2) / (4 - 1)]^{1/2}$$

$$S_n = [(1.82 + 0.16 + 1.82 + 0.16) / 3]^{1/2}$$

$$S_n = 1.15$$

4. Calculate the Lower Quality Index Q_L for the lot. ($L=96.3$)

$$Q_L = (X - L) / S_n$$

$$Q_L = (97.95 - 96.30) / 1.15$$

$$Q_L = 1.4348$$

5. Determine PWL by entering Table 1 with $Q_L=1.44$ and $n=4$.

$$PWL = 98$$

B. PWL Determination for Air Voids.**1. Air Voids of four random samples taken from Lot A.**

$$A-1 = 5.00$$

$$A-2 = 3.74$$

$$A-3 = 2.30$$

$$A-4 = 3.25$$

2. Calculate the average air voids for the lot.

$$X = (x_1 + x_2 + x_3 \dots + x_n) / n$$

$$X = (5.00 + 3.74 + 2.30 + 3.25) / 4$$

$$X = 3.57 \text{ percent}$$

3. Calculate the standard deviation S_n for the lot.

$$S_n = [((3.57 - 5.00)^2 + (3.57 - 3.74)^2 + (3.57 - 2.30)^2 + (3.57 - 3.25)^2) / (4 - 1)]^{1/2}$$

$$S_n = [(2.04 + 0.03 + 1.62 + 0.10) / 3]^{1/2}$$

$$S_n = 1.12$$

4. Calculate the Lower Quality Index Q_L for the lot. ($L=2.0$)

$$Q_L = (X - L) / S_n$$

$$Q_L = (3.57 - 2.00) / 1.12$$

$$Q_L = 1.3992$$

5. Determine P_L by entering Table 1 with $Q_L=1.41$ and $n=4$.

$$P_L = 97$$

6. Calculate the Upper Quality Index Q_U for the lot. ($U = 5.0$)

$$Q_U = (U - X) / S_n$$

$$Q_U = (5.00 - 3.57) / 1.12$$

$$Q_U = 1.2702$$

7. Determine P_U by entering Table 1 with $Q_U = 1.29$ and $n = 4$.

$$P_U = 93$$

8. Calculate Air Voids PWL

$$PWL = (P_L + P_U) - 100$$

$$PWL = (97 + 93) - 100 = 90$$

EXAMPLE OF OUTLIER CALCULATION (REFERENCE ASTM E 178)

Project: Example Project

Test Item: Item P-885, Lot A.

A. Outlier Determination for Mat Density.

1. Density of four random cores taken from Lot A arranged in descending order.

$$A-3 = 99.30$$

$$A-4 = 98.35$$

$$A-2 = 97.55$$

$$A-1 = 96.60$$

2. Use $n=4$ and upper 5 percent significance level of to find the critical value for test criterion = 1.463.

3. Use average density, standard deviation, and test criterion value to evaluate density measurements.

- a. For measurements greater than the average:

If $(\text{measurement} - \text{average}) / (\text{standard deviation})$ is less than test criterion,
then the measurement is not considered an outlier

For A-3, check if $(99.30 - 97.95) / 1.15$ is greater than 1.463.

Since 1.174 is less than 1.463, the value is not an outlier.

- b. For measurements less than the average:

If $(\text{average} - \text{measurement}) / (\text{standard deviation})$ is less than test criterion,
then the measurement is not considered an outlier.

For A-1, check if $(97.95 - 96.60) / 1.15$ is greater than 1.463.

Since 1.135 is less than 1.463, the value is not an outlier.

NOTE: In this example, a measurement would be considered an outlier if the density were:

Greater than $(97.95 + 1.463 \times 1.15) = 99.63$ percent

OR

less than $(97.95 - 1.463 \times 1.15) = 96.27$ percent.

Table 1. Table for Estimating Percent of Lot Within Limits (PWL)

Percent Within Limits (P _L and P _U)	Positive Values of Q (Q _L and Q _U)							
	n=3	n=4	n=5	n=6	n=7	n=8	n=9	n=10
99	1.1541	1.4700	1.6714	1.8008	1.8888	1.9520	1.9994	2.0362
98	1.1524	1.4400	1.6016	1.6982	1.7612	1.8053	1.8379	1.8630
97	1.1496	1.4100	1.5427	1.6181	1.6661	1.6993	1.7235	1.7420
96	1.1456	1.3800	1.4897	1.5497	1.5871	1.6127	1.6313	1.6454
95	1.1405	1.3500	1.4407	1.4887	1.5181	1.5381	1.5525	1.5635
94	1.1342	1.3200	1.3946	1.4329	1.4561	1.4717	1.4829	1.4914
93	1.1269	1.2900	1.3508	1.3810	1.3991	1.4112	1.4199	1.4265
92	1.1184	1.2600	1.3088	1.3323	1.3461	1.3554	1.3620	1.3670
91	1.1089	1.2300	1.2683	1.2860	1.2964	1.3032	1.3081	1.3118
90	1.0982	1.2000	1.2290	1.2419	1.2492	1.2541	1.2576	1.2602
89	1.0864	1.1700	1.1909	1.1995	1.2043	1.2075	1.2098	1.2115
88	1.0736	1.1400	1.1537	1.1587	1.1613	1.1630	1.1643	1.1653
87	1.0597	1.1100	1.1173	1.1192	1.1199	1.1204	1.1208	1.1212
86	1.0448	1.0800	1.0817	1.0808	1.0800	1.0794	1.0791	1.0789
85	1.0288	1.0500	1.0467	1.0435	1.0413	1.0399	1.0389	1.0382
84	1.0119	1.0200	1.0124	1.0071	1.0037	1.0015	1.0000	0.9990
83	0.9939	0.9900	0.9785	0.9715	0.9671	0.9643	0.9624	0.9610
82	0.9749	0.9600	0.9452	0.9367	0.9315	0.9281	0.9258	0.9241
81	0.9550	0.9300	0.9123	0.9025	0.8966	0.8928	0.8901	0.8882
80	0.9342	0.9000	0.8799	0.8690	0.8625	0.8583	0.8554	0.8533
79	0.9124	0.8700	0.8478	0.8360	0.8291	0.8245	0.8214	0.8192
78	0.8897	0.8400	0.8160	0.8036	0.7962	0.7915	0.7882	0.7858
77	0.8662	0.8100	0.7846	0.7716	0.7640	0.7590	0.7556	0.7531
76	0.8417	0.7800	0.7535	0.7401	0.7322	0.7271	0.7236	0.7211
75	0.8165	0.7500	0.7226	0.7089	0.7009	0.6958	0.6922	0.6896
74	0.7904	0.7200	0.6921	0.6781	0.6701	0.6649	0.6613	0.6587
73	0.7636	0.6900	0.6617	0.6477	0.6396	0.6344	0.6308	0.6282
72	0.7360	0.6600	0.6316	0.6176	0.6095	0.6044	0.6008	0.5982
71	0.7077	0.6300	0.6016	0.5878	0.5798	0.5747	0.5712	0.5686
70	0.6787	0.6000	0.5719	0.5582	0.5504	0.5454	0.5419	0.5394
69	0.6490	0.5700	0.5423	0.5290	0.5213	0.5164	0.5130	0.5105
68	0.6187	0.5400	0.5129	0.4999	0.4924	0.4877	0.4844	0.4820
67	0.5878	0.5100	0.4836	0.4710	0.4638	0.4592	0.4560	0.4537
66	0.5563	0.4800	0.4545	0.4424	0.4355	0.4310	0.4280	0.4257
65	0.5242	0.4500	0.4255	0.4139	0.4073	0.4030	0.4001	0.3980
64	0.4916	0.4200	0.3967	0.3856	0.3793	0.3753	0.3725	0.3705
63	0.4586	0.3900	0.3679	0.3575	0.3515	0.3477	0.3451	0.3432
62	0.4251	0.3600	0.3392	0.3295	0.3239	0.3203	0.3179	0.3161
61	0.3911	0.3300	0.3107	0.3016	0.2964	0.2931	0.2908	0.2892
60	0.3568	0.3000	0.2822	0.2738	0.2691	0.2660	0.2639	0.2624
59	0.3222	0.2700	0.2537	0.2461	0.2418	0.2391	0.2372	0.2358
58	0.2872	0.2400	0.2254	0.2186	0.2147	0.2122	0.2105	0.2093
57	0.2519	0.2100	0.1971	0.1911	0.1877	0.1855	0.1840	0.1829
56	0.2164	0.1800	0.1688	0.1636	0.1607	0.1588	0.1575	0.1566
55	0.1806	0.1500	0.1406	0.1363	0.1338	0.1322	0.1312	0.1304
54	0.1447	0.1200	0.1125	0.1090	0.1070	0.1057	0.1049	0.1042
53	0.1087	0.0900	0.0843	0.0817	0.0802	0.0793	0.0786	0.0781
52	0.0725	0.0600	0.0562	0.0544	0.0534	0.0528	0.0524	0.0521
51	0.0363	0.0300	0.0281	0.0272	0.0267	0.0264	0.0262	0.0260
50	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Percent Within Limits (P _L and P _U)	Negative Values of Q (Q _L and Q _U)							
	n=3	n=4	n=5	n=6	n=7	n=8	n=9	n=10
49	-0.0363	-0.0300	-0.0281	-0.0272	-0.0267	-0.0264	-0.0262	-0.0260
48	-0.0725	-0.0600	-0.0562	-0.0544	-0.0534	-0.0528	-0.0524	-0.0521
47	-0.1087	-0.0900	-0.0843	-0.0817	-0.0802	-0.0793	-0.0786	-0.0781
46	-0.1447	-0.1200	-0.1125	-0.1090	-0.1070	-0.1057	-0.1049	-0.1042
45	-0.1806	-0.1500	-0.1406	-0.1363	-0.1338	-0.1322	-0.1312	-0.1304
44	-0.2164	-0.1800	-0.1688	-0.1636	-0.1607	-0.1588	-0.1575	-0.1566
43	-0.2519	-0.2100	-0.1971	-0.1911	-0.1877	-0.1855	-0.1840	-0.1829
42	-0.2872	-0.2400	-0.2254	-0.2186	-0.2147	-0.2122	-0.2105	-0.2093
41	-0.3222	-0.2700	-0.2537	-0.2461	-0.2418	-0.2391	-0.2372	-0.2358
40	-0.3568	-0.3000	-0.2822	-0.2738	-0.2691	-0.2660	-0.2639	-0.2624
39	-0.3911	-0.3300	-0.3107	-0.3016	-0.2964	-0.2931	-0.2908	-0.2892
38	-0.4251	-0.3600	-0.3392	-0.3295	-0.3239	-0.3203	-0.3179	-0.3161
37	-0.4586	-0.3900	-0.3679	-0.3575	-0.3515	-0.3477	-0.3451	-0.3432
36	-0.4916	-0.4200	-0.3967	-0.3856	-0.3793	-0.3753	-0.3725	-0.3705
35	-0.5242	-0.4500	-0.4255	-0.4139	-0.4073	-0.4030	-0.4001	-0.3980
34	-0.5563	-0.4800	-0.4545	-0.4424	-0.4355	-0.4310	-0.4280	-0.4257
33	-0.5878	-0.5100	-0.4836	-0.4710	-0.4638	-0.4592	-0.4560	-0.4537
32	-0.6187	-0.5400	-0.5129	-0.4999	-0.4924	-0.4877	-0.4844	-0.4820
31	-0.6490	-0.5700	-0.5423	-0.5290	-0.5213	-0.5164	-0.5130	-0.5105
30	-0.6787	-0.6000	-0.5719	-0.5582	-0.5504	-0.5454	-0.5419	-0.5394
29	-0.7077	-0.6300	-0.6016	-0.5878	-0.5798	-0.5747	-0.5712	-0.5686
28	-0.7360	-0.6600	-0.6316	-0.6176	-0.6095	-0.6044	-0.6008	-0.5982
27	-0.7636	-0.6900	-0.6617	-0.6477	-0.6396	-0.6344	-0.6308	-0.6282
26	-0.7904	-0.7200	-0.6921	-0.6781	-0.6701	-0.6649	-0.6613	-0.6587
25	-0.8165	-0.7500	-0.7226	-0.7089	-0.7009	-0.6958	-0.6922	-0.6896
24	-0.8417	-0.7800	-0.7535	-0.7401	-0.7322	-0.7271	-0.7236	-0.7211
23	-0.8662	-0.8100	-0.7846	-0.7716	-0.7640	-0.7590	-0.7556	-0.7531
22	-0.8897	-0.8400	-0.8160	-0.8036	-0.7962	-0.7915	-0.7882	-0.7858
21	-0.9124	-0.8700	-0.8478	-0.8360	-0.8291	-0.8245	-0.8214	-0.8192
20	-0.9342	-0.9000	-0.8799	-0.8690	-0.8625	-0.8583	-0.8554	-0.8533
19	-0.9550	-0.9300	-0.9123	-0.9025	-0.8966	-0.8928	-0.8901	-0.8882
18	-0.9749	-0.9600	-0.9452	-0.9367	-0.9315	-0.9281	-0.9258	-0.9241
17	-0.9939	-0.9900	-0.9785	-0.9715	-0.9671	-0.9643	-0.9624	-0.9610
16	-1.0119	-1.0200	-1.0124	-1.0071	-1.0037	-1.0015	-1.0000	-0.9990
15	-1.0288	-1.0500	-1.0467	-1.0435	-1.0413	-1.0399	-1.0389	-1.0382
14	-1.0448	-1.0800	-1.0817	-1.0808	-1.0800	-1.0794	-1.0791	-1.0789
13	-1.0597	-1.1100	-1.1173	-1.1192	-1.1199	-1.1204	-1.1208	-1.1212
12	-1.0736	-1.1400	-1.1537	-1.1587	-1.1613	-1.1630	-1.1643	-1.1653
11	-1.0864	-1.1700	-1.1909	-1.1995	-1.2043	-1.2075	-1.2098	-1.2115
10	-1.0982	-1.2000	-1.2290	-1.2419	-1.2492	-1.2541	-1.2576	-1.2602
9	-1.1089	-1.2300	-1.2683	-1.2860	-1.2964	-1.3032	-1.3081	-1.3118
8	-1.1184	-1.2600	-1.3088	-1.3323	-1.3461	-1.3554	-1.3620	-1.3670
7	-1.1269	-1.2900	-1.3508	-1.3810	-1.3991	-1.4112	-1.4199	-1.4265
6	-1.1342	-1.3200	-1.3946	-1.4329	-1.4561	-1.4717	-1.4829	-1.4914
5	-1.1405	-1.3500	-1.4407	-1.4887	-1.5181	-1.5381	-1.5525	-1.5635
4	-1.1456	-1.3800	-1.4897	-1.5497	-1.5871	-1.6127	-1.6313	-1.6454
3	-1.1496	-1.4100	-1.5427	-1.6181	-1.6661	-1.6993	-1.7235	-1.7420
2	-1.1524	-1.4400	-1.6016	-1.6982	-1.7612	-1.8053	-1.8379	-1.8630
1	-1.1541	-1.4700	-1.6714	-1.8008	-1.8888	-1.9520	-1.9994	-2.0362

END OF SECTION 110

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